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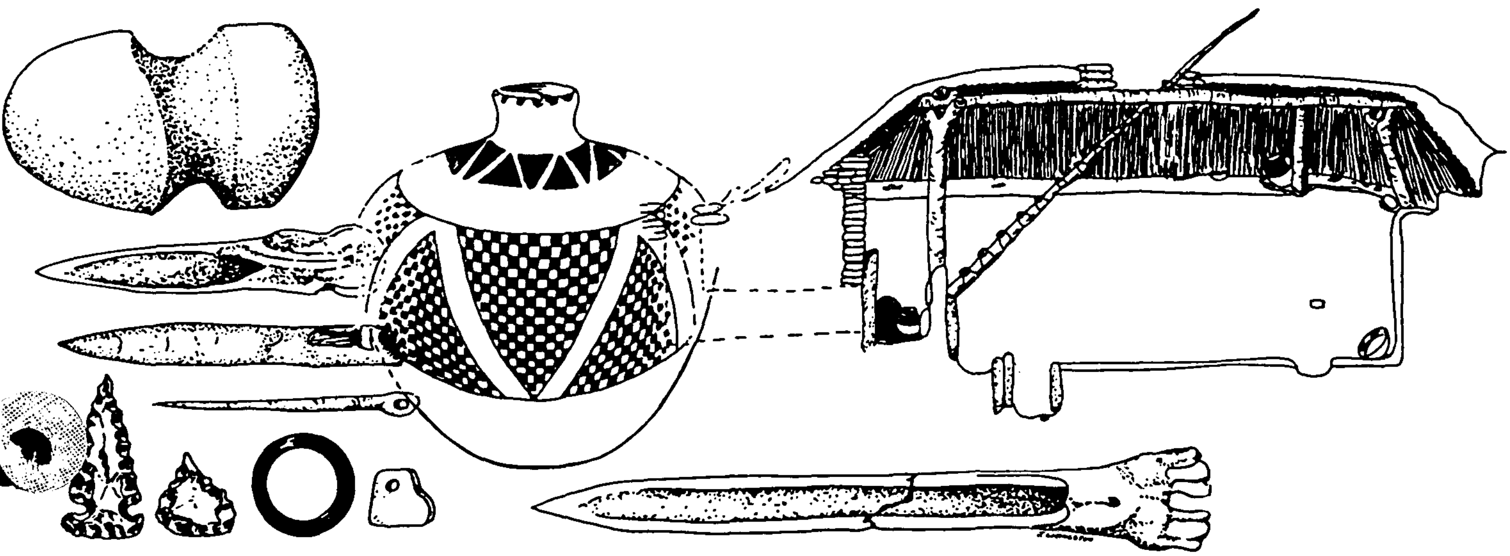
Reports of the Chaco Center
Number Seven



THE ARCHITECTURE AND MATERIAL CULTURE OF 29SJ1360

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Reports of the Chaco Center
Number Seven

THE ARCHITECTURE AND MATERIAL CULTURE OF 29SJ1360

Chaco Canyon, New Mexico

by

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With Contributions
by
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Edited by
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DIVISION OF CULTURAL RESEARCH
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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 R.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
   1983 The Outlier Survey: A Regional View of Settlement in the San Juan Basin. Reports of the Chaco Center, No. 3. Division of Cultural Research, National Park Service, Albuquerque.

4. BRUGGE, DAVID M.
   1979 A History of the Chaco Navajos. Reports of the Chaco Center, No. 4. Division of Cultural Research, National Park Service, Albuquerque.

5. WINDES, THOMAS C.
   1978 Stone Circles of Chaco Canyon, Northwestern New Mexico. Reports of the Chaco Center, No. 5. Division of Cultural Research, National Park Service, Albuquerque.

6. LEKSON, STEPHEN H., ED.
   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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   1984 Architecture and Material Culture of 29SJ1360, Chaco Canyon, New Mexico. Reports of the Chaco Center, No. 7. Division of Cultural Research, National Park Service, Albuquerque.

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Acknowledgments

More than 70 small sites have been excavated in Chaco Canyon, but precious few have been reported. The National Park Service's archaeological investigations in Chaco Canyon involved excavation of 11 small sites during the 1970s, including 29SJ1360. The majority of the Chaco Center's work concentrated on small sites for two main reasons: a) to examine change and development in the Chacoan Anasazi, and b) to provide a background and comparative information for study and interpretation of the Bonito phase. In contrast to the body of information developed for the small sites, contemporary and compatible data on the Bonito phase Great Houses is based on a very small and limited sample from one site, Pueblo Alto. This report on site 1360 represents only a small portion of the Center's work on small sites in Chaco Canyon; hopefully, additional information on the small sites will appear in this publication series.

After Randy Morrison, the excavator of 1360, returned to the University of Arizona in 1974, the site report was shelved by the Chaco Center. In 1976 I received permission from Jim Judge, chief of the Division of Cultural Research (Chaco Center), to use data from 1360 in work for my graduate degree. Judge was generous in his bequests of time, support, and advice throughout the course of work on site 1360. Other responsibilities were more pressing, however, and work on the report continued slowly until the preliminary draft began circulating in 1979. With Marcia Truell and Tom Windes providing most of the comment, the manuscript saw numerous revisions and several major additions between that time and 1983. After all the preliminary dust had cleared, Ted Birkedal and Gwinn Vivian provided the needed substantive comments, which were incorporated into the present version of the report.

During the time of this report's creation a host of people, whom I most gratefully acknowledge and thank, commented on and contributed to the manuscript. Foremost among these were a staff of archaeologists employed by the Chaco Center to analyze the artifacts from the Chaco Project. With the intermittent appearance of specific reports on different artifact classes from 1360, each section of the report was reevaluated and, if necessary, revised. I particularly want to thank the staff of the Chaco Center who provided invaluable assistance, comments, and, eventually, the artifact reports. Cathy Cameron prepared reports on the chipped stone and manos. Steve Lekson provided a concise report on the formal chipped stone tools as well as offering instructive comments. Nancy Akins contributed a variety of specialized reports, including those on faunal remains, burials, and abraders. Joan Mathien provided a report on ornaments and minerals. Mollie S. Toll identified and reported on the meager vegetal material from 1360. Others who contributed to the different artifact analyses and discussions were Wirt Wills (hammerstones), Cory Breternitz (axes, choppers, and mauls), Robert Powers (miscellaneous ground stone), and L. Jean Hooton (metates). Both Nancy Akins and H. Wolcott Toll provided constructive direction on the discussion and just-so story in the section on human remains.

One of the major additions to the manuscript in 1982 was the chapter on ceramics. Wolky Toll deserves special recognition and thanks for his influence and aid. Toll's contribution to the ceramic write-up consisted of computer processing, design of table formats and the analytical approach (as in all ceramic reports of the Chaco Center), occasional paragraphs, and an in-depth edit. Jerry Brody and the staff of the Maxwell Museum also contributed to the ceramic analysis by graciously allowing access to their kiln for numerous sherd refiring tests, which are discussed in this and other ceramic studies from the Chaco Center.

Technical and editorial assistance was provided by a group of skilled professionals. Jerry Livingston took many and developed all of the photographs used herein. He also inked or redrafted many of the line drawings and figures. Matthew Schmader also redrafted some figures. A fine and patient editorial team has diligently worked to iron out the usual and unusual kinks and the catalog of incomprehensibles found in all manuscripts. Bruce Panowski reorganized the format, provided first-order corrections, and coordinated the editorial team. The editorial team for this volume consisted of Lynne Sebastian, June-el Piper, and M. Robyn Côté. Lynne performed the senior editorial duties of correction and revision; June-el assisted with the editorial work and typed the manuscript; and Robyn forced the references, tables, figures, and captions into a comprehensible sequence and format. I pay these pearls homage and thank them for their unstinting efforts.

Peter J. McKenna
Division of Cultural Research
National Park Service

REPORTS OF THE CHACO CENTER

The Chaco Center, formally known as the Division of Cultural Research, a joint National Park Service/University of New Mexico facility, was established in 1971 to conduct multidisciplinary research in the area of Chaco Canyon, New Mexico. One of the center's most important missions is to disseminate the results of its research to the professional community and to the interested public. Reports on research projects of the center are issued either in the National Park Service _Publications in Archeology_ series or in the _Reports of the Chaco Center_ series. The latter was established in 1976 to provide economical and timely distribution of the more specialized research undertaken by the center. This report is issued as the seventh of that series.

The Division of Cultural Research maintains an up-to-date listing of all published papers, reports, and monographs dealing with Chacoan or Chaco-related research carried out under the general auspices of the Chaco Center, regardless of where they might be published. This list, entitled "Contributions of the Chaco Center," is available on request. Correspondence should be addressed to the Archival Assistant, Division of Cultural Research, National Park Service, P.O. Box 26176, Albuquerque, New Mexico, 87125.

CHAPTER 1

Introduction

In the summer of 1974, the Chaco Center, now the Division of Cultural Research, National Park Service, began its second season of field excavations in Chaco Canyon. The inventory survey of the canyon was essentially complete, and research emphasis had shifted to the study of Pueblo I sites. Excavation of 29SJ1360 (hereafter called 1360) was undertaken as part of an effort to examine the full temporal range of the canyon's Anasazi occupation. As it happened, excavations at 1360 did not produce information on the Pueblo I period, but they did reveal a Pueblo II occupation in a small site of the Early Bonito phase (Judge et al. 1981) or Gladwin's (1945) Red Mesa to Wingate phases, a period of great interest in Chaco because it marks the initial development of Great House communities.

This report contains a description of the architecture and those of other Chaco Center preliminary site reports. Some changes in the original field designations of features have been necessary, partly due to subsequent revisions in terminology (Judge et al. 1976) and partly because some revision seemed warranted. For example, all three pit structures were originally designated as "kivas." This term has been subdivided into three different functional types (kiva, pithouse, and pit structure) for various reasons that will be made clear in the text. The original kiva letter designations (A, B, C) are retained, to assist in correlating this discussion with the field notes and maps. Description and discussion of artifacts vary somewhat in purpose and completeness from class to class. The presentation of data was the primary concern in preparing this volume, and this has been done largely through the voluminous tables. Accordingly, the interpretations offered here are preliminary, incomplete, and speculative. For a broader comparative and synthetic treatment of this material, see McKenna (1983).

Many references are made throughout this volume to other sites excavated and reported by the Chaco Center. Sites recorded during the federal survey of Chaco Canyon were given site numbers following the Smithsonian Institution's field numbering system. In this system, states are given a numeric equivalent by alphabetical order, i.e., "New Mexico = 29." The state designation is followed by a two-letter designation for the county and a consecutive site number within that county. Thus, 29SJ1360 was the one-thousand three-hundred sixtieth site recorded in San Juan County, New Mexico. In order to avoid frequent repetition of these long Smithsonian designations and of citations for Chaco Center reports, the following sites and reports are referred to simply by site name throughout the book:

Smithsonian Number	Site name in text	Reference for site report
29SJ627	627	Truell 1980
29SJ628	628	Truell 1975
29SJ629	629	Windes 1978b
29SJ389	Alto, Pueblo Alto	Windes 1980

SETTING, EXCAVATION PROCEDURES, AND SAMPLING

Setting

Geography and Geology

Recent work (DeAngelis 1972; Love 1977; 1979) has outlined, updated, and refined our understanding of the geomorphology of the study area. DeAngelis (1972:1) characterizes the San Juan Basin as a region of topographic variety, featuring deep canyons, abrupt monoclines, broad up-warps, and basins and dominated by flat-lying sedimentary rocks with a variety of volcanics around the periphery. Chaco Canyon is an atypical feature of the region both in its topographic relief and in its functioning as a catchment of multiple drainage systems. The Chaco River is the principal drainage of the San Juan Basin. Originating 40 km east of the Chaco Culture National Historical Park along the continental divide, the river enters Chaco Canyon near the Canada Alameda junction and emerges about 32 km downstream at the confluence with Escavada Wash. The park extends approximately 17 km upstream from the Escavada confluence, encompassing the canyon bottomlands and adjacent mesas and the numerous Anasazi settlements for whose protection the park was created.

The canyon's walls are largely continuous along the north but are deeply dissected and broken along the south, with major breaks at the junctions of the Chaco with the South Gap and the Fajada washes. The confluence of many laterals with the canyon effectively increases the drainage volume as well as water source diversity. It is at the major confluences that the Great Houses may be found, while the smaller sites are scattered evenly along the canyon bottom.

Located in the northern shadows of Fajada Butte, 1360 overlooks the confluence of the Fajada and Chaco washes (Figure 1.1). Approximately 1420 m north, across the Chaco and Gallo washes, lies the nearest Great

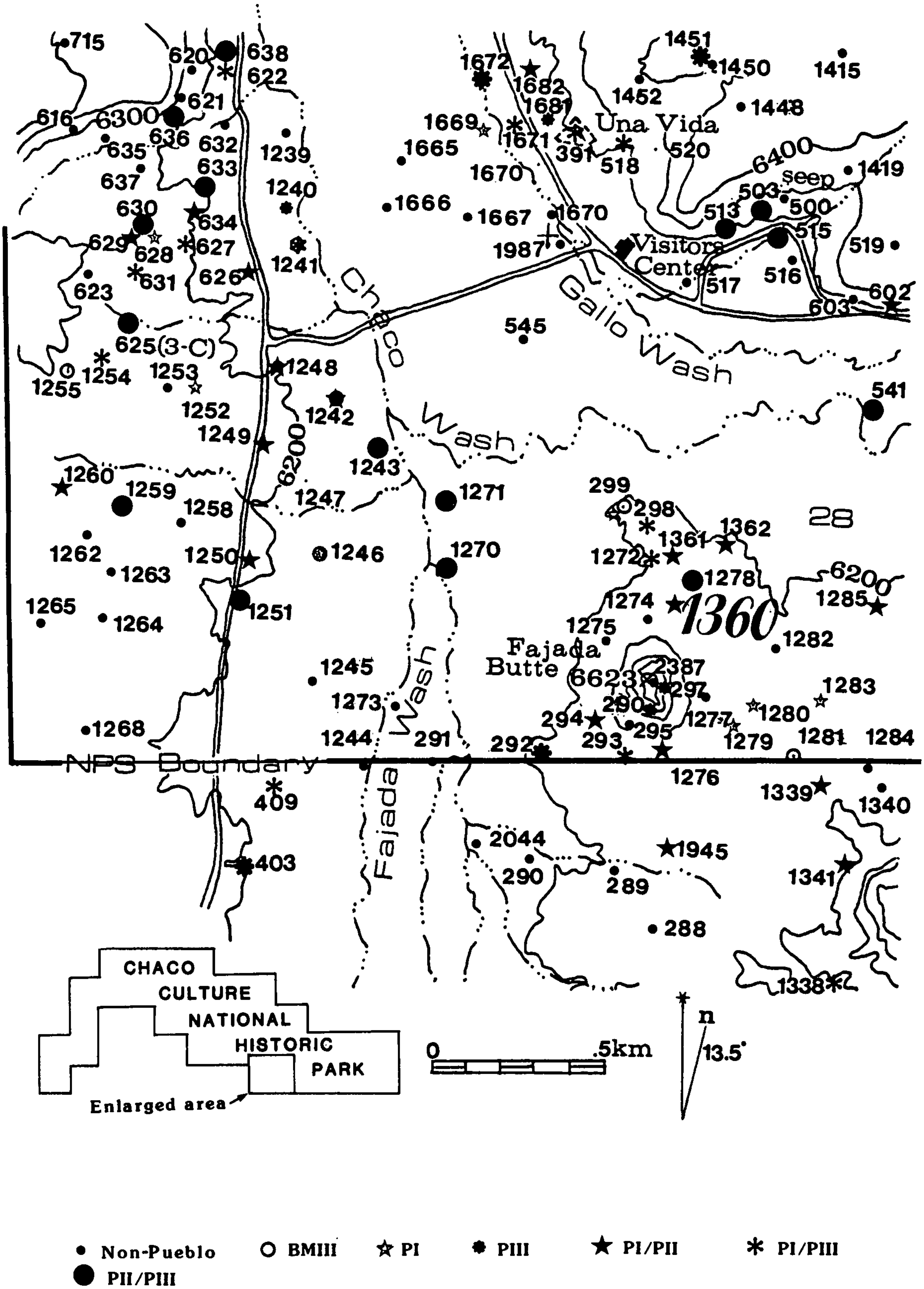


Figure 1.1. Location and temporal assessment of 29SJ1360 and associated sites in the Una Vida area

House, Una Vida. The lower talus slopes of Fajada Butte are 70 m southwest of the site. In more specific terms, 1360 is located in the SE 1/4 of the NW 1/4 of the SW 1/4 of Section 28, Township 21 North, Range 10 West of the Pueblo Bonito USGS 7.5 minute quadrangle at an elevation of 1896 m (6220 ft) above sea level. Today only foot access is permitted to the site from the nearby Visitor Center.

The bedrock geology of the area is predominantly sandstone formations of the Mesa Verde Group (Love 1977; Siemers and King 1974). Canyon walls and the nearby Fajada Butte are made up of hard, fine-grained Cliff House sandstone underlain by the softer Menefee Formation. Seams of low-grade coal and shale from the Menefee are visible along Fajada's base. Burned coal seams have baked overlying shale, producing a red shale known as "red dog," deposits of which are visible from the site on Chacra Mesa's north-facing slopes a few hundred meters to the east. Local sandstone and shale beds weather into clay, calcite, limonite, and selenite.

The site itself rests on what appears to be, in part, a stabilized dune extending approximately 400 m north from the base of Fajada Butte (Figure 1.2). Site 1360 lies on the uppermost crest of this ridge, about 12 m above the bottomlands. Although a ridge remnant of the Menefee connects Fajada Butte and Chacra Mesa immediately south of the site, it is not known whether that formation contributes to the foundation of the ridge on which 1360 rests. Site soil consists of compacted yellow-tan sandy loam without remarkable stratigraphy. No bedrock was encountered during excavation.

About 450 m north of 1360 the Chaco arroyo is currently entrenched to a depth of about 5 to 8 m and, in places, spans about 65 m. The arroyo bed itself is 3 to 4 m below the inner benches, which in turn are several meters below the main canyon floor. Previous interpretations of arroyo formation have viewed this process as the end result of vegetative denudation, which in more recent periods has been aggravated by livestock, but in the past was due to the activities of aboriginal populations (Bryan 1954; Hawley 1934). In a more recent study of sedimentation and fluvial regimes in Chaco, Love (1977) has suggested that entrenchment is caused by increased precipitation and the resultant increase in flow velocity and sediment load through the canyon, regardless of associated vegetative densities or land use. The semiarid regime currently prevailing in the canyon leads to a greater sediment contribution from local laterals and slower velocities in the main channel, resulting in gradual aggradation represented in part by the building of point bars along the main channel's floodplain (Love 1979). These processes are largely related to regional hydrology.

Exposed sediments in the arroyo and the occurrence of salt deposits near the mouth of the canyon further indicate that the water table has never been appreciably higher than at present (Love 1979:294). The table's depth, which is regulated by the elevation of the Chaco and Escavada Wash junction, is consequently greater up-canyon. Although it is possible that the site residents depended on some as yet undiscovered deep wells (13+ m) to the water table, it seems more likely that they

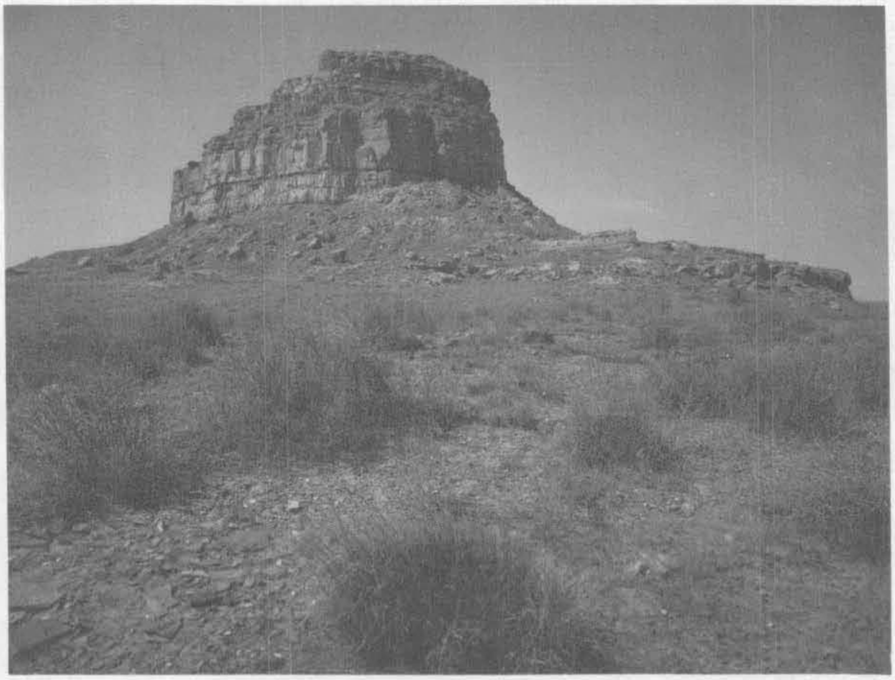


Figure 1.2. Fajada Butte overlooking unexcavated 29SJ1360; view to south

transported and stored water from intermittent runoff, naturally ponded or dammed pools, and distant seeps or springs. No evidence of active seeps in the immediate area of either Fajada Butte or Chacra Mesa was found by the survey. The nearest possibly active seep is across the canyon in the present Park Service residential area, near the Headquarters site (Vivian 1950); it is unlikely that there was a dependable daily local water source near 1360.

Climate

The general aridity of the San Juan Basin is, in part, a result of a rain-shadow effect caused by the surrounding mountains. The Chuska Mountains to the west and the Zuni uplift to the south/southwest block prevailing frontal systems from the West Coast, while the southern highlands along the continental divide trap the larger, moisture-bearing summer air masses from the Gulf of Mexico (DeAngelis 1972; Jones 1972). Precipitation and temperature patterns within the basin are associated with elevation: cooler, wetter conditions increase with altitude. Topography also plays a large role in the pattern of summer convectional storms throughout the basin.

In Chaco, precipitation is variable and generally follows a late-summer dominant pattern. More substantial contributions to ground water and to the resedimentation of bottomlands probably occur, however, with the less dramatic late winter and spring precipitation. Annual rainfall averages from 85 mm to more than 470 mm, with a yearly average of 223 mm (Love 1979).

Like rainfall, daily temperatures in Chaco fluctuate widely. Elevation has little effect on daytime temperatures throughout the canyon, but nighttime cold-air drainage may be more marked along the canyon's pronounced north-side reentrants. Temperatures frequently exceed 90 degrees F during the summer months, with daily ranges of more than 50 degrees F recorded (Jones 1972).

DeAngelis (1972:Tables 4 and 5) cites data to indicate a lengthy summer season of 141 days in Chaco and even longer elsewhere in the basin. Love (1979:280) indicates that since DeAngelis' figures were prepared (1956 data), there has been a reduction in the number of effective growing days to 110. Recent experiments with corn plots in the canyon (Toll et al. 1979) have suggested that the growing season in Chaco is of sufficient duration to secure a crop, but only with extensive, specialized plant husbandry.

Vegetation

Chaco Canyon lies within the Upper Sonoran zone (1524-2134 m), as does the majority of the San Juan Basin. Vegetation is related to soil characteristics and rainfall and may be generally described as mixed shrub-grassland. The *Preliminary Vegetative Type Map of Chaco Canyon* by Potter and Kelley (Potter 1974) indicates that 1360 lies in a mixed community dominated by fourwing saltbush (Atriplex canascens), Indian ricegrass (Oryzopsis hymenoides), and sand dropseed grass (Sporobolous cryptandrus). This community is the main vegetative cover in the canyon bottomlands. Other major plant types found along the Fajada ridge and in neighboring plant communities include galleta (Hilaria), muhley (Muhlenbergia), asters (Aristida spp.), black sagebrush (Artemisia nova), wolfberry (Lycium), Mormon tea (Ephedra spp.), winterfat (Eurotia lanata), Yucca spp., black greasewood (Sarcobatus vermiculatus), and rabbitbrush (Chrysothamnus spp.). Concentrations of fourwing saltbush and greasewood flank the ridge on which the site lies, with denser stands of greasewood between the ridge's toe and the Chaco Wash. Greasewood is most plentiful in the canyon from the near-confluence of the Gallo and Chaco washes eastward.

Young and Potter's (1975:21) study, which attempted to correlate indicator plants with archaeological sites, examined site 29SJ1278, which is 25 m north of 1360. Among the plants commonly found on sites, 1278 was marked primarily by galleta, tansy mustard (Descurania), fourwing saltbush, snakeweed (Gutierrezia spp.), and dropseed. Mustard, a high correlator with site presence, was the dominant forb on the trash mound and along the ridge.

The wash itself supports what little riparian vegetation exists in the canyon, including cottonwoods (Populus fremontii), willows (Salix exigua), and the exotic tamarisk (Tamarix pentandra), which was introduced mainly during the 1930s conservation program. Pinyon and juniper are scattered throughout the mesa tops, with some growing lower in the heads of large rincons. Only on Chacra Mesa are appreciable stands of these evergreens found; juniper dominates the western portion of the mesa. Other noteworthy species growing within the vicinity of 1360 include dock (Rumex), cactus (Opuntia spp.), cliff-rose (Cowania mexicana), globemallow (Sphaeralcea coccinea), and blue grama grass (Bouteloua gracilis), as discussed by both Potter (1974) and Jones (1972).

Fauna

J. Cully's (1981) study of small mammal and bird populations in the canyon describes different communities of species correlated with Potter and Kelly's (Potter 1974) vegetative areas. Differing populations occur in two general zones: the pinyon-juniper zone of the mesa tops and the scrub-grassland zone of the canyon bottom, with the bench and talus areas acting as an intermediate "sink" for nesting and/or overflow population. Birds, many of which are migratory or summer insectivorous residents, are not as sensitive an indicator of the canyon's ecological zones as are small mammals.

Common mammal species found throughout the canyon include desert cottontail (Sylvilagus auduboni), black-tailed jackrabbit (Lepus californicus), badger (Taxidea taxus), pocket gophers (Thomomys bottae), coyotes (Canis latrans), bobcats (Lynx rufus), and mule deer (Odocoileus hemionus). Prairie dogs (Cynomys gunnisoni) and porcupines (Erethizon dorsatum) were apparently more abundant at one time than they are at present. Prairie dogs were reported from the Fajada Butte and South Gap areas, but in recent years the population may have been reduced through disease (probably sylvatic plague; see Findley et al. 1975:134). Small mammals more common to the pinyon-juniper area include Colorado chipmunks (Eutamias quadrivittatus), pinyon mice (Peromyscus truei), and Stephens and bushy-tailed woodrats (Neotoma stephensi and cineria). Species occurring exclusively in the bottomlands include silky pocket mice (Perognathus flavus) and northern grasshopper mice (Onychomys leucogaster), while other mice such as the Plains mouse and western harvest mouse (Perognathus flavescens, Reithrondontomys megalotis) and Ord's kangaroo rat (Dipodomys ordi) occur most frequently in this area but are also found in the pinyon-juniper zone.

Among the more notable seasonal birds that inhabit Chaco are prairie falcons (Falco mexicanus), cliff swallows (Petrochelidon pyrrhonota), turkey vultures (Cathartes aura), and infrequently, the golden eagle (Aquila chrysaetos). More permanent residents include horned larks (Eremophila alpestris), pinyon jays (Gymnorhinus cyanocephala), common ravens (Corvus corax), great horned owls (Bubo virginianus), and the abundant brown towhee (Pipilo fuscus) and Say's phoebe (Sayornis saya).

Jones (1970) documents the variety of reptiles and amphibians in the canyon. Common reptiles include prairie rattlesnakes (Crotalus viridis), gopher snakes (Pituophis melanoleucus), and yellow-headed collared lizards (Crotaphytus collaris), with the less commonly seen amphibians consisting principally of Western spadefoot toads (Scaphiopus hammondi) and the tiger salamander (Ambystoma tigrinum).

Excavation Procedures and Sampling

Work at 1360 began in early 1972 with the inclusion of the site in the survey records of the then on-going archaeological inventory survey of Chaco Canyon National Monument. Seven of the 11 Anasazi sites around Fajada Butte occur along the 400-m ridge between the base of the butte and the bottomlands of Chaco Wash (Figure 1.1). One of these sites, located near the top of the ridge, was assigned the site number 29SJ1360, although it had formerly been designated Bc 240. This site is one of eight Pueblo I through early Pueblo II houseblocks, making Pueblo I-Pueblo II the most abundantly represented time period in the immediate area of Fajada Butte (Hayes et al. 1981).

The site was recorded as a 20-room, three-kiva house with the usual Pueblo I house style--a crescentic arc of rooms fronted by a ramada and pithouses. Pit structure depressions and the upright slabs of surface rooms were clearly visible. Slab concentrations in the trash and in the area between 1360 and nearby 1278 suggested considerable churning, probably for burials, at some point in the past. The subsequent excavation of the site in 1974 confirmed some of these surface observations, but also revealed unanticipated complexities.

Following the general outline given in <u>Prospectus: Chaco Canyon Studies</u> (Corbett 1970), the Chaco Center attempted to excavate sites of all the time periods represented in Chaco Canyon. Site 1360 was one of several sites assigned to the Pueblo I period by the survey that were chosen for excavation in an effort to cover the AD 700-800 period of occupation. The location of 1360 in the general area of the previous year's work was also a factor in selection, since continued work in the same area would expand the data base, permitting comparisons with excavations from a similar period in Marcia's Rincon and elsewhere in the canyon. In addition, proximity to the maintenance and headquarters area simplified logistics and reduced costs. Finally, since access to the site area had already been established, the impact upon the land was minimized.

Pueblo I sites, at least those in pristine condition, were to prove most elusive at Chaco Canyon; excavations and tests aimed at recovering materials from this period were only partially successful. The Pueblo I period was most clearly represented at 29SJ299 and 29SJ724 (Windes 1976a, 1976b). Excavation of 1360 proved to be another disappointment in this regard, as the site was primarily of Pueblo II association. Reliance on survey data concerning low-visibility surface architecture, a typological analysis of grab-sampled ceramics, and field collection practices contributed to the chronological misinterpretation of 1360. The survey surface collections concentrated on trash mounds; subsequent excavation at 1360 revealed that the trash mound was one of the earliest portions of the site. Although 1360 does contain a small Pueblo I architectural component, a reappraisal of Hayes' discussion (1981:46-52) would include it primarily in early Pueblo II (AD 900-975) overlapping into late Pueblo II (AD 975-1100). This would make 1360 one of 354 known pueblos in the canyon from this period. The location of 1360 is consistent with those of most early Pueblo II sites, over 90 percent of which are situated in the canyon bottom. Approximately 29 percent of these Pueblo II sites are situated on ridges, like 1360; only 16 percent are located on the lower floodplain.

Previous work in the area of 1360 had been limited to prospecting for burials and pot-hunting ventures by such historic Chaco personages as Richard Wetherill, George Pepper, and Frank H.H. Roberts Jr. Controlled excavation of the site took place during a single, partial season, beginning on May 15, 1974, and proceeded until July 30. Excavation was carried out under the direction of Charles R. Morrison, who was supervised by Alden C. Hayes. Eight local Navajo laborers were employed for the bulk of the work. One laborer, Ken Augustine, performed yeoman service, doing much of the field mapping and cataloging. Several volunteers offered additional, short-term excavation assistance. Laboratory work took place in Albuquerque. In conjunction with stabilization research and preservation tests, a team of Japanese technicians (Fenn and Burge 1979) visited the site and applied liquid preservatives to various unrecorded wall sections. No follow-up examinations of these preservation efforts have occurred, leaving this aspect of research at the site in limbo.

Some of the field methods employed at 1360 lacked the precision and sophistication of the techniques later developed for use at other sites. Although this may have obscured some details concerning the site occupation, a general understanding of the history of the site may still be derived. Some of the later improvements in fieldwork that were not enjoyed by Morrison were a reduction in the laborer-to-archaeologist ratio and standardization of field procedures (Judge et al. 1976). The archaeologists carrying out these early excavations found themselves acting as supervisor, excavator, chauffeur, time-keeper, field cataloger, tour guide, and most importantly, as the note taker. The common ratio of laborers to archaeologists was about eight to one, with the laborers earnestly digging in different parts of the site while the archaeologists scurried back and forth between work groups, trying to produce adequate field notes. At that time neither a systematic program of photography and sampling nor standards for field notes--such as "feature forms" with a uniform set of observations--had been developed. Many of the laborers were untrained in archaeological field methods and required close supervision and instruction. Marcia Truell, visiting 1360 from her excavations at 627 a few kilometers to the west, witnessed one young Navajo methodically swinging his pick-mattock against a culinary jar in Plaza Area 5 because, as he pointed out, otherwise the potsherds would not fit in the bag. Conditions such as these are important to note because they create problems affecting the quality of both notes and data recovery, and these in turn ultimately determine the quality of the interpretations concerning the prehistory of Chaco Canyon.

Approximately 10-13 rooms in two houseblocks were excavated and/or defined (Figures 1.3 and 1.4). Two of five pit structures were excavated, and a large ramada and plaza were stripped, revealing various features such as firepits and ventilators of unexcavated pit structures. A test trench was placed in the trash mound. Approximately 585 sq m of the site were excavated or stripped, with a minimum of 178.7 cu m of fill being removed in 268 man days. Following completion of the excavation, backdirt was replaced with a backhoe.

Because the survey of 1360 suggested a relatively small site, a complete excavation was planned; when stripping of the ramada surface revealed the presence of ventilators belonging to additional pit structures, it became clear that complete excavation was not possible. Following surface-overburden removal and wall searches, room fill was removed in bulk to floor levels. Floor artifact recovery in all structures usually incorporated at least 5 cm of fill above floor. Five major exploratory test trenches or pits were dug. These excavation units defined general stratigraphic sequences and clarified relationships between structures and fill and among the structures. These excavation units included a trench in the trash mound, a test pit in ridge soil southeast of House 1, a test pit in the plaza beside the exterior south wall of Room 6, a cruciform trench on the east side of the ramada, and a northwest-southeast trench bisecting the center of House 2. After test trenching to determine the boundaries of Kiva A, fill was removed in arbitrary 40-cm levels to the floor of this structure. Overburden to bench level in Pithouse B was removed with a back-

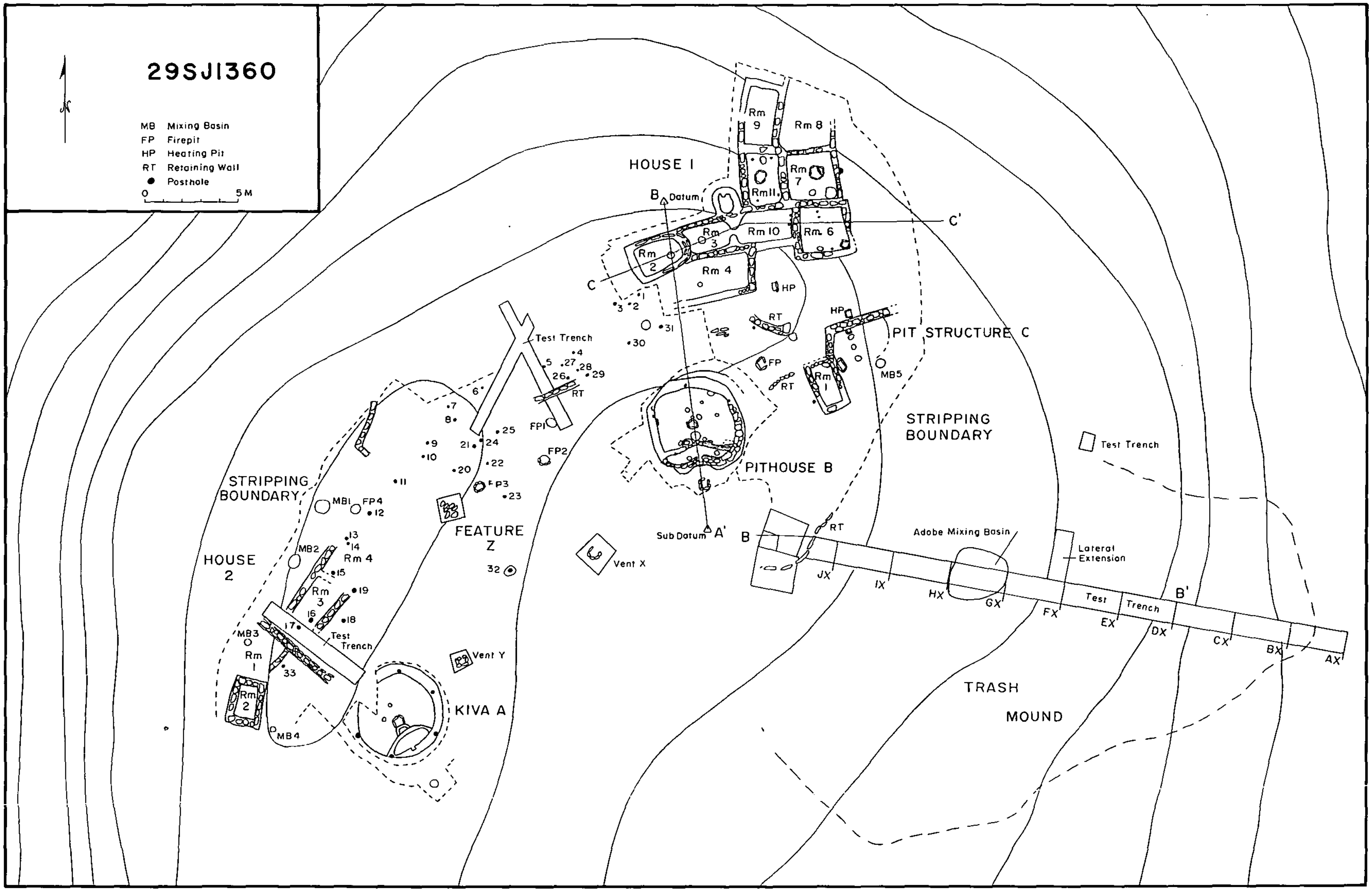


Figure 1.3. Plan of 29SJ1360

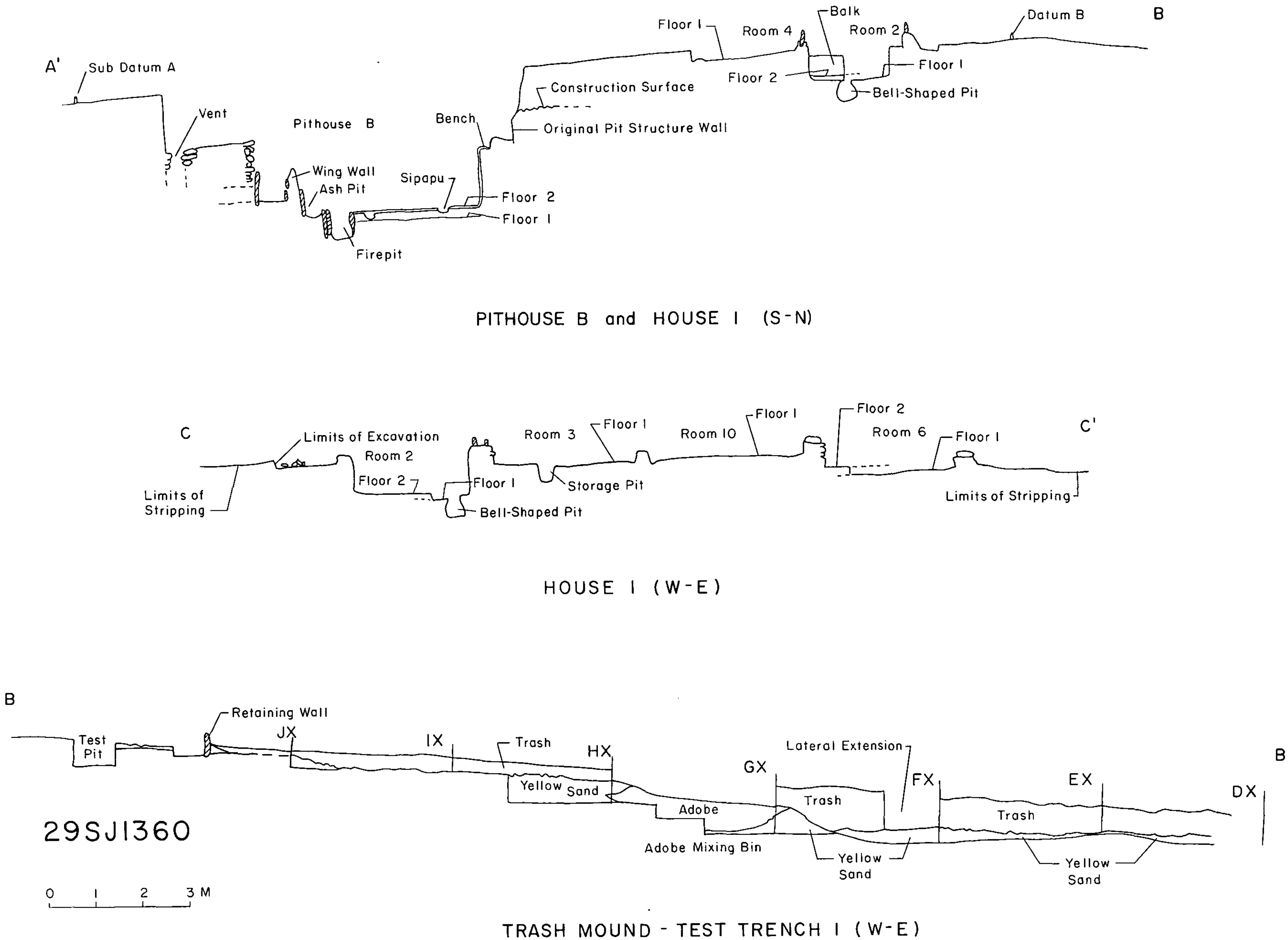


Figure 1.4. Site profiles

hoe. The ramada area was surface stripped to reveal postholes, with supplementary trenching being used to define stratigraphy and to search for suspected walls. The trash midden was manually trenched to "sterile" sands, with some upper and lower "units" being distinguished in the 30- to 80-cm-deep east-west trench. No material was screened. Areas containing minute cultural objects, such as the black heishi beads with Burial 2 in Pithouse B, were carefully hand-checked by laborers.

Artifacts were bagged with individual field specimen (FS) numbers for each item or bulk category (ceramics, bones, chipped stone). No sequential numbers by provenience were assigned, and the field numbers were not written on items taken to the Albuquerque lab. Many large stone items, such as metates, manos, and other ground stone fragments, were measured, numbered, and left in the field. Laboratory personnel reboxed artifacts into general categories for later analysis by individual specialists.

All field site maps were prepared with plane table and alidade by Morrison and Augustine; site topography was mapped by Hayes and Tom Windes. There was some experimentation with bipod photography for mapping and detailed artifact-provenience recording, but this technique proved to be ineffective. No in situ mapping of artifacts as a back-up to bipod photography was done, but extensive site record photos were taken, and these, along with sketch maps and notes (on file at the Chaco Center), provide a reference base for reconstructing floor-artifact distributions. The detailed feature profiling and recording system that was later instituted by the Chaco Center was not used at this site. Accordingly, all feature diagrams and volumes herein are reconstructions from field notes, maps, and photos. In addition, the systematic sampling procedures for pollen, flotation, and conservation samples that are now used by the Chaco Center were not part of the excavation procedures at 1360. A few pollen samples were taken, but only after general excavations had ceased. None of these have been processed, and because of the high potential for contaminants and the unsystematic nature of collection, these samples are not currently scheduled for analysis.

In 1979 the author reexcavated portions of 1360 in order to secure additional archaeomagnetic samples and to attempt to resolve some questions concerning the site's architecture. This resulted in the discovery of a few new features and the recovery of some artifacts, primarily chipped stone, from the backdirt. Fill was replaced, and some room corners in House 1 were marked with small rock cairns; fieldwork at 1360 had come to an end.

CHAPTER 2

Architecture and Stratigraphy

Architectural units excavated or tested at the site included two roomblocks and three pit structures. Evidence of two additional pit structures (in the form of ventilator shafts) was encountered during stripping operations in the ramada area in the central portion of the site (see Figure 1.3 in the previous chapter). Excavations in architectural and extramural areas are discussed below by individual provenience. Table 2.1 lists the structure dimensions; Appendix 1 gives the dimensions of features.

The following architectural discussion incorporates tabulations of the portable artifacts found in each major provenience. Table 2.2 gives percentage data for the most numerous type or class within each of the major artifact categories (i.e., ceramics, chipped stone, and bone) by provenience. Because decorated ceramics are considered to be relatively more time-sensitive than culinary wares, the dominant decorated type is listed rather than the usually more numerous culinary types. The tables in this chapter present lumped provenience inventories for artifact assemblages from individual proveniences. Discussions of individual artifact categories may be found in subsequent chapters, along with detailed provenience inventories using finer subdivision by level or floor.

HOUSE 1

House 1 consists of approximately 10 rooms; associated features include a probable parrot bin, a mealing area, a major retaining wall, and various extramural areas with features (Figure 2.1). Pithouse B also appears to be associated with this structure. The ground plan of the main roomblock is an unusual L-shape. Roomblocks built during this period are generally symmetrically arranged, but House 1 exhibits accretional room additions to the east and north, producing an arrangement of rooms that is asymmetrical in respect to both the site orientation and the position of Pithouse B. The expected roomblock/pit structure arrangement would have included a pit structure fronting the eastern tier of rooms, but stripping and testing in this area revealed no evidence of such a structure.

Table 2.1. Room and pitstructure dimensions and floor area (Measurements in centimeters)

	North			South			East			West			Dimensions: General Room			Floor	
	L	W	H	L	W	H	L	W	H	L	W	H	L	W	Depth	Area m^2	Fill m^3
House 1																	
Room 1	120	30	--	110	30	20	185	30	--	195	30	--	190	125	--	2.31	ca. 0.59
Room 2	218	44	--	220	34	--	140	39	--	158	20	--	215	140	91	2.73	2.48
Room 3	250	18-29	40	228	33	50	125	20-40	20	140	39	--	230	138	34	3.03	1.03
Room 4	---	33	30	490	30	14	200	25	25	---	--	--	490	180	20	8.74	1.75
Room 6	237	45	51	271	28	40	242	33	22	246	30	70	238	250	46	6.05	2.78
Room 7	255	19	33	235	42	60	167	19	21	152	36	44	248	250	54	6.15	3.32
Room 8	---	--	--	272	20	36	---	25	8	365	27	37	365	283	35	ca. 10.33	ca. 3.62
Room 9	170	24	1	168	27	27	306	27	30	330	33	38	305	170	30-48	5.17	2.02
Room 10	330	18-29	40	290	--	50	140	30	--	125	20-40	20	310	173	34	4.51	1.53
Room 11	80	30	32	191	32	63	265	30	40	310	23	64	300	180	49	5.33	2.61
Bin 1	---	--	--	---	--	--	---	--	--	---	--	--	108	75	41	0.66	0.27
House 2																	
Room 1	---	--	--	150	--	200	50	--	--	---	--	--	---	---	--	----	----
Room 2	173	25	--	215	30	--	95	35	--	120	35	--	170	108	--	1.27	----
Room 3	245	33	--	370	33	--	100	20	--	ca. 250	50	--	365	160	--	5.84	----
Room 4	130	33	--	---	--	--	---	--	--	100	20	--	---	---	--	----	----

	Ventilator: Horizontal			Ventilator: Vertical			Wing Walls: East			Wing Walls: West			Bench	Bench Area	Floor Area (m^2): Wing	Floor Area (m^2): Main	
	L	W	H	L	W	H	L	W	H	L	W	H	W	(m^2)	Walls	Chamber	Total
Kiva A	240	30	40	----	45	45	115	20	20	110	20	20	35	6.10	----	12.75	18.85
Pithouse B	165	20	25	100+	20	40	165	20	117?	115	25	117	20-45	4.19	1.81	10.74	16.74

Table 2.2 Predominant artifact categories by provenience

	Ceramics			Lithic Raw Materials		Fauna	
Provenience	Red Mesa B/w	Early Red Mesa/ Red Mesa B/w	Red Mesa/ Gallup B/w	Chert/ Chalcedony	Petrified Wood	Small Mammals	Large Mammals
House 1							
Room 1	83%			67%			
Room 2		79%			93%		
Room 3/10		78%				58%	
Room 4	71%				88%		
Room 6	100%						
Room 7			78%		85%		48%
Room 9			69%		86%		
Room 11			59%		100%	50%	
Pithouse B			77%		79%	47%	
Pit Structure C		90%					100%
House 2			71%	67%			
Kiva A		86%			77%		57%
Plaza							
Area 2			84%		100%		
Area 3			78%		77%		40%
Area 4		86%					
Area 5			77%		83%		48%
Ramada		80%			83%		(38% carnivores)
Trash Mound	85% (including Basketmaker mineral-on-white)				73%	33%	

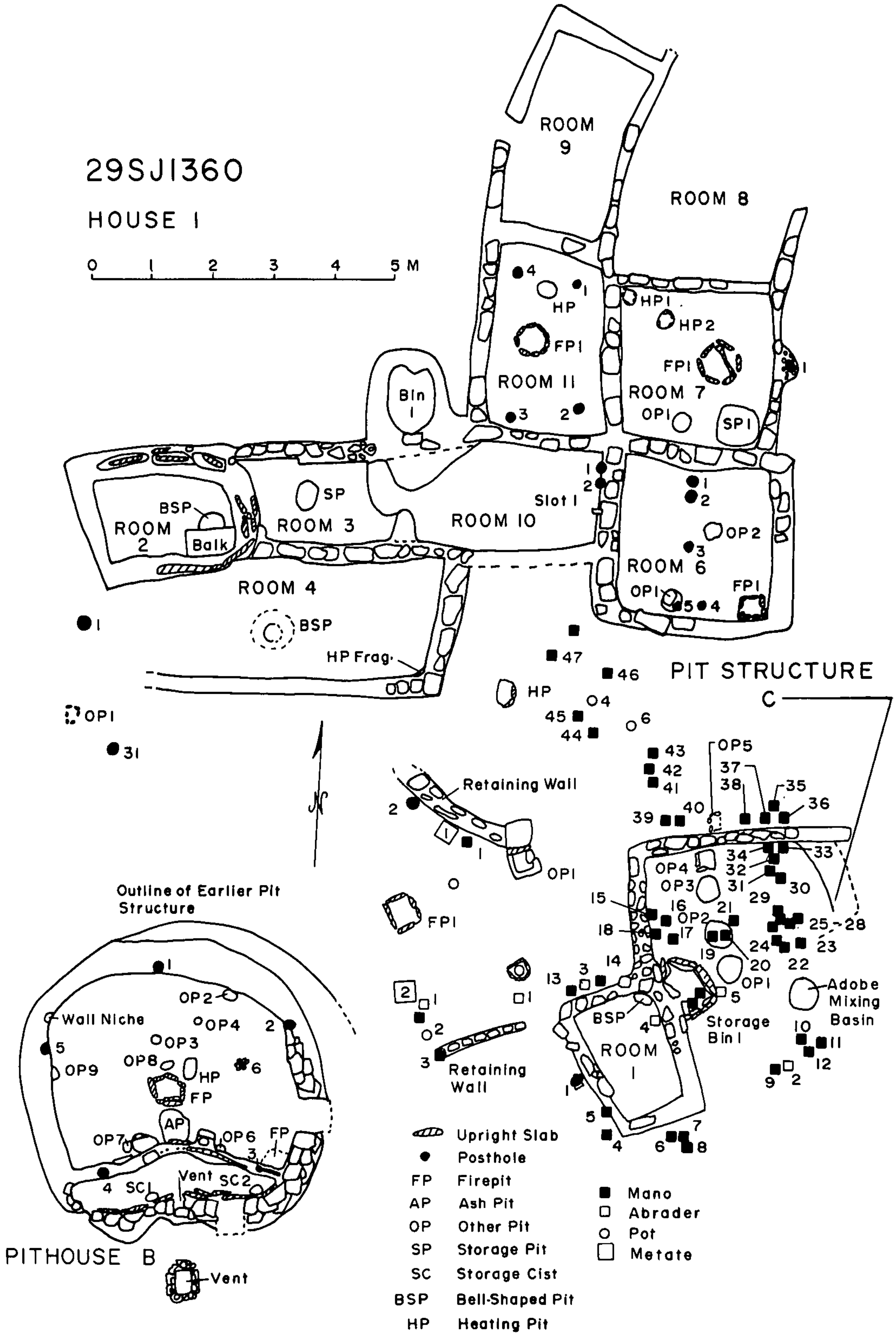


Figure 2.1. Plan of House 1, Pithouse B, Mealing Area, and associated extramural areas

Among the rooms in this house, only Room 2 is architecturally distinct (see description below). The remaining rooms can be differentiated from one another on the basis of floor areas and features, but construction techniques and general appearances are similar. The House 1 area of 1360 was apparently the locus of the last construction and occupation episodes at the site; this area produced the most substantial returns in terms of both portable artifacts and standing architecture (Figures 2.1-2.3).

Room 1

Location: The southern isolated room overlying or adjacent to Pit Structure C (Figures 1.3, 2.4, and 2.5).

Fill: Aeolian sands constituted the bulk of the fill. A poorly defined 9-cm layer of adobe above the floor probably represented wall mortar wash.

Walls: The masonry walls rest on a 33-cm-wide base of adobe. The east and west walls consist of single courses of large irregular sandstone blocks. The north wall is composed of smaller sandstone slabs, which protrude into unconsolidated exterior fill.

Floor: A well-defined tan clay floor, 2.5 cm thick and coped against the north wall, was found throughout the room.

Floor Features:

Floor Cist: A sealed bell-shaped pit in the northeast corner extends under the walls (Figure 2.6). It contained clean sand.

Artifact Assemblage: see Table 2.3.

Remarks: Room 1 seems to have been one of the later structures at the site, as it appears to overlie the earlier Pit Structure C. It is possible that the layer of adobe wash above the floor served as a later use surface, but as noted, it is more likely to have been wall mortar wash. Artifacts are few and do not suggest any particular function for the room, but the extremely small size of this isolated structure (Table 2.1) and the lack of features other than the corner pit suggest that this was a storage room.

Room 2

Location: The westernmost room in House 1 (Figure 2.7).

Fill: The fill consisted of decomposed architectural materials. Below surface sands, sandstone rubble and compacted concentrations of wall adobe filled the upper third of the room; the remaining fill consisted of a sandier adobe mix.

Figure 2.2. General layout and architecture of House 1; view to northeast

Figure 2.3. General layout and architecture of House 1; view to east

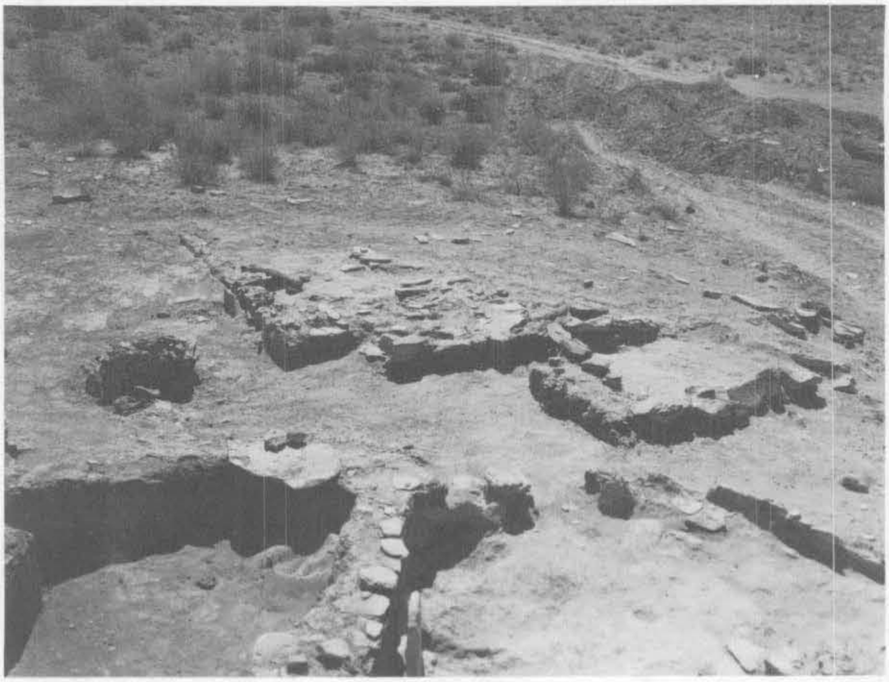


Figure 2.4. Room 1, L-shaped wall mealing area, and central plaza with Retaining Walls 1 and 2. Stratigraphic balks are located on exterior north wall of Room 1 and run north from Retaining Wall 1 (foreground); view to east

Figure 2.5. Trash Mound, test trench, Room 1, Retaining Wall 2, and metate near excavation pit for Pithouse B; view to southeast

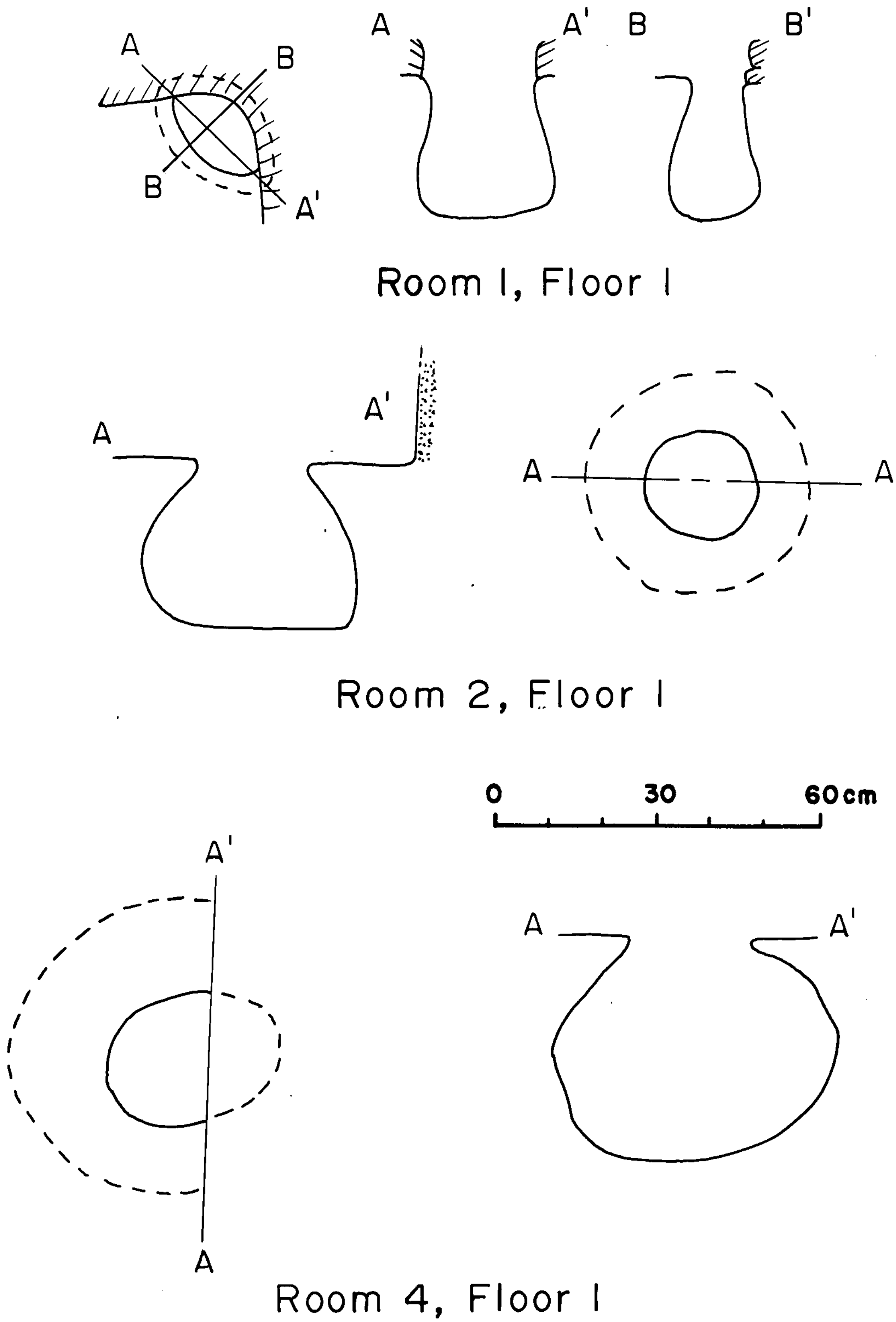


Figure 2.6. Bell-shaped pits at 29SJ1360

Table 2.3 Artifacts from House 1

Provenience	Ceramics	Chipped Stone	Other Stone	Bone	Bone Tools	Other	Comments
Room 1 fill	21	3	2	1	–	1 eggshell	includes 1 mano, 1 hammerstone
floor	9	–	2	1	–		includes 1 passive abrader, 1 polishing stone
Room 2 fill	67	12	3	–	–	2 bulk minerals, 1 adobe jar stopper	includes 1 mano, 2 hammerstones
floor	9	2	–	3	–	1 bulk mineral, 1 eggshell	
Rooms 3/10							
fill	152	3	1	12	2	3 bulk minerals, 1 corncob 1 other ornament	includes 1 hammerstone
floor	133	–	–	–	–	1 bulk mineral, 1 piece of turquoise	
Room 4 fill	32	8	2	2	–	13 bulk minerals, 1 piece of turquoise	includes 1 mano, 1 active abrader
floor	35	–	1	2	–	1 bulk mineral, 1 piece of turquoise, 1 other ornament	includes 1 mano
Room 6 fill	44	–	–	2	–	1 corncob	
Floor 3	–	–	2	–	–		includes 2 metates
Floor 2	–	–	2	–	–		includes 2 manos
Floor 1	–	–	1	–	–		includes 1 mano
Room 7 fill	250	6	3	22	1	1 other ornament	includes 1 mano, 1 hammerstone
floor	39	7	2	3	–	1 bulk mineral	includes 2 manos
Room 9 fill	31	5	4	1	–	1 bulk mineral	includes 1 anvil, 1 passive abrader, 2 active abraders
floor	73	2	–	–	–		
Room 11 fill	329	12	5	31	–	52 bulk minerals, 1 eggshell	includes 2 manos, 1 active abrader, 1 polishing stone
floor	12	–	–	–	–	1 piece of turquoise 1 eggshell	

Walls:

Below Surface: The room is semisubterranean; tan puddled-adobe walls with scattered horizontal and vertical stone elements were built against sterile native soils forming the sides of the excavated pit (Figure 2.7).

Above Surface: The puddled-adobe walls extend above the original ground surface to form a base for the superstructure, although the upper walls are offset to the exterior of the puddled-adobe base. The north wall incorporates massive upright slabs with supporting shims (Figure 2.8); the southeastern curved wall contains two smaller slabs enclosing a core of distinctive gray clay. The eastern wall is horizontal masonry of thinly bedded sandstone in gray adobe mortar.

Floor: Four different hard-packed surfaces were identified during excavation. During the analysis, these surfaces were numbered consecutively from bottom to top. The lower two surfaces, Floors 1 and 2, were well constructed and appeared to be occupation flooring. Floors 3 and 4, located 34 and 58 cm above the initial floor, respectively, may have been use surfaces contemporary with an adjacent floor level in Rooms 3 and 4, but since fill stratigraphy seems to have crosscut these levels, it is more likely that these upper "floors" were actually the remains of puddling episodes related to room decomposition. Initial excavations in similar semisubterranean rooms at other Chacoan sites often have been marked by confusion and premature identification of floors--based on experience of where floors "should be" or from general on-site floor levels.

Floor Features:

Floor Cists: A bell-shaped pit was found on Floor 1 in the southeast portion of the room (Figure 2.6). It was sealed by Floor 2.

Artifact Assemblage: see Table 2.3.

Remarks: Room 2 is very similar to the rooms at 29SJ724 and 629 described by Windes (1976b, 1978b) as "tub-rooms." The bell-shaped pit in Room 2 may be an unusual feature for this type of room, but it supports the storage function usually suggested for them. These partially subsurface rooms seem to have been built and used from AD 700 to 850. Room 2 is the only such room at 1360.

Room 3

Location: Centrally placed in House 1, Room 3 is adjacent to and east of Room 2 (Figure 2.9).

Fill: Undifferentiated sandy fill was found throughout the room.

Walls: Simple masonry of large, angular, unfinished sandstone slabs makes up the north and south walls. This masonry rests on puddled-adobe

Figure 2.7. Room 2: stratigraphic balk in southeast corner; view to east

Figure 2.8. Upright slab construction of Room 2; view to north

Figure 2.9. Room 3 with large central storage pit (15-cm scale); view to west

foundations 5 to 7 cm below Floor 1. The west wall is the convex puddled adobe and upright slabs of Room 2. The eastern wall is of adobe. This wall was encountered 20 cm below the remaining height of the north and south walls, but no evidence of jacal or masonry superstructure was apparent.

Floor: No evidence of a plastered floor was found. A hard-packed, irregular, sand surface approximating the tops of features was designated as floor.

Floor Features:

Floor Cist: An irregular, roundish cist about 1.44 m deep was encountered in the west-central part of the room (Figure 2.10).

Door: A 35-cm-wide opening in the center of the east wall was designated as a door. Its edges appeared to be rounded.

Entrance Trough: A shallow, 5-cm-deep trough extending from the door opening north into the room may have been created by foot traffic on the soft floor.

Artifact Assemblage: see Table 2.3.

Remarks: Despite the discrepancy in floor levels between Rooms 3 and 2, these rooms appear to constitute a paired unit of "storage" rooms. Excavations at 29SJ724 (Windes 1976b) and elsewhere have suggested a pattern of disparity in depth--one deep room and one shallow--for these paired storage units. Rooms 2 and 3 also produced similar ceramic assemblages, although this has been obscured by the field lumping of Room 10 and Room 3. Both rooms lacked occupationally related floor-contact materials, and both have floor pits, possibly related to a storage function. Testing in 1979 revealed that Room 3 had been completely excavated. Remarks concerning Room 10 (below) are particularly important to an understanding of the relationship between Room 3 and the rest of the site.

Room 4

Location: This room is represented by an L-shaped wall segment just to the south of Rooms 2 and 3.

Fill: Between 15 and 20 cm of an undifferentiated clay and sand mixture similar to the fill of Rooms 2 and 3 were removed from this room.

Walls: Both the north and east walls consist of large angular unworked slabs, forming masonry without apparent spall chinking (Figure 2.11). This masonry rests on adobe foundations from 5 to 15 cm thick (Figure 2.12). The north wall begins 30 cm below the floor; the eastern and southern walls are based at floor level. The exterior of the east wall and the easternmost 65 cm of the interior south wall exhibit veneers of

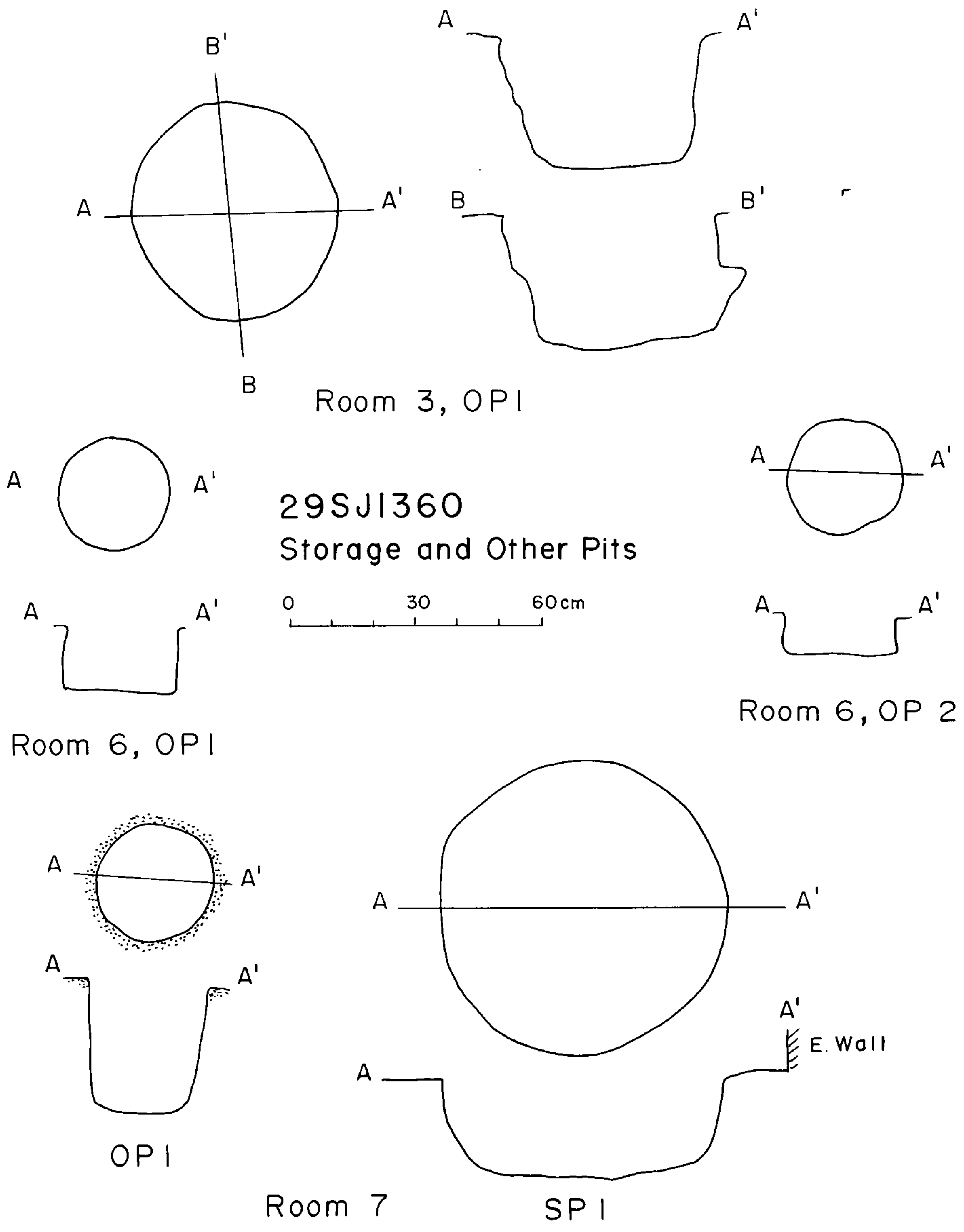


Figure 2.10. Storage and other pits at 29SJ1360

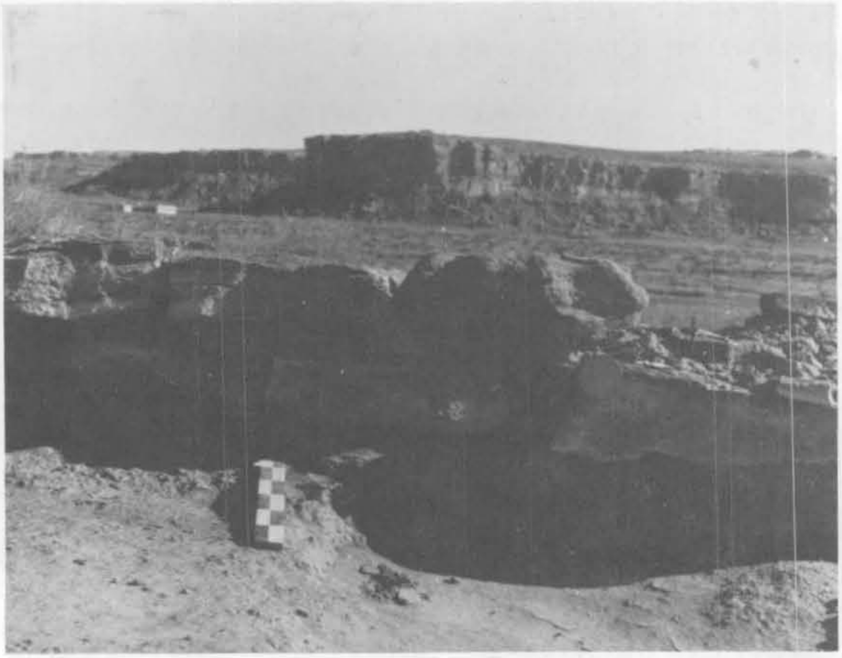


Figure 2.11. North wall, Room 4, displaying unmodified large tabular sandstone core (30-cm scale)

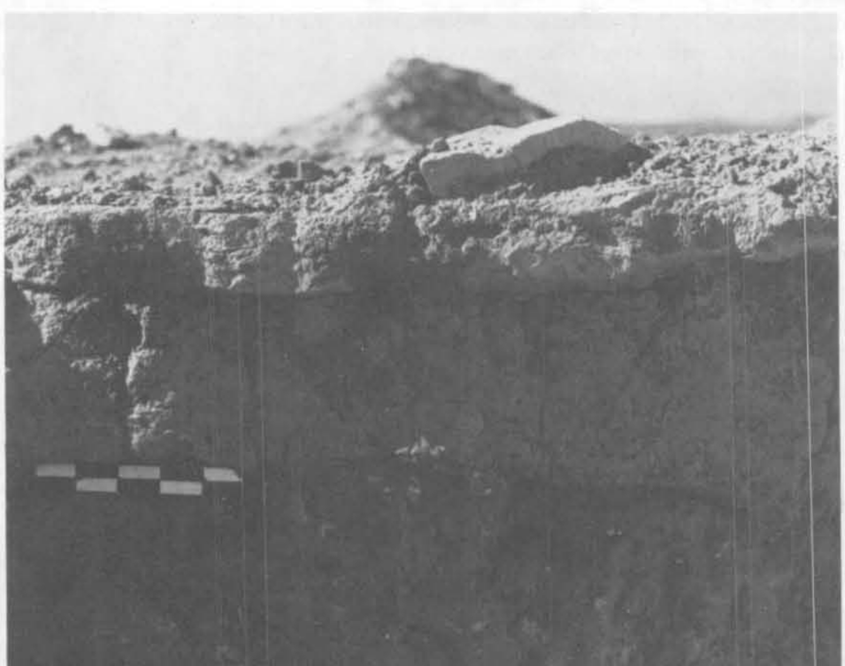


Figure 2.12. Detail of adobe foundation in the north wall of Room 4; adobe block is above the 15-cm scale

closely spaced small sandstone spalls (Figure 2.13). All that is left of the south wall is a puddled-adobe foundation.

Floor: A compaction surface with a slightly higher clay content than the room fill was designated as floor. This surface is irregular, with sandstone rubble protruding through it from unexcavated pits.

Floor Features:

Firepit 1: A small, 13-by-15-cm curved segment of burned adobe plaster in the southeast corner of the room probably represents the remains of a removed firepit (Figure 2.14). No ash, charcoal, or other materials common to firepit fill were associated with this plaster. The partial incorporation of this fragment into the wall plaster suggests extensive remodeling in the area.

Storage Pit 1: In the center of the room is a large bell-shaped pit, which contained burned structural adobe and assorted small artifacts (Figure 2.6).

Artifact Assemblage: see Table 2.3.

Remarks: Considerable erosion has reduced the south wall to a low adobe foundation. The west wall was not found, but it is probably located near the stub of the south wall. The size and position of Room 4, fronting Rooms 2 and 3, implies that it was a living room in the living room/storage rooms pattern common to Chacoan sites, despite the absence of obvious "domestic" features. Subfloor testing in 1979 indicated that Room 4 had been completely excavated.

Room 5

A portion of the plaza was field-designated as Room 5; this area will be discussed in the plaza section below.

Room 6

Location: The southeastern room in the main roomblock of House 1.

Fill: Fill was without distinctive stratification. Masonry rubble was concentrated in the upper fill, with the usual mixture of alluvial sands and adobe above Floor 3. A trash fill was encountered between Floors 3 and 2. The nature of the fill between Floors 2 and 1 was not recorded.

Walls: The north and west wall are of close-set, 5-to-10-cm-long coursed sandstone slabs (Figure 2.15), with the north wall being more an interior veneer than complete masonry. The south wall is predominantly adobe with sporadic sandstone spalls. The east wall, of which only one course remains, is crude simple masonry footed on a 33-cm-wide adobe base. This base begins 12 cm below the lowermost floor.

Figure 2.13. Spall veneer, exterior of east wall of Room 4

Figure 2.14. Firepit fragment in southeast corner of Room 4; fragment is above base of 15-cm scale

Figure 2.15. Spall veneer, interior of west wall of Room 6

Floors: Three floors were recorded, the uppermost being only a possible use surface.

Floor 1: The lowest floor is a well-compacted surface.

Floor 2: Floor 2 was similar in consistency to and 15 cm above Floor 1.

Floor 3: A third, poorly defined surface was noted 22 cm above the original floor. This surface had no structural features, but two metates were found, apparently associated with it, at opposite ends of the room. Exposure to the elements could have been responsible for the condition of this surface, but it is more likely that Floor 3 represents a contact line between structural rubble and lower alluvial/trash fill rather than an occupation surface.

Floor Features:

Floor 1:

Hearth: A slab-lined circular firepit approximately 45 cm in diameter and 20 cm deep was found in the southeast corner of the room. The six fire-reddened upright slabs that form the sides of the firepit slant inward toward the basin-shaped dirt bottom. The hearth was filled with fine mixed sand and organic debris (Figures 2.16-2.18).

Postholes: Five possible postholes ranging in diameter from 9 to 16 cm were noted in the lowest floor. Four of these postholes form a north-south linear arrangement bisecting the room. The other posthole is adjacent to the firepit on the west side near the south wall.

Floor 2:

Pits: Two straight-sided, flat-bottomed pits were associated with the second floor, one along the south wall and another in the center of the room (Figure 2.10). The function of these features is not known.

Artifact Assemblage: see Table 2.3.

Remarks: The corner firepit associated with the lowest floor is similar in dimensions and volume to features associated with interior cooking activities at 629 and 627. This feature suggests that this room may have served as a habitation room at one time. Remodeling of the floor covered the small storage pits and cooking facilities, suggesting that habitation in Room 6 was discontinued. Cooking seems to have occurred elsewhere during the occupation associated with Floor 2, as only storage pits were found. The ceramics recovered from the fill suggest that this room may have fallen into disuse before the rooms to the north, but after Rooms 2, 3/10, and 4 to the west. Although it is a chronic problem at 1360, the failure to distinguish between floor artifacts from different floors and fill artifacts from different levels in the fill is particularly unfortunate in Room 6. Given the presence of

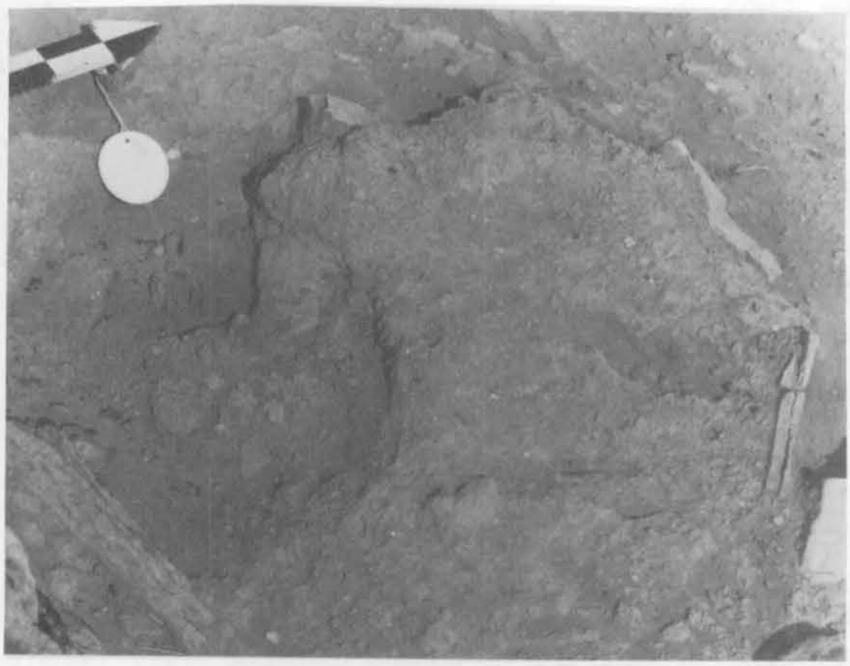


Figure 2.16. Unexcavated firepit in southeast corner of Room 6

Figure 2.17. Excavated firepit in southeast corner of Room 6 (30-cm scale)

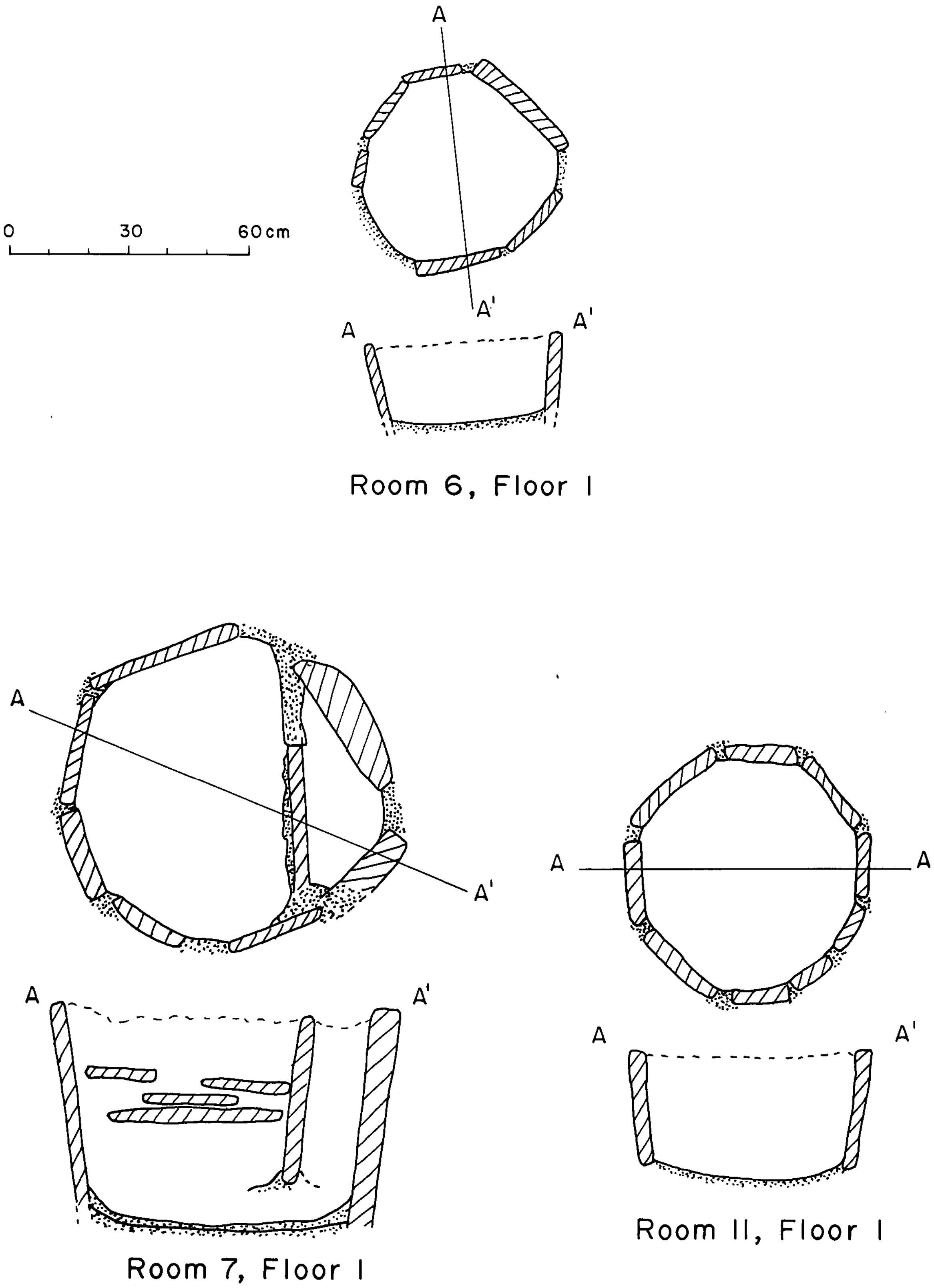


Figure 2.18. Room firepits at 29SJ1360

two rather widely spaced floors, such information might have indicated room-function changes through time.

Room 7

Location: Centrally placed on the east side of House 1 (Figure 2.19).

Fill: Wall fall and mortar filled the room, crosscutting the purported upper floors. There was no evidence of roofing material.

Walls: Construction of the northern and eastern walls created Room 7. The already existing walls from Rooms 6 and 11, which consist of masonry of closely packed, 5-to-10-cm-long sandstone chinks, formed the south and west walls of Room 7. Sandstone ashlars with irregular chinking make up the interior face of the north wall, while the east wall is simple masonry of large, angular chunks of sandstone. Walls are based in adobe at the level of the lowest floor (Figure 2.20).

Wall Features:

Posthole: A posthole approximately 15 cm in diameter is located in the center exterior of the east wall.

Floors:

Floor 1: A 2-cm-thick puddled-adobe floor was the first floor constructed in Room 7. It rests on cultural fill, including charcoal-flecked sands and burned sandstone.

Floor 2: This apparently was a living surface, but no details about its nature were recorded.

Floor 3: Apparently similar to Floor 2, this floor was located near the tops of the standing walls.

Floor Features

Floor 1:

Firepit 1: Located east of room center, the firepit was constructed of seven upright slabs set in adobe (Figure 2.18). The slabs extend from floor level to the bottom of the hearth. Subsequent to the construction of this feature, another upright slab was used to bisect the original pit. These slabs are heavily sooted, and the surrounding floor is oxidized pink. The pit fill consisted of a sandy matrix with charcoal and corncob fragments in increasing densities toward the bottom. A broken Captain Tom Corrugated culinary jar was scattered over the top of this feature (Figures 2.19, 2.21-2.24).

Pit 1: An apparent storage pit was found in the southeast corner of this floor (Figure 2.10).

Figure 2.19. Room 7, Floor 1, with upper floor heating pits pedestaled in northwest corner (30-cm scale)

Figure 2.20. Interior of south wall of Room 7; note the central line of spalls in conjunction with the core of large unworked pieces of sandstone (30-cm scale); F.H. Ellis and Al Hayes are examining trash in the plaza

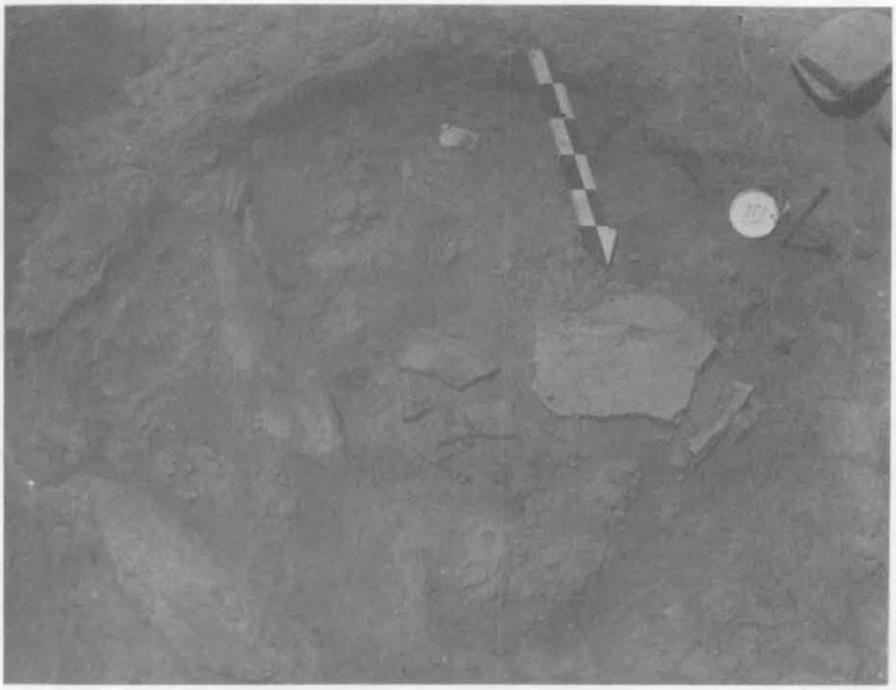


Figure 2.21. Unexcavated firepit, Room 7 (30-cm scale)

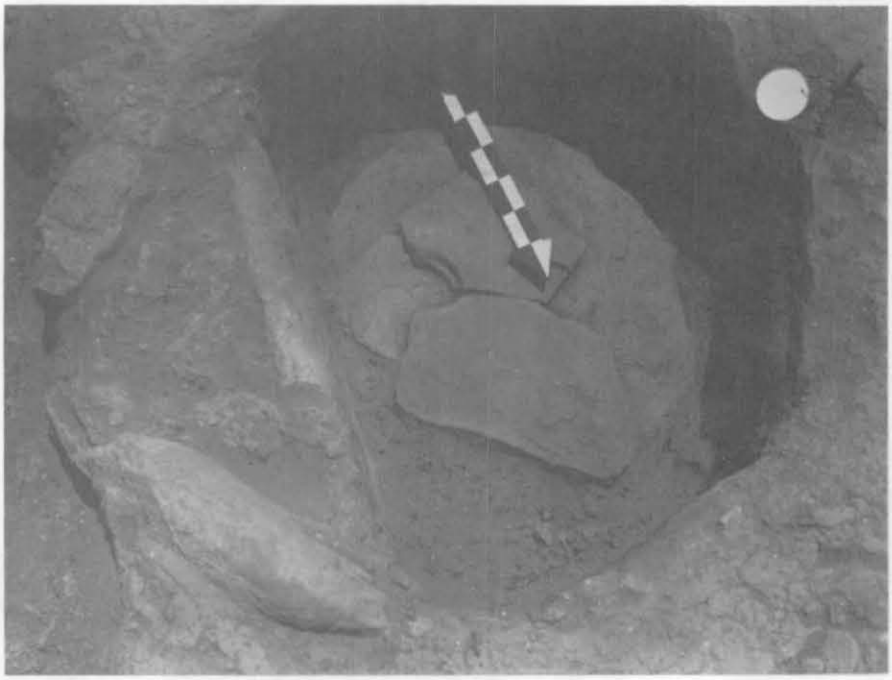


Figure 2.22. Partially excavated firepit, Room 7 (30-cm scale)

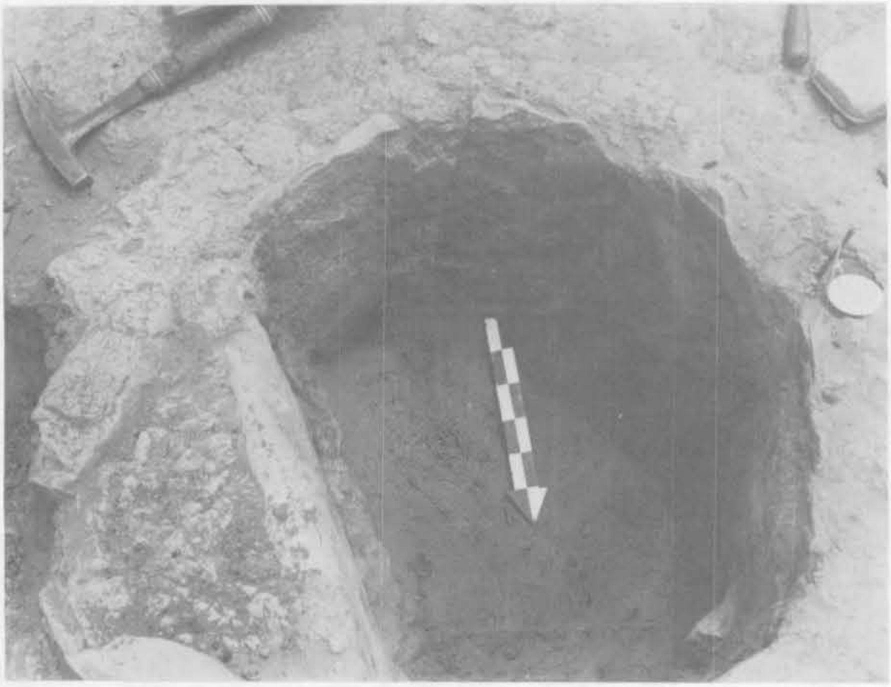


Figure 2.23. Excavated, remodeled firepit, Room 7 (30-cm scale)

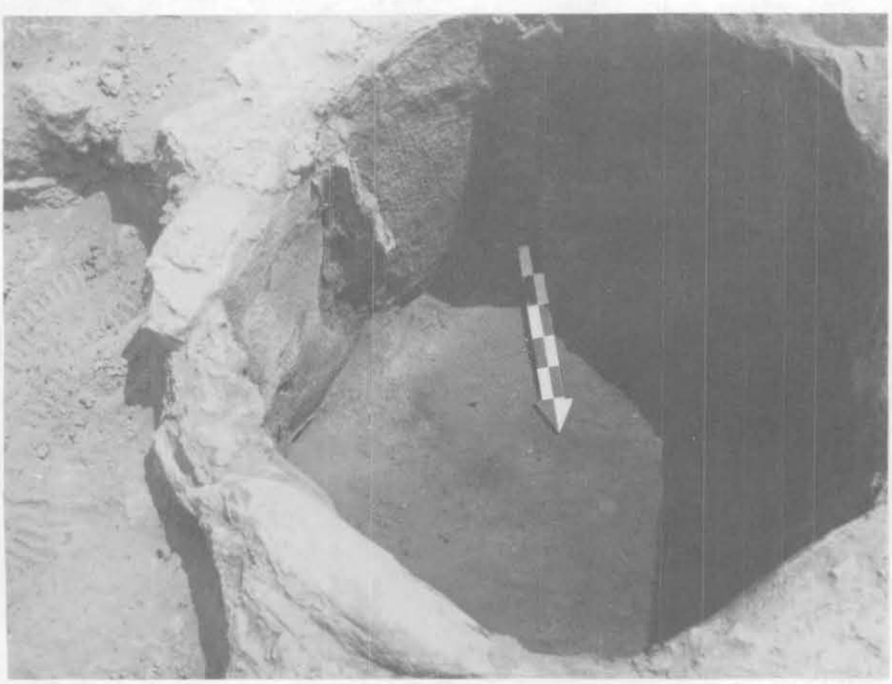


Figure 2.24. Original firepit, Room 7 (30-cm scale)

Pit 2: An unlined pit was recorded near the center of the south wall. Floor adobe is oxidized for 3 cm around the edge of this feature. Although this would seem to imply that the pit was used for heating, heating pits commonly have a greater diameter than depth, and this feature has a 1:1 ratio of depth to diameter. The nature of the fill was not recorded.

Floors 2 and 3:

Heating Pits: On both floors a shallow, amorphous 20-cm depression was found in the northwest corner of the room. Pits on both floors had an upright slab on the western side; both slabs exhibited some oxidation. Again, fill content of these pits was not recorded.

Artifact Assemblage: see Table 2.3.

Remarks: Although heating pits were reputedly located on upper floors in Room 7, they probably represent postoccupational activity unrelated to room function. No distinctive floors, either articulating with wall plasters (Figure 2.19) or exhibiting other features, were described for either level; neither were similar contemporary floor levels noted elsewhere in the site. Room 7 probably contained only one occupationally related floor.

At first glance, Floor 1 materials and features would seem to indicate a habitation; the firepit, however, is of inordinate volume. Comparisons with 629 and with Kiva A at 1360 reveal that firepits of this size (and expected volume) are normally found in pit structures and ramada areas, where they serve approximately 18 sq m; the volume of material from Firepit 1 (194.4 l; see Appendix 1), however, would suggest that it served a 36-sq-m area, approximately six times the floor area of Room 7. It is possible that, rather than being a habitation, Room 7 was a locus for activities such as curing and processing of foodstuffs.

Room 8

Location: The northeastern room of House 1.

Fill: Mixed adobe and sand filled the room to a maximum depth of 37 cm. The Room 8 fill contained less rock and higher sand content than other rooms in House 1. A good portion of the room has been lost to erosion; all of the northern wall and most of the eastern wall are missing. This apparently accounts for the more alluvial and less architectural composition of the fill.

Walls: The remnant of the eastern wall is simple masonry of large angular sandstone elements. The southern wall, shared with Room 7, consists of intervals of chinking and large ashlars and exhibits the greatest regularity of pattern in the Room 8 interior faces (Figure 2.25). The western wall, again full-width slab masonry, also exhibits occasional spalls.

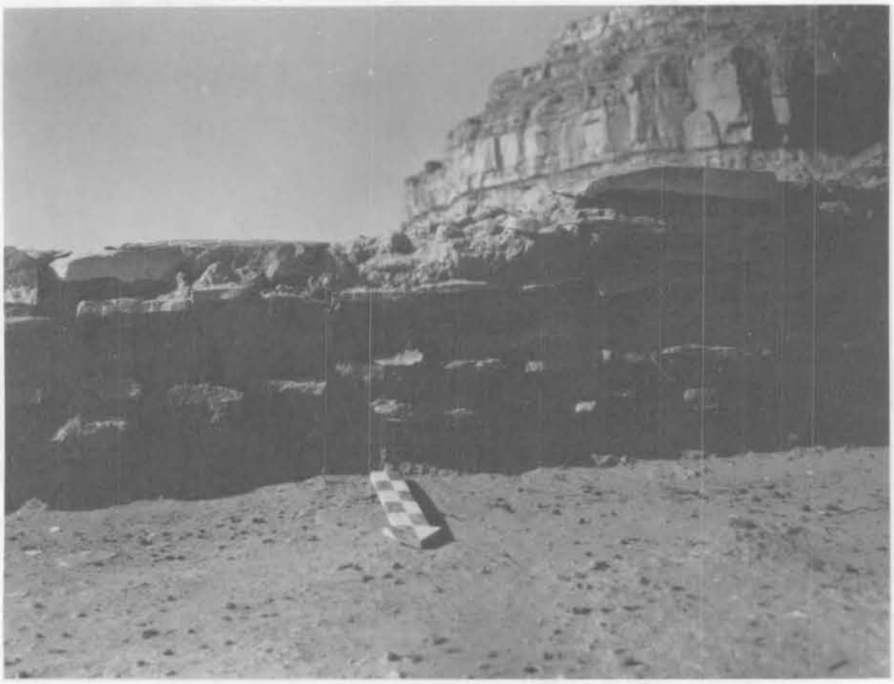


Figure 2.25. Interior of south wall, Room 8, with narrow tabular unmodified sandstone slabs in mortar

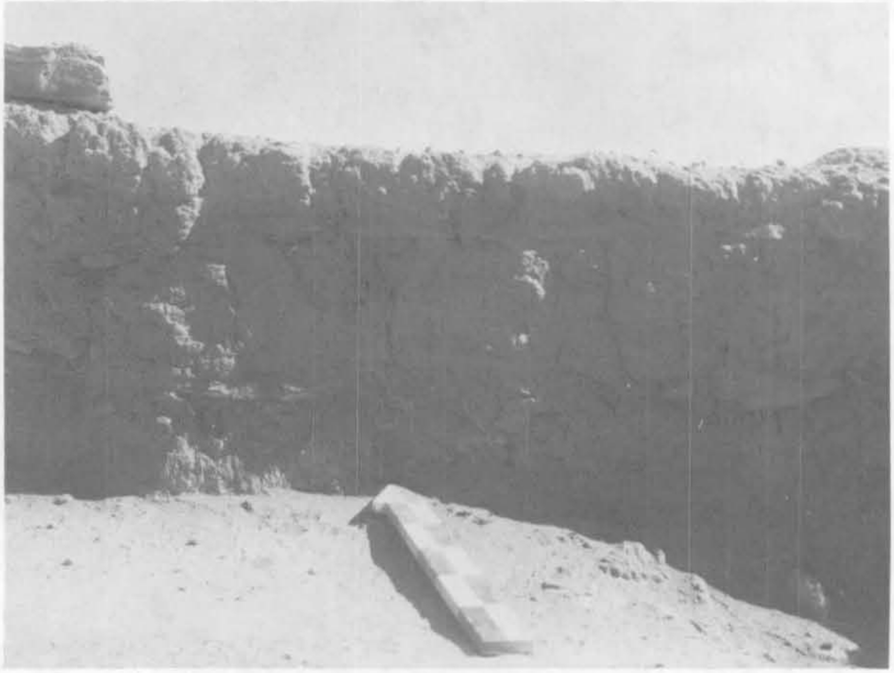


Figure 2.26. Interior of south wall, Room 9, with thin unmodified sandstone and ample mortar (30-cm scale)

Figure 2.27. Exterior of west wall, Room 9; tabular ashlar core exposed; the south end of this wall is contiguous with the wall shown in Figure 2.32; view to southeast (30-cm scale)

Figure 2.28. Rooms 3 and 10; Room 3 in foreground; note postholes and "slot" along the east wall of Room 10; view to east (15-cm scale)

Floor: A floor of unspecified nature (Floor 1) was found in the southwestern portion of the room. Approximately three-quarters of the floor has been lost to erosion.

Features: No features were found on Floor 1.

Heating Pit: Near the top of the fill, in the southeast corner, a small pit, 25 cm in diameter, was noted 10 cm above the floor. It was lined with small upright slabs; association with an upper surface is suggested, but unclear.

Artifact Assemblage: Two manos, one from fill, one on Floor 1.

Remarks: Assuming that Room 8 was approximately rectangular, its floor area would have been ca. 10.3 sq m, making it the largest room at 1360. Its size would imply that this was a habitation room. Unfortunately, severe erosion has removed both floor-related features and the bulk of the occupational fill, making it difficult to support this suggested room function. A heating pit located in the southeast corner may be related to postoccupational activities noted for similar nearby features in Room 7, although no higher "floor" level is described as being associated with the heating pit in Room 8. The three small heating pits found within the fill of Rooms 7 and 8 form a relatively tight group at 1360. As other rooms at the site do not have such features within the fill, these firepits may represent an isolated, postoccupational, limited-activity area associated with the occupation of 29SJ1278.

Room 9

Location: The northwestern room of House 1.

Fill: Fill was of structural debris, predominantly adobe.

Walls: All walls are simple masonry of large tabular pieces of unworked sandstone. The south wall exhibits a coursed spall veneer over this masonry core. Other walls have occasional spalls in evidence, suggesting eroded spall veneers. All walls have adobe foundations (Figures 2.26, 2.27).

Floor: Room 9 has suffered extensive erosion, especially at the northern end. No plastered floor remains, but an irregular surface dropping 18 cm from the southern to northern wall bases is mentioned in the notes.

Features: No floor features were found.

Door: An irregular breach of 45 cm was found in the west wall. This ill-defined feature is unique relative to the architecture of this site, as it was the only exterior door noted; this identification is questionable, however.

Artifact Assemblage: see Table 2.3.

Remarks: As was the case for Room 8, any inferred function for this featureless room would be tenuous. The integrity of the artifact assemblage attributed to this room is also questionable because of the breach in the west wall. Given its irregularity, there is a high probability that this "door" is an erosional, rather than a man-made feature. Therefore, cultural material recovered from the room may include some contributions from alluvial redeposition. Nevertheless, the presence of abraders and an anvil in this assemblage minimally suggests storage of materials for craft production (as opposed to mealing equipment) as one function of this room.

Room 10

Location: In the center of House 1, between Rooms 3 and 6 (Figure 2.28).

Fill: Undifferentiated sandy clay from structural melt; similar to Room 3.

Walls: The north and east walls and the western portion of the south wall are masonry of large, unworked tabular sandstone elements with adobe footings. Small spalls occur in the north wall. The west wall, which is 20 cm lower than the others, and the eastern two-thirds of the south wall are adobe.

Floor: A single hard-packed clay floor was found.

Features:

Floor 1:

Postholes: Two small, unlined postholes were found along the northern east wall.

Slot: A rectangular feature, partially incorporated into the east wall, was found just south of the two postholes (Figure 2.29).

Artifact Assemblage: Combined with Room 3; see Table 2.3.

Remarks: Room 10 was originally designated as a part of Room 3. The western wall, ignored during the initial (field) room designations and descriptions, actually does exist (Figure 2.28). Field notes indicate that this area contained a considerably higher density of trash than the rest of the fill. This may be related to a pile of artifacts located just to the south in Plaza Area 5. The reality of the south wall has been questioned, both by Morrison and by the author, but testing in 1979 indicated that the floor does not extend under it and that consolidated adobe seems to make up a wall. How much this consolidation is a result of the Japanese mortar preservative testing (a thin, rubbery film was visible on the wall in 1979) and of dehydration since 1974 is unknown. Based on recent tests, the presence of the south wall has been confirmed (thereby making Room 10 a true room and not an extension of Plaza Area

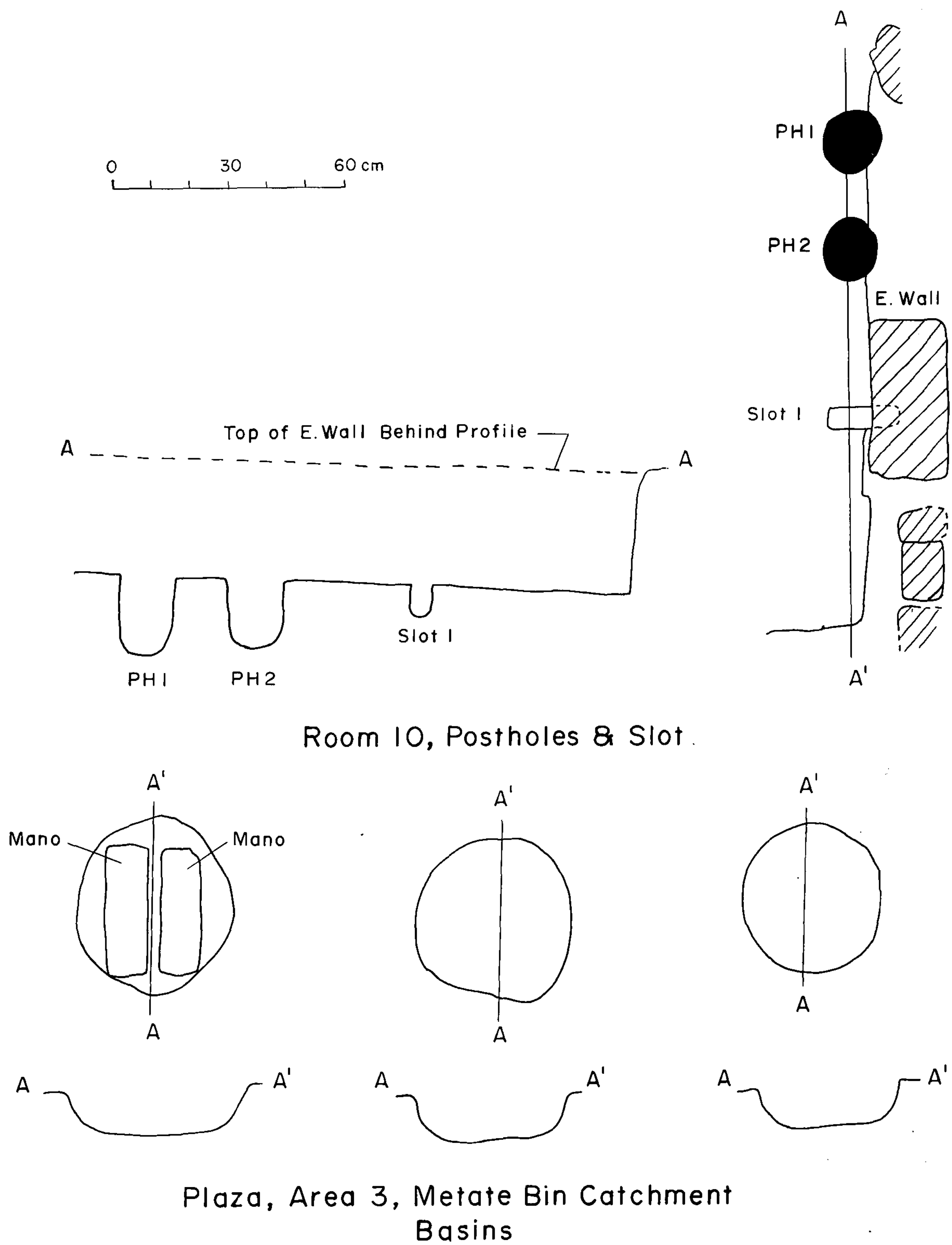


Figure 2.29. Profiles -- Room 10 postholes and slot; Plaza Area 3 metate bin catchment basin

5), but it is architecturally inconsistent with other wall construction at the site.

Room 11

Location: West-central room in House 1 (Figure 2.30).

Fill: The room was filled with structural debris, a mixture of sandstone and rewashed adobe.

Walls: All walls are based in adobe foundations; cored with large, angularly tabular sandstone; and veneered with mortar containing 5-to-10-cm, coursed spalls (Figure 2.31). The varying degrees of erosion on this veneer give an appearance of architectural variability (Figure 2.32). The veneer is best preserved on the north and south walls.

Floor: A poorly preserved, apparently use-compacted surface within the room is similar to other floors recorded at the site.

Floor Features:

Firepit: In the center of the room is an oval firepit constructed of upright slabs and adobe mortar. It was filled with gray ash and charcoal. Small charred corncobs were also present. Oxidation of flooring and adobe was noted for a 5-cm margin around the lip of the firepit (Figure 2.18).

Heating Pit: A 35 cm circular pit in the north-central portion of the floor contained adobe room fill, but no charcoal. A 1-cm-wide fire-reddened lip marks this shallow, structureless pit (Figure 2.33).

Postholes: Four 12-cm-diameter postholes were observed, one near each of the room corners. The northern postholes contained lignite packing; the fill of the southern postholes included sandstone slabs. None contained wood.

Artifact Assemblage: See Table 2.3.

Remarks: Room 11 has a central firepit with dimensions and volume comparable to firepits commonly found in pit structures and open ramada surfaces. As noted for Room 7, firepits of this size generally serve much larger areas than Room 11, and this feature would seem to greatly exceed the domestic heating requirements of the room. Certainly such a firepit would render auxiliary heating features, such as Heating Pit 1, superfluous. More importantly, such diversity of heating features in rooms warns against simplistic equations of firepit=domestic habitation room and lack of firepit=storage room. Given the unusual capacity of the firepit, Room 11, like Room 7, is less likely to have served as a simple habitation and more likely to have fulfilled some special function requiring a large heat source, such as bulk food processing.

Figure 2.30. Room 11 -- Floor 1 fill and structural rubble in southeast corner

Figure 2.31. Interior of west wall, Room 11; detail of spall and unmodified tabular sandstone masonry

Figure 2.32. Exterior of west wall, Room 11; differential erosion is evident between this segment of wall and the portion visible in Figure 2.27; the adobe wall of Bin 1 is visible in the lower right (30-cm scale)

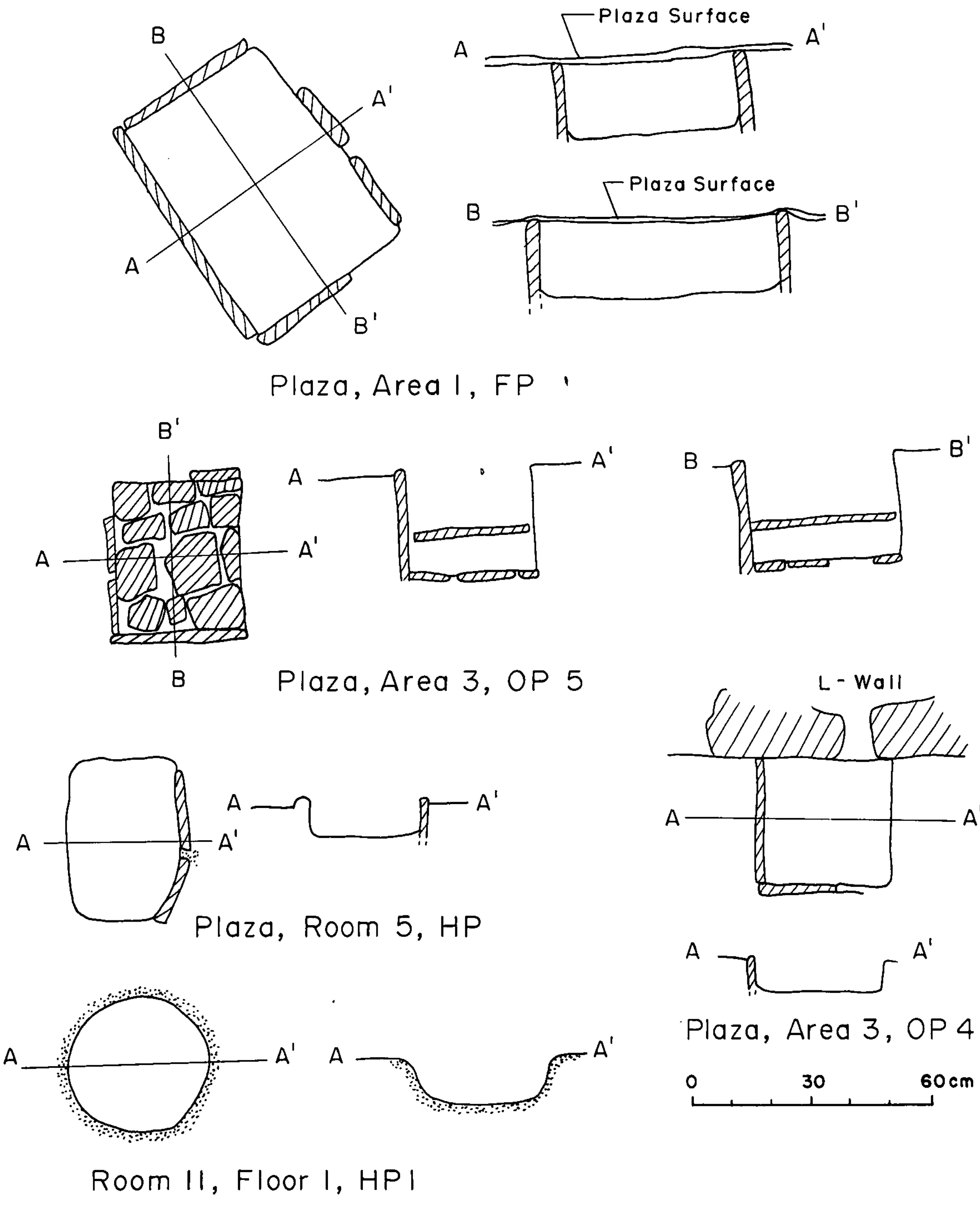


Figure 2.33. Fire, heating, and other pits at 29SJ1360

Bin 1

Location: Extending north from the exterior north wall of Room 10 (Figure 2.1).

Fill: Structural melt from the walls.

Floor: A single, flat, slightly packed surface was noted on ridge sands.

Features: There were no floor features, but an adobe plug, 15 cm in diameter, was noted in the north wall.

Artifact Assemblage: Eleven sherds of Red Mesa Black-on-white were recovered from the fill; several pieces of a single shell bracelet were found on the floor.

Remarks: This feature, given its location and shape and the presence of the wall plug, looks remarkably like a parrot bin. The presence of a macaw in the faunal assemblage from the site lends some support to this functional assessment.

PITHOUSE B

Location: Downslope from and south of House 1 (Figure 2.34).

Fill: Structural collapse and filling of the depression created three distinct components. The major fill constituent was an alluvial and aeolian sand matrix with a low charcoal content. Except for the rocks over Burial 2 and the central floor features (Figure 2.35), this sandy fill was uniform throughout the greater portion of the main chamber. The second component consisted of structural debris. Lying directly over the bench, 90 cm below the surface, were the decomposed remains of the northern stringer beam and vegetal-impressed adobe (Figures 2.36, 2.37). Quantities of adobe were found close to walls from floor fill to bench level. The fill between the wing walls and the south wall contained a concentration of masonry rubble that stopped just short of the floor (Figure 2.38). The third component, the floor fill, was of higher organic content, indicating remaining roof fall. This natural stratigraphy was crosscut by four arbitrary levels: 90 cm of backhoed sandy overburden to approximately bench level (Figure 2.39), two 40-cm levels (Figure 2.40), and a 20-cm level to floor fill (Figure 2.41). Floor fill and floor were cleared as a unit. The nature of the fill between the floors was not specified.

Walls: Three types of wall construction were noted: direct plaster over native soils (Figure 2.42), simple masonry (Figures 2.38, 2.43, 2.44), and massive vertical sandstone slabs with a thick covering of

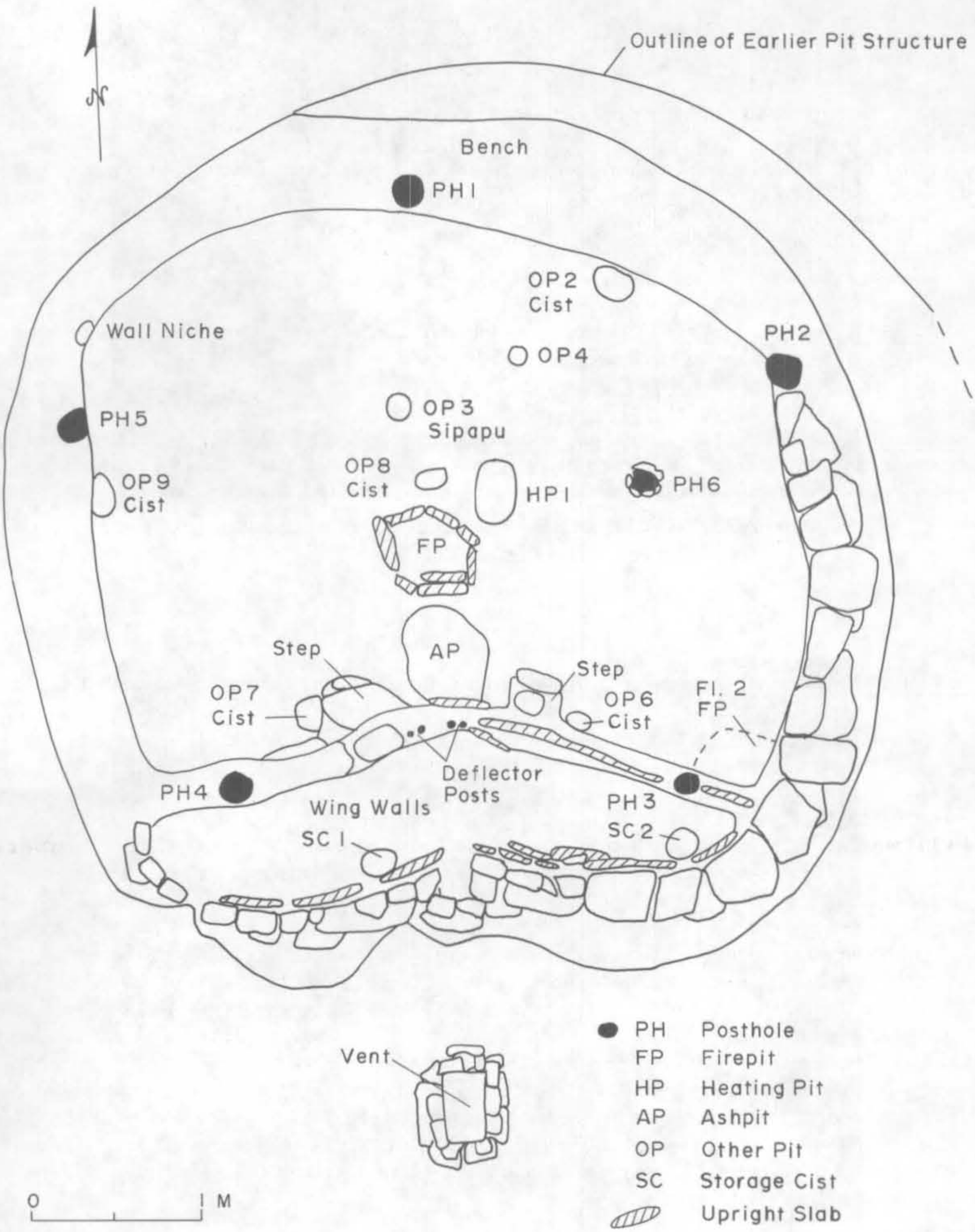


Figure 2.34. Plan of Pithouse B

Figure 2.35. Pithouse B, remains of possible entry hatch over the firepit

Figure 2.36. Pithouse B, remains of northern stringer beam on the bench

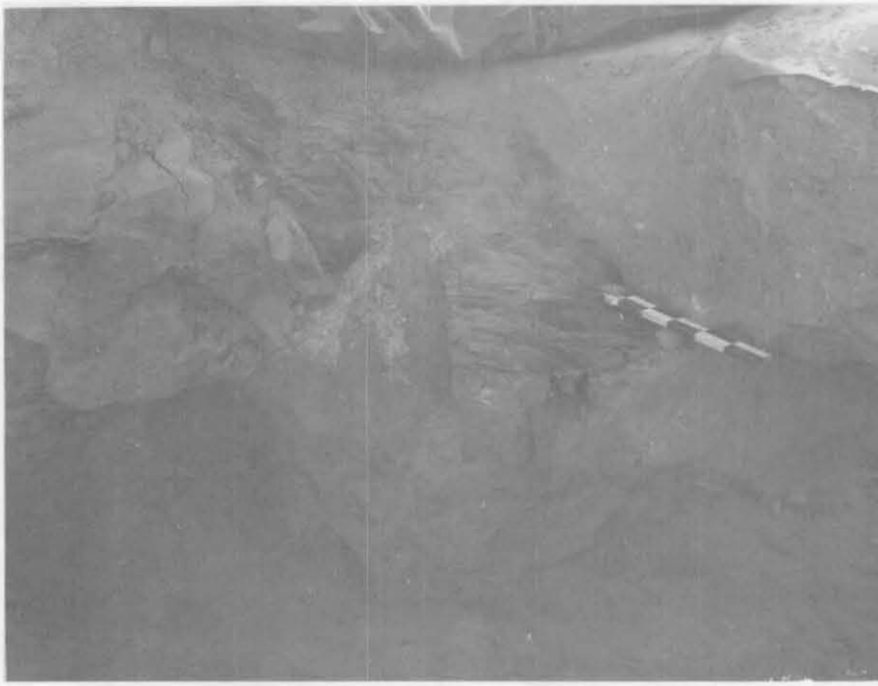


Figure 2.37. Pithouse B bench with decomposed northern stringer beam

Figure 2.38. Pithouse B, masonry and metates from behind the wing wall

Figure 2.39. Pithouse B, excavation of Level 2 after removal of overburden (Level 1) above bench with backhoe

Figure 2.40. Pithouse B, excavation of Level 3; view to south

Figure 2.41. Pithouse B, excavation of floor fill (Level 4); C.R. Morrison is photographing recovery of shale heishi necklace from Burial 2

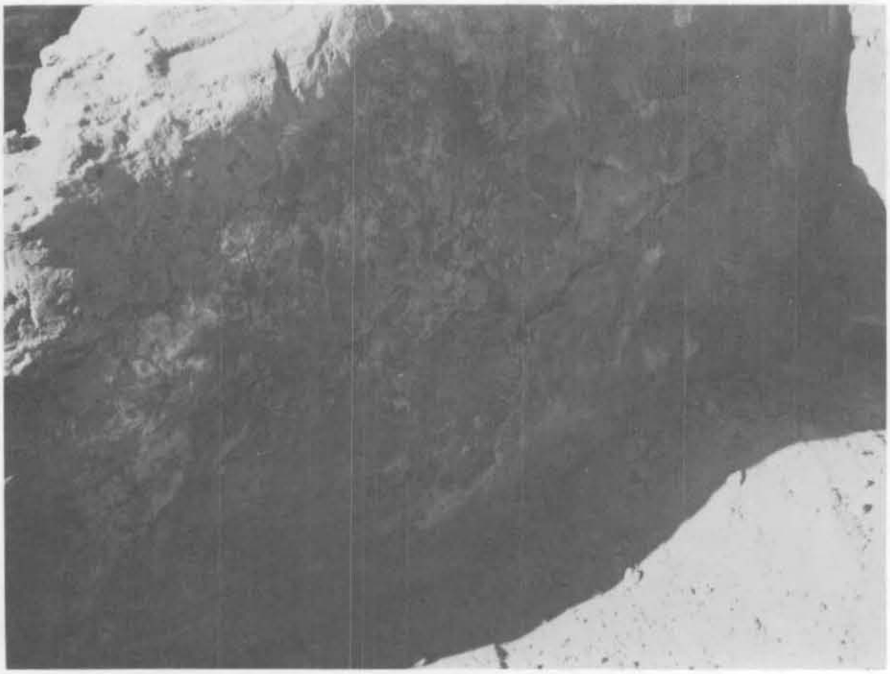


Figure 2.42. Pithouse B, mottled plaster on western wing wall

Figure 2.43. Pithouse B, Posthole 2 and east wall masonry in the main chamber

Figure 2.44. Detail of south wall masonry in Pithouse B; note fronting upright slab at wall base (30-cm scale)

mud. Most of the wall and bench construction in the main chamber consists of plaster over sand (Figure 2.45). This plaster is described as comprising at least eight layers of various colors, the last a soot-blackened layer about 1.5 cm thick. The southern wall and the eastern portions of the main chamber adjacent to the wing wall are of simple masonry against native soils. Vertical slabs are restricted to the southern wall base as a facing for the simple masonry. Wall widths range from 14 to 56 cm, thickening from west to east. The location and amount of rubble in the fill suggest that this wall rose above bench height, probably above prehistoric ground surface, lending direct structural support to the roof.

Floors: Two clay floors of unrecorded thickness were located approximately 1.95 and 2.15 m below the surface in the main chamber. Unlike the usual procedure at the site, these floors were numbered from top to bottom, with the upper floor being Floor 1 and the lower Floor 2. A single clay floor was laid over sterile soil in the area behind the wing walls; it is 30 cm above the final main chamber floor.

General Architectural Features:

Bench: Around the perimeter of the main chamber is a 20-to-45-cm-wide bench about 1.10 m above the floor. The bench is widest on the north and thins along the sides toward the wing wall. At the wing wall it terminates and merges into the southern masonry walls of the pithouse (Figures 2.46 through 2.52).

Wing Walls: Rising above the main chamber floor approximately 1.17 m are two 20-to-25-cm-thick wing walls enclosing a small area (1.8 sq m; Table 2.1) in front of the ventilator. West and east wing walls are 1.15 m and 1.65 m long, respectively, and they bow from 20 cm to 60 cm north of the south wall. An opening, offset to the west and roughly 75 cm wide, provided access between the area enclosed by the wing walls and the main chamber. The western wing wall is well preserved, with molded plaster and adobe intact. The eastern wing wall is seriously eroded, exposing an internal core construction of massive upright slabs to which considerable amounts of puddled mortar were applied (Figures 2.41, 2.53).

Ventilator: A rectangular masonry-lined ventilator shaft opens directly onto the raised floor behind the wing walls near the center of the southern wall. Interior opening dimensions are roughly 25 by 20 cm. The vertical shaft is located about 1.30 m south of the south wall interior and is about 35 by 25 cm. The ventilator was only partly excavated.

Deflector: No deflector per se was recorded, but four small postmolds at the lip of the wing wall opening and between the firepit and the ventilator may represent the foundation for either a screen or a jacal feature serving this purpose. Steps, facilitating access between the wing wall area and the main chamber, are located at either side of the ashpit and deflector postmolds.

Figure 2.45. Pithouse B, Floor 1, general view to west

Figure 2.46 Pithouse B, west bench

Figure 2.47. Pithouse B, northwest bench

Figure 2.48. Pithouse B, northwest bench

Figure 2.49. Pithouse B, northwest bench

Figure 2.50. Pithouse B, northwest bench

Figure 2.51. Pithouse B, north bench

Figure 2.52. Pithouse B, east bench

Floor 1 Features:

Ashpit: A plastered circular pit, roughly 51 cm in diameter, was located in the upper floor between the firepit and wing walls. The nature of the fill was not recorded.

Firepit: The central firepit was roughly rectangular or D-shaped and slab-lined. Except for a raised double row of slabs and an adobe collar separating firepit from ashpit, slabs were flush with the floor. Charcoal and ash filled the feature.

Heating Pit: An oval heating pit, measuring 40 by 25 cm, was located a few centimeters northeast of the main firepit (Figure 2.51).

Sipapu or Ladder Rest: A 15-cm-diameter pit (Pit 3) located midway between the north wall and the firepit was designated as the sipapu. A companion pit (60 cm to the east), Pit 4, was of similar size and morphology, and it has been suggested that these two features were part of a ladder-rest arrangement. Given the distance between the two, their position on the pithouse floor, and vertical orientation of the pit walls, it seems more likely that these were independent features.

Storage Pits: Two large storage cists were found, one on each side of the wing wall area. The eastern cist was slab-covered (Figures 2.53, 2.54).

Other Pits: Six smaller circular and oval pits of indeterminate function were located on the floor of the main chamber (Figures 2.55, 2.56). All except Pit 8 and Pit 4 were along the periphery of the chamber. Pit 6 and Pit 7 were adjacent to the steps, one on either side of the ashpit. No record was made of the nature of fill or material contents for any of these pits.

Steps: On either side of the ashpit were steps rising to half the height of the floor area behind the wing walls. The eastern step, which was about 30 by 28 cm, exhibited a vertical-slab facing with a horizontal stone forming its upper surface. A second rectangular stone, the access step, was set into mortar on the lip of the wing wall floor.

Postholes: Five postholes ranging from about 10 to 15 cm in diameter were positioned around the main chamber in the bench and wing walls (Figures 2.34, 2.43, 2.57, and 2.58). A sixth posthole, apparently masonry-lined, was recorded in the northeast portion of the floor. This identification and the function of this feature are uncertain. Four of the postholes formed a rectangular arrangement within the main chamber. The two wing wall postholes were slightly closer together than the postholes in the northeast and northwest corners of the bench. The fifth posthole, located on the north-central bench, would have provided additional support under the long northern stringer. All bench postholes were lignite- and adobe-packed and extended for an unspecified distance below the second floor (Figure 2.58). Wing wall postholes were oriented vertically, while bench postholes were canted to the interior of the pithouse at an angle of at least 5 degrees. The northeastern

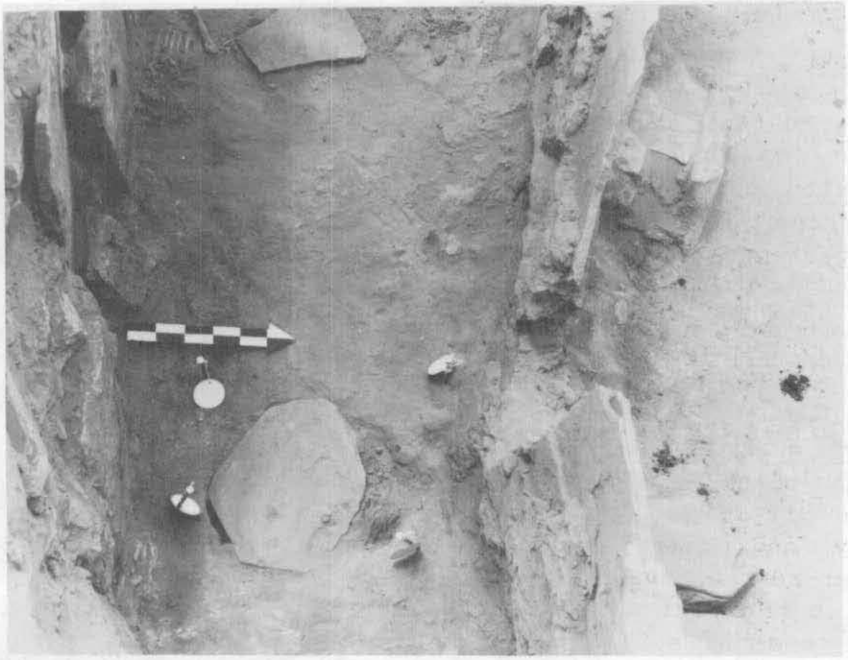


Figure 2.53. Pithouse B, Storage Cist 2 and cover in the area behind the east wing wall (30-cm scale)

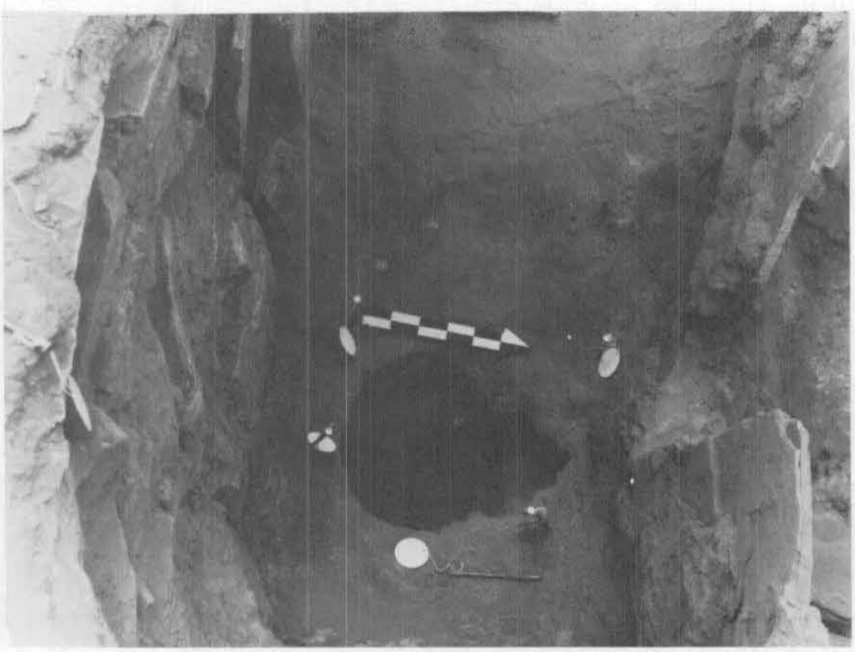


Figure 2.54. Pithouse B, Storage Cist 2 uncovered (30-cm scale)

Figure 2.55. Pithouse B, Pit 2 and spall patch on north wall (30-cm scale)

Figure 2.56. Pithouse B, Pit 9 and passive lapidary abraders; view to west

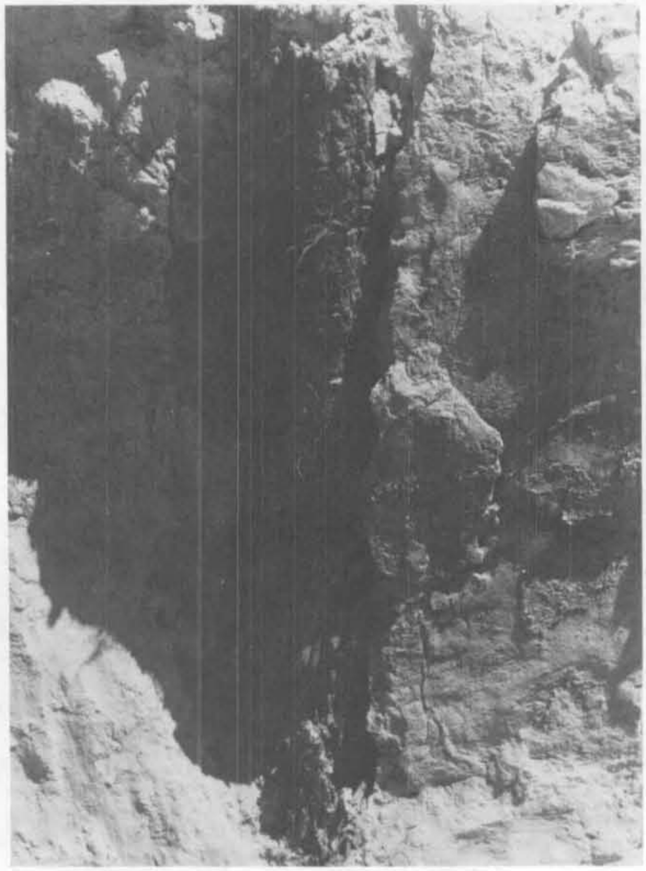


Figure 2.57. Pithouse B, Post 1 in center of north wall

Figure 2.58. Pithouse B, detail of Posthole 1 showing lignite packing

posthole was most severely angled, emerging from the wall before reaching the top of the bench. Wing wall postholes were oriented toward the ventilator side, were plastered over as were those in the bench, and apparently did not contribute to the structural support of the wing wall itself.

Wall Niche: A small rectangular niche was recorded a few centimeters above the floor, just north of Posthole 5 (Figure 2.59).

Floor 2 Features:

Firepit: Located in the southeast corner of the main chamber is a 38-by-30-cm firepit of unspecified construction. Fill was of charcoal and ash. The position of this firepit suggests that the earlier floor was considerably offset to the southeast from the main excavation designated as Pithouse B. The pedestaling of features from Floor 1 probably interfered with locating additional features on the second floor. The offset between the floors strongly suggests two distinct pit structures rather than a simple replastering and continued use of the original house.

Artifact Assemblage: See Table 2.4.

Remarks: The construction of Pithouse B in the depression of a former pit structure, the presence of a leveling fill over the earlier floor, and the general location of Pithouse B with respect to House 1 suggest a reoccupation of the area after a hiatus of undetermined length. The lower pit structure is possibly associated with the occupation of House 1, Rooms 2, 3, and 4. This occupation would have constituted a small, single-family Pueblo I habitation unit similar to other such units found in Chaco Canyon.

The fill of the upper pit structure, Pithouse B, reveals a rapid decomposition of the structure without apparent salvage of the main support beams. The presence of the northern lateral on the bench, of roofing impressions and masonry in direct floor contact in the southern portion of the structure, and of the probable hatchway masonry centered in the fill over the firepit suggests that the structure was purposefully destroyed without the removal of either portable artifacts or valuable architectural elements. The abundance of storage, heating, and miscellaneous pits would suggest that this was the principal (excavated) habitation structure at 1360. The multitude of utilitarian items of stone and bone, the culinary pottery, the apparent division of storage from living areas, and the presence of two adults, three children, and two dogs on the floor confirm the domestic function of Pithouse B.

PIT STRUCTURE C

Location: The easternmost pit structure; located below and east of Room 1 and the L-shaped plaza wall of House 1.

Figure 2.59. Pithouse B, wall niche in northwest corner (30-cm scale)

Table 2.4 Artifacts from other structures

Provenience	Ceramics	Chipped Stone	Other Stone	Bone	Bone Tools	Other	Comments
Pithouse B							
fill	1376	62	67	87	6	22 bulk minerals, 10 pieces of turquoise, 1 shell	including 28 manos, 24 metates, 4 active abraders, 2 anvils, 1 maul fragment, 3 hammerstones
floor	380	161	38	60	40	12 bulk minerals, 37 pieces of turquoise, 1 shale necklace, 4 shells, 10 corncobs, 1 other ornament, 2 matting impressions, 5 human burials	including 2 manos, 6 metates, 8 active and 8 passive abraders, 6 polishing stones, 6 hammerstones, 2 light points, 1 flesher (?)
Pit Structure C							
fill	100	-	-	3	1	7 bulk minerals	
House 2							
fill	202	3	1	-	-		includes 1 metate
floor	-	3	-	-	-	1 other ornament, 3+ corncobs	
Kiva A fill	5412	171	122	358	22	35 bulk minerals, 30 pieces of turquoise, 3 shells, 4 other ornaments, 28 corncobs, 1 textile fragment	includes 56 manos, 7 metates, 16 active, 1 passive, and 1 grooved abraders, 8 polishing stones, 1 anvil, 2 stone bowls, 26 hammerstones, 6 light points, 3 knives, 1 endscraper, 1 preform

Fill: Sandy brown alluvial matrix with charcoal and ash; extent and depth are unknown.

Walls: Probably 3 to 5 mm of buff plaster over native soil, as indicated by finish on the upper bench.

Floor and Features: No information.

Artifact Assemblage: See Table 2.4.

Remarks: Pit Structure C is a largely unexcavated structure of indeterminate function. A test on its eastern margin provided some information about its nature. Excavation south of the L-shaped plaza wall revealed a hole approximately 20 cm below site surface and under the adobe plaza surface associated with House 1. A sandy brown matrix with ash and charcoal lenses was removed from the east side of the pit structure to a depth of 90 cm below plaza surface. At 73 cm a shelf, probably the bench, was encountered. Here, 3 to 5 mm of plaster had been applied over native soils, suggesting construction similar to that of Kiva A and portions of Pithouse B. Extrapolation from the bench curve indicates a pit structure with a radius no greater than 2.5 m. This structure appears to be centered near the northwest angle of the L-shaped wall, which is clearly built over the pit structure fill.

OTHER PIT STRUCTURES

Two ventilators, evidence of other unexcavated and unnumbered pit structures, were identified in the area between Kiva A and Pithouse B. Both were located during stripping of overburden from the ramada surface.

Feature X: Approximately 6 m southwest of Pithouse B, a rectangular masonry ventilator opening was found. It is lined with adobe (Figures 2.60, 2.61) and is oriented north-south, with interior dimensions of 35 by 25 cm. Masonry extends outward for 70 cm around the opening. Upper fill consisted of collapsed masonry and alluvial sand. The skull and miscellaneous bones of an infant (Burial 6) were located beneath the masonry rubble at 40 cm below surface.

Feature Y: This 40-cm-square ventilator opening was uncovered about 1.5 m east of Kiva A. A 20-cm adobe lip is present, but excavation of 40 cm of sandy fill indicated only spotty interior masonry lining. The condition of this feature is probably due to erosion.

Artifact Assemblage: Artifacts recovered from Features X and Y are included in ramada fill tabulations (see Ramada discussion below).

Figure 2.60. Ventilator X before excavation (30-cm scale)

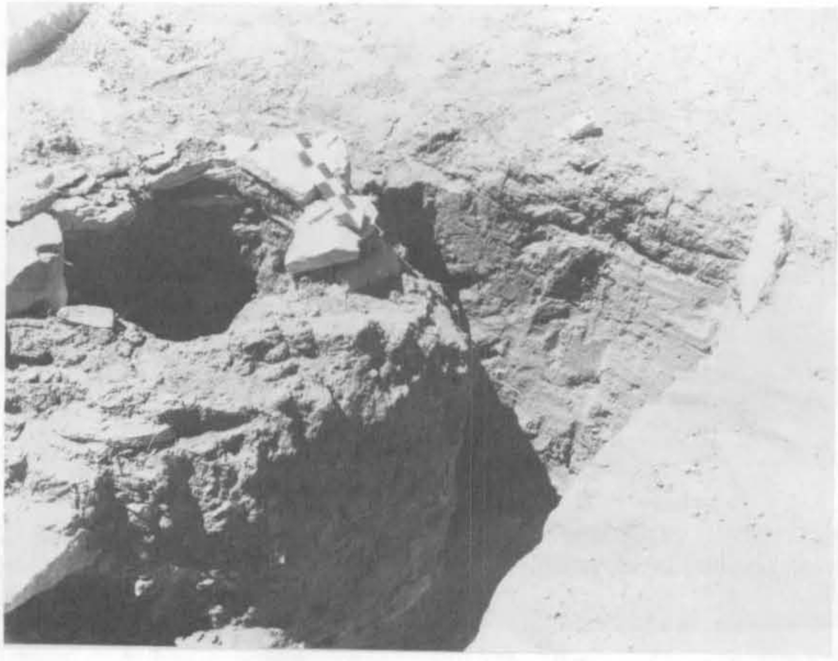


Figure 2.61. Ventilator X after excavation (30-cm scale)

HOUSE 2

House 2 consists of fragmentary room walls built over an earlier ramada surface (Figure 2.62). The extent of the ramada is indicated by the continuous alignment of postholes at and below the wall bases of rooms in House 2. Little occupational fill remained over the native ridge soil. Extreme erosion and possible salvage of construction material had reduced the architecture and cultural fill to a minimum.

Six rooms may be tentatively assigned to House 2. The northeastern wall of Room 1 extends beyond the room corner and into the area between Rooms 1-4 and Kiva A. This suggests that there were two pairs of small rooms (Rooms 1 and 2 and Rooms 3 and 4), each fronted by a larger room, since destroyed. Such suites of larger fronting rooms backed by paired smaller rooms are an architectural arrangement common to Chaco Canyon and other Anasazi areas. Given the ubiquity of these suites, the suggestion that such an arrangement characterized House 2 is not inappropriate, even though no other archaeological remains of larger front rooms were encountered in House 2.

General Remarks: The postholes mentioned below in the description of House 2 will be further treated in the section concerning the ramada, since they are probably functionally associated with the latter. Their dimensions are shown with other features from the ramada in Appendix 1. The few artifacts recovered during testing of House 2 (Table 2.4) were provenienced as a single unit, without finer subdivision by room or test trench.

Room 1

Location: The second room from the south end of the roomblock.

Fill: Fire-reddened sands were found in the central and southern portion of the room. Trenching revealed that this burned material overlay and interfingered with sterile tan sands below.

Walls: East and south wall fragments are adobe-based with a course of large tabular sandstone elements on top, suggesting simple masonry. The north wall is unique in terms of House 2 architecture. This wall is 50 cm wide and consists of a core of large tabular masonry bordered by smaller, vertical upright slabs. The wall extends some 2.7 m beyond the east wall of Room 1, implying a fronting room, as noted above. No west wall was found.

Floor: No formal floor was found.

Features:

Feature A: A large burned spot, centrally located within the room, was designated as a "floor burn"; the nature of its association with the

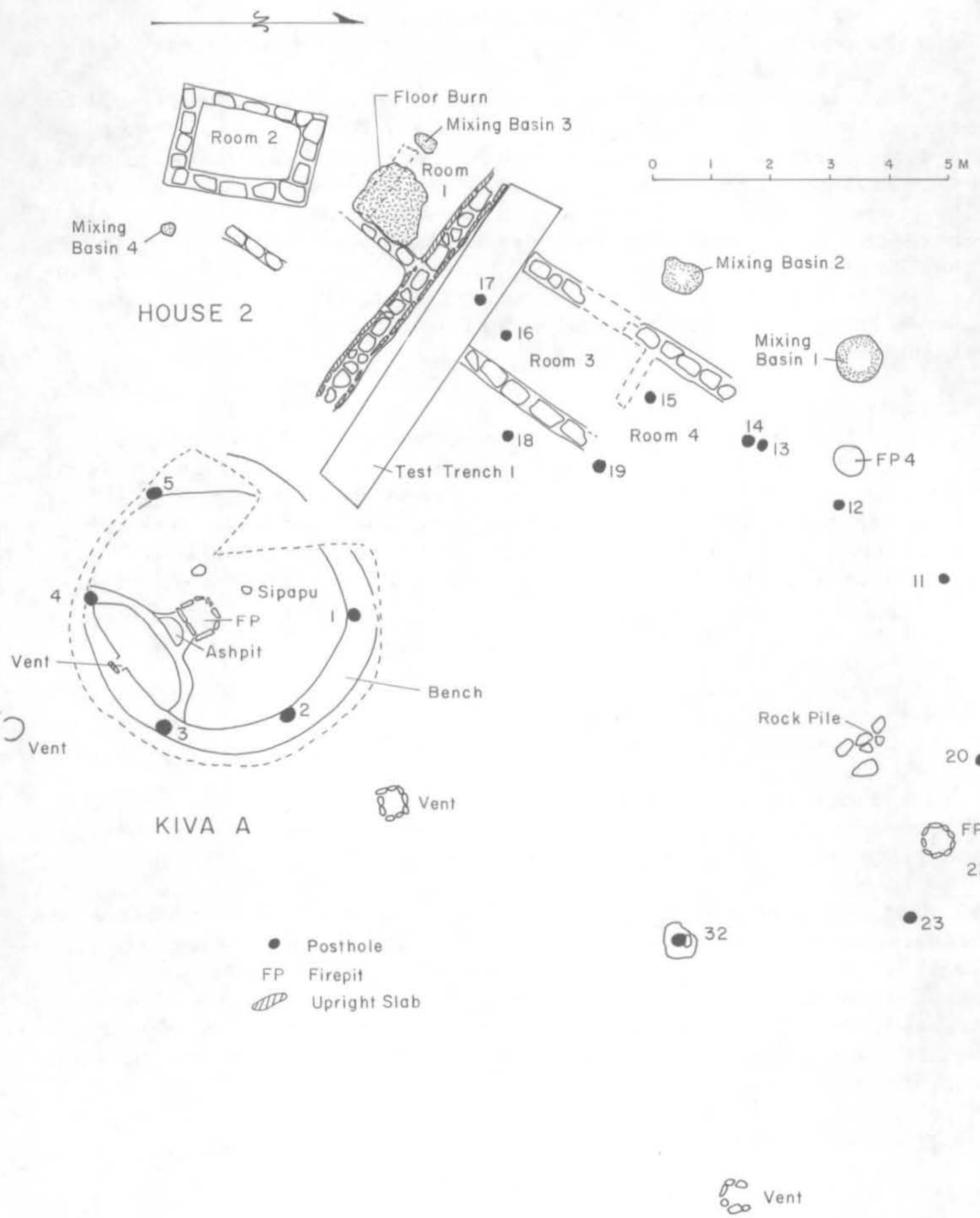


Figure 2.62. House 2, Kiva A, and associated extramural areas

room's occupation, collapse, or postoccupational use is unknown. Associated artifacts suggest that the feature is considerably more recent than Room 1. Feature A provided archaeomagnetic sample ESO 934; this sample was not datable.

Remarks: None.

Room 2

Location: The southwestern room in House 2.

Fill: This was the only room in House 2 containing abundant cultural fill, but it was not excavated.

Walls: Adobe foundations overlain by simple masonry of large tabular sandstone elements were noted.

Floor and Features: No information.

Remarks: None.

Room 3

Location: Northeast of and adjacent to Room 1.

Fill: Sandy overburden. Only the wall bases were explored, leaving the bulk of the 5 to 10 cm of cultural room fill intact.

Walls: A single course of simple adobe-based masonry exists in the east wall, but masonry is only suggested by a single stone on the west. Only adobe foundations remain of the north wall.

Floor: No floor was found.

Features:

Postholes: There are two postholes, each about 25 cm in diameter, in the southern portion of the room. The southernmost posthole was located during exploratory trenching below wall bases (Figure 2.63).

Remarks: None.

Room 4

Location: Northernmost room in House 2.

Fill: Wind-blown sandy overburden. Room fill was left in place.

Figure 2.63. House 2, test trench through Room 3 to Kiva A; Chacra Mesa in background; view to southeast

Walls: Four large aligned sandstone elements on adobe foundations suggest the west wall. Only adobe foundation remains for the southern crosswall. No northern or eastern walls remain.

Floor: None.

Features:

Posthole: A single posthole was recorded in the southwest corner. Surface indications are of a 20-cm-diameter, lignite-packed feature with two sandstone shims.

Remarks: None.

KIVA A

Location: The westernmost of five possible pit structures, Kiva A is southeast of and downslope from House 2 (Figure 2.64).

Fill: Kiva A was trash-filled (Figures 2.65, 2.66). Trash deposition began following collapse of the southwestern wall. Test trenching and removal of mixed alluvium and surface trash overburden revealed ash-stained cultural fill that contrasted sharply with the material outside the kiva boundaries. Fill was removed in four 40-cm arbitrary levels; the density of cultural material in the fill increased below 60 cm. Level 4 (1.30-1.70 m) was remarkable for abundant quantities of rock debris. The stratigraphic balk collapsed before a profile could be made of the fill, but Figure 2.66 suggests that a minimum of five macrolayers were present, with finer lensing evident in Figure 2.65. The trash came from upslope, and the deposits dipped to the west against the collapsed southwestern wall. Given this direction of deposition, the trash appears to have come from occupants of House 1. No evidence of roofing was found in the kiva fill; the 10-cm floor-fill level also consisted of postoccupationally deposited trash.

Walls: Walls consist of a 5-to-10-mm-thick coating of buff plaster over native aeolian ridge sand.

Floor: A single floor of tan, well-packed adobe plaster was uncovered at a depth of 1.80 m below the modern surface (Figures 2.67, 2.68). Only this single floor, without replasterings, patching, or plugged or extraneous features, was laid over the sterile soil.

Features:

Bench: Along the east and northeastern portion of Kiva A, a 35-cm-wide bench was encountered 1.40 m above the floor. The bench was created by stepping back the native soil to the desired width and then plastering the subsoil face. A soot-blackened layer of buff plaster, 5 to 10 mm thick, was recorded for this feature.

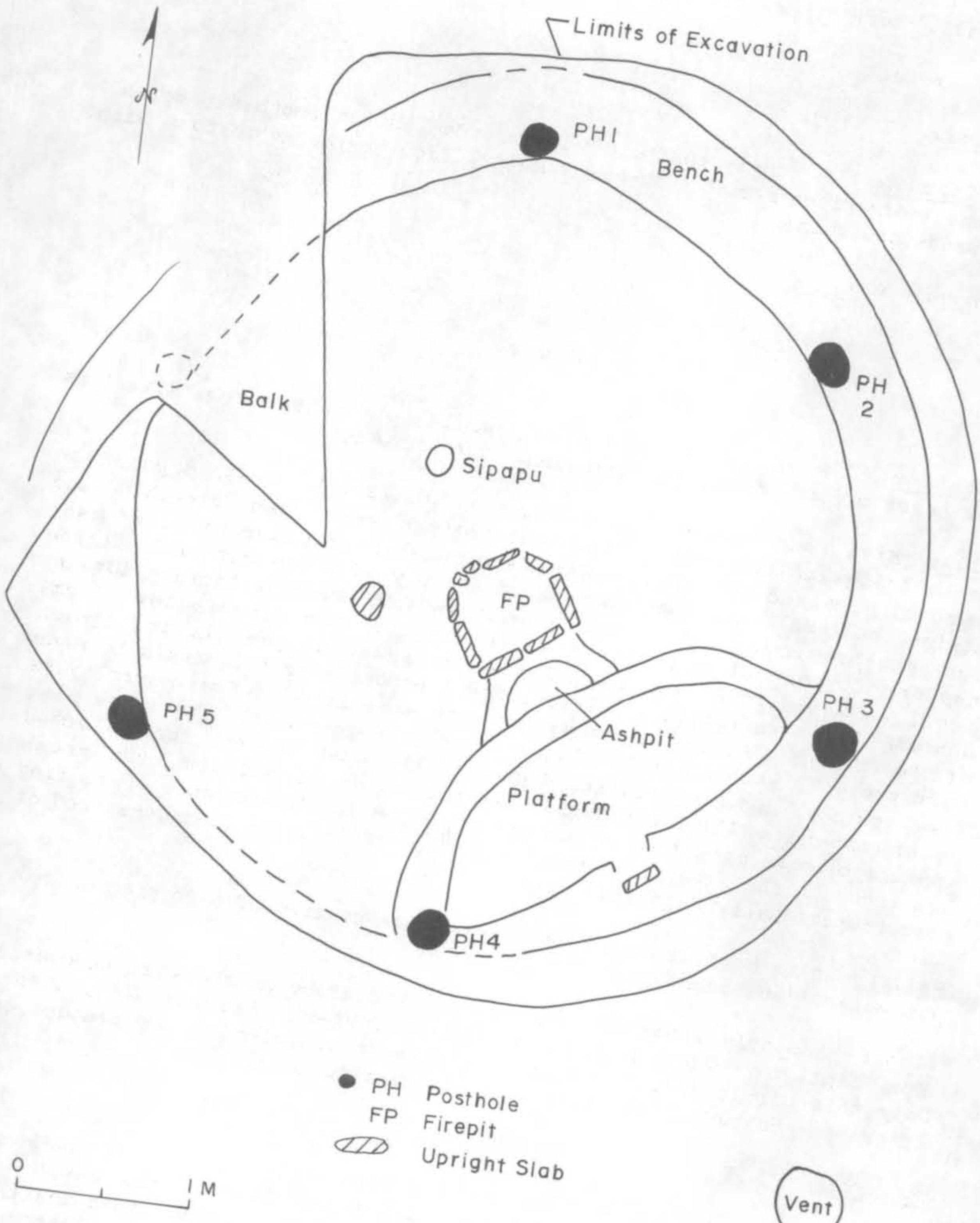


Figure 2.64. Plan of Kiva A

Figure 2.65. Kiva A balk

Figure 2.66. Kiva A balk with major stratigraphic units emphasized

Figure 2.67. Kiva A, Floor 1; view to east (30-cm scale)

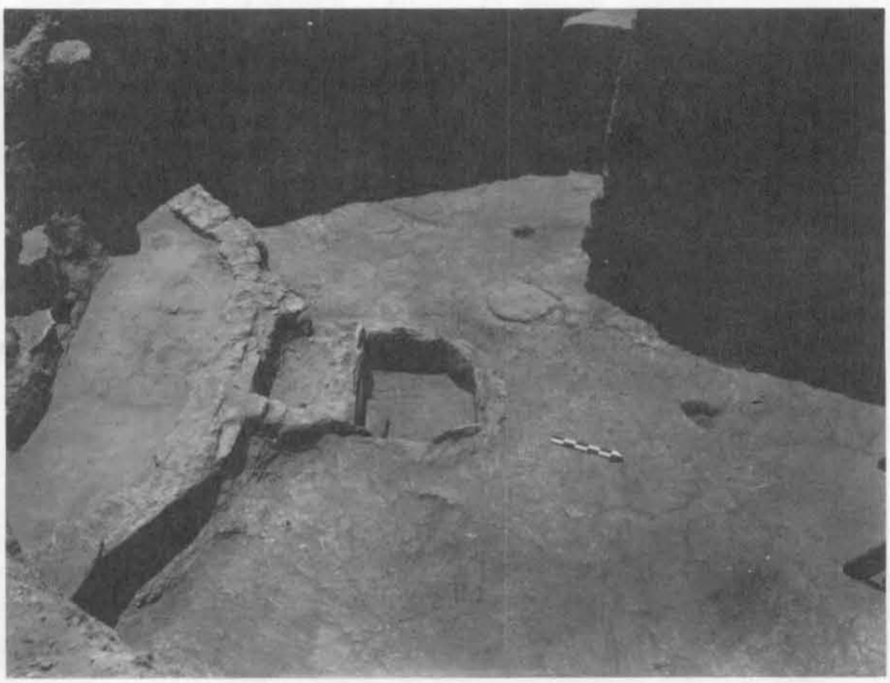


Figure 2.68. Kiva A, Floor 1; view to west (30-cm scale)

Ventilator: Centrally located along the base of the southeast wall is a 40-by-30-cm rectangular ventilator opening. Removal of 60 cm of lower vent-tunnel fill revealed a construction lining of sandstone slabs. Top slabs are supported by vertical side slabs, but the construction details of the bottom slabs were not recorded. A circular 45-cm-diameter surface ventilator opening was described as lying 1.50 m southeast of Kiva A. The presence of masonry at this opening suggests that the entire ventilator is masonry-lined.

Floor Features:

Platform: The southeastern portion of the floor is subdivided from the rest of the chamber by an outcurving arc of masonry, 20 cm high. Clean sand behind this arc forms a raised platform between the central heating features and the ventilator. This split-level effect was apparently achieved by digging a little deeper in the main chamber prior to laying floor plaster. The face of the raised area of native soil is protected by a coping of vertical slabs covered with plaster that merges with the main chamber flooring. Floor plaster did not appear to extend beyond the coping, leaving a fragile sandy surface exposed on top of the platform (Figures 2.67, 2.68).

No test pit was sunk into the clean sand of this feature; consequently, it is not known whether plaster flooring underlies it at the level of the floor in the main chamber. It could be that there is a single floor level in Kiva A and that the coping face served as a deflector and low "wing walls" reminiscent of larger walls found in earlier pithouses. The coping could have trapped clean alluvial sands washing out of the ventilator prior to trash deposition, thereby creating a false impression of a platform. On the other hand, the presence of a raised southern floor area in Pithouse B argues for the reality of a platform for Kiva A. Furthermore, it seems improbable that alluvium could have been so evenly deposited in only this one area of Kiva A prior to the commencement of trash deposition.

Ashpit: Sandwiched between the platform and the firepit is a feature designated as an ashpit (Figure 2.69). The 55-by-38-cm rectangular pit contained material identical to the general kiva trash fill. The functional assignment of "ashpit" was based on the presence of lighter-colored interior plaster, suggestive of embedded ash.

Firepit: A D-shaped, slab-lined firepit is in the center of the kiva floor. The straight side of the pit is toward the ventilator and backed by the ashpit. Plaster and adobe line the pit, forming an exterior collar and securing the vertical slabs in place. Fine, compacted, white ash filled the feature to kiva floor level. The bottom is smooth and level.

Sipapu: A 15-cm-wide depression was noted in the central northwest floor. It is in the correct position for a sipapu in the traditional ventilator-firepit-sipapu alignment, although the alternative function

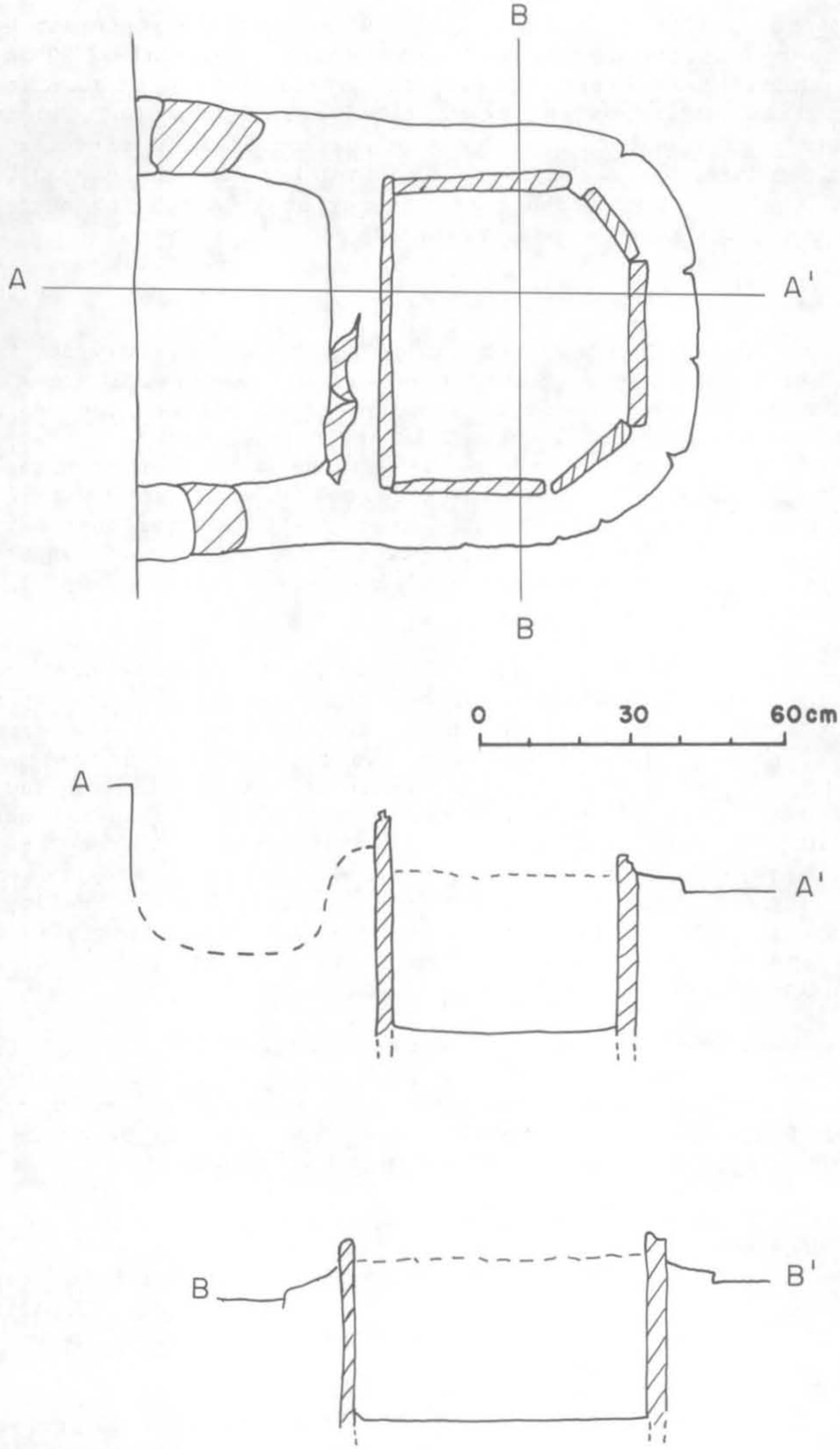


Figure 2.69. Plan and profile of firepit/ashpit on Floor 1, Kiva A

of ladder rest has also been suggested for this feature. The balk collapsed, covering the feature before it was fully recorded.

Postholes: Five postholes, each approximately 21 cm in diameter, were located on the bench. A sixth posthole, if present, was covered by the balk in the northwest quarter of the structure. Presupposing the existence of the sixth posthole, the roof supports are complementarily distributed bilaterally along a northwest-southeast axis around the main chamber's circumference. Post seatings are deep holes extending at least 1.40 m to floor level; they display no evidence of additional support, such as lignite packing or stone shims (Figure 2.67).

Artifact Assemblage: Only an unworked river cobble (possibly serving as an anvil) embedded in the floor, a small Chaco Corrugated jar, and firedogs in the firepit could be identified as floor artifacts distinguishable from the general matrix of trash fill (Table 2.4).

Remarks: The architecture and stratigraphic position of Kiva A suggest that it is one of the later pit structures at the site. Removal of roof beams and supports, and the lack of replastering or floor patchings suggest a short use span and orderly abandonment for Kiva A. Abandonment may have been related to the structural instability of the sands into which Kiva A was dug. As evidenced by the prehistoric collapse of the southwest wall, ridge sand becomes dry and lacks stability when exposed through excavation. The material from this wall collapse lay directly on the floor; the collapse of this part of the structure may have been the impetus for the kiva's abandonment if aboriginal architects foresaw chronic problems stemming from the character of the surrounding sandy soil. Following wall collapse, the kiva was filled with trash until the structural hole was virtually full--preserving the original construction depth and clear stratigraphic relationship with House 2.

Premature collapse of the stratigraphic balk resulted in aborted recording and sampling. No detailed profile or description of the fill could be made, and pollen and flotation samples were likewise forfeited. The material from the collapsed balk was left in Kiva A (Figure 2.70), and none of the artifacts in it were salvaged. The abundance of cultural material in the backfill (as observed in 1979) would make identification and recovery of the balk artifacts almost impossible should future excavation be considered for such purposes.

The lack of in situ artifacts prevents direct functional comparisons with the habitation structure, Pithouse B. The apparent dearth of floor features and the lack of high wing walls to delineate distinct work areas, however, suggest that Kiva A may have served more ceremonial, or at least specialized, functions than those inferred for the multipurpose habitations at 1360.

Figure 2.70. Kiva A and House 2 after heavy rains in July; view to northwest

Location: The extramural areas located around House 1 and Pithouse B, which are described as having a prepared clay surface; the plaza includes the special activity areas associated with the L-shaped wall/Room 1 complex (Figures 2.71, 2.72).

Fill: Four layers were distinguished by trenching and excavations. Enumeration and description is generally from bottom to top.

Layer 1: Only partially and intermittently exposed, Layer 1 is of mixed sand, charcoal, and organic matter. The layer underlies, minimally, most of the plaza area; Rooms 6, 7, 11; part of Room 10; and the trash mound; it also constituted the fill of Pit Structure C. Layer 1 is the late Basketmaker or Pueblo I stratum upon which the Pueblo II occupation was built; it was not explicitly investigated.

Layer 2: This layer was the major fill component excavated in the plaza. It consisted of structural rubble and aeolian/alluvial sands mixed with the accumulated cultural material from the plaza. There was no evidence of purposeful trash dumping. In the center of the plaza, near the retaining wall, Layer 2 was 37 cm thick, but this layer thinned rapidly past exterior House 1 walls.

Layer 3: This layer consisted of a loose sandy surface overburden of an aeolian/alluvial nature admixed with vegetation, general site structural rubble, and sparse late Pueblo I to Pueblo II trash.

Layer 4: A postoccupational alluvial deposit at the plaza level, Layer 4 consisted of gravel and sand associated with retaining walls in the central plaza. Further discussion of this material may be found in the description of those associated features. The exact depth and extent of Layer 4 were not determined.

Walls: Four walls or segments of walls partition the plaza.

The L-Shaped Wall: Extending north 1.9 m and then east 3.7 m from the northeast corner of Room 1 is a compound masonry wall. The northern portion is 45 cm wide, but the wall thins to 25 cm after turning east. Foundations are a single course of large sandstone elements set in 15 cm of gray adobe below the plaza surface. The rubble from the collapsed wall, which lies to the south of the standing portion, indicates that the wall may have been no more than three courses higher than its current standing height of 30 to 35 cm.

Retaining Wall 1: In the central plaza stands a 32-cm-high, 31-cm-thick, 1.80-m-long wall segment running northwest to southeast; the wall is convex to the southwest (Figure 2.73). The southeastern terminus is quite distinct, but the northwest end is eroded and indistinct, suggesting a greater original length. Erosion seems to have been particularly severe along the lower 25 cm of the wall, removing many of the spalls and creating a veneer effect for the southwestern face in the

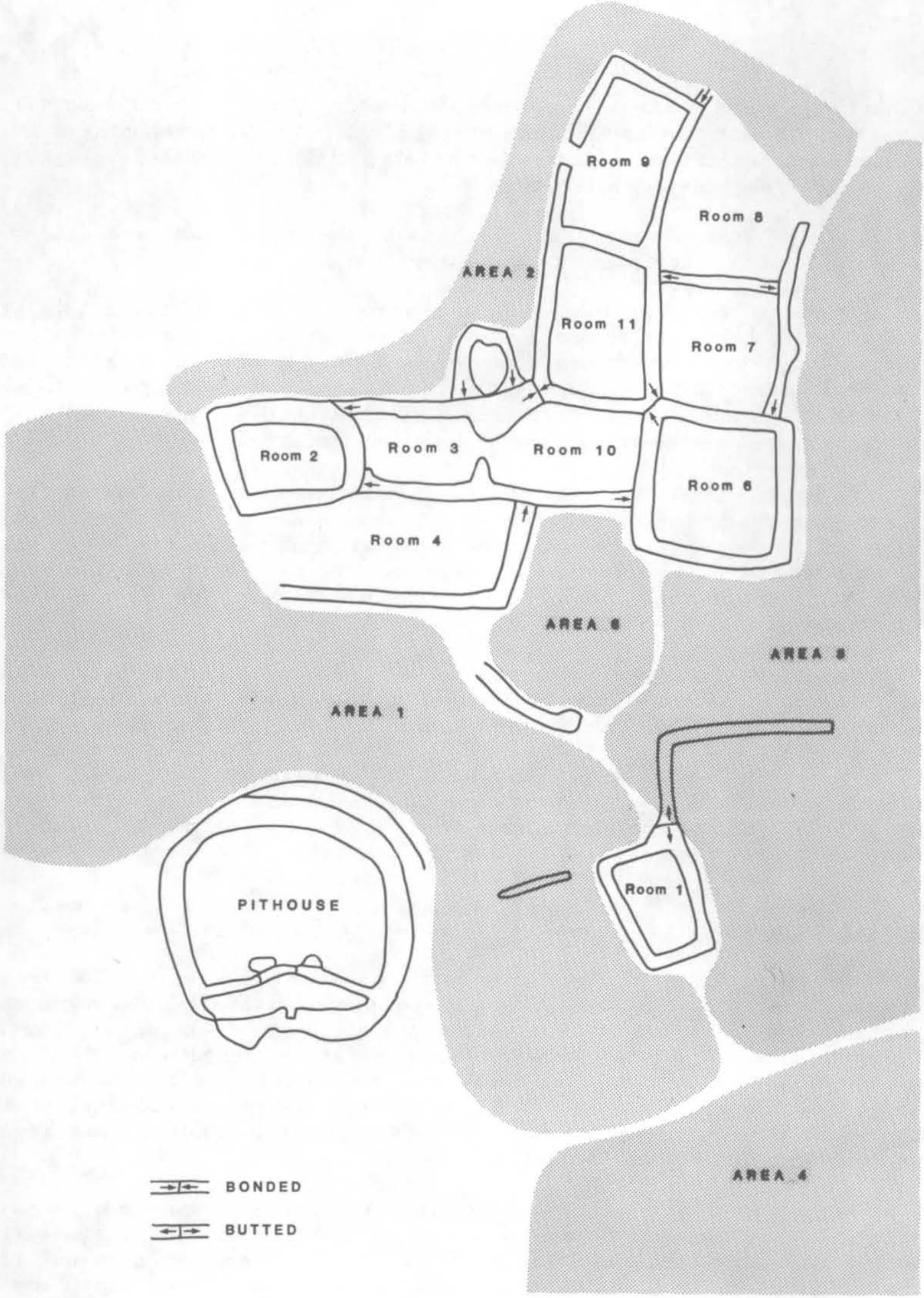


Figure 2.71. Plaza Areas; bonded and butted walls illustrated

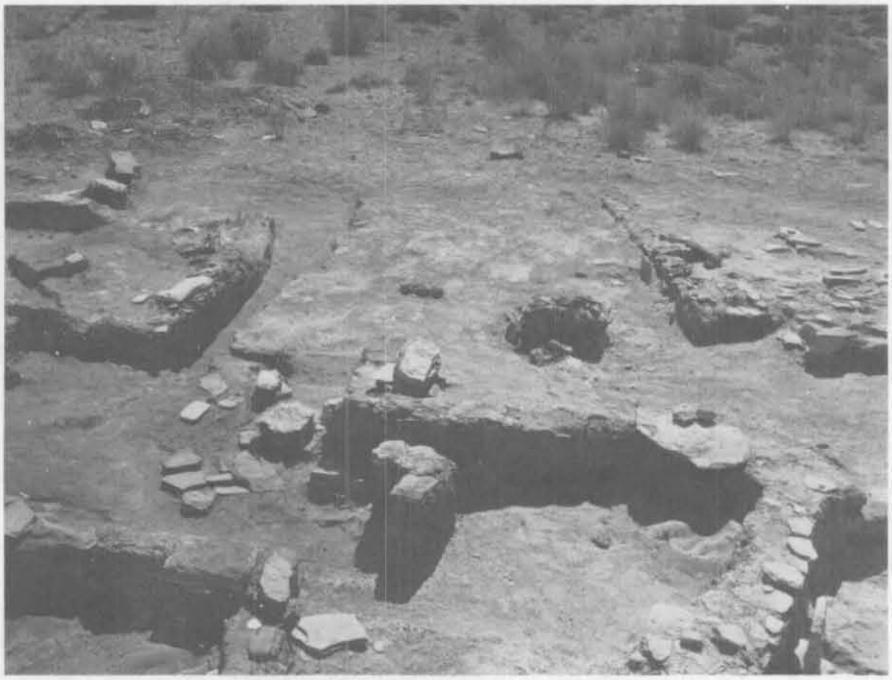


Figure 2.72. Central plaza of House 1; view to east

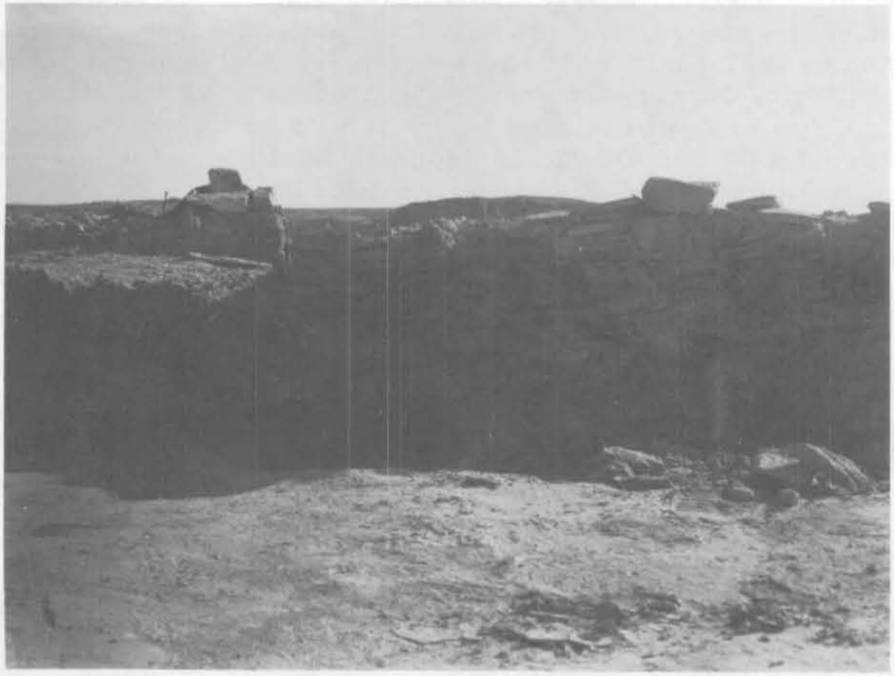


Figure 2.73. Southern face of Retaining Wall 1

plaza. Enclosed within the upslope curvature of the wall are alluvially deposited gravels and sand, in contrast to the general clay plaza surface overlying Layer 1.

Retaining Wall 2: Oriented northeast to southwest between the northwest exterior corner of Room 1 and Pithouse B is a low, 17-to-20-cm-high, 1.5-m-long wall segment. It is composed of three courses of spall-sized stones 9 to 14 cm wide. This wall was visible on the surface prior to excavation, indicating the progressive thinning of Layer 2 with distance from House 1 and the central plaza.

Wall Stub: A short, 50-cm-long, 28-cm-high, and 25-cm-wide wall stub is located about 60 cm west of the northwest corner of Retaining Wall 1 between Room 4 and Pithouse B. Four courses of masonry slabs, similar to those of Retaining Wall 1, remain. Large quantities of associated wall fall in the 1.8-by-1.4-m area between Pithouse B and Room 4 are oriented east to west, suggesting that the wall stub is an alluvially reoriented portion of Retaining Wall 1 that did not decompose. Both wall stub and rubble are underlain by and mixed with washed gravels and sand similar to the material enclosed by Retaining Wall 1. The gradient toward Pithouse B is rather steep--1 cm vertical for every 10 cm horizontal--suggesting possible terracing of the plaza at the retaining wall.

Floors: Two surfaces were distinguished.

Plaza Surface 1: A distinct, hard-packed, smooth, tan adobe clay forms the main surface; it was encountered roughly 40 cm below modern ground surface in the central plaza. This plaza surface overlies Layer 1 and served to seal earlier irregularities and features and to create a smooth, relatively level work area. The thickness of the adobe varies, depending on the kind of feature being sealed or leveled. Adobe over Pit Structure C is 47 cm thick; in front of Rooms 6 and 7 it is about 7 cm; in the area north of Pithouse B over Firepit 1 it is 2 to 3 cm thick. To the west this clay surface terminates prior to reaching the ramada area. It thins and disappears a little beyond House 1 to the east, but it is not clear whether this is due to erosion or to original absence. This surface may represent melt from the original Pueblo I structures rather than an intentionally laid surface.

Plaza Surface 2: This "surface" was defined on the basis of limited evidence of activities noted at the interface between overburden and Layer 2. Evidence of Pueblo III activities (sherds, metates, firepits) was scanty; no formally prepared or use-compacted surface was evident.

Features:

Layer 1 Features:

Firepit 1: A rectangular slab-lined firepit oriented northwest-southeast was located just northeast of Pithouse B. Its fill of charcoal and ash was sealed by 2 to 3 cm of plaza clay.

Plaza Surface 1 Features:

Heating Pit 1: A shallow oval heating pit was located midway between Rooms 4 and 6 in the central plaza (Area 5). As with other pits on the plaza, fill consisted of Layer 2 soils, not of charcoal and ash. Upright slabs were placed on the southeast and south sides of this feature.

Pit 1: A storage cist approximately 30 cm in diameter at the surface was located at the southeastern base of Retaining Wall 1. Depth and nature of fill were not recorded.

Postholes: Two postholes were found near the southern end of the plaza: Posthole 1 near the exterior southwest corner of Room 1 and Posthole 2 at the northwest end of Retaining Wall 1. Both contained lignite packing; Posthole 1 also had two shims and a remnant post. No additional postholes were found between Postholes 1 and 2 and the ramada postholes to the west.

L-Shaped Wall Complex Features (Plaza Surface 1):

Storage Bin: A roughly 60-by-40-cm slab-sided feature is abutted to the exterior east wall of Room 1. The north end is open. The eastern and southern slabs exhibit slight oxidation, but the nature of the fill, which consisted of adobe, ground stone, and manos, and the lack of charcoal or ash argue against terminal use as a firepit. This feature may represent reuse of previously burned slabs in construction of a bin.

Other Pits: Five pits are arranged in a line north to south. These pits were field-designated B-F from south to north. The three southern features (here designated Pits 1-3) are roughly the same size and shape--round, 40 cm in diameter, and 10 cm deep (Figure 2.29). They were molded directly into the clay of the plaza surface covering Pit Structure C. The presence of two manos in the center pit, pit morphology, and the placement of these features in relation to the L-shaped wall suggest that these are remnant mealing catchment basins for a series of metates. No evidence of permanent bins was found, suggesting that this area was commonly used for grinding but that investment in a formalized mealing station was not part of site architecture at 1360 during this time period.

Pits 4 and 5 lie to the north of Pits 1-3. Both are rectangular and lined with thin (less than 1 cm) vertical slabs; flooring slabs are present in Pit 5, and its 25-cm depth was subdivided at 15 cm by another horizontal slab. Fill in both pits was charcoal-flecked sand and adobe wash. Slabs in Pit 8, which lies 8 cm north of the L-shaped wall, show evidence of being fired, but the pit did not contain extensive amounts of charcoal. Pit 4, which abuts the south face of the L-shaped wall, is well placed for storage of small items, but the feature apparently was empty when it fell into disuse.

Artifact Assemblage: See Table 2.5.

Remarks: The plaza has been discussed as an entire unit, but it was arbitrarily subdivided during excavation for convenience in handling the extramural proveniencing (Figure 2.70). Materials from Area 1 were included in the assemblage for the ramada area and will be discussed with that section of the site. Area 1 features near House 1, such as the wall segments, have been discussed in the current section, however, as they are more reasonably associated with House 1 construction and activity than with the ramada.

If Wall Segment 1 in the ramada was originally connected with Retaining Wall 1 and the wall stub (and its associated structural rubble) in the plaza, this would have created a major retaining or diversion wall approximately 14 m long for the protection of Pithouse B. The site drainage patterns (Figure 1.3), the destruction of the western portion of Room 4, and the retention of wash gravels on the upslope side of retaining walls (in contrast to the general sandy composition of the ridge) all point to the presence of a diversion wall in this area. Following site abandonment, the continued channeling of runoff through the main plaza would have quickly floated off pure, lighter charcoal and ash deposits from plaza heating pits (e.g., Heating Pit 1 and L-shaped wall area Pit 5), replacing these with a mixture of sands, adobe from room melt, and ash. This postabandonment replacement of the fill in the plaza features makes functional interpretation of these features difficult.

The plaza areas immediately adjacent to House 1 produced later ceramic assemblages, while Area 4, near the trash mound, yielded slightly earlier ceramics. The plaza would appear to have had the most intensely used surfaces at the site, at least in terms of features. Heating and storage pits are sandwiched between the L-shaped wall and the roomblock. Probable mealing basins and mano storage bins are located within the southeastern arc of the L-shaped wall and Room 1 (Figure 2.74). The lack of extramural features north of the roomblock indicates that 1360 was similar to other contemporary sites in the southward focus and orientation of its open-air work areas.

RAMADA

Location: The saddle area between Houses 1 and 2; the area adjacent to Pithouse B, south of Retaining Wall 1 and west of House 1, Room 1 (Figure 1.3).

Fill: No more than 10 cm of aeolian surface overburden and vegetation had to be removed in order to expose the majority of the ramada surface and features. In the saddle, two exploratory trenches, 15 cm deep, revealed angular sandstone blocks and spalls beneath the exposed ramada surface. With the exception of a small area around Pithouse B, only the terminal ramada use surface was exposed and recorded (Figure 2.75).

Table 2.5 Artifacts from extramural areas

Provenience	Ceramics	Chipped Stone	Other Stone	Bone	Bone Tools	Other	Comments
Plaza Area 2							
fill	329	6	2	-	1	4 bulk minerals, 1 piece of turquoise	includes 1 metate, 1 hammerstone
Plaza Area 3							
fill	562	30	4	25	1	26 bulk minerals, 3 pieces of turquoise	includes 2 manos, 1 metate
Floor 1	-	-	40	-	-		includes 35 manos, 1 metate, 2 hammerstones
Floor 2	-	-	2	-	-		includes 2 manos
Plaza Area 4							
fill	27	-	1	1	-		includes 1 active abrader
floor	-	-	6	-	-		includes 1 active and 1 passive abrader, 1 polishing stone, 3 anvils
Plaza Area 5							
fill	391	23	4	24	1	6 pieces of turquoise	includes 2 manos, 2 hammerstones, 1 drill
floor	118	7	9	9	-	5 bulk minerals, 10 pieces of turquoise, 72 other ornaments	includes 8 manos, 1 active abrader
Ramada fill	853	60	45	11	1	4 bulk minerals, 1 piece of turquoise, 1 corncob, 1 human burial	includes 26 manos, 5 metates, 1 active abrader, 2 polishing stones, 2 stone bowls, 1 chopper, 7 hammer-stones, 1 light point
floor	20	1	30	31	-		includes 21 manos, 1 metate, 1 active and 2 passive abraders, 1 anvil, 1 hammerstone
Trash Mound							
fill	1604	72	15	21	-	12 bulk minerals, 3 pieces of turquoise, 1 shell, 1 other ornament, 1 corncob	includes 7 manos, 2 metates, 1 grooved abrader, 1 polishing stone, 2 hammerstones, 1 light point, 1 drill

Figure 2.74. L-shaped wall mealing area; central plaza stratigraphic balk and piles of discarded artifacts in background

Figure 2.75. Work area in east section of ramada (Area 1) near Pithouse B; passive abrader (lower right, Figure 4.18) and Mancos canteen in a slab-lined cist; Retaining Wall 1 in background

Walls: Three apparent wall segments were isolated.

Wall 1: The north-south test trench encountered a 1.8-m-long, 25-cm-wide, single-course wall segment of friable yellow sandstone elements based in 11 cm of gray mortar laid on sand. This probably represents a continuation of Retaining Wall 1.

Wall 2: North of the posthole alignments a roughly north-south oriented L-shaped rock alignment 2.5 m long was recorded. It lacks adobe foundations. Observation in 1979 suggested that this was part of the foundation for at least two contiguous rooms isolated from Houses 1 and 2.

Wall 3: A rock pile, field-designated as Feature Z, was located downslope from and south of the Wall 2 rock alignment but within the ramada boundaries. The rock pile was explored to a depth of 6 cm; it appeared to have additional depth but was not investigated further because of time constraints. This feature may represent a structure.

Floors: The single exposed ramada surface consists of sandy, gravelly, but apparently unplastered harder material beneath the loose sand of the site overburden. The surface is irregular, with chunks of sandstone of various sizes protruding through it; it corresponds to the tops of features in the ramada. A second surface and associated features in this area are discussed with the central plaza areas with which they were associated.

Features:

Heating Pits: Four heating pits were located. Three are clustered in the central southern margin of the ramada; two of these are slab-lined. Other such slab-lined features at the site were usually referred to as firepits and accorded a slightly different functional weight than the more ephemeral "heating pit." It is unclear why these particular features were termed heating pits rather than firepits. The fourth heating pit is located just north of the back row of postholes near House 2; it is not slab-lined. These heating pits range from 50 to 60 cm in diameter at the surface; none were excavated.

Other Pits: A single pit of unrecorded nature is centered within the four postholes adjacent to House 1, Rooms 2 and 4. Its 50-cm surface diameter corresponds with other features labeled heating pits, although no oxidation was specifically noted. On the other hand, its position and surface diameter are also similar to those of large, bell-shaped pits in the plaza of 629 (Windes 1978b). The nature and function of this feature cannot be determined without excavation.

Adobe Mixing Basins: Three features designated as adobe mixing basins were recorded near and behind House 2, about 2 m beyond the northern alignment of postholes. None were excavated. Although barrow pits have been found during excavation of Chacoan sites, including one such feature in the 1360 trash mound, none are as small as these features, making them somewhat unusual and therefore problematic. The criteria for labeling these unexcavated pits as adobe mixing basins are not made explicit in the notes.

Postholes: Thirty-three postholes, ranging from 15 to 30 cm in diameter, were exposed and mapped. All contain lignite packing; some have sandstone shims. No postholes were excavated; shape and fill information was recorded for only a few examples. Dimensions discussed here were gleaned from site maps at various scales. It is not possible to determine from these maps the location of main load-bearing posts or to assess the construction techniques. A back row of postholes (Numbers 1-17) is fairly clear, but the front-row postholes seem to be erratically placed, suggesting that not all of these were located by the excavators. The most likely indications of lateral subdivisions are the fronting and/or lateral postholes over Heating Pit 3 and Pit 1.

Artifact Assemblage: See Table 2.5.

Remarks: The main portion of the ramada was exposed through surface stripping without extensive investigation of features or subsurface stratigraphy. The exposed portion exhibits features indicating the presence of more pit structures between the two that were excavated. It may be that the eastern portion of the ramada is slightly earlier than the rest.

Postholes 4-17 may form the most recent ramada back row. The gap between that group and the rectangular arrangement of postholes centered around Pit 1 (Postholes 1, 2, 3, 30, and 31) may be spurious (because intervening postholes were missed), or it may be that these two groups of postholes represent two separate but contemporaneous structures. Alternatively, the smaller rectangle may be earlier and not associated and/or used with the later, expanded ramada. In the latter case, the small ramada section may have been associated with the earlier occupation suggested for House 1, Rooms 2, 3, and 4.

TRASH MOUND

Location and Fill Stratigraphy: Approximately 6 m southeast of Pithouse B a low, hook-shaped, 5-m-long retaining wall of upright slabs separates the trash midden from the main portion of the site (Figures 1.3 and 2.5). This midden was gridded in 3-m squares with an east-west base line (X) approximately bisecting the deposit. Along the north side of this base line, a test trench 1 m wide and approximately 28.5 m long was excavated. A 2-m-long trench extending north from and perpendicular to the main trench in the center of the trash mound (Grid FX) completed the investigations. Fill was removed in a single level in all but three centrally located grids (DX, EX, FX), where two levels of approximately 30 cm each were required because of apparent stratigraphic changes.

Unstratified, unstructured sheet trash made up the majority of the removed deposits. Trash depth ranges from 10 to 20 cm over the 8 m adjacent to the structures, increases to ca. 60 cm across the middle 9 m of the midden, and thins to an alluvially redeposited sheet no more than 8 cm thick in the 6 m of the trench farthest from the central site area. Approximately 21 m beyond the retaining wall, a marked increase in sandstone spalls and slabs probably indicates the limits of the trash mound proper.

The shallow trench revealed little change in deposits, but the excavations may not have been uniformly carried to sterile. The main trash accumulation rests on charcoal-flecked sands; a test pit extending 15 cm below the bottom of the trench at the FX grid line revealed a continuation of these sands. Charcoal-flecked backdirt from a prehistorically excavated pit in Grid EX was apparently tossed upslope, and above this earlier disturbance the bulk of trash midden accumulated. Below the backdirt of this pit lay a thin, 2-cm-thick lens of earlier trash containing sherds of Lino Gray, Fugitive Red, and La Plata Black-on-white. Beneath this Basketmaker/Pueblo I material lay sterile sands. Trenching farther upslope was not deep enough to monitor the presence of this lowest stratum.

<u>Features</u>:

<u>Heating Pit</u>: Located in the eastern portion of Grid BX was an apparently unlined basin-shaped hearth. Locational information for this feature is sketchy, and its relationship to the Anasazi occupation of 1360 is problematical.

<u>Adobe Mixing Basin (Feature A)</u>: In the middle of Grid GX was an adobe mixing basin approximately 3.4 m in diameter and containing about 55 cm of dark-gray shale/clay mortar. Layering within this mortar deposit suggested at least three to four separate uses prior to abandonment. The feature was excavated into the yellow, charcoal-flecked basal stratum that predates the development of the major trash deposits.

<u>Retaining Wall (Feature B)</u>: A 5-m-long curved row of upright slabs designated as a retaining wall was noted just upslope from the trash mound.

<u>Artifact Assemblage</u>: See Table 2.5.

SUMMARY OF ARCHITECTURE

<u>Room Walls</u>:

<u>Puddled Adobe and Upright Slabs</u>: Room 2 was built by excavating a pit and lining it with a thick layer of mud. Upright slabs were set into this adobe approximately even with the prehistoric ground surface (Figure 2.8). Large single slabs and parallel, paired smaller slabs

containing a darker core of adobe were used to form the base for a superstructure of undetermined height and composition.

Adobe Walls: The eastern two-thirds of the south wall of Room 10 and the dividing wall between Rooms 10 and 3 were built entirely of adobe. The Room 10 southern wall has an admixture of irregularly oriented spall-sized sandstones used as a filler. The adobe dividing wall may have been only a base for an upper wall of unknown construction.

Masonry on Adobe Foundation: The remaining rooms of Houses 1 and 2 exhibit adobe turtlebacks and puddled blocks as shallow subfloor foundations. Large, tabular, unfinished sandstone slabs were laid on these foundations. Smaller spalls were added haphazardly to this core. A layer of adobe and horizontal spalls in varying densities was applied over this wall core. Variability in the degree of erosion on this final wall coating gives an erroneous impression of architectural variability.

Retaining Walls: A thin row of upright slabs sets off the trash mound from the remainder of the site. All other retaining walls are of simple coursed masonry and apparently acted either as subdividers of extramural space and/or as water diversion features.

Pit Structure Construction: Basic pit structure construction techniques consisted of plaster applied directly to the ridge soils into which the structures were excavated. Kiva A is entirely of this construction. Pithouse B also exhibits simple unfinished masonry, which is slightly more regularly aligned in the main chamber, especially along the eastern wall. In the southern portion of the structure, behind the wing walls, the masonry is faced with upright slabs at floor level. The use of masonry in this instance may have been necessary to provide support against roof pressure on the downhill side of the pit structure, as well as to reinforce this wall against the unconsolidated fill of the earlier pit structure into which Pithouse B was built. Wing walls were found only in Pithouse B. These walls are of massive upright slab cores covered with puddled adobe.

Roofing Construction: The builders of both pit structures appear to have relied on upright posts for roof support; Pithouse B has five postholes and Kiva A probably has six. All posts were recessed into the benches, away from the main chamber floor. Roofing in rooms seems to have been supported by a combination of room walls and posts. Only Room 11 exhibits a regular, four-cornered plan of roof support posts. Room 6 has a mid-line linear arrangement of postholes, which have been identified as possible roof supports.

Adobe beam casts and decomposed roofing material found on the floor and bench of Pithouse B suggest that the roofs were the traditional Anasazi arrangement of small poles and fine vegetal material (local grass, in this case), capped by mud and dirt and supported by upright posts with interconnecting stringer beams and with leaners as needed.

Ramada: The area between Houses 1 and 2 was covered with a light-weight roof supported by upright posts. Posts were steadied by packing lignite and occasional basal and lateral sandstone shims around the base of the post inside the posthole. If backing or lateral dividing walls existed, these were probably of movable brush or mats leaving no trace of materials anchored between the posts.

SUMMARY OF STRATIGRAPHY

A stylized composite of site stratigraphy is presented in Figure 2.76. It represents a combined cross section of the principal stratigraphic units as they were revealed in the soil test pit east of House 1 and in the trenches in the trash mound, House 1, Pithouse B, the ramada, House 2, and Kiva A.

Trash Fill: Domestic trash disposal was restricted to the trash mound and the Kiva A depression. Both were excavated in artificial levels. The trash mound predates the deposits in Kiva A.

Intentionally Redeposited Trash Fill: Materials between Floors 1 and 2 in Pithouse B may have been intentionally placed over the earlier pit structure floor as a leveling fill prior to the construction of the later floor.

Structural Rubble: The fill in Layer 3 of Pithouse B and in all the rooms was primarily structural melt or collapse.

Structural Rubble/Alluvium Mixture: The overburden of Pithouse B and the plaza areas of House 1 consisted of a combination of alluvium and structural melt.

Aeolian/Alluvial Deposits: The entire site surface, ramada area, and most of House 2 were overlain by water- and wind-deposited sandy fill.

Undisturbed Proveniences: In Pithouse B, Floor 1, all portable occupationally related materials were found in situ. The entire floor and bench had been sealed by roof collapse. The L-shaped wall complex and Plaza Area 5 also contained considerable quantities of material with little evidence of severe alluvial disturbance.

CONSTRUCTION SEQUENCES AND DATES

Occupation at 1360 appears to have consisted of two major episodes spanning roughly 150 to 175 years. A Pueblo I use of this site (probably between AD 850 and 950) and a Pueblo II occupation (AD 950-1030) created the architectural remains. Evidence of late Pueblo II and

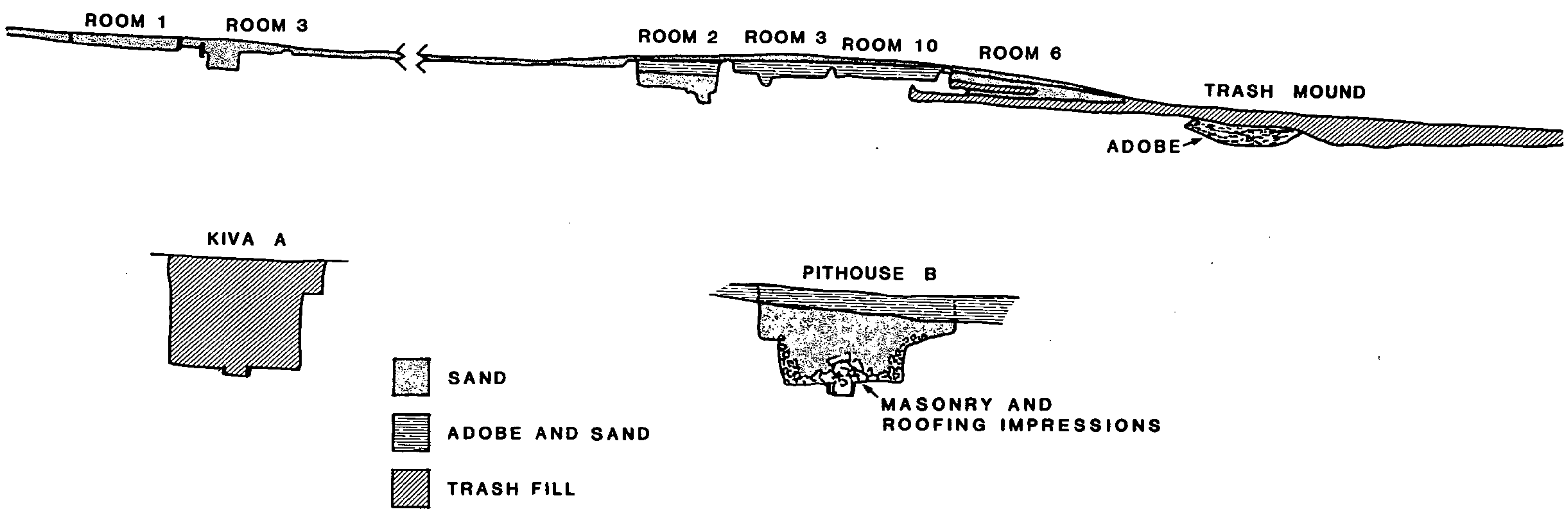


Figure 2.76. Generalized west-east stratigraphic cross section.

Pueblo III (post-AD 1075 or 1100) use of the site is restricted to surface materials. Dating is currently based on ceramic associations.

The degree of hiatus between the two occupations is uncertain and cannot be determined without more extensive dating or further investigation of the unexcavated pit structures and ramada and plaza surfaces. Examination of the ceramic data (Chapter 3; Appendix 2) indicates a continuous transition of ceramic types, suggesting uninterrupted occupation and development at 1360. The distribution of ceramics does suggest changing patterns of trash disposal through time, from earlier sheet-trash deposits to a later use of abandoned pit structures (e.g., Kiva A) within the area of the housemound proper. The majority of floors and plaza surfaces exposed during the excavation were probably last occupied between AD 950 and 1030. The order of events discussed below is based on general site stratigraphy, ceramic chronology, and abutment studies; this sequence is schematically represented in Figures 2.71 and 2.77.

Period I (AD 850-950)

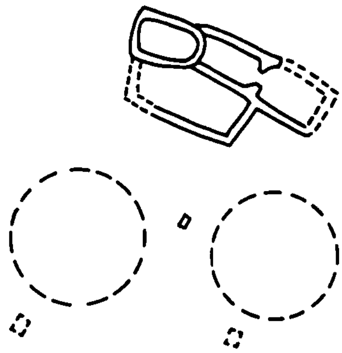
The bulk of the trash mound; House 1, Rooms 2, 4, and probably 3; Pit Structure C; and Pithouse B, Floor 2, may be tentatively assigned to this period. This assignment for the lower floor in Pithouse B relies on evidence that Floor 1 overlies an earlier pithouse that is offset to the east. Intentional trash fill seems to have been placed over the early floor and obscures dating by ceramic association. Pit Structure C is unexcavated, but the presence of structures built above it and the earlier ceramic trash recovered from the excavated portion of its fill suggest affiliation with the early period.

It may be that additional remains associated with the earlier occupation lie within the unexcavated portions of 1360. The size of the trash mound is certainly suggestive of a larger site. Some completely razed earlier structures could underlie House 1; subfloor tests in that structure were limited and are inconclusive in this regard.

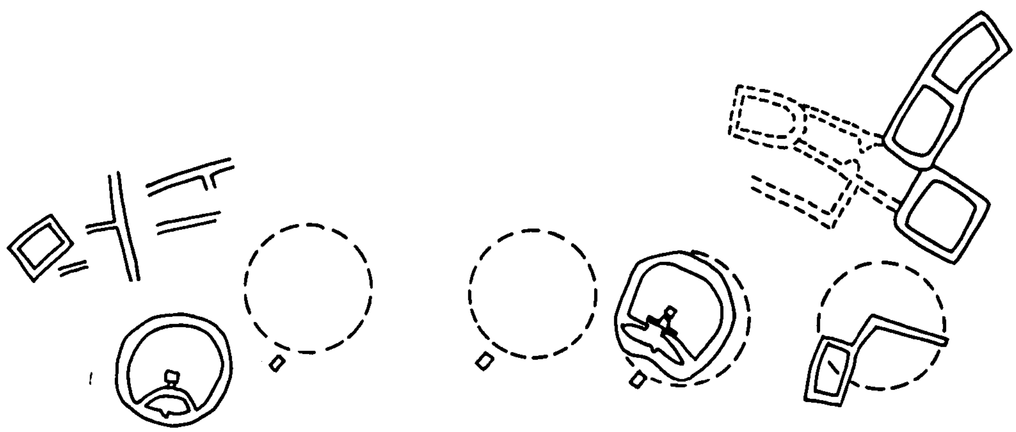
Exact temporal placement of the central portion of the site is tenuous. House 1, Room 3 appears to be a small storage room paired with Room 2, but ceramics from this room were lumped with those from Room 10 during excavation. Abutment sequences are indistinct between these two rooms, but the nature of the wall construction in the neighboring rooms (6 and 11) suggests that indeterminate portions of Room 10's east and north walls were removed to make way for the construction of Rooms 6 and 11. The lumped ceramics from Room 3/10 do not show the wide temporal spread expected from mixing of noncontemporaneous assemblages. These ceramics most closely resemble the assemblages from Rooms 2, from lower trash of Kiva A, and from the trash mound.

Period II (AD 950-1030)

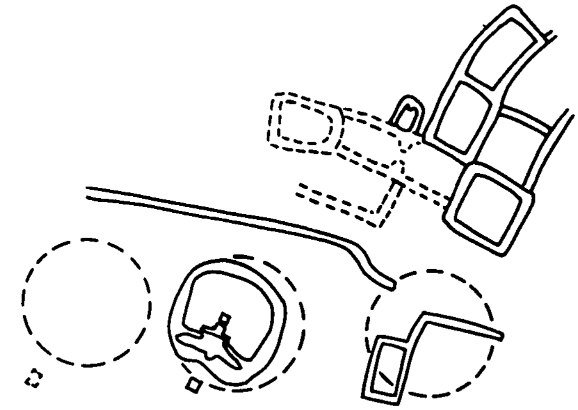
The terminal period of occupation at 1360 may be discussed as a



Period I: AD 850-950



Period II: AD 950-1010,
maximum extent of site



Period IIa: ca. AD 1020-1030,
areas in use at abandonment (?)

Figure 2.77. Architectural growth and abandonment at 29SJ1360
as suggested by stratigraphy and abutments

quick series of construction and abandonment events of relatively uncertain duration and sequence.

In House 1, Rooms 6, 9, and 11 were constructed first. It is possible that, of these, Room 6 was built first; abutments and ceramics are both fairly ambiguous, but the later ceramics are absent from Room 6 and the walls of other rooms definitely butt against this room. The east wall of Rooms 7 and 8 is butted to the north wall of Room 6, and the cross wall added to form Rooms 7 and 8 is butted to their shared east wall. Ceramics, not abutments, suggest that Room 3/10 had been abandoned by this period, but a section of the exterior north wall of Room 3/10 near Room 11 was used to back the construction of Bin 1. Rooms 7, 9, and 11 all display the latest ceramics from floor contexts in House 1 (see discussion in Chapter 3) and appear to be contemporary with the Pithouse B floor assemblage.

House 2 was built during this time, and probably during the additions to the core Rooms 6, 9, and 11 of House 1. Certainly the entire ramada was in use and probably the unexcavated pit structures represented by Ventilators X and Y as well. House 2 was built over some of the westernmost (earlier) ramada postholes (15-19, Figure 1.3). House 2 is too fragmentary to reconstruct its internal sequence of construction, but the suggested number of suites hints that no more than two construction episodes were required for its completion.

Kiva A is probably associated with House 2. It is stratigraphically and spatially centered south of House 2, and it is offset to the west from the most westerly of the sub-House 2 ramada postholes, suggesting that it was not enclosed by, and therefore was not associated with, the earlier ramada.

It is probable that Kiva A and House 2 fell into disuse at the same time, possibly either just prior to or shortly after the construction of Pithouse B. Kiva A's west wall collapsed, and all construction materials were apparently salvaged; timbers and construction materials salvaged from Kiva A may have been used in Pithouse B. With the abandonment of the western portion of the site, House 2 was razed to the foundations. The L-shaped wall complex (mealing area) and Room 1 (storage) were built into the hard, poured-clay plaza surface almost directly overlying the filled Pit Structure C. The retaining wall north of Pithouse B was constructed, again possibly coincident with the building of Pithouse B. The extension of the retaining wall beyond the pit structure represented by Ventilator X suggests that this structure was still occupied, but that possibly the pit structure belonging to Ventilator Y had been abandoned.

At the time of abandonment, excavated structures still in use were Pithouse B, the House 1 plaza areas, Room 1 and the L-shaped wall complex, and House 1 excluding Rooms 2, 3, 4, and possibly 10. Kiva A seems to have been the principal active trash repository at this time. An indeterminate section of the ramada was probably still in use. The retaining wall in back of Pithouse B functioned long enough to divert

Table 2.6. Dates from 29SJ1360 features

Dendrochronology Dates

CNM-229	Pithouse B, Level 1	PNN	AD 758	-862vv
231	Pithouse B, Post 1 (N)	PNN	776	-871+vv

Archaeomagnetic Dates

ESO- 934	House 2, Feature A	na
1730	House 1, Room 7, Floor 1, Firepit 1 1st burn	AD 1070*
1733	House 1, Room 11, Floor 1, Heating pit 1	na
1734	House 1, Room 7, Floor 1, Firepit 1 2nd burn	na
1736	House 1, Room 11, Floor 1, Firepit 1	AD 910*

*Estimate; sample has large alpha.

water through the plaza area, completely eroding the majority of Room 4's western and southern walls while filling the heating pits in the central plaza area with a homogeneous mix of alluvial sand and charcoal. The position of Burial 6 in Ventilator X testifies to the abandonment of the associated pit structure before the end of the site occupation.

Portable materials in rooms appear to have been salvaged at abandonment, and unwanted goods were apparently discarded in a large pile in the center of Plaza Area 5 at the eastern end of the retaining wall. The metates and any metate-bin construction materials possibly associated with the L-shaped wall area seem to have been salvaged, leaving only the catchment basins. The bulk of construction material for House 1 was left intact, falling eventually into the unused rooms.

Dating

Table 2.6 provides a comprehensive list of dates available from 1360. Two dendrochronology specimens, both pinyon, came from Pithouse B; they indicate construction near the turn of the ninth century. These dates suggest either that the beams were reused wood incorporated into a later pit structure or that Pithouse B was occupied for a long time. The general morphology of this pithouse, when compared with pithouses and dates from 628, and the floor-contact ceramic assemblage from the structure suggest the latter.

The archaeomagnetic samples are singularly uninformative, as the large alpha values prohibited confident dating. The resulting estimates may only tentatively be viewed as supportive of the proposed sequence of construction; Room 7 is estimated to be more recent than Room 11. Both dates generally overlap the proposed occupational period of the site. In view of the restricted scope and inconclusiveness of this group of dates, the chronological sequence at 1360 may best be inferred from the range and distribution of ceramics.

CHAPTER 3

Ceramics

INTRODUCTION

The Anasazi in Chaco Canyon had both abundant and varied pottery at their disposal. Traditionally this has been attributed to a rather vague concept of "trade" and important but unspecified foreign contacts. In order to examine more rigorously the implications of such "trade," site-specific ceramic reports of the Chaco Center generally conform to two primary objectives: a comprehensive presentation of the site's ceramics and an analysis of ceramic attributes geared toward the assessment of various aspects of the Chacoan adaptation and the site's placement therein. The search for ceramic patterns is ultimately aimed at addressing questions about the system that produced those configurations. For example, ceramic patterns can provide information about the apparent variability of status within Chacoan social organization. Such patterns also enable us to assess the explanatory potential of various models of the Chaco System, such as the ecological model proposed by Judge (1979) which focuses on redistribution of goods as a buffering mechanism against the unpredictability of the San Juan Basin ecosystem.

The analytical approach employed here entailed examination of the variation of discrete attributes, such as temper, paint type, and design, within traditional type groups. This information was then used to provide ceramic descriptions and to examine the more refined assemblage of attribute clusters that may have significance in identifying particular production areas.

Approximately 12,800 ceramic specimens were recovered from 1360. The results of the rough sort of these sherds appear in Table 3.1; detailed distributional information may be found in Tables 1-5 of Appendix 2. Red Mesa Black-on-white and narrow neckbanded dominate the assemblage, with other types indicating the relative duration of the early and late occupations. The relative temporal ranges for types pertinent to this report and the relative abundance of whiteware types through time are presented in Figure 3.1.

Table 3.1. Results of the ceramic rough sort

Type	Number	% of Total	% of Ware	Bowls	% of Ware	Jars	% of Ware	Others	% of Ware
Lino Gray	50	--	1	---	--	50	1	---	--
Lino Fugitive Red	38	--	--	---	--	38	--	---	--
Plain gray	3394	27	56	---	--	3394	56	---	--
Wide neckbanded	238	1	4	---	--	238	4	---	--
Narrow neckbanded	1370	11	23	---	--	1370	23	---	--
Neck corrugated	225	2	4	---	--	225	4	---	--
PII corrugated	44	--	1	---	--	44	1	---	--
Unidentified corrugated	718	6	12	---	--	718	12	---	--
Subtotal	6077	47	101	---	--	6077	101	---	--
BMIII-PI mineral B/w	159	1	5	119	75	38	24	2	1
Early Red Mesa B/w	271	2	9	159	59	107	39	5	2
Red Mesa B/w	2291	18	77	934	41	1290	56	67	3
Puerco-Escavada B/w	71	1	2	17	24	52	73	2	3
Gallup B/w	108	1	4	44	41	64	59	---	--
Chaco B/w	5	--	--	1	20	4	80	---	--
Exotic mineral B/w	86	1	3	47	55	38	44	1	1
Subtotal	2991	24	100	1321	44	1593	53	77	3
Whiteware	1633	13	47	526	32	1090	67	17	1
PII-III mineral B/w	1816	14	53	579	32	1195	66	42	2
Subtotal	3449	27	100	1105	32	2285	66	59	2
Lino B/g	5	--	4	4	80	1	20	---	--
Kana-a B/w	7	--	6	2	29	5	71	---	--
Tunicha B/w	19	--	17	5	26	14	74	---	--
Burnham B/w	12	--	11	6	50	6	50	---	--
Newcomb B/w	47	--	42	28	60	18	38	1	2
Toadlena B/w	5	--	4	1	20	4	80	---	--
Chuska B/w	3	--	3	3	--	---	--	---	--
Chaco-McElmo B/w	6	--	5	4	67	2	33	---	--
McElmo B/w	7	--	6	2	29	5	71	---	--
Mesa Verde B/w	1	--	1	1	--	---	--	---	--
Shato B/w	1	--	1	1	--	---	--	---	--
Subtotal	113	1	100	57	50	55	49	1	1

(continued)

Table 3.1 (continued)

Type	Number	% of Total	% of Ware	Bowls	% of Ware	Jars	% of Ware	Others	% of Ware
Chuskan carbon B/w	27	--	68	16	59	10	37	1	4
San Juan carbon B/w	8	--	20	4	50	4	50	---	--
Tusayan carbon B/w	2	--	5	---	--	2	--	---	--
Little Colorado carbon B/w	3	--	8	1	33	2	67	---	--
Subtotal	40	t	101	21	53	18	45	1	3
Lino smudged	2	--	3	2	3	---	--	---	--
Forestdale smudged	57	--	97	57	97	---	--	---	--
Subtotal	59	t	100	59	100	---	--	---	--
Puerco B/r	2	--	3	2	--	---	--	---	--
White Mountain Redware	1	--	2	1	--	---	--	---	--
Sanostee R/o	3	--	5	3	--	---	--	---	--
Abajo R/o	2	--	3	2	--	---	--	---	--
Deadmans B/r	34	--	54	29	85	4	12	1	3
San Juan Redware	21	--	33	13	62	8	38	---	--
Subtotal	63	t	100	50	79	12	19	1	2
Cumulative total	12,792	99	100	2613	20	10,040	78	139	1

t = trace

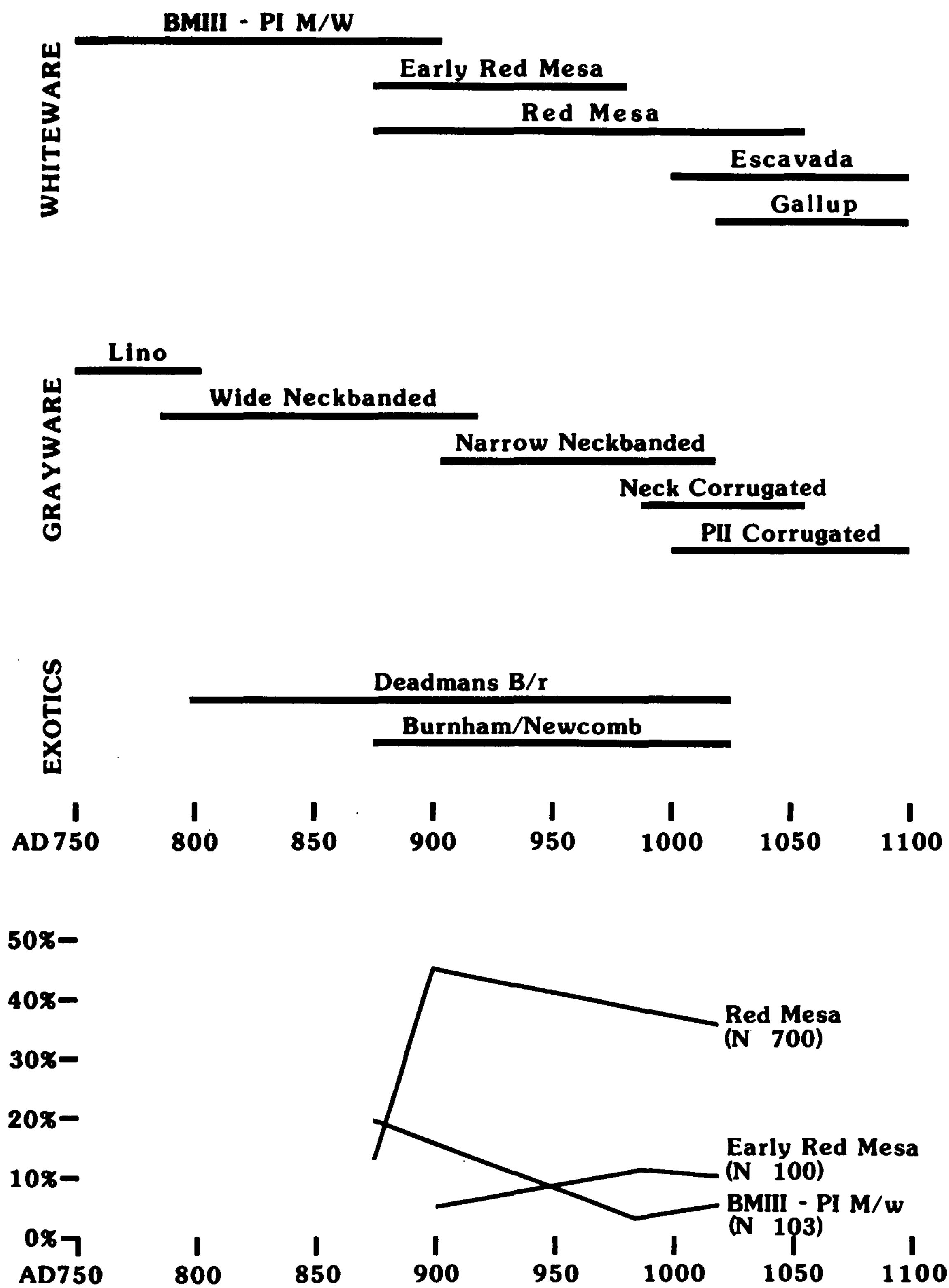


Figure 3.1. Ceramic chronology for principal types, 29SJ1360

CERAMIC DISTRIBUTIONS

As indicated in the artifact tables that appear in Chapter 2 and as detailed in Appendix 2, the following ceramic patterns are evident in the main site proveniences.

Trash Mound

Red Mesa Black-on-white predominates, but in the limited stratified tests, higher relative frequencies of Pueblo I types occur in lower levels. The trash mound is distinct, being devoid of Gallup, Puerco, and other Pueblo II-Pueblo III decorated or culinary types. The heaviest representations of White Mound and La Plata Black-on-white and of Lino Gray are in the trash mound.

Pit Structures

Kiva A ceramic trash consists mostly of Red Mesa Black-on-white and narrow neckbanded (Figures 3.2 and 3.3). This kiva, along with the associated House 2 rooms, contains the highest proportions of San Juan igneous-tempered and exotic mineral-on-white ceramics. The latter are primarily Cortez or Mancos Black-on-white. Pithouse B, the latest occupied pit structure among those excavated, is, in terms of ceramic types, the latest area of 1360. It contains a late Red Mesa-early Gallup Black-on-white assemblage remarkable for its variety of pottery; other types include Red Mesa, Escavada, Mancos, and Gallup Black-on-white associated with culinary vessels of Kana-a Gray, Tohatchi Banded, and Coolidge, Exuberant, Newcomb, and Blue Shale Corrugated. Most ceramics in Pithouse B occur as whole vessels or large use-sherds (Figures 3.4-3.7). In only one case were sherds from the same vessel found within the fill of both pit structures.

Rooms

Rooms are likewise dominated by Red Mesa Black-on-white (Figure 3.8). Rooms 2 and 3/10 appear to be earlier, since they produced higher frequencies of early Red Mesa Black-on-white. In this respect they are similar to the lower fill of Kiva A, and this assemblage suggests abandonment of these proveniences at ca. AD 850-950. Likewise there is slight typological evidence (in the form of Gallup Black-on-white and Pueblo II corrugated sherds) that Rooms 7, 9, and 11 were the latest occupied or last abandoned rooms in House 1. House 2 assemblages are too small to warrant temporal discussion.

Plaza or Extramural Areas

Red Mesa Black-on-white, narrow neckbanded, and early Gallup Black-

Figure 3.2. Culinary vessels from Kiva A (1 and 5) and House 1 plaza areas (2-4): (1) Gray Hills Banded; (2-3) Tohatchi Neck-banded sherds used as cist liners; (4-5) Coolidge Corrugated; (1-3) classified as narrow neckbanded and (4-5) classified as neck corrugated for this analysis

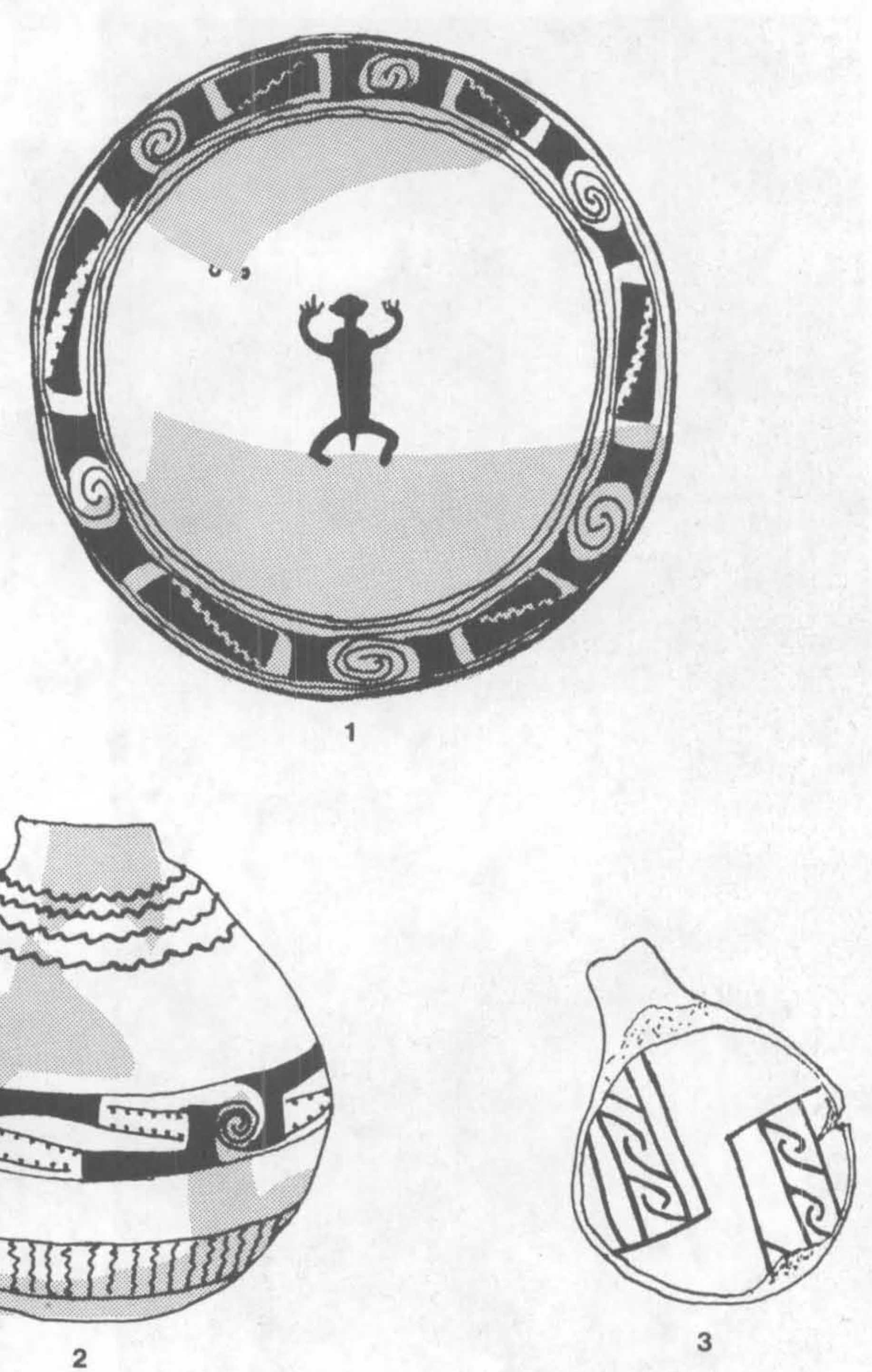


Figure 3.3. Whiteware restorations: (1) Red Mesa Black-on-white bowl; (2) Red Mesa Black-on-white canteen; (3) Newcomb Black-on-white ladle fragment [shaded areas represent missing portions of vessels]

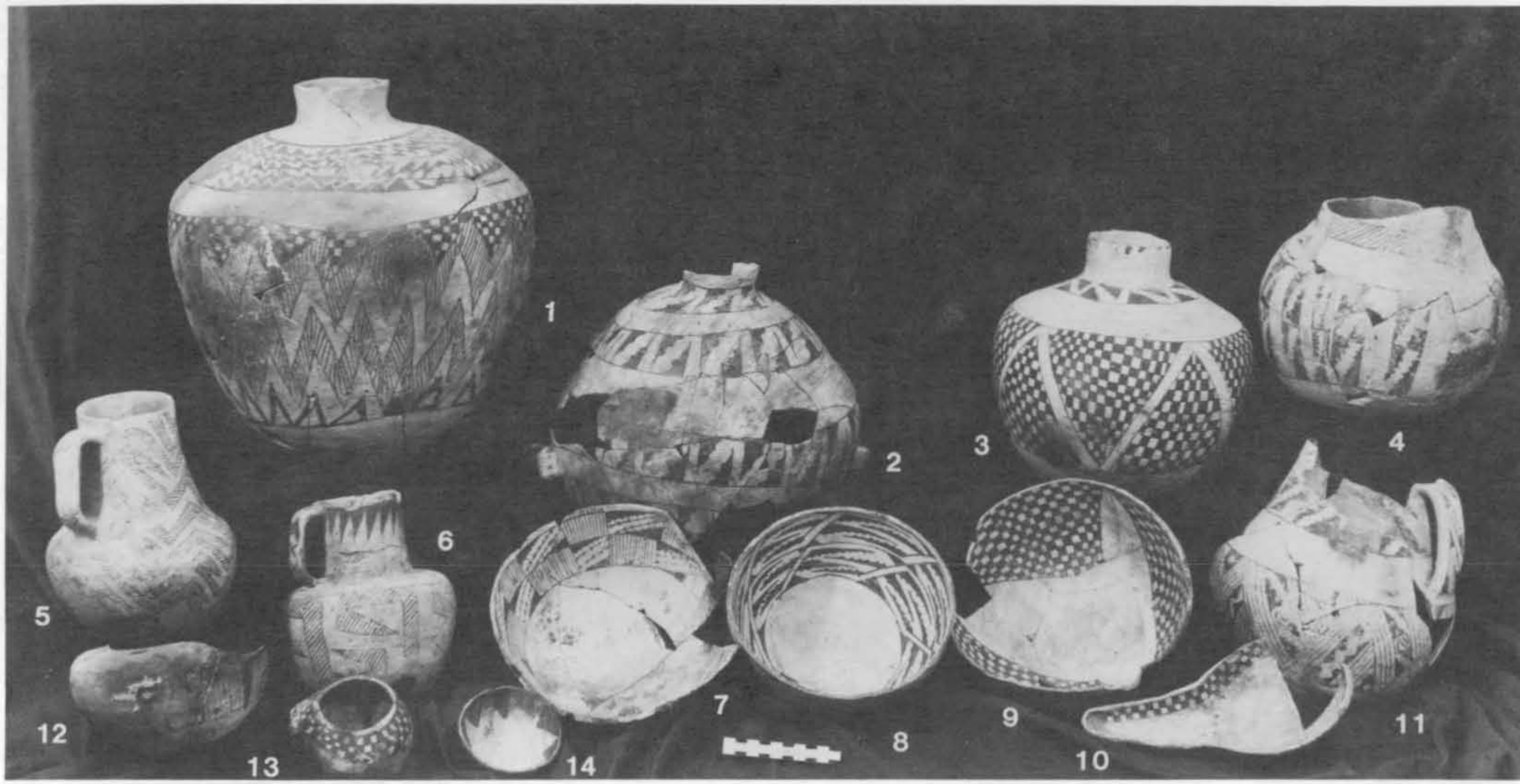


Figure 3.4. Whiteware from Pithouse B floor: (1) Escavada - early Gallup Black-on-white; (2) Naschitti or early Taylor Black-on-white; (3, 7-13) Red Mesa Black-on-white; (4) Escavada Black-on-white; (5) Brimhall Black-on-white, classified as Gallup Black-on-white for this analysis; (6) early Gallup Black-on-white; (14) Mancos Black-on-white.

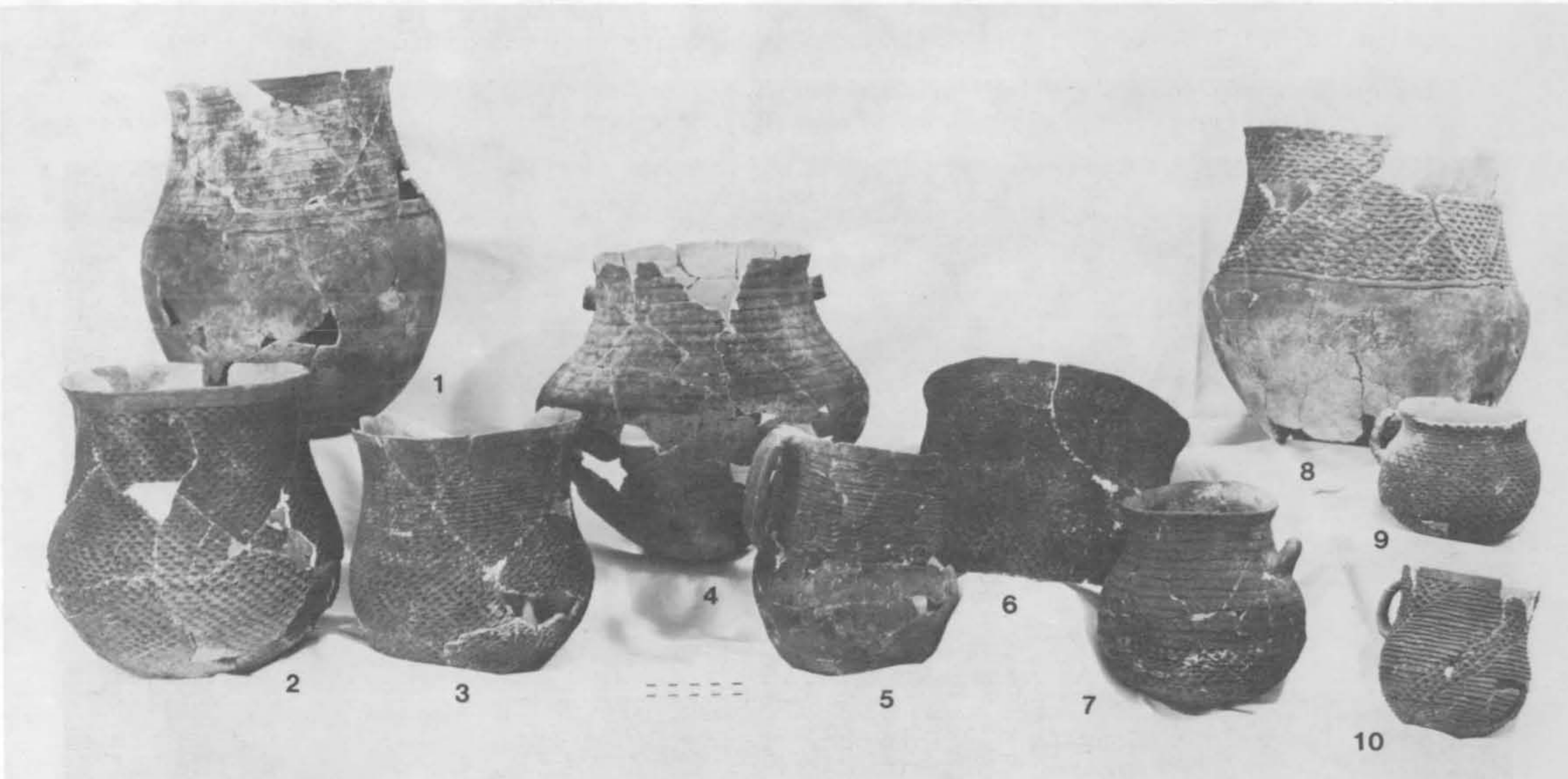


Figure 3.5. Culinary pots from Pithouse B floor: (1) Tohatchi Neckbanded; (2-3, 6, 9) Blue Shale Corrugated; (4) Kana-a Gray; (5) Newcomb Corrugated; (7) Exuberant, classified as Pueblo II corrugated for this analysis; (8) Coolidge Corrugated; (10) Captain Tom Corrugated

Figure 3.6. Sherd scoops from Pithouse B bench; sherd (3) from vessel (2) and sherds (5-6) from vessel (4) have been used as scrapers

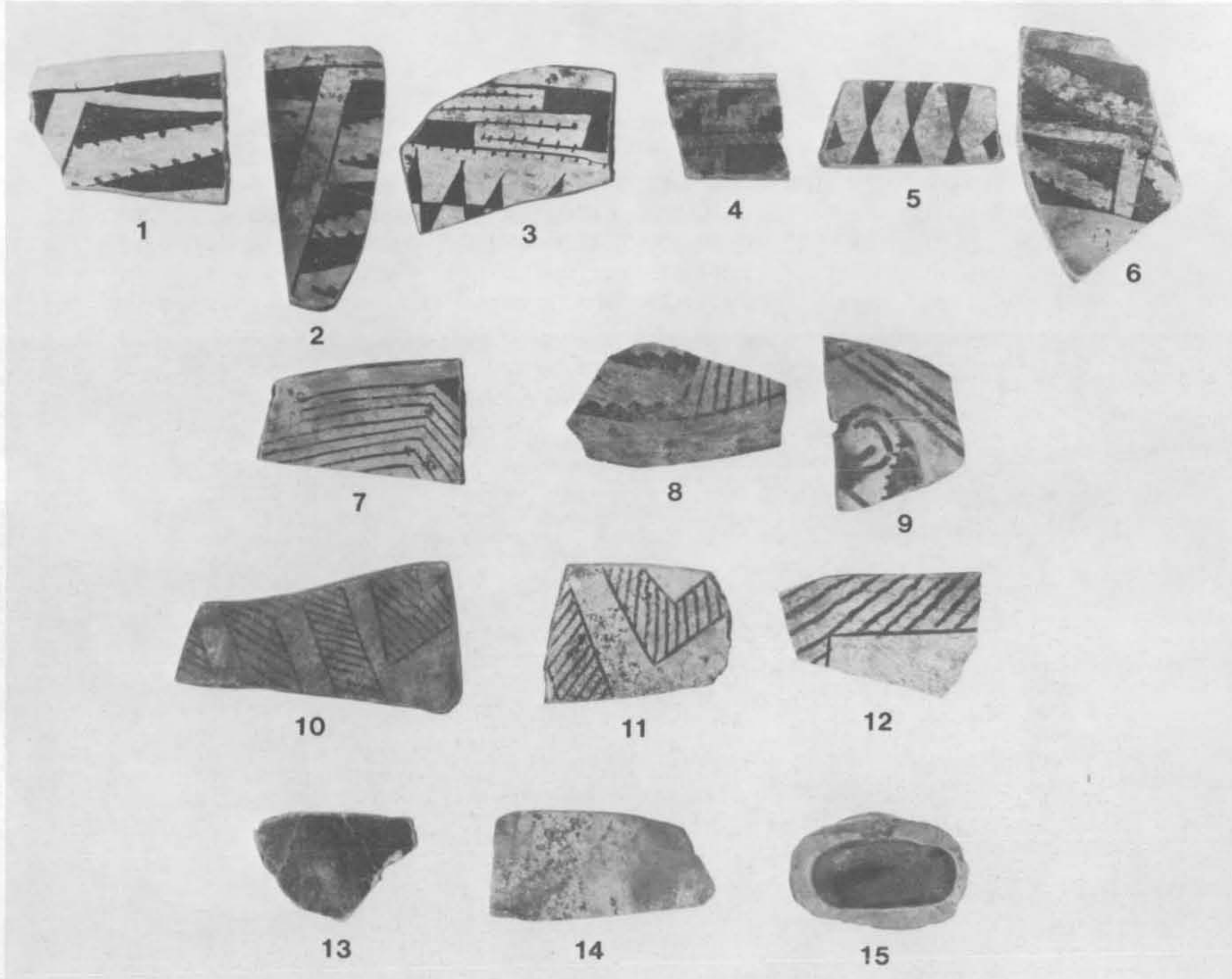


Figure 3.7. Red Mesa Black-on-white worked sherds from Pithouse B floor and bench; most are from bowls, five (8-9, 12, 14-15) are from jars

Figure 3.8. Whiteware vessels from plaza areas and House 1 rooms (1-4) and from Kiva A (5-12): (1) Mancos Black-on-white canteen; (2) Red Mesa Black-on-white seed jar; (3) Kiatuthlanna bowl/scoop; (4) Pueblo II - Pueblo III mineral-on-white ladle -- bowl portion; (5-6) Early Red Mesa Black-on-white duck pot and scoops; (7, 9) Red Mesa Black-on-white seed jar and ladle; (8) Naschitti Black-on-white gourd jar; (10) Escavada Black-on-white bowl; (11) Naschitti Black-on-white doughnut form; (12) Red Mesa Black-on-white ladle

on-white frequencies in these areas are similar to relative frequencies of these types in Pithouse B and the later rooms of House 1 (Figure 3.8).

OVERVIEW OF PRINCIPAL TYPES

In addition to distribution data, Appendix 2 also displays data concerning matched sherds from various proveniences across the entire collection. The physical matching of sherds with different Field Specimen (FS) numbers is a common method used to reduce sample duplication and to identify related areas of a site. At 1360 this information does not indicate the dispersal of vessels across major proveniences. This finding is contrary to the pattern of widespread and interrelatable ceramic dispersal at other sites (e.g., 629, 627) and somewhat facilitates intrasite comparisons between proveniences.

Apparently the main occupation of 1360 encompassed almost the full period of Red Mesa Black-on-white production. Both Red Mesa and narrow neckbanded have been described elsewhere (Gladwin 1945; Toll and McKenna 1981, 1982; Vivian 1965); they will be only briefly discussed here.

Red Mesa Black-on-white is traditionally described as a mineral-painted, white-slipped type. Temper is usually sand and sherd, with sherd increasing in frequency and relative proportion through time. The most common forms are bowls, jars with short necks or none, large water ollas, pitchers, canteens, ladles, and effigy forms, including the "duck pot." It has been found that slip, and to some extent polish, may be related to production area as defined by identifiable exotic tempers (Toll and McKenna 1981, 1982). As a type, Red Mesa usually exhibits smooth, well-slipped and polished surfaces, but it is more variable in the application and finishing of the slip than is its variant, "Early Red Mesa." Early Red Mesa, which is discussed below, has also been partly discussed as Kiatuthlanna Black-on-white (Vivian 1965; see also Toll and McKenna 1981).

Bands are the most common design elements for Red Mesa, although occasional free-form hatchure or checkerboard patterns occur, usually on late Red Mesa pieces. The number and placement of bands depends on vessel form and size: bowl interiors usually have only one; large ollas may have one large or several narrow bands; and pitchers are almost always adorned with independent panels on neck and lower body. Common motifs in bands are ticked triangles from which scrolls or volutes often interlock, solid stepped elements with opposed ticked lines, parallel lines as panel dividers, and sawteeth. Large jars are more likely to exhibit paneled and sub-paneled band designs involving extensive use of parallel line dividers than are bowls, ladles, or smaller enclosed forms.

The category "Early Red Mesa" was established as an analytical category by the Chaco Project in order to separate for evaluation a distinctive mode of design. Vivian (1965) discusses problems in separating the types Kiatuthlanna and Red Mesa Black-on-white in Chacoan assemblages. An additional problem concerns a style of design involving solid figures with many continuous parallel framing lines, large open areas, and designs pendant from bowl rims; this style is at least a subset of the ceramics traditionally called Kiatuthlanna. The chronological position of this ceramic category relative to Red Mesa is somewhat unclear, but it appears to fall at the early end of the Red Mesa production span (perhaps 875-950 as opposed to 875-1050 for Red Mesa). Thus, while there is no assurance that items labeled Early Red Mesa are in fact earlier than all those labeled Red Mesa, it is likely that they are. While it is incorrect to consider the two categories as being sequential, they do permit consideration of probable developmental trends; the imperfect nature of the sequence should be borne in mind, however.

Narrow neckbanded has been described and discussed as Tohatchi Banded (Olson and Wasley 1956), as Tocito and Gray Hills Gray, and as Captain Tom Corrugated (Windes 1977b). Forms are primarily jars with a few pitchers. From the shoulder of the vessel to the rim fillet, "narrow" bands are left exposed or tooled. The upper bands overlap the lower with an occasional patterned effect being achieved through a short series of wavy coils or pseudo indentations. Bands are narrow in respect to the preceding wide neckbanded or Kana-a Gray type; they are usually less than 7 mm wide, whereas the Kana-a bands frequently exceed 10 mm in width. Below the shoulder, narrow neckbanded vessels have a plain gray body, similar in paste and finish both to earlier Lino Gray and to the lower bodies of other neck-decorated culinary wares. Temper in the Chaco area is traditionally held to be coarse sand without sherd, although the inclusion of Chuskan types into this classification clearly broadens this aspect of the narrow neckbanded definition.

CERAMIC CHRONOLOGY

Other Chaco Center ceramic reports have developed three important aspects of ceramic chronology: typological, depositional, and absolute time (Toll and McKenna 1981, 1982). Absolute time is, of course, the most desirable but requires numerous, relatively secure absolute dates from several sites in a type's production area in order to confidently correlate "type" with period of production; the availability of such evidence is the exception rather than the rule. Because of the small number of absolute dates from 1360 and the large standard deviations of the archaeomagnetic samples, the site cannot contribute to the development of a ceramic chronology correlated with absolute time.

Typological time is the usual dimension of reference in discussions of ceramic chronology. This term refers to the more or less serial occurrence of types through time. The ordinal trends and tendencies of typological time are often disrupted by the effects of depositional time--the actual time of ceramic discard or site abandonment (as determined from stratigraphy), which may be considerably different from the period of production and presumed time of entry of items into the archaeological record. There are many factors--such as vessel strength, differential use, and cost (Foster 1960)--that affect the rate of discard, but clearly the majority of items are disposed of within their period of typological time, which is why that concept is useful. Although the differential deposition of ceramics is a normal process of artifact use and life, and not an abnormal event that "obscures" the archaeological record, such processes do affect temporal assessments when context is ignored.

Site 1360 offers one of the better opportunities available to the Chaco Project to study depositional time and its effect on typological time. Among the factors involved in the depositional time phenomenon, the most familiar is the survival of an heirloom, a piece that actually remains in use longer than the normal period of production or vessel life. The Kana-a Gray jar from Pithouse B (Figure 3.5[4]) is apparently such a specimen. This culinary type is assigned by a number of researchers to a short production interval of 100-125 years ending at AD 900 (see discussion of Moccasin Gray in Breternitz et al. 1974; Colton 1955), yet this particular jar is present in a context that postdates the usually accepted end of Kana-a Gray production by approximately 100 years.

Two other factors affecting depositional time are curation and secondary use. Both of these extend the practical life of ceramic vessels or parts of vessels and delay their ultimate deposition, blurring the boundaries of any one type's production life. Culinary jars or upper bodies, such as those in Figure 3.2, are often used to line cists whose use extends beyond the typological production life of the jars in question. Likewise, mend holes attest to repair and continued use of (mostly) whitewares as functional vessels even before their reduction to secondary tools, such as scoops, lids, trays, scrapers, and worked sherds (Figures 3.7 and 3.9). Curated items such as these may find their way into later burials (see Kiatuthlanna Black-on-white scoop in Toll and McKenna 1982:Figure 25a) or be found in use context like the items in Pithouse B at 1360.

Red Mesa Black-on-white is the predominant decorated type in Pithouse B, but it is represented primarily by items no longer serving their primary function; as a type it is curated. Figure 3.6 shows a portion of the many secondary tools in this assemblage made from Red Mesa vessels. The functional vessels in this assemblage exhibit a distinct mixture of different types, including late Red Mesa, Mancos, early Gallup, and Escavada Black-on-white, and completely corrugated Pueblo II utility ware (Figures 3.4 and 3.5). The inference is clear; although Red Mesa predominates in the assemblage, production of this design style was on the wane, and later styles, such as hatchured Gallup and completely tooled utility wares, were on the rise. (This assumes, of course, that the intersection of independent variables of surface treatment and technology define pottery "types" [Colton and Hargrave 1937:2; Rice 1976:542; Wheat et al. 1958].) The reuse of Red Mesa items effectively delayed their deposition at 1360. Pithouse B would seem to

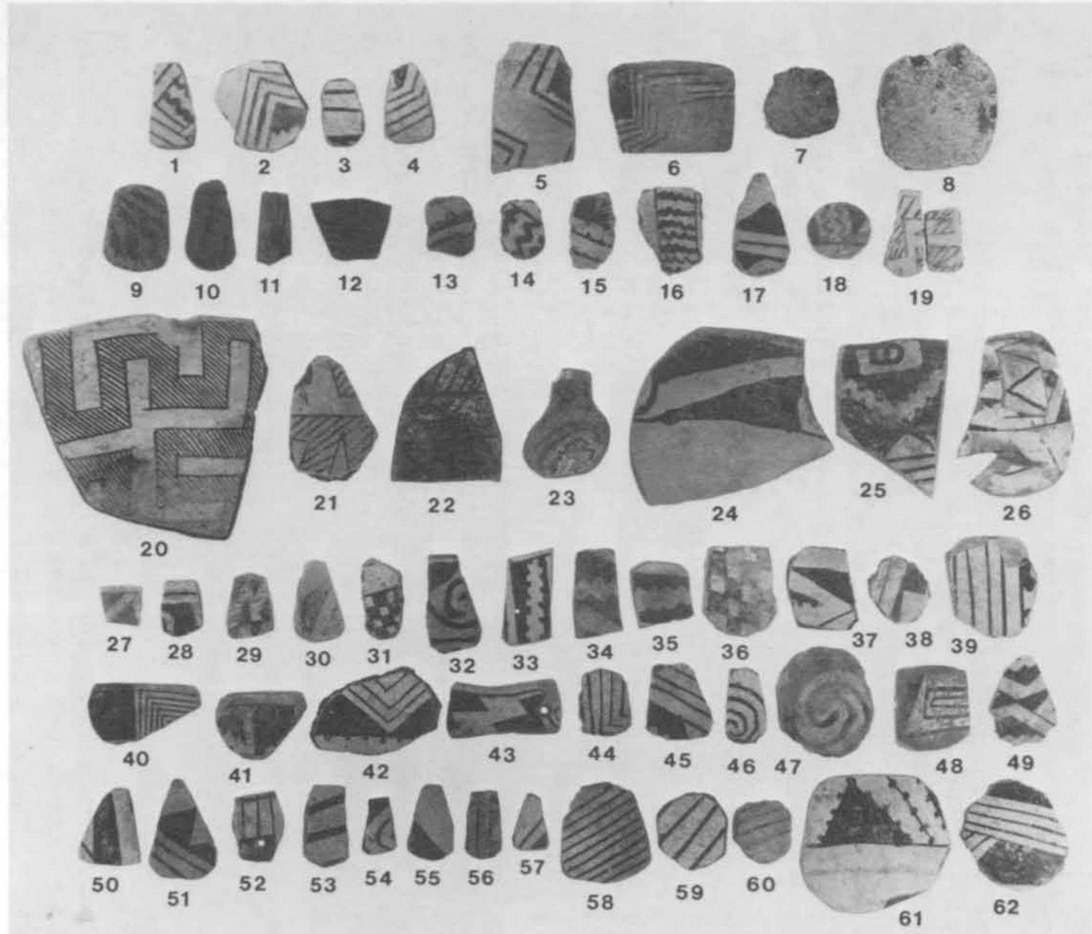


Figure 3.9. Worked sherds: (1-4) Basketmaker III - Pueblo I mineral-on-white; (5-6) Early Red Mesa Black-on-white; (7-8) Lino Gray; (9-12) redwares; (13-15) carbon-on-white; (16-18) exotic mineral-on-white; (19) Brimhall Black-on-white; (20-26) completely worked scrapers or small scoops; (27-49) Red Mesa Black-on-white, one sherd (49) is a chipped blank; (50-62) Pueblo II - Pueblo III mineral-on-white

date to the mid-900s if type count were the only criterion. If the type identifications of only the whole functional vessels are considered, however, a date of 1020-1030 would be more appropriate, given the context of ceramic use.

SAMPLE AND ANALYSIS

The ceramic analysis consisted of a traditional typological or "rough sort" classification followed by a more detailed analysis based on types and attributes.

The rough sort, more fully treated elsewhere (McKenna and Toll n.d.), is a temporally oriented classification based primarily on surface attributes. The rough sort is heavily dependent on decorative motifs and their spacing and placement, since these are key factors in assessing and recognizing ceramic temporal change. All of the ceramics recovered at each site excavated by the Chaco Project were processed through the rough sort, providing a comparable ceramic inventory for each site. Inasmuch as the rough sort does not record the wide array of types used in more traditional Southwestern typology (Colton and Hargrave 1937), it cannot be completely compared with classifications founded on that system. Nevertheless, the pragmatic nature of the rough sort has allowed the structuring of the collection into categories that are very similar to, if in some cases broader than, traditional classifications. The rough-sort classification provides type identifications that are as specific as traditional typology for those decorated wares that are most abundant--the Cibola series. It is in materials traditionally considered to be nonlocal--the San Juan and Tusayan series, for example--that the rough sort groups encompass a number of traditional types. Separate tabulation of some of these types (e.g., Appendix 2, Table 1) corrects this failing to some extent, but these more refined types are not entered as variables in the detailed analysis.

The detailed analysis was performed on a sample drawn from the total collection (Table 3.2). The sample was chosen so as to minimize multiple inclusions of single vessels; this was accomplished by matching sherds and by concentrating on rim sherds. Because a sherd by itself has little meaning in terms of the actual number of vessels in use, the vessel-oriented detailed analysis sample is the focus of the ensuing discussion. To reiterate, the types with which this discussion is most concerned are defined with the same specificity as traditional ceramic types, even though they are referred to here as "rough sort" types.

Two phases of recording were used in the detailed analysis: a macroscopic examination of the surface attributes for design, paint, and finish; and a microscopic examination of the paste for temper, texture, and clay color. Surface attributes are primarily nominal in scale but do include some metric variables, such as rim fillet width on culinary specimens and orifice diameter for all items of a sufficient size to make projected measurements possible. Paste attribute studies focus on

Table 3.2. 29SJ1360 Ceramic sample for detailed analysis

Rough Sort Type	Rough Count	Rough Sort %	Detailed Count	Detailed %	Temper Count	Temper %	Rim Count	Rim %
Plain Gray	3394	26.5	54	2.6	19	1.1	10	.7
Lino Gray	50	.4	46	2.2	44	2.6	41	2.8
Lino Fugitive	38	.3	8	.4	6	.4	3	.2
Wide Neckbanded	238	1.9	78	3.7	67	4.0	61	4.1
Narrow Neckbanded	1370	10.7	153	7.3	153	9.2	148	10.1
Neck Corrugated	225	1.8	50	2.4	48	2.9	39	2.7
PII Corrugated	44	.3	46	2.2	45	2.7	46	3.1
Unid. Corrug.	718	5.6	8	.4	5	.3	3	.2
TOTAL GRAY	6077	47.5	443	21.2	387	23.3	351	23.9
BMIII-PI M/w	159	1.2	92	4.4	90	5.4	82	5.6
E. Red Mesa B/w	271	2.1	116	5.6	106	6.4	95	6.5
Red Mesa B/w	2291	17.9	726	34.8	599	36.1	518	35.3
Escavada/Puerco B/w	71	.6	21	1.0	21	1.3	16	1.1
Gallup	108	.8	36	1.7	34	2.0	32	2.2
Chaco B/w	5	-	3	.1	3	.2	2	.1
Exotic M/w	86	.7	38	1.8	33	2.0	24	1.6
PII-III M/w	1816	14.2	358	17.1	233	14.0	216	14.7
TOTAL M/w	4807	37.5	1390	66.5	1119	67.4	985	67.1
BMIII-PI C/w	31	.2	24	1.1	19	1.1	15	1.0
Red Mesa (Chuska)	59	.5	27	1.3	23	1.4	19	1.3
Chuska B/w	3	-	2	.1	2	.1	2	.1
Chaco McElmo	6	-	1	-	1	.1	1	.1
Mesa Verde B/w	1	-	0	-	-	-	-	-
Chuska Whiteware	32	.3	15	.7	15	.9	12	.8
San Juan Whiteware	15	.1	5	.2	4	.2	5	.3
Tusayan Whiteware	3	-	0	-	-	-	-	-
Little Colorado WW	3	-	0	-	-	-	-	-
TOTAL C/w	153	1.1	74	3.4	64	3.8	54	3.6

(continued)

Table 3.2. (continued)

Rough Sort Type	Rough Sort Count	Rough Sort %	Detailed Count	Detailed %	Temper Count	Temper %	Rim Count	Rim %
Unidentified Whiteware	1633	12.8	135	6.5	50	3.0	42	2.9
TOTAL WHITEWARE	6593	51.5	1599	76.6	1233	74.2	1082	73.7
Decorated Redware	63	.5	24	1.1	20	1.2	13	.9
Polished Smudged	59	.5	22	1.1	20	1.2	22	1.5
GRAND TOTALS	12792	100.0	2088	100.0	1660	99.9	1467	100.0
Percent of Rough Sort			16.3		13.0		11.5	
Percent of Detailed analysis					79.5		70.3	

distinctive tempering material as an indicator of manufacturing source. Chaco Canyon and its environs are formed largely of fine- to medium-grained sandstone formations, principally of the Mesaverde Group (Dane and Bachman 1965). It is difficult to distinguish among these sandstones, especially when they have been reduced to ceramic temper (Warren 1976, 1977a); most of the sandstone-tempered ceramics found are recorded in this analysis as "undifferentiated." Nevertheless, the presence of distinctive igneous materials, distinguishable chalcedonic-cemented sandstone, or sandstones exhibiting clear grain-size differentiation in ceramic items allows us to suggest (albeit with varying specificity) particular geological sources for several San Juan Basin tempering elements.

Although systems of surface attribute recording are well established, similar systems of core-composition attribute recording are not, especially for large collections. Warren (1967, 1976, 1977a) has done work on temper identification in the Chaco area, and the temper and paste recording systems used in the detailed analysis discussed here were based on her work, although her recording system (Warren 1977a, 1977b) was modified to make it more computer oriented. Items recorded include a) specific temper types identifiable at 30-45x with a dissecting microscope, as well as the more general tempers noted; b) a rating of temper grain size to the nearest 0.25 or 0.50 mm (depending on coarseness); c) an estimate of temper density; d) visual placement in a clay-temper category if appropriate; e) an estimate of the quantity of sherd temper relative to other temper; and f) a visual assessment of degree of vitrification. Although this system does not begin to record all of the potentially observable variability in tempers and clays, much of that variability is of little geological meaning to us at this time. The virtue of the system is that it permits processing of quantities of sherds and provides at least some distributional information.

Inspection of the tables will reveal a discrepancy between the number of sherds with surface-attribute observations and the number of sherds with observations on the paste. Such discrepancies are primarily due to the detailed analysis sample having been further reduced for temper and paste analysis (Table 3.2). Sherds examined microscopically were principally rim sherds (85 percent of the temper sample), though only 96 percent of the rims were so analyzed. The remainder of the temper analysis group consists of handles (6 percent), worked sherds (3 percent), and whiteware jar body sherds (2 percent), all of which occur in greater frequencies in the final analysis sample as a whole. The remaining 4 percent of non-rim sherds in the temper sample consist of neck-decorated culinary, exotics, rare forms, and a few whitewares. Selection of the temper sample was thus based mainly on the presence of part of the vessel's rim, but large portions of matched vessels that lacked rims were also included. Other items were included on the basis of availability and size. The size of this sample compensated for the minor inconsistencies in its selection; the temper sample is nearly 80 percent of the detailed sample. Where only surface attributes are involved, the entire detailed sample is used; when paste attributes are involved, only the temper sample is included. Minor discrepancies of a few sherds also occur in the tables; these result from coding errors or unobservable attributes. Paste-attribute recording recognized portions of sandstone and igneous tempers in sherds containing both. In the tables describing technical attributes (Tables 3.4 and 3.14-20, below) these mixed tempers are all included under the igneous temper in the mix; in the import tables (Tables 3.22 and 3.23, below), the San Juan igneous-sandstone mixes are included as imports, but the trachyte mixes with more sandstone than trachyte are not.

Most excavated Anasazi sites reported show more grayware than whiteware in their bulk sherd counts, while whole-vessel as well as rim-sherd counts suggest that the actual population of vessels contained more whitewares than graywares. Site 1360 is unusual in that whiteware constitutes more than half of <u>both</u> the bulk count and the vessel-controlled collection. The large numbers of complete and partially restorable pots, the large sherd tools, and the large size of trash sherds all help to account for this, since these factors serve to keep sherd proportions more nearly in line with vessel proportions.

Matching of already large-sized sherds further reduces the representation of culinary vessels at the rim/temper sample level. The incorporation of all rim sherds, coupled with considerable sherd matching, and the generally large size of specimens at 1360, makes plausible the argument that the sample is a reasonable representation of the entire vessel assemblage, with whitewares represented in proportion to their actual occurrence.

Many factors undoubtedly contributed to this greater rate of production, consumption, and deposition (and hence recovery) of whitewares relative to graywares. A few of these factors may be suggested:

1) Functional conversions or reuses. Broken bowls, as vessels, have fewer reuse options than large jars; bowls require actual physical replacements as containers. Large cook pots may suffer paste fatigue on the bottom from repeated thermal shock in addition to the ubiquitous abrasion suffered by all vessels in daily use. Jars with "bottom burn-out" or severe cracks may still be used as standing dry-storage containers or as cist liners; this effectively extends their vessel use life and thereby reduces the demand for production of jars for these purposes. Likewise, complete nonporous white jars normally are used as domestic water containers but may be converted to cooking jars or field ollas (Fontana et al. 1962:80), again reducing the demand for the grayware jars normally used for these purposes. Several sooted Red Mesa ollas in Kiva A trash attest to the possibility of such reuse. In comparison, broken whiteware bowls evidence no reuse as containers. Large bowl sherds may be reused as scoops, but the vast majority of utilized bowl fragments are worked sherds located in trash, suggesting their use as expedient scrapers.

2) Special use. Special forms, notably ollas (whiteware or grayware) and large grayware storage jars, may have seen more stationary use, protective placement, better care, or infrequent handling, any of which would have reduced breakage rates of such forms relative to bowls.

3) Seasonality of access to vessels. Although this difference is probably not observable archaeologically, warm-weather occupations may have facilitated a high rate of breakage. Because activities were moved into less-structured outdoor areas, access to vessels would have increased, especially for children and animals, and this, in turn, would have increased the rate of breakage. Cold weather would have caused a concentration of activities and vessels in more-structured indoor areas with reduced or more routinized vessel accessibility. All things being equal (temper tantrums, clumsiness, ritual destruction, normal wear), cold-weather occupations would result in breakage of the forms most often handled--bowls.

4) Relative cost. Cost of production for the bowl form is comparatively low, and this could have permitted easier dismissal of broken items from the household inventory. The bowl shape possibly facilitated transport (Whittlesey 1974), exchanges, and gifting, all of which suggest that bowls may normally have been an item of some surplus and consequently of less value, so that they would have been accorded less cautious treatment.

5) Basic vessel strength. Although relative strength has not been tested on different Chacoan wares, decorated types and graywares are likely to have had different strengths. Bronitsky (1981) has documented such a difference for decorated (St. Johns Polychrome) and culinary ware at Chavez Pass, Arizona, with the latter being the stronger pottery. In studies involving Chuskan pottery, Windes (1977b:295) found no significant difference in strength among different culinary wares from the lower Chaco River. Differences in breakage patterns between Cibolan and Chuskan culinary wares (see Toll and McKenna 1983) do, however, suggest that Chuskan ceramics, though not measurably stronger, were perhaps more durable. Subjectively, it seems that the Pueblo II-Pueblo III Chaco-Cibola whitewares are harder than both most contemporary graywares and the later St. Johns Polychrome. If graywares were both larger and weaker than whitewares, this would contribute to the higher frequency of graywares relative to whitewares in most bulk sherd counts. The 1360 results, however, suggest that the relative proportions of whitewares and graywares are due less to differential strength than to conditions of deposition and differential handling.

Tables 3.3 and 3.4 present two data sets of special interest concerning the 1360 ceramic assemblage. Table 3.3 shows the heavy proportions of certain vessel forms within certain wares. Only in the earliest types does grayware exhibit much diversity of form beyond "jar." The majority of whitewares occur as bowls, but the closed whiteware forms display greater variation than can be found in grayware. Throughout this analysis gray jars were kept separate from white jars. "Whiteware jar" is a lumped category that also includes smaller closed forms that were not differentiated for this analysis: short-necked globular jars of less capacity than ollas and sherds that could only be identified as being from a closed form. For these reasons whiteware jar rims are underrepresented. A larger than usual number of ollas, i.e., large whiteware jars with small orifices, are characterized simply as Pueblo II-Pueblo III mineral-on-white. This is due to the normally non-

Table 3.3. Vessel forms of all rough sort types, 29SJ1360

Rough Sort Type	Bowl	Ladle	Canteen	Pitcher	Seed Jar	Tecomate	Gourd Jar	Jar	Olla	Exotics[a]	Unknown	Total
Plain gray	1	--	--	4	--	--	--	35	--	1	13	54
Lino Gray	--	--	1	1	1	24	--	18	1	--	--	46
Lino Fugitive Red	--	--	--	2	--	--	--	1	2	--	3	8
Wide neckbanded	--	--	--	--	--	--	--	78	--	--	--	78
Narrow neckbanded	--	--	--	2	--	--	--	150	--	1	--	153
Neck corrugated	--	--	--	2	--	--	--	48	--	--	--	50
PII corrugated	--	--	--	2	--	--	--	44	--	--	--	46
Unidentified corrugated	--	--	--	--	--	--	--	8	--	--	--	8
Total grayware	1	--	1	13	1	24	--	382	3	2	16	443
Percent of ware	0.2	--	0.2	2.9	0.2	5.4	--	86.2	0.7	0.5	3.6	
BMIII-PI M/w	78	3	--	--	--	1	--	9	--	1	--	92
Early Red Mesa B/w	85	8	--	4	--	--	--	15	3	1	--	116
Red Mesa B/w	453	84	5	22	5	2	4	113	25	9	3	725
Escavada/Puerco B/w	10	4	--	3	--	--	--	1	3	--	--	21
Gallup B/w	29	1	--	4	--	--	--	1	1	--	--	36
Chaco B/w	1	--	--	1	--	--	--	1	--	--	--	3
Exotic M/w	27	5	--	--	--	--	3	3	1	--	--	39
PII-III M/w	180	29	4	14	1	2	2	87	20	6[b]	13	358
Total Mineral-on-white	863	134	9	48	6	5	9	230	53	17	16	1390
Percent of ware	62.1	9.6	0.6	3.5	0.4	0.4	0.6	16.5	3.8	1.2	1.2	

(continued)

[a]Includes 1 cylinder jar, 10 miniatures, 5 duck pots, 8 effigy pots.

[b]1 cylinder jar rim.

Table 3.3 (continued)

Rough Sort Type	Bowl	Ladle	Canteen	Pitcher	Seed Jar	Tecomate	Gourd Jar	Jar	Olla	Exotics[a]	Unknown	Total
BMIII-PI C/w	10	--	--	3	--	--	1	9	--	--	--	23
Chuska, Red Mesa design	16	2	--	4	--	--	--	5	--	1	--	28
Chuska B/w	1	1	--	--	--	--	--	--	--	--	--	2
Chuska C/w	8	2	--	3	--	--	1	--	--	1	--	15
Chaco-McElmo B/w	1	--	--	--	--	--	--	--	--	--	--	1
San Juan C/w	2	--	--	--	--	--	--	1	1	1	--	5
Total Carbon-on-white	38	5	--	10	--	--	2	15	1	3	--	74
Percent of ware	51.3	6.8	--	13.5	--	--	2.7	20.3	1.3	4.1	--	
Unidentified whiteware	44	6	1	4	--	--	--	61	8	1	10	135
Total whiteware	945	145	10	62	6	5	11	306	62	21	26	1599
Percent of ware	59.1	9.1	0.6	3.9	0.4	0.3	0.7	19.1	3.9	1.3	1.6	
Redware	18	1	--	--	--	--	--	3	--	1	1	24
Percent of ware	75.0	4.2	--	--	--	--	--	12.5	--	4.2	4.2	
Polished smudged	22	--	--	--	--	--	--	--	--	--	--	22
Grand Total	987	145	11	75	7	29	11	691	65	24	43	2088
Percent	47.3	6.9	0.5	3.6	0.3	1.4	0.5	33.1	3.1	1.1	2.1	
Rims only												
Whiteware	825	64	10	43	7	5	8	61	46	12	--	1081
Redware	12	1	--	--	--	--	--	--	--	--	--	13
Smudged	22	--	--	--	--	--	--	--	--	--	--	22
Grayware	--	--	--	13	--	24	--	314	--	--	--	351
Total rims	859	65	10	56	7	29	8	375	46	12	--	1467

[a]Includes 1 cylinder jar, 10 miniatures, 5 duck pots, 8 effigy pots.

Table 3.4. 29SJ1360 Temper types tabulated by rough sort types

Rough Sort Type	Unidentified Sandstone	Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total
Plain gray	11	3	--	1	--	4	--	19
Lino Gray	33	2	4	3	--	2	--	44
Lino Fugitive Red	4	--	2	--	--	--	--	6
Wide neckbanded	44	19	--	--	--	4	--	67
Narrow neckbanded	96	28	--	3	3	22	1	153
Neck corrugated	31	6	1	1	--	9	--	48
PII corrugated	13	5	--	1	--	26	--	45
Unidentified corrugated	1	1	--	--	--	3	--	5
n	233	64	7	9	3	70	1	387
% of grayware	60.2	16.5	1.8	2.3	0.8	18.1	0.3	
BMIII-PI M/w	70	7	2	3	8	--	--	90
Early Red Mesa B/w	69	13	--	--	9	7	8	106
Red Mesa B/w	390	122	--	3	39	20	25	599
Escavada/Puerco B/w	16	2	--	--	3	--	--	21
Gallup B/w	20	2	--	--	4	8	--	34
Chaco B/w	1	--	--	--	--	1	1	3
Exotic M/w	14	2	--	--	6	8	3	33
PII-III M/w	164	35	--	--	13	9	12	233
n	744	183	2	6	82	53	49	1119
% of M/w	66.5	16.4	0.2	0.5	7.3	4.7	4.4	

(continued)

Table 3.4 (continued)

Rough Sort Type	Unidentified Sandstone	Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total
BMIII-PI C/w	5	--	--	--	1	13	--	19
Chuska, Red Mesa design	--	--	--	--	--	22	--	22
Chuska B/w	--	--	--	--	--	2	--	2
Chuska C/w	--	--	--	--	--	15	--	15
Chaco-McElmo B/w	1	--	--	--	--	--	--	1
PII-III C/w	1	--	--	--	1	1	1	4
n	7.0				2.0	53.0	1.0	63
% of C/w	11.1	--	--	--	3.2	84.1	1.6	
Unidentified whiteware	34	10	--	--	--	5	1	50
Total whiteware	785.0	193.0	2.0	6.0	84.0	112.0	51.0	1233
% of whiteware	63.7	15.7	.2	.5	6.8	9.1	4.1	
Total redware	2.0	--	--	--	16.0	1.0	1.0	20
% of redware	10.0	--	--	--	80.0	5.0	5.0	
Polished smudged	19	1	--	--	--	--	--	20
Grand Total	1039.0	258.0	9.0	15.0	103.0	183.0	53.0	1660
Percent	62.6	15.5	.5	.9	6.2	11.0	3.2	

distinctive decoration found on olla necks, which does not allow a more specific typological assignment. The carbon-on-white and mineral-on-white assemblages are similar; the major differences are the relatively higher frequency of carbon-painted pitchers and the lower numbers of bowls in the carbon group. Unidentified whiteware runs low on bowls and high on jars, which has more to do with the placement of decoration on the two forms than with an inordinately high rate of production for plain jars. Redwares are mostly bowls and all polished-smudged vessels are bowls.

The initial temper classifications at 1360 contained higher frequencies of exotic items than did those from previously analyzed, contemporaneous sites. Most notably, the figures for San Juan igneous and unidentified igneous tempers are considerably higher at 1360 than at the other sites. A ré-examination of a number of sherds identified as having these tempers led to changing of some temper classifications; the revised data are presented in this report. We have reasonable confidence in this analysis for several reasons:

1) The relative quantities of the major imported tempers are similar to those at 629 and 627, and the igneous tempers in question always represent the smallest portion of the sample. In this method of analysis (low-power microscope without sectioning) opinion may vary on some sherds. Especially problematic are pieces of finely ground sherd temper, which are sometimes difficult to distinguish from finely ground rock at this level of analysis.

2) Chalcedonic sandstone, possibly from the Morrison formation south of Chaco, is also more frequent in the 1360 assemblage than at the other sites. In many cases the fracture and texture of the matrix of this sandstone is very distinctive and unlikely to be confused with other geological materials or with sherd temper. Once again, however, the finely ground tempers of whitewares are more difficult to identify confidently, especially when they include white sherd temper. A further possible source of confusion is Chuska sandstone, which has a white, opaline matrix (Warren 1977a:51) somewhat similar to the white variant of chalcedonic sandstone. Since Chuska sandstone is rare, as far as we know, and occurs outside the direct acquisition area for Chacoan pottery materials (see Arnold 1980), this similarity is of little concern to us.

3) The characteristics of trachyte have been adequately covered elsewhere (Shepard 1939; Warren 1976; Windes 1977b).

The distinctiveness of these temper groups is such that a reexamination of sherds in those classes was not considered necessary. While every sherd would probably not be classified exactly the same were they all reanalyzed, the trends shown here appear to be valid.

To reiterate, temper frequencies in the complete 1360 ceramic assemblage (Table 3.4) are generally similar to those of contemporary sites: undifferentiated sandstone is most abundant, followed by chalcedonic sandstone, trachyte, San Juan and unidentified igneous, and iron-bearing sandstone. Items tempered with chalcedonic sandstone are represented in equal proportions in decorated and culinary ware (ca. 17 percent). Overall, 1360 has slightly more trachyte than San Juan and unidentified igneous items.

A thumbnail comparison of earlier whitewares and graywares shows the tempers recorded at 1360 to be somewhat different from those at 627 and 629:

	Sandstone	Chalcedonic Sandstone	Trachyte	San Juan Igneous	Unidentified Igneous	n
Whiteware (Basketmaker III-Pueblo I mineral-on-white through Red Mesa Black-on-white only)						
1360	66.5	17.9	3.4	7.0	4.2	795
627	85.7	6.6	5.7	0.9	0.6	2614
629	82.2	8.8	3.7	2.5	0.7	681
Grayware (Plain gray through narrow neckbanded only)						
1360	65.3	17.1	12.1	0.3	0.9	340
627	70.2	10.6	14.8	0.9	0.0	772
629	61.8	12.7	17.4	1.2	0.0	259

The major differences are in higher frequencies of chalcedonic sandstone, San Juan igneous, and unidentified igneous tempers at 1360, especially in the whitewares. Although the three sites have substantial quantities of all the types lumped together in these comparisons, the assemblages indicate that the heaviest use of the site at 629 occurred somewhat earlier than the heaviest use of 1360, while the most intensive use at 627 occurred somewhat later than that at 1360. This probably accounts in part for some of the differences among the sites in ceramic temper, and it is especially interesting in the case of chalcedonic sandstone, since the peak import period for chalcedonic sandstone and the main occupation of 1360 seem to coincide. There are probably some nontemporal differences as well; as the trachyte and San Juan distributions suggest, 1360 seems to exhibit a slightly lower consumption of trachyte than do the other sites (H. Toll 1983). In addition, some of the differences among the sites are probably due to differences in recording during analysis.

STATISTICS

The statistics used in the following discussion of the analysis results are simple ones; several, such as means, t-test, and chi-square, are so common as to require no explanation here (see Siegel 1956; Thomas

1976). The 0.05 level of significance has been used consistently as a cutoff, though modern technology allows presentation of precise levels. Included with results from chi-square tables with dimensions greater than 2 by 2 are coefficients of contingency values (C). These coefficients take into account sample size and give a measure of strength of association. While this is useful information, it must be stressed that C values cannot be directly compared from table to table unless the tables' dimensions are the same. The maximum value for C may be calculated for square (k by k) tables as the square root of (k-1)/k (Siegel 1956:201), so that a 3 by 3 table has a maximum value of 0.816 and a 10 by 10 table has a maximum value of 0.949, approaching a limit of 1 regardless of sample size. Maximum values cannot be calculated for tables that are not square (as far as we know), so the statistic cannot be standardized.

The Shannon-Weaver Diversity Index (Pielou 1969:225-235, 1974:162-164) is a descriptive statistic that shows two aspects of distributions of categories within a sample: their diversity (H') and evenness (J). The version used here employs natural logarithms of percentages of each category; the natural log of the number of categories (s) is the maximum value for H', and J is calculated as the proportion of actual to maximum value. While J thus ranges from 0 to 1, the maximum diversity value increases with the number of categories (here--motifs, vessel forms, and types). Because of the effect of the number of categories on values of this index, it is clear that sample size is important to it (see Tramer 1969). Archaeological applications of the statistic include C. Breternitz (1982), Rice (1981), H. Toll (1981, 1983), and Toll and McKenna (1983).

Two similarity coefficients are used. The coefficient of Jaccard (S_J; Sneath and Sokal 1973:131-132) is used to treat attributes that can be compared in terms of characters present or absent. For example, two types may be compared by how many design elements they have in common and how many are not shared. (See Table 3.5 below for a sample calculation of the coefficient.) Note that items that are absent in both of the groups being compared (cell "d" in the schematic table) do not enter into the calculation, which is useful here since theoretically that category is unknown. The value of S_J ranges from 0 to 1, but only if the two types (for example) have the same number of motifs--the greater the difference in number of categories, the less the maximum possible value of S_J.

The second similarity coefficient, the Brainerd-Robinson Agreement Index (Marquardt 1978; Robinson 1951), is a standard archaeological technique which operates on the assumption that similar units will have similar percentages of various artifacts or attribute states. By subtracting from 200 the sum of the absolute values of difference in percent for each attribute in two units, an agreement index between 0 (completely dissimilar) and 200 (completely similar) is generated for each pair. These values may then be used to order a matrix in which all unit pairings are present. (This statistic is used on Table 3.25, below.)

CERAMIC CHARACTERISTICS

The present descriptions and analyses bear resemblances to traditional typology, to new approaches, and to the type-variety method (Sabloff and Smith 1969; Wheat et al. 1958), but they are identical to none of these. First, it must be recognized that the "typology" of the Chaco series has never been solidified (witness the "rough sort"); this analysis, like the recent work of Windes (1982), has been structured to contribute to a definition of the Chaco series. Without the establishment of types, the delineation of varieties is not possible. Furthermore, the very use of "varieties" has been called to question: a) as being inappropriate to the study of continuous variation, since varieties mask too much variability, and b) as being inherent in a typological framework (Dunnell 1971). Accordingly, elements of both traditional typological analysis and the attribute-based taxonomy recently used by others working with Southwestern ceramics (Hantman et al. 1978; McGimsey 1980; S. Plog 1977, 1980a; Redman 1977; Sullivan 1978) are employed.

The standard procedure in Chaco Project ceramic analyses has been to select specific types exceeding 2.5 percent of the detailed counts (Table 3.2) for fuller description and examination of principal attribute groups. Types from 1360 selected for more scrutiny are wide and narrow neckbanded, neck corrugated, Pueblo II corrugated, Basketmaker-Pueblo I mineral-on-white, and Early Red Mesa and Red Mesa Black-on-white. Inspection of Table 3.2 reveals that the inclusion of neck corrugated and Pueblo II corrugated and the omission of Lino Gray from this selection violate normal procedure. Lino Gray was omitted because it is more appropriately studied in the context of Basketmaker sites. The later utility types were included in order to facilitate comparison with samples from 629 and 627. Whiteware types selected for description are illustrated in sherd form on Figures 3.10 through 3.13; Figure 3.14 illustrates the exotic service wares. Culinary types are illustrated on Figures 3.2 and 3.5.

Refined monitoring of the main attribute groups that constitute a "type" is accomplished by recombining selected attributes of temper, paste color, and paint type. In some measure these groups may represent different production sources, and consequently, attributes are examined for intragroup consistency; where possible, they are also compared with similar groups isolated at other sites.

The attribute grouping procedure has been abbreviated in scope for 1360 to include only the two most abundant types, Red Mesa Black-on-white and narrow neckbanded. Emphasis is placed on comparison of these two type categories with the same ones from 627 and 629. Types other than Red Mesa and narrow neckbanded are not discussed because of the similarity of temper distribution for those types at 1360 and at other sites where those types met the abundance criterion and thus were examined and discussed in detail. Tabulations for these types at 1360 are the same as for the other sites, permitting comparison with other

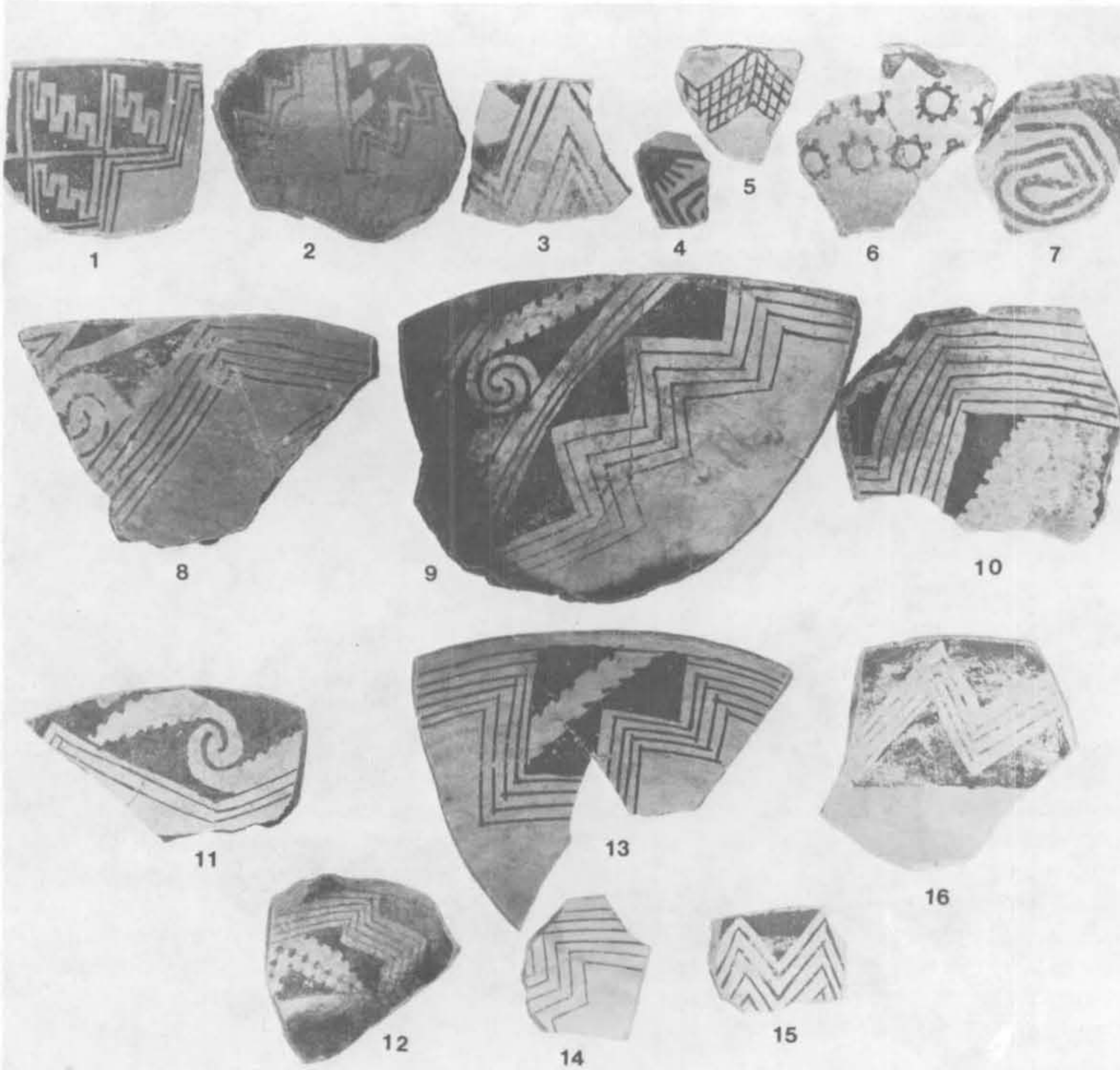


Figure 3.10. Basketmaker III - Pueblo I mineral-on-white (1-7) and Early Red Mesa Black-on-white (8-16) sherds: (1-3) White Mound Black-on-white, (4) La Plata Black-on-white, and (5-7) Piedra Black-on-white

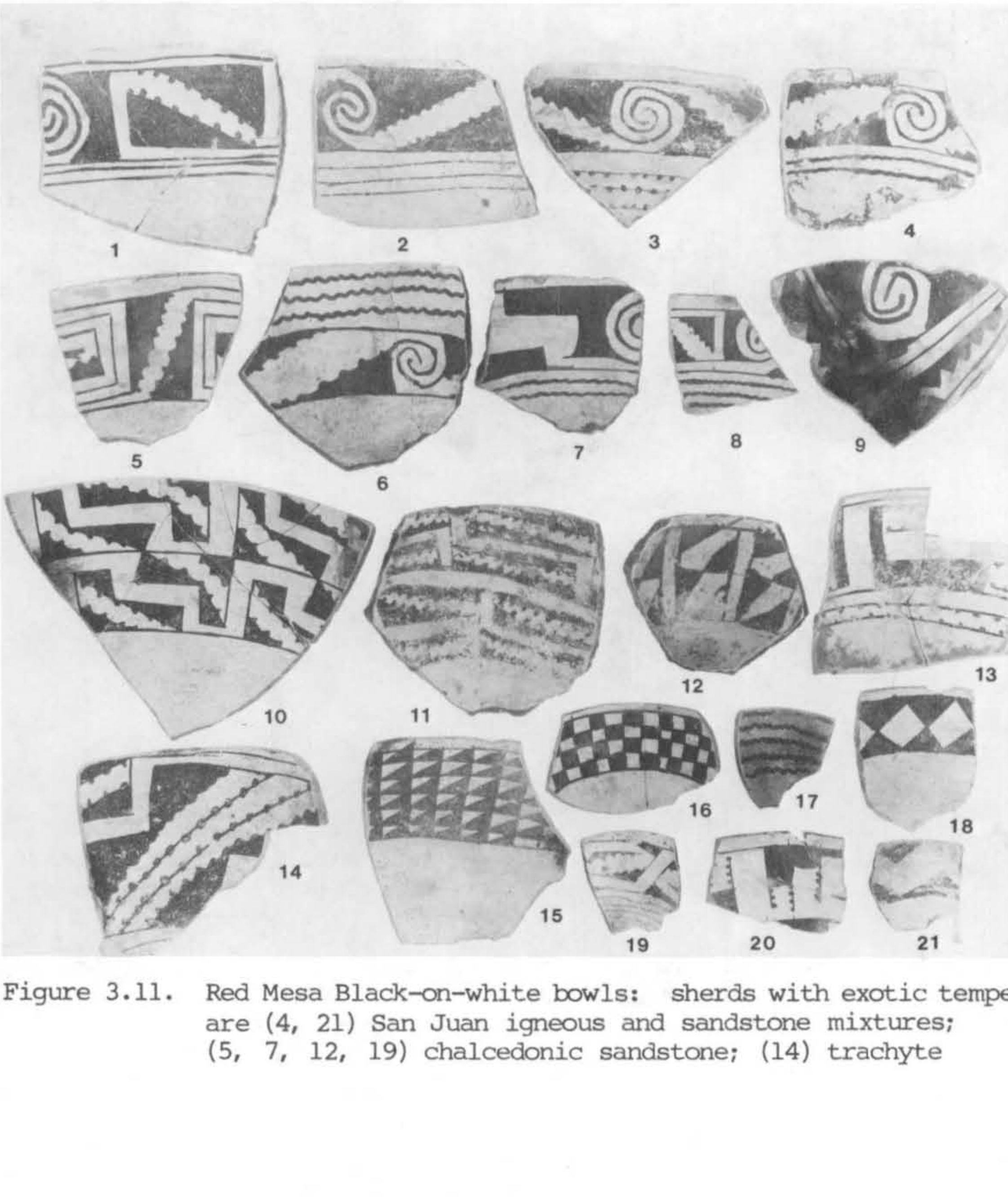


Figure 3.11. Red Mesa Black-on-white bowls: sherds with exotic tempers are (4, 21) San Juan igneous and sandstone mixtures; (5, 7, 12, 19) chalcedonic sandstone; (14) trachyte

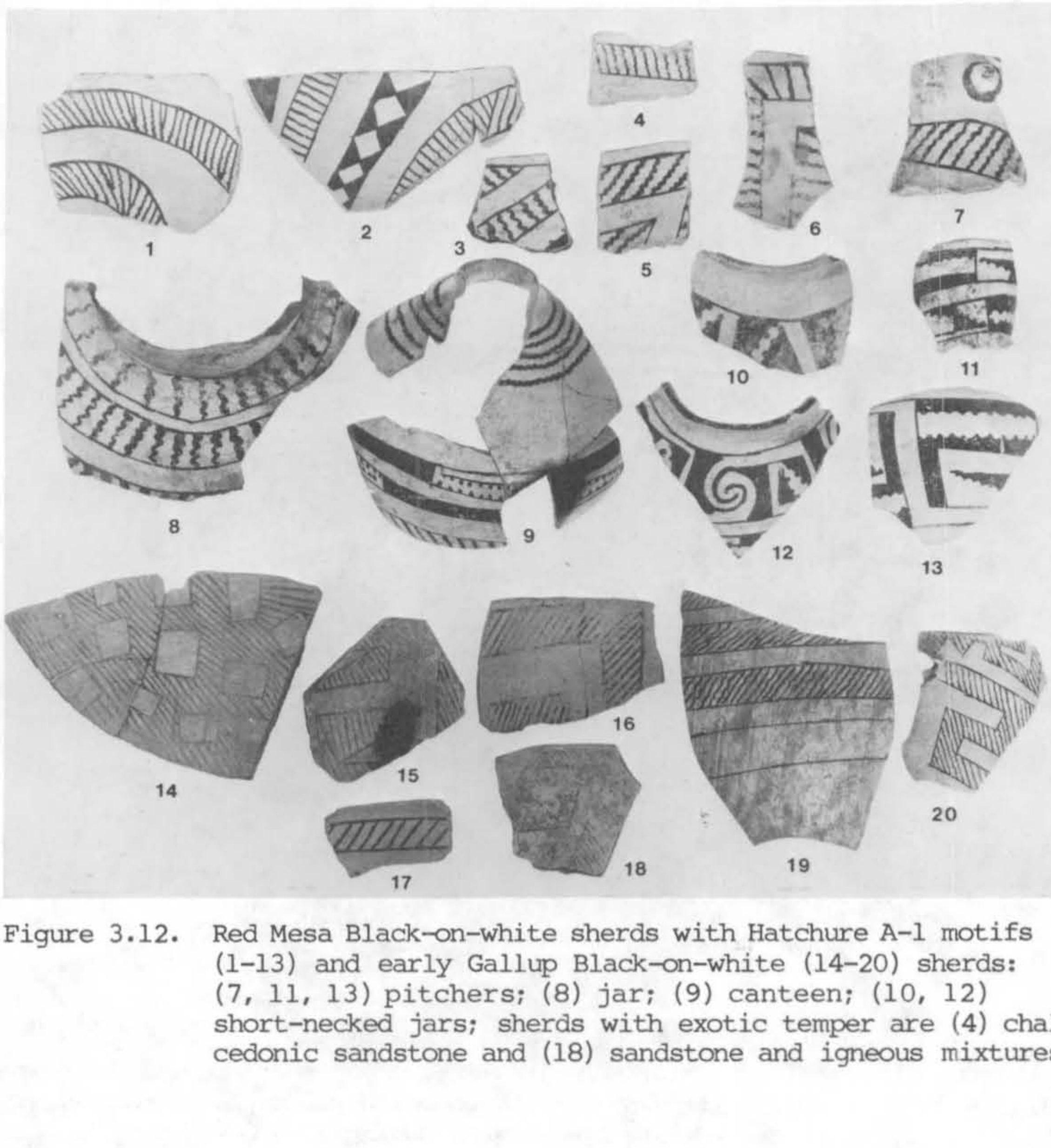


Figure 3.12. Red Mesa Black-on-white sherds with Hatchure A-1 motifs (1-13) and early Gallup Black-on-white (14-20) sherds: (7, 11, 13) pitchers; (8) jar; (9) canteen; (10, 12) short-necked jars; sherds with exotic temper are (4) chalcedonic sandstone and (18) sandstone and igneous mixtures

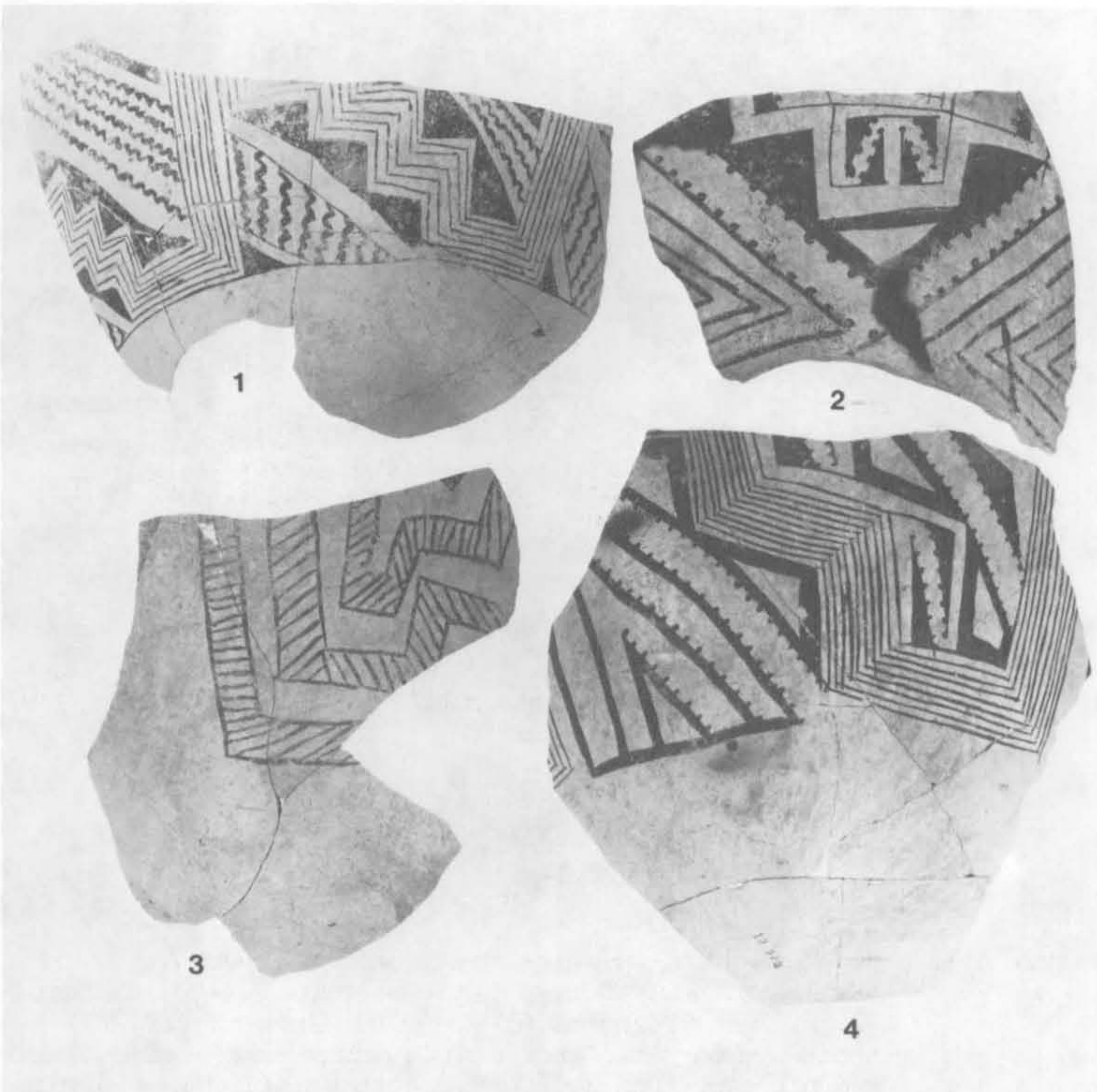


Figure 3.13. Large olla fragments tempered with medium- to fine-grained undifferentiated sandstone: (1-2, 4) Red Mesa Black-on-white; (3) Gallup Black-on-white

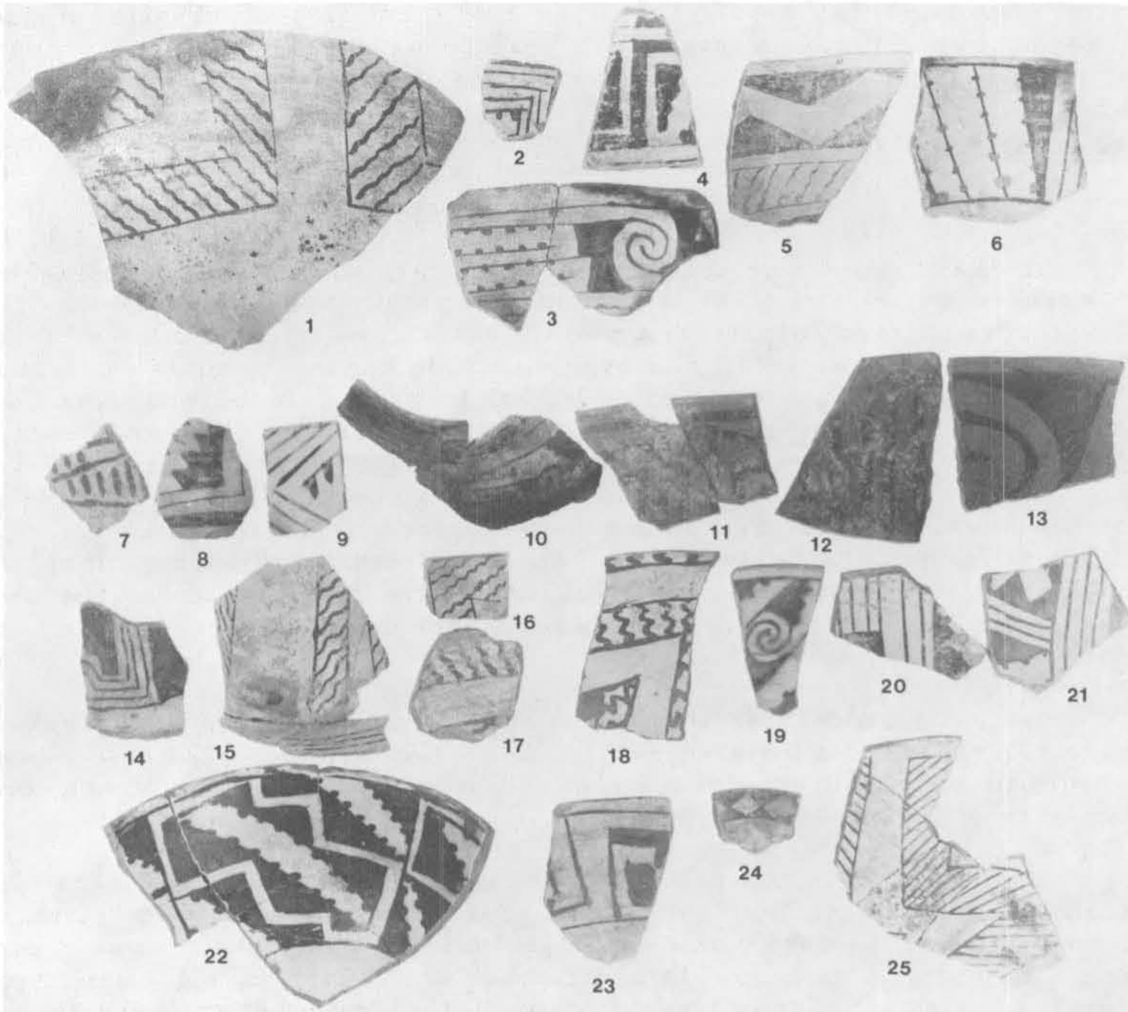


Figure 3.14. Exotic mineral- and carbon-painted black-on-white sherds: (1-2) Cortez Black-on-white; (3, 6) Naschitti Black-on-white; (4-5) Mancos Black-on-white; (7) Lino Black-on-gray; (8-9) Kana-a Black-on-white; (10) Wepo Black-on-white; (11-13) Deadmans Black-on-red; (14) Tunicha Black-on-white; (15-18) Burnham Black-on-white; (19-24) Newcomb Black-on-white; (25) Chuska Black-on-white

sites on that level. Attribute group examinations then focus on the most common types at 1360 in order to explore the ceramics from a site where some evidence exists for ceramic production. In addition to direct evidence for manufacture (see the discussion of on-site production below), it may be suggested that an especially large attribute group with sandstone temper constitutes indirect evidence for production at 1360.

Whiteware Surface Treatment

The main aspects of surface treatment fall within the categories of finishing and decoration. Motif distribution must be viewed on the level of both typological and temporal variations. The abundance of Red Mesa suggests that it is the type in which uncommon motifs are most likely to occur at 1360, and indeed this proved to be the case (see Appendix 2, Tables 6-8 for detailed information on whiteware surface treatment). Early Red Mesa (Figure 3.10[8-16]) shows considerably fewer motifs than Basketmaker III-Pueblo I mineral-painted (Figure 3.10[1-7]) or Red Mesa, but this is not unexpected since by definition this type has a more specific design style. The more restricted number of motifs in the Early Red Mesa group is indicated by the fact that Early Red Mesa has fewer motifs than does the Basketmaker III-Pueblo I grouping, in spite of having a larger sample.

Table 3.5 summarizes the common occurrence of designs among Basketmaker III-Pueblo I mineral-on-white, Early Red Mesa, and Red Mesa Black-on-white. The table provides a number of ways of looking at the commonality of motifs among types:

Section A shows types in common--the number of motifs in each type that are shared with the other types. Percentages are given in terms of both the motif inventory for each type and the number of items in each motif category. Thus, the 18 motifs that are common to all three types constitute 46 percent of the 39 painted motifs in Red Mesa, but those same 18 motifs account for 86 percent of the coded sherds in Red Mesa.

Section B shows the number of shared motifs--the number of common motifs exhibited in the three possible pairs of types. The percentages in this section are of the motif inventory in each type.

Section C displays the coefficients of similarity. This section also treats the types in a pair-wise fashion in terms of numbers of motifs. As discussed earlier, the coefficient is that of Jaccard (Sneath and Sokal 1973:131-132).

Early Red Mesa can be seen to be a subset of Red Mesa in that all of its decorated elements are also found in Red Mesa. Somewhat surprisingly, there is greater sharing of motifs between Red Mesa and Basketmaker III-Pueblo I mineral-on-white than between Early Red Mesa and Basketmaker III-Pueblo I. The motifs that occur only in one type account for very small percentages of each type, and most of the motifs that occur only in two of the types are less than a percent of each

Table 3.5. Motif co-occurrence in principal Cibola Whiteware types at 1360; painted motifs only, n=1396 (sherd n=923)

A.

Type (number of motifs)	Motifs shared w/2 other types	Motifs shared w/1 other type	Motifs unique to type
BMIII-PI M/w (32)	18	8	5
% BMIII-PI motifs	58%	26%	16%
% BMIII-PI ceramics accounted for	82%	14%	4%
Early Red Mesa B/w (23)	18	5	0
% Early Red Mesa motifs	78%	22%	-
% Early Red Mesa motifs accounted for	96%	4%	-
Red Mesa B/w (39)	18	13	8
% Red Mesa Motifs	46%	33%	21%
% Red Mesa ceramics accounted for	86%	12%	2%

B.

	Number of shared motifs	
	BMIII-PI	Early Red Mesa
Early Red Mesa	18	
% BMIII-PI motifs	58%	
% Early Red Mesa motifs	96%	
Red Mesa	26	23
% BMIII-PI or Early Red Mesa motifs	84%	100%
% Red Mesa motifs	67%	59%

C.

	Jaccard coefficients of similarity	
	BMIII-PI	Early Red Mesa
Early Red Mesa	.500	
maximum value *	.639	
Red Mesa	.591	.590
maximum value	.705	.590

Calculation of coefficient of Jaccard:

$S_J = a/a+b+c$ or $a/(x+y)-a$

		Type 2 +	Type 2 −	
Type 1	+	a	b	x
	−	c	d	
		y		n

* represents the maximum possible value given the sample characteristics

type's motifs (the exception being interlocked ticking in the two Red Mesa groups). These types thus largely use motifs from the same pool, though emphases shift through time. Although a small Red Mesa sample might not have overlapped with the visually and symmetrically quite different Basketmaker III-Pueblo I mineral-painted group, the large Red Mesa sample seems to have contained enough motifs to ensure substantial overlap of occurrence. The commonality between Red Mesa and Early Red Mesa is the use of the parallel framing lines around ticked and unticked solids. What separates Red Mesa from the other types is the heavy use of solid band design (Figure 3.11), which is the most pronounced change in motif use through typological time in the present sample. In addition, only Red Mesa exhibits exterior texturing on bowls, but this technique is rare.

Table 3.6 serves not only to compare primary motif differences by basic vessel form for each type, but to present those changes in primary motifs most apparent through typological time. The motifs are arranged by relative frequency and for each type exhibit a change from the previous type in predominant motif with the former principal motif relegated to some secondary position. In all types the relative frequency of parallel lines is closely linked to that of framers around solids, so that the two are obviously related. The most recurrent individual motif is Hatchure A-1 (widely spaced hatchure with hatchure and framer lines of equal width, Figures 3.12 and 13[3]), which occurs in all three types. Hatchure motifs can be seen to diversify in Red Mesa materials (Appendix 2, Table 8), but they are found in equal abundance in the three types under examination (also see Figure 3.12). Inspection of the individual type tables (Appendix 2, Tables 6-8) shows other differences when all motifs are considered, but considerable noise is encountered from motifs not tabulated as "primary"; witness the increase in such items as ticking and corner triangles in the Basketmaker III-Pueblo I mineral-on-white group. The most marked temporal change in Red Mesa motif use is the increasing selection of solid motifs, such as sawteeth, checkerboards, and ticked triangles, in preference to motifs involving parallel lines.

A few motif differences can be seen within ceramic types when vessel form is taken into account (Table 3.6). Most of these differences are apparent in Red Mesa, where solid-painted sawteeth and parallel framers around ticked solid elements are found more often than expected on closed forms (Figure 3.13), while open forms are high in solid band designs and checkerboards (Figure 3.11). A comparison of Red Mesa bowls and ladles indicates that ladles are high in solid band design. Since bowls and jars are (usually) larger than ladles, this intratype difference would suggest that ladle decoration is more stylized and that larger fields of design tend to have increased use of parallel panel dividers, nested chevrons, or other motifs using lines rather than purely solid elements.

The measures of diversity (H') and evenness (J) are lower for Red Mesa and Early Red Mesa than for Basketmaker III-Pueblo I (Table 3.7), which indicates increasing repetition of certain motifs. That is, Red Mesa, while being represented by the largest number of motifs, has fewer

Table 3.6. Primary designs by vessel form

A. RED MESA BLACK-ON-WHITE (78.6 percent of most common motif)*

Design	Bowl	Ladle	Closed	n
	Vessel Form			
Solid band	153	46	54	253
Ticked triangles	71	8	21	100
Hatchure A-1	39	10	14	63
Checkerboards	46	2	10	58
Parallel lines	21	-	16	37
Framers with ticked solids	22	-	10	32
Sawteeth	13	2	12	27
Total	365	68	137	570

$x^2 = 17.637$
df = 6
p = .007
C = .173
no cells with less than 5

Contributors:
Open forms high in solid band and checkerboards; closed forms high in sawteeth, parallels, and framers with ticked solids

Closed forms by bowls only (ladles excluded; n = 502)

$x^2 = 14.009$
df = 6
p = .030
C = .165
no cells with less than 5

Contributors:
Jars high in sawteeth and parallel lines; bowls high in ticked triangles and checkerboards

Bowls by ladles only (closed forms excluded; n = 433)

$x^2 = 23.834$
df = 5
p = .000
C = .228
1 cell with less than 5

Contributors:
Ladles high in solid band design, low in triangles and checkerboards; bowls high in framers and parallels (these designs lumped for this test)

(continued)

* refers to the most prevalent motif on each sherd; see p. 143

Table 3.6. (continued)

B. EARLY RED MESA BLACK-ON-WHITE (75 percent of most common motif)

Design	Bowl	Ladle	Closed	n
	Vessel Form			
Framers with ticked solids	21	2	7	30
Parallel lines	22	-	1	23
Framers with unticked solids	14	-	2	16
Hatchure A-1	2	1	5	8
Squiggle lines	4	-	1	5
Narrow Sosi style	4	-	1	5
Total	67	3	17	87

Chi-square comparison (omitting squiggle and narrow Sosi and combining bowl and ladle vessel forms into "open"; n = 76)

$x^2 = 16.020$
df = 3
p = .001
C = .417
3 cells with less than 5

Contributors:
Hatchure A-1 occurs more often than expected on closed forms and less often than expected on bowls; parallel lines occur more often than expected on bowls

C. BASKETMAKER III - PUEBLO I MINERAL-ON-WHITE (55 percent of most common motif)

Design	Bowl	Ladle	Closed	n
	Vessel Form			
Framers without ticked solids	15	1	2	18
Parallel lines	8	-	2	10
Hatchure A-1	9	-	-	9
Scrolls	4	-	2	6
Sawteeth	5	-	1	6
Total	41	1	7	49

(Sample size too small to permit chi-square testing) motifs accounting for a higher proportion of the design than do the other types (Appendix 2, Tables 6-8). The occurrence of multimotif sherds also increases with Red Mesa, however (Table 3.7 under design distribution), and different motif compositions more regularly contribute to the overall design. "Most common motif" (as used on Table 3.7 and Appendix 2, Tables 6-8) refers to the number of motifs recorded per sherd and their respective prevalence. Any sherd with a design will have an entry under "1st most common motif"; for sherds with more than one motif, the designs were recorded in order of importance insofar as possible. In Table 3.7, then, the more sherds with two or especially three motifs, the higher the diversity. While there is no radical change in motifs being used among these three types, there is substantial reordering and change in layout of those motifs most commonly in use.

Distinct trends and significant differences were found in tests comparing paint color, slip, and polish among the three types. These tests used data presented in Appendix 2, Tables 6-8, and the results are displayed below:

	n	Chi-square	df	p	C	Number of cells <5
Paint	907	94.901	4	0.000	0.308	2
Bowl slip	677	198.094	4	0.000	0.476	0
Bowl polish	680					
amount		137.284	10	0.000	0.410	4
sides		85.126	4	0.000	0.333	0

These tests involve only the most common attributes observed, with some combining of low-frequency, similar categories. Tests were run on the color variations for mineral paint and on the slip and polish on bowls. Bowls were considered not only because of the low frequency of jars in the earliest types, but because bowls are subject to potentially different treatment on each surface. Slip tests combined slip-slop with internally slipped bowls because slip-slop is a treatment that does not really make its appearance until Red Mesa (n = 23). Tests on polish examined the amount of polish on both sides by type using the categories "no polish," "less than complete," and "complete polish" as attributes (recorded as "amount" in the summary above), and the number of sides of bowls so treated (recorded as "sides" above). The distribution of Red Mesa attributes controls the expected values because of the high contribution of Red Mesa (greater than 75 percent) in each test.

Red Mesa shows greater than expected values in black mineral paint, the slipping of both surfaces, and the polishing of interior or both surfaces. Polishing on Red Mesa bowls tends to be a complete polish on the interior or a complete interior polish with at least a moderate exterior polish. Early Red Mesa shows greater than expected amounts of

Table 3.7. Comparative vessel metrics and diversity indices for surface treatments

Rough Sort Type	number	Design Diversity s	Design Diversity H'/J	Design Distribution[a] s	Design Distribution[a] H'/J	Form Diversity s	Form Diversity H'/J	Polish Diversity[b] s	Polish Diversity[b] H'/J
Wide Neckbanded	81	5	1.965 .600	2	.067 .100	-	-	-	-
Narrow neckbanded	153	13	1.953 .762	2	.225 .324	3	.109 .099	-	-
Neck Corrugated	50	14	2.290 .868	2	.471 .680	2	.165 .242	-	-
Pueblo II Corrugated	46	9	1.663 .757	2	.241 .348	2	.179 .258	-	-
BMIII-PI mineral-on-white	92	33	3.052 .873	3	.876 .800	5	.577 .359	8	1.831 .880
Early Red Mesa B/w	116	23	2.670 .852	3	.899 .818	6	.928 .518	7	1.458 .749
Red Mesa B/w	726	41	2.717 .732	3	.914 .832	12	1.235 .497	8	1.499 .721

[a] distribution of 1st, 2nd, 3rd most common motif
[b] bowls only less unknown

Shannon-Weaver Indices: Diversity = H'
Evenness = J
number of categories = s

brown paint, interior slipping (only one observed slip-slop treatment), and polishing of both sides. Early Red Mesa is the only type that shows higher than expected occurrences of polish on both surfaces, yet it tends to be slipped only on the interior (based on expected values). This tendency to complete polish is also reflected in the jar treatments of Early Red Mesa, where completely polished specimens were observed more often (87 percent) than in the other types. Basketmaker III-Pueblo I mineral-on-white items occur more often than expected in the red and brown mineral paint categories, and in the absence of either slip or polish. Where polishing is observed, it tends to be less than complete and only on the interior of bowls.

Through time, surface treatment of whiteware vessels seems to have stabilized, if not standardized, into a more involved, elaborate procedure than that evident on the earliest forms. The technology of surface treatment in the present sample developed from an extremely variable Basketmaker III-Pueblo I mineral-on-white treatment characterized by unslipped, unpolished vessels with brown or red mineral paint to a completely slipped and polished vessel with black paint. Technological control of paint color (i.e., firing standards) seems to be the principal change, since application of slip and completeness of polishing, though certainly more prevalent than in the Basketmaker III-Pueblo I mineral-on-white sample, are still somewhat variable. Singular forms of vessel marking with slip, such as slip-slop and complete slipping, and differentiation in the amount of polishing on different surfaces, emerge as characteristics of Red Mesa ceramics.

The diversity of forms increases through typological time (Table 3.7). Bowls, jars, and ladles, in that order, are the three most common vessel forms in all three types; pitchers and ollas appear in substantial numbers only in Red Mesa Black-on-white. Although bowls are by far the most abundant form in all three types, the <u>relative</u> proportion of this form declines from Basketmaker III-Pueblo I to Early Red Mesa to Red Mesa. The relatively low evenness indices for form suggest that, although form does diversify in later whitewares, specialized vessels are not yet a major component of pottery assemblages. Lastly, perhaps as an aspect of form changes, handles and lugs begin appearing in appreciable numbers in Early and later Red Mesa; certainly such items are not unknown in Basketmaker III-Pueblo I ceramics, but none occur in the present sample from that period.

Only bowls are sufficiently abundant to permit an examination of changes in vessel size as reflected by orifice diameter (Table 3.8; Figure 3.15). Although means for all types are fairly close, size does significantly increase through time when Basketmaker III-Pueblo I mineral-on-white items are compared with the later types. Variation in bowl size can be seen to decline through time. Insufficient frequencies in both Basketmaker III-Pueblo I and Early Red Mesa forms make other comparisons tentative, but size variation is considerably greater in Red Mesa ladles than in ladles of the other types; orifice variation in jars declines through Red Mesa. Variation in jars exceeds the variability in all other forms except effigy vessels, but this is probably another indicator of the catch-all nature of the "jar" category.

Table 3.8. T-tests of vessel metrics

	Number in Sample	Mean	s.d.	t	variance	df	p > |t|
A. WHITEWARE							
Orifice Diameter (mm)							
Basketmaker III - Pueblo I m/w	69	169.1	53.792				
vs. Early Red Mesa	72	187.9	49.545	-2.167	equal	139.0	.032
Red Mesa B/w	368	190.1	49.601				
vs. Early Red Mesa				- .3345	equal	439.0	.7382
Red Mesa B/w vs. Basketmaker III - Pueblo I m/w				-3.183	equal	436.0	.001
B. GRAYWARE							
Orifice Diameter (mm)							
Wide neckbanded	57	167.7	42.700				
vs. narrow neckbanded	135	178.6	49.636	-1.438	equal	190.0	.152
Narrow neckbanded vs. neck corrugated	35	191.9	51.369	-1.343	equal	168.0	.181
Narrow neckbanded vs. Pueblo II corrugated	41	200.1	55.300	-2.372	equal	174.0	.019
Neck corrugated vs. Pueblo II corrugated				.717	equal	74.0	.476

(continued)

Table 3.8. (continued)

	Number in Sample	Mean	s.d.	t	variance	df	p > |t|
Rim Fillets (mm)							
Wide neckbanded	59	16.3	3.342				
vs. narrow neckbanded	144	15.5	3.017	1.703	equal	201.0	.090
Narrow neckbanded							
vs. neck corrugated	37	15.0	3.632	.824	equal	179.0	.411
Narrow neckbanded							
vs. Pueblo II corrugated	44	17.6	4.11	3.033	equal	79.0	.003
Neck corrugated							
vs. Pueblo II corrugated				-3.230	unequal	57.8	.002
Rim Flare (degrees)							
Wide neckbanded	37	15.6	6.193				
vs. narrow neckbanded	57	14.6	5.297	.813	equal	92.0	.418
Narrow neckbanded							
vs. neck corrugated	22	15.6	5.860	.054	equal	81.0	.957
Narrow neckbanded							
vs. Pueblo II corrugated	26	14.6	6.268	- .721	equal	77.0	.473
Neck corrugated							
vs. Pueblo II corrugated				- .601	equal	46.0	.551

s.d. = standard deviation
t = Student's t
df = degrees of freedom
p > |t| = probability of finding a greater value of t

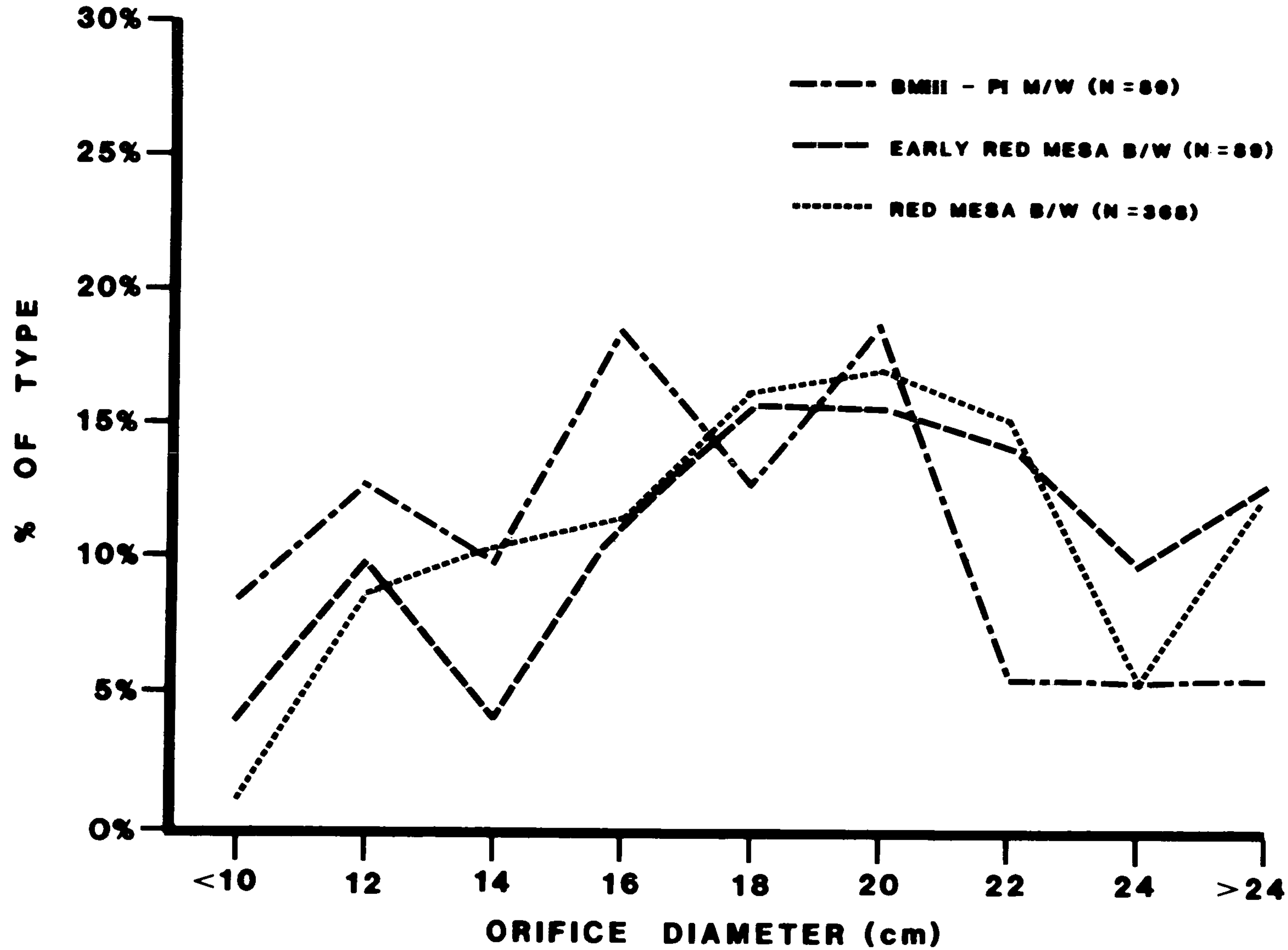


Figure 3.15. Whiteware bowl orifice diameters (in cm)

Whiteware Pastes

Undifferentiated sandstone is the predominant temper in all three decorated types (Appendix 2, Tables 6-8), never falling below 65 percent. Basketmaker III-Pueblo I mineral-on-white has the highest amount of undifferentiated sandstone temper and is the only type in which iron-bearing sandstones occur in more than trace quantities. Basketmaker III-Pueblo I mineral-on-white exhibits the lowest percentages of San Juan igneous and chalcedonic-cemented sandstone tempers. Early Red Mesa and Red Mesa have progressively increasing relative frequencies in chalcedonic sandstone, but Red Mesa shows a moderate decline in items containing trachyte and San Juan or other igneous material. (See Figure 3.14 for examples of exotic decorated types.) Even if all eight trachyte-tempered "exotic mineral-on-white" items are Naschitti Black-on-white (Peckham and Wilson's [1965] name for Chuska mineral-on-white with Red Mesa design) and are added to Red Mesa, the relative frequency of trachyte is less in the Red Mesa than in the Early Red Mesa group (see Appendix 2, Table 8). Diversity indices for temper increase between Basketmaker III-Pueblo I mineral-on-white and Red Mesa (Table 3.9), indicating an increase in the presence of tempers other than undifferentiated sandstone. Despite this increase, the continued preponderance of undifferentiated sandstone is apparent in the consistently low evenness measures.

Two tempering trends are quite apparent; one involves the increase in both the use and amount of sherd temper through typological time, and the other is the trend toward the use of medium- or finer-grained materials, particularly sandstones. The increased use of sherd tempers is undoubtedly a cause of the increased number of paste combinations. Larger and larger portions of each type can be seen to fall into the category "gray clay with white sherd," which becomes the most abundant paste combination group. White paste is the most abundant clay category coded in Basketmaker III-Pueblo I mineral-on-white, and it is the second most abundant in both Early Red Mesa and Red Mesa. With the exception of more gray clay with white sherd in Red Mesa, Early Red Mesa and Red Mesa are quite similar in paste distributions, although Red Mesa has a slightly higher percentage of items containing at least some sherd than does Early Red Mesa.

The texture index suggests somewhat finer pastes in Red Mesa than in Early Red Mesa, with Basketmaker III-Pueblo I mineral-painted being markedly coarser than the two later types. The use of finer-grained sandstones and sherd temper helps offset the effects of a steady increase in temper densities in this index. The texture index is calculated as

$$\frac{\text{Density x Grain Size}}{\text{Sherd Temper + 1}}$$

Thus, although the amount of temper added to whitewares increased through time, the addition of more sherds lent a finer texture to the

Table 3.9. Summary of paste attributes for types selected for detailed description, 29SJ1360

Type	n	Temper			Texture			Clay		
		s	Diversity	Evenness	s	Diversity	Evenness	s	Diversity	Evenness
Wide neckbanded	67	4	.995	.718	5	1.404	.872	7	1.114	.572
Narrow neckbanded	153	8	1.207	.580	6	1.385	.773	7	1.364	.701
Neck corrugated	58	8	1.232	.593	6	1.486	.829	6	1.366	.762
Pueblo II corrugated	45	7	1.309	.673	7	1.641	.843	6	1.331	.743
BMIII-PI M/w	90	8	.940	.452	7	1.940	.997	9	1.649	.751
Early Red Mesa	89	6	.781	.436	6	1.426	.796	9	1.815	.826
Red Mesa	598	13	1.227	.479	7	1.462	.751	10	1.700	.736

s = number of attributes

paste, assuming (as does the index) that sherd temper probably serves to reduce vessel friability.

Grayware Surface Treatment

The four culinary types analyzed in detail--wide neckbanded, narrow neckbanded, neck corrugated, and Pueblo II corrugated (Appendix 2, Tables 9-12)--are crudely sequential, although the whole projected production span of neck corrugated overlaps with the late end of narrow neckbanded and the early end of Pueblo II corrugated. Of these types, Pueblo II corrugated is the least completely represented at 1360, as its production span continued well beyond the abandonment of the site. All types except Pueblo II corrugated exhibit plain bodies below the vessel shoulder, although this is not included as a surface treatment option in the descriptive and summary tables.

Wide neckbanded (Figure 3.5[4]) shows the smallest number of different surface treatments and the lowest frequency of multiple treatments on single items. The consistency of wide neckbanded is probably more a case of craft development than of routinization of ceramic products. Narrow neckbanded (Figures 3.2[1-3] and 3.5[1]), the most abundant of the four types, shows similarity to neck corrugated (Figures 3.2[4 and 5] and 3.5[8]) in the occasional occurrence of corrugation and to wide neckbanded in the high frequency of the category "wide clapboard." The apparent contradiction of the occurrence of "wide clapboard" in "narrow neckbanded" can be explained by clarifying the definition of the surface treatment as opposed to the type. The <u>types</u> narrow and wide neckbanded are separated on the basis of fillet treatment and surface finish as well as neck fillet width; on the whole, narrow neckbanded does have narrower neck fillets, but fillets in both types cover a range of widths. The <u>attribute</u> of clapboard width is separated at 5 mm, which falls within the narrow neckbanded range; there would be a better type separation on this attribute if the cutoff were at 7.5 mm. Diversity and evenness measures in Table 3.9 suggest that a florescence of surface texturing or tooling occurred in the neck-decorated types subsequent to wide neckbanded. Perhaps reflecting its transitional nature, neck corrugated exhibits more surface treatment variations in more even distribution than the other three types, in spite of having one of the smaller sample sizes (Table 3.9). Varieties of corrugation are the most common surface treatment in neck corrugated, but there is substantial mixture of motifs, and neck corrugated is more likely to exhibit multiple treatments on a single piece than the other types. Judging from other sites that encompass more of the production span of Pueblo II corrugated (Figure 3.5[2, 3, 6, 9]), that type would show more diversity if 1360 had been occupied longer and/or if its sample were larger. Design inventories show appreciable overlap and continuance of principal surface finishing techniques from type to type; wide clapboard, for example, is the main motif in both wide and narrow neckbanded.

Metric variables show a steady increase through typological time in jar orifice and, by inference, in jar size; Pueblo II corrugated jar mouths are, on the average, about 3 cm larger than those of wide neckbanded. Treating the types as sequential, no significant differences in jar orifice diameter are found between adjacent pairs, but Pueblo II corrugated is significantly larger than narrow neckbanded (t-test, Table 3.8). Rim fillet width and rim flares are more variable, but a significant--if slight--increase in fillet width may be seen on Pueblo II corrugated. Coefficients of variation suggest that production was relatively consistent within and between types and that, especially when orifice variations are compared with those in whitewares, production was standardized with minor (if any) functional differentiation (Appendix 2, Tables 9-12; Figures 3.15 and 3.16). Rim flare measures are the most variable within types, particularly within Pueblo II corrugated, but the means for all four types fall within a degree of each other (Table 3.8). Perhaps rim flare in these types was of little functional significance.

Soot on vessel exteriors is a practical indicator of actual culinary use, and this attribute can be seen to increase through typological time (Appendix 2, Tables 9-12). Grayware sooting will be discussed in detail below.

Form variation is virtually nonexistent in the graywares: jars predominate. The ratio of handles per item in the assemblage declines through time, with wide neckbanded having handles on about every fourth vessel and Pueblo II corrugated on about every twelfth vessel. If differentiation and number of culinary lugs can be seen to have a functional basis, wide neckbanded may have served a greater variety of needs than subsequent types. The variety of lug types declines markedly with neck corrugated. Narrow neckbanded is in an intermediate position; it exhibits a wide variety of lug types (like wide neckbanded), but these lugs occur considerably less often. The pattern of lug occurrences in whitewares is a mirror image of the grayware pattern, which supports the suggestion that the role of whitewares changed through time, with whitewares becoming more diverse and gradually replacing the previously generalized culinary wares.

Grayware Pastes

The three main temper classes--undifferentiated sandstone, chalcedonic sandstone, and trachyte--all show continuous trends in the 1360 culinary types when they are treated as a sequence. Wide and narrow neckbanded and neck corrugated all have over 60 percent undifferentiated sandstone temper, but this temper drops sharply in Pueblo II corrugated to less than 30 percent. Wide neckbanded has the highest relative frequency of chalcedonic-cemented sandstone temper (28 percent), and each successive type has somewhat less. Trachyte temper exhibits the opposite trend, increasing gradually through the neck-manipulated types and jumping radically in Pueblo II corrugated to 55 percent. It is in neck corrugated that trachyte becomes relatively more abundant than chalcedonic sandstone.

Similar overall trends are present at 627 and 629, but there are some differences. The high frequency of chalcedonic sandstone in wide

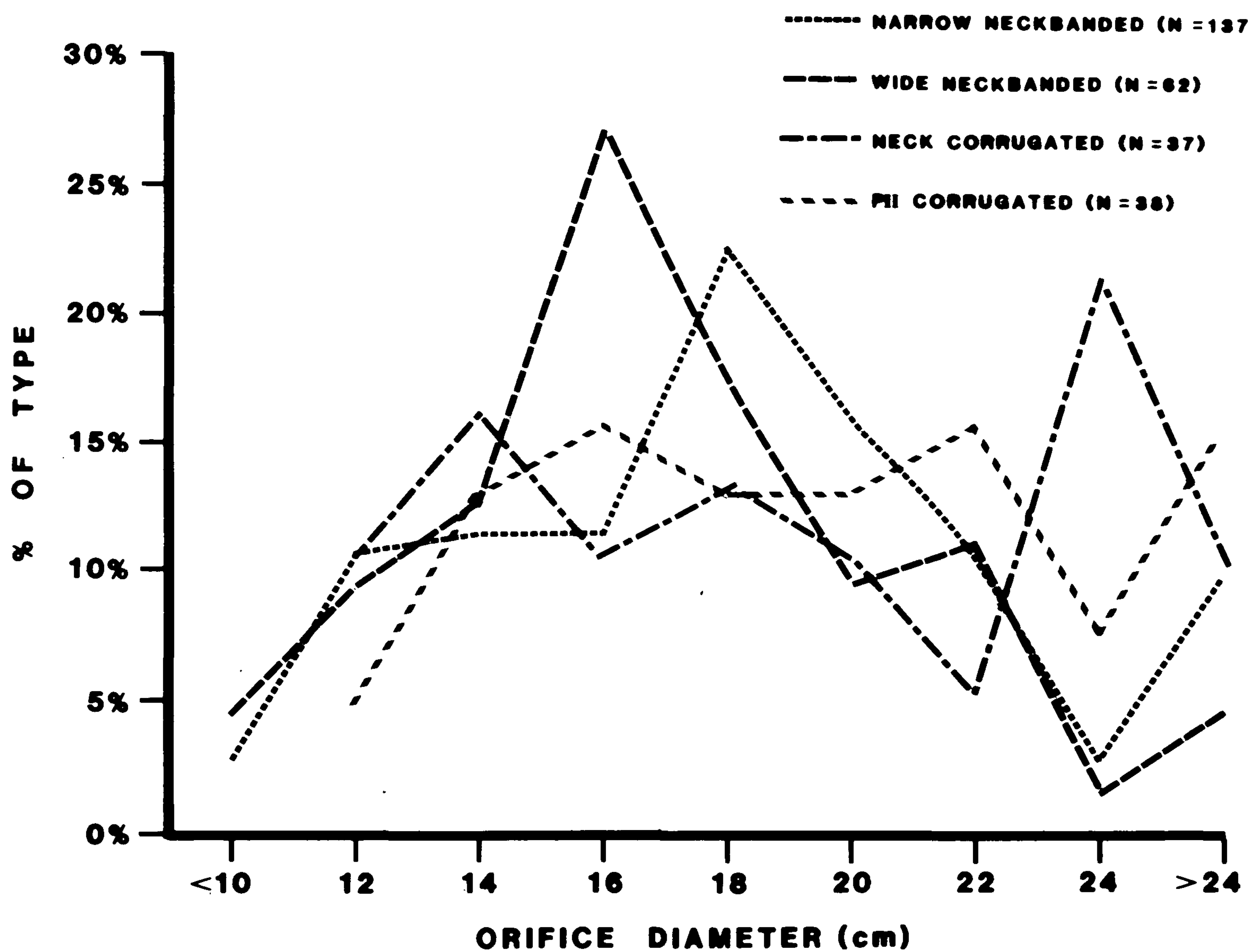


Figure 3.16. Culinary ware orifice diameters (in cm)

neckbanded at 1360 is not present at 629 and is less marked at 627. The highest relative frequency of chalcedonic sandstone is in narrow neckbanded at 627 and in neck corrugated at 629. The similar levels of chalcedonic sandstone in neck corrugated and Pueblo II corrugated at 1360 attest not only to the decline of this temper type in the corrugated culinary wares, but also to the early temporal placement of the 1360 Pueblo II corrugated sample. In contexts later than 1360, such as at Pueblo Alto, chalcedonic sandstone temper drops below 5 percent in Pueblo II corrugated. While a high chalcedonic sandstone frequency is a characteristic that tends to be early in Pueblo II corrugated ceramics, a very high percent of trachyte is more often a late characteristic. The large increase in trachyte at both 1360 and 629 in relatively scarce Pueblo II corrugated wares suggests increased import close to site abandonment (see H. Toll 1983).

The temper diversity indices show increasing diversity and evenness in composition through typological time (Table 3.9), but the number of different tempers is not the same for each type. Wide neckbanded has the smallest number of different possible temper sources of the ceramics at 1360. The remaining types are virtually equal in number of potential sources recorded, but their increasingly even representation implies increasing dependence on a variety of ceramic sources. Similar patterns may be seen in the indices concerning paste texture and clay color (Table 3.9), although the restricted temporal range of Pueblo II corrugated must be kept in mind.

The texture and clay attributes are very similar from type to type. The occurrence of "Chuska Gray" is specific to trachyte-tempered pots and naturally rises with the increase in such vessels. Some differences are apparent in the texture index, which serves to represent a measure of paste appearance based on differences in grain size and temper density. Narrow neckbanded differs from all other culinary wares in the category of grain size by having more "coarse" than "very coarse" undifferentiated sandstone, and by having a higher proportion of temper densities that are greater than 20 percent. The increased quantity of temper in narrow neckbanded may have compensated for some difference in grain size. The use of fine-grained tempers first appears in neck corrugated. With the predominance of trachyte tempers in Pueblo II corrugated, paste textures can be seen to expand to their broadest distribution. Nonetheless, coarse tempers and textured pastes are characteristic of all culinary types.

Refiring Tests

A series of 223 sherds in 27 distinct groups were refired to 950 degrees C following procedures outlined by Shepard (1939) and Windes (1977b:290-293). All specimens refired are detailed in Appendix 2, Table 13, and summarized here in Table 3.10. As in similar tests on Cibola and sandstone-tempered ceramics from Chaco, the majority of the specimens fired in the buff range (Toll et al. 1980; Toll and McKenna 1981; Windes 1977b).

Three main classes of sherds were sampled in order to examine variation in clay sources associated with differing paste combinations. The majority of specimens were Red Mesa Black-on-white and narrow neck-banded sherds that were selected because of differing tempers or because of paste variations within a temper type. Another sample of exotic mineral-on-white and additional Red Mesa sherds was drawn in order to examine clay variation in relation to distinctive surface treatments (e.g., glaze paint, or soft chalky or "silty" slips), to vessel forms (e.g., ollas), and to exterior motifs on bowls, such as those shown in Figure 3.17. The third class, smudged redwares, were refired in conjunction with a broader study of Chaco's smudged wares (McKenna and Toll n.d.). Table 3.10 shows the affiliation of buff with Lino Smudged and redder colors with Forestdale Smudged. Forestdale Smudged is responsible for inflating the proportion of redder colors in the undifferentiated sandstone category, since it is the only type containing color group 6 at 1360; but smudged wares were not a major focus of the 1360 analysis and will not be further discussed. No Pueblo II corrugated sherds were refired, because a) the sample size is very small, and b) it consists almost wholly of imported ceramics.

If the various attribute groups represent distinct production units, then variation in clay color should be relatively low within each group; ideally, intragroup clay colors should be homogeneous. Recent tests of clay resources in and near Chaco (Franklin 1982; McKenna and Toll n.d.; Warren 1977a), however, suggest that the variation within a single formation or locality can be considerable, even though a broader, generalized area may be characterized by prevailing refired color group. Some variation in Munsell color should be expected in any production unit. Selection of clays, whether by tradition or in conformance with clay characteristics necessary to the technology, clearly occurs. Even given this variation within clay sources, one would still expect more variability in ceramics between broad areas than within wares produced at a single site. The question remains: Is the traditional dichotomy between buff and red clays sufficiently sensitive to monitor the presence of interareal production units at the site level?

Some major changes in paste color are apparent between wares and time periods. The test for differences in source area (the results of which appear below) compares buff (color groups 1-3) against redder-firing clays (color groups 4-5), but the abundance of different clay colors falling within the buff range renders most red/buff comparisons inconclusive.

Table 3.10. Summary of refiring data: color group by rough sort type and temper group

Rough Sort Type	White	Color Group[a] 1	2	3	4	5	6	7	Total
Narrow neckbanded	1	8	13	--	6	5	--	--	33
Neck corrugated	--	1	--	--	--	--	--	--	1
Early Red Mesa	1	1	5	--	2	3	--	--	12
Red Mesa B/w	17	28	46	13	11	6	--	--	121
Gallup B/w	--	--	--	1	1	--	--	--	2
Naschitti B/w	3	1	3	1	5	1	--	--	14
Mancos B/w	--	2	3	--	--	--	--	--	5
Cortez B/w	1	2	3	1	--	--	--	--	7
Piedra B/w	--	1	--	--	--	--	--	--	1
Kiatuthlanna B/w	--	--	1	--	--	--	--	--	1
Snowflake B/w	1	--	--	--	--	--	--	--	1
PII-III M/w	1	1	1	--	--	--	--	--	3
Lino Smudged	1	2	--	--	--	--	--	--	3
Forestdale Smudged	--	--	--	--	--	8	7	--	15
Total[b]	26	47	75	16	25	23	7	--	219

Temper Group	White	Color Group 1	2	3	4	5	6	7	Total
Fine-medium sandstone	16	17	41	10	11	12	7	--	114
Coarse-very coarse sandstone	1	9	5	--	--	1	--	--	16
Pink chalcedonic sandstone	--	1	6	2	1	3	--	--	13
White chalcedonic sandstone	2	5	11	1	2	2	--	--	23
Trachyte	1	2	3	1	3	2	--	--	12
Trachyte + sandstone	2	1	1	--	6	--	--	--	10
Sandstone + trachyte	--	1	3	--	1	--	--	--	5
San Juan igneous	1	--	1	--	--	--	--	--	2
San Juan igneous + sandstone	--	7	2	--	1	2	--	--	12
Sandstone + San Juan igneous	2	2	2	2	--	--	--	--	8
Total[c]	25	45	75	16	25	22	7	--	215

[a]Windes (1977b)

[b]Four sherds not assigned (vitrified gray).

[c]Four sherds not temper identified.

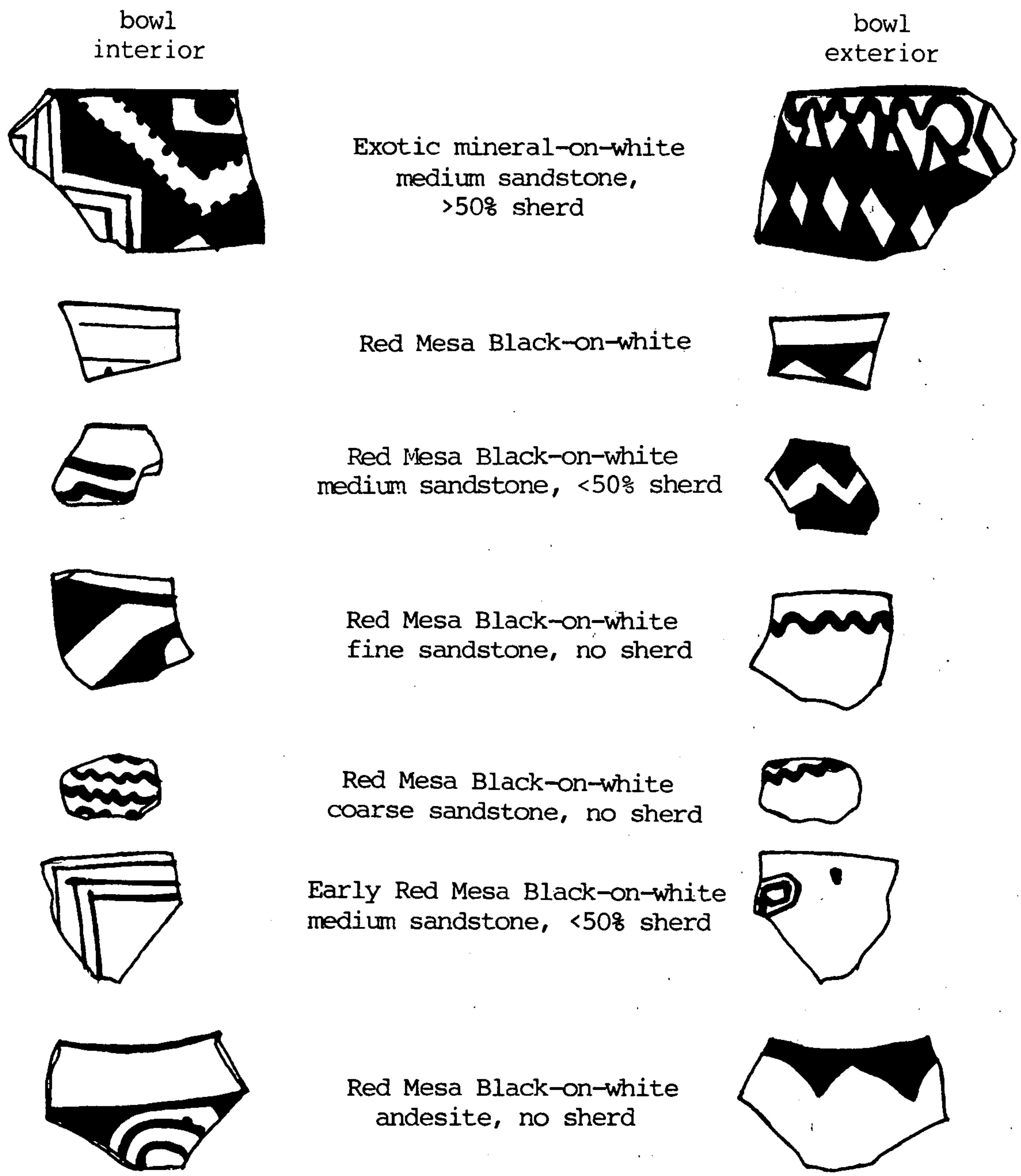


Figure 3.17. Designs on mineral-on-white bowls

(all buff vs red, df = 1)	n	Chi-square	df	p
General: All temper types	215	10.389	3	0.012
Culinary:				
white vs pink chalcedonic sandstone	14	0.100	1	0.751
chalcedonic sandstone vs trachyte	22	0.387	1	0.534
chalcedonic sandstone and trachyte vs undifferentiated sandstone	35	7.146	1	0.008
Mineral-on-white:				
gray paste (less than half vs greater than half white sherd)	10	0.625	1	0.429
gray paste (fine sandstone vs coarse sandstone)	17	0.245	1	0.621
gray paste (with black vs white sherd)	36	0.915	1	0.339
black paste vs black paste with white sherd	25	0.024	1	0.878
trachyte vs sandstone with trachyte	11	0.413	1	0.521
trachyte vs trachyte with sandstone	12	3.000	1	0.083
trachyte with sandstone vs sandstone and trachyte	12	3.000	1	0.083
white vs pink chalcedonic sandstone	17	0.101	1	0.751
chalcedonic sandstone vs trachyte and trachyte with sandstone	42	6.480	1	0.011
black paste vs gray paste	68	0.138	1	0.710
black paste vs tan paste	32	0.053	1	0.818
tan paste vs gray paste	50	0.475	1	0.491

Only three tests produce chi-squares that are significant. These show that there is a difference between the redder trachyte items and the buff sandstone groups. Items with chalcedonic-cemented sandstone or San Juan igneous tempers do display considerable dispersion in color range, but temper/color combinations occur in expected frequencies. As used above, the chi-square tests of lumped colors are insensitive to differences in the majority of paste types, particularly those predicated on the use of undifferentiated sandstone as an attribute group determinant where the variation present is within the buff range.

Temporal paste-color changes may be seen on Table 3.11, which divides culinary and mineral-on-white paste groups into rough approximations of the Chaco Center's intersite time/space comparative matrix--a matrix based on provenience age assessments rather than on individual sherd classification.

This comparison examines refired color distributions of sandstone-tempered items and reveals a trend toward lighter-firing pastes in the post-AD 1000 period (Table 3.11). This change is most evident in the culinary pastes (27 percent increase in buff) with change in whiteware paste being less pronounced (4 percent increase in buff). The higher-than-expected values for buff-firing grayware, as opposed to the whiteware, accounts for the significant chi-square value on Table 3.11.

Table 3.11. Time-space assignments of refired ceramics

	Trash Mound Pre-820	Kiva A 820-1000	House 1 and Pithouse B 1000-1020	Total
Culinary				
White	--	1	--	1
Color groups 1-3	--	15	8	23
Color groups 4-5	3	7	1	11
Subtotal	3	23	9	35
Mineral-on-white				
White	4	14	7	25
Color groups 1-3	8	67	36	111
Color groups 4-5	--	18	7	25
Subtotal	12	99	50	161
n	15	122	59	196
Buff	12	97	51	160
Reddish-yellows	3	25	8	36
Total	15	122	59	196

Chi-square tests	n	x^2	df	p
M/w vs culinary; buff vs red	196	4.848	1	.028
M/w vs culinary; 4 vs 5	148	.016	1	.899
M/w buff vs red; 4 vs 5	149	.416	1	.519
Culinary buff vs red; 4 vs 5	32	.464[a]	1	.500

[a]With Yate's correction factor.

Although the sample is very small, this trend toward selection of lighter clay may suggest continued constriction of clay-source use for the production of sandstone-tempered ceramics through time. The data in Table 3.11 should not be construed as evidence of increasing homogeneity in ceramic resources through time, as other, distinct wares are known to contribute to ceramic assemblages in Chaco. The Chuskan wares, for example, have been omitted from the table. Chuskan culinary, at least, is known to consistently refire increasingly redder from about AD 1000 (Blue Shale Corrugated), again suggesting--with a different and known exotic ware--that temporal constriction of clay sources occurred through time (Toll and McKenna 1983).

The chronic problem of recognizing different sandstone varieties remains. Finer scrutiny of color-group distribution in the buff range is necessary to assess any cohesiveness of paste/temper groups as representing units of ceramic production. Because frequencies were too low to test finer subdivisions of the buff-firing groups within each paste classification, the diversity index for each paste group was compared with an index for the ware subtotal in order to gain a relative idea of the variability within each paste-group subset (Table 3.12). It should be recognized that some of the indices are based on percentages taken from small samples and some from only two color categories; they are presented as provisional suggestions of group variability.

To aid in the differentiation of buff-firing ceramics, those firing white (according to the Munsell readings) were separated from those buff sherds exhibiting some color and otherwise falling into color groups 1-3 (Tables 3.11-3.12). Furthermore, the finest subgroups, those differentiated on the percentage of sherd temper (see Appendix 2, Table 13), were lumped into basic paste-color/temper units, as chi-square tests suggested that differences between the finer groups were not significant. The combinations of attributes used to form refiring groups show a range of within-group variability, suggesting that some may represent restricted sources, while others probably do not. Table 3.12 shows that these paste/form/paint whiteware groups mostly fall into all three of the lumped color categories. The two whiteware groups falling into one color category are both chalcedonic sandstone subgroups, lending some support to the assumption that chalcedonic sandstone temper represents a restricted area of production.

Because of the variability in number of color categories among groups, comparisons are better made using the standardized evenness index than the diversity index, which varies radically with such small numbers of categories (s). These comparisons point up the fact that most whiteware groups do fall predominantly in the buff groups (color groups 1-3), exceptions being in trachyte with sandstone and gray clay with black sherd. Predictably, the trachyte group contains an unusual number of redder items; the gray clay with black sherd group has more red and white items than buff, making it perhaps the most unusual group. Items tempered primarily with trachyte display a broad, very evenly distributed range of refired colors, in keeping with Cibolan and Chuskan types of the period (ca. AD 950-1040), which commonly include clays of lighter firing colors (Toll and McKenna 1983; Windes 1977b). Items from

Table 3.12. Summary of refiring data: specific temper, paste, and finish groups in mineral-on-whites and culinary wares

	Windes' Color Group[a]				Evenness	Diversity (J)	
	White	1-3	4-5	Total	H'	s=3 [s=2]	+
Red Mesa Black-on-white							
Trachyte	1	4	1	6	.868	.790	+
Trachyte and sandstone	2	1	5	8	.900	.819	+
[Sandstone and trachyte	–	4	1	5	.500	.721]	
Pink chalcedonic sandstone	–	7	–	7	.000		
White chalcedonic sandstone	1	11	2	14	.656	.597	
Chalcedonic sandstone, black paste with white sherd	–	6	–	6	.000		
Undifferentiated sandstone:							
[tan paste	1	6	–	7	.410	.592]	
gray paste with black sherd	3	2	3	8	1.082	.985	+
gray paste with white sherd	2	19	4	25	.704	.641	
gray paste with black and white sherd	2	4	1	7	.956	.870	+
[black paste	2	3	–	5	.673	.971	+]
black paste with white sherd	6	11	3	20	.975	.887	+
Other Service Wares							
[Exotic mineral-on-white	6	12	–	18	.637	.918]	
Glaze-painted	3	7	1	11	.860	.783	+
Silty slips	2	9	3	14	.982	.895	+
Bowls with exterior motifs	3	5	3	11	1.067	.971	+
Ollas	–	15	3	18	.451	.651	
Subtotal, service wares	34	126	30	190	.872	.793	
Subtotal, less duplicated sherds[b]	25	111	25	161	.835	.760	

(continued)

Table 3.12. (continued)

	Windes' Color Group[a]				Evenness	Diversity (J)	
	White	1-3	4-5	Total	H'	s=3 [s=2]	+
<u>Culinary Wares</u>							
[Trachyte	-	2	4	6	.637	.918	+]
[Pink chalcedonic sandstone	-	4	4	8	.693	1.000	+]
[White chalcedonic sandstone	-	5	2	7	.598	.863	+]
Undifferentiated sandstone:							
tan paste	1	4	1	6	.868	.790	+
black paste	-	8	-	8	.000		
Subtotal, culinary wares	1	23	11	35	.741	.675	
Total, service and culinary	35	149	41	225	.873	.794	
Total, less duplicated sherds[b]	26	134	36	196	.839	.764	

+ = groups of greater evenness than subtotal indices

[a] Windes 1977b

[b] The "duplicated sherds" are whiteware sherds used in one row category that exhibit characteristics of another group of refired sherds. Although drawn as individual groups for refiring, cross-typing was possible. For example, a bowl with glaze paint might also have been grouped with others containing undifferentiated sandstone with gray paste and white sherd temper; thus, a single sherd could be grouped twice to increase sample sizes. Complete column and minimum refired sherd totals are kept separate on this table.

the paste group that contains a higher proportion of sandstone than trachyte in the temper are perhaps of local vintage, or at least of restricted production, given relatively low diversity; most of these items refire buff.

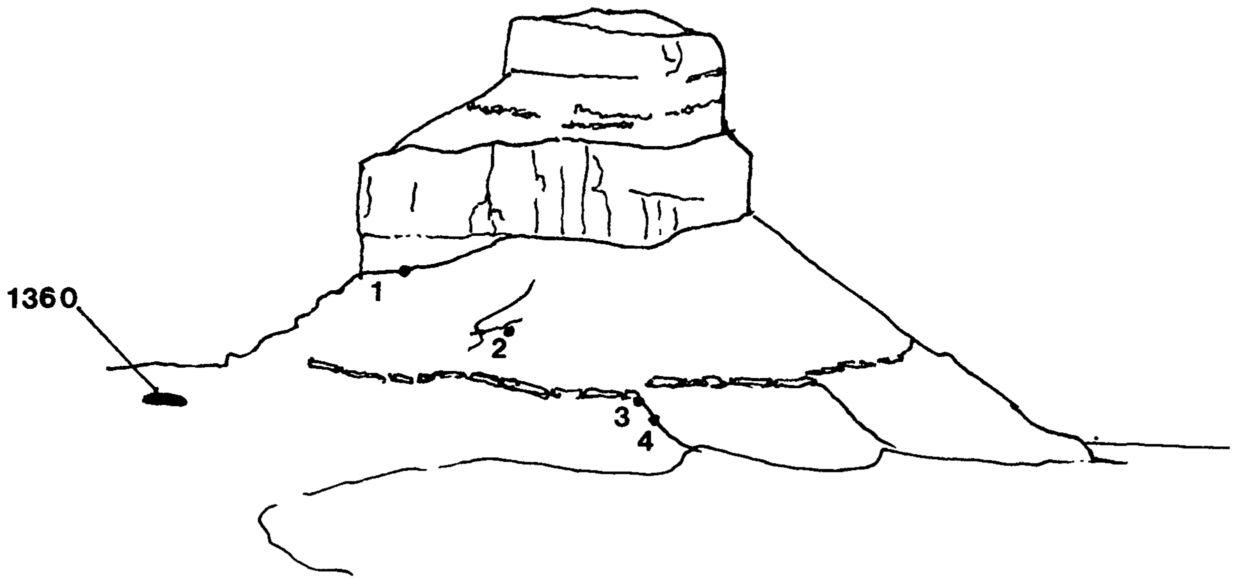
The grayware groups differ from the whiteware groups in having almost no white-firing paste and generally more even distributions in the buff and red groups. Again trachyte shows reddish clay, while chalcedonic-sandstone-tempered items tend to refire lighter. The most consistent culinary group is black clay, all eight examples of which refired buff.

Tempering with sherds was, by the period of Red Mesa production, almost a standard practice; those items lacking sherd temper appear to have been produced from less diverse clay sources than those with sherd temper. Those specimens selected on the basis of different surface treatments crosscut many paste categories and are usually the most diverse class of sherds refired.

Two mixed groups, Red Mesa ollas and exotic mineral-on-white bowls, were exceptions. Exotic mineral-on-white produced no items that fired red; whiteware ollas produced none that fired white. Perhaps this represents clay selection for differing vessel forms, but the extensiveness of Cretaceous clay deposits in the San Juan Basin that potentially contain clays refiring to these color groups prohibits confident assignment of local and nonlocal status to vessel forms based on refiring color. The data indicate that canyon clays tend to refire to Groups 1 through 2, suggesting that the majority of items in the attribute groups delineated by undifferentiated sandstone are potentially canyon-area products.

Clays sampled from the geologic deposits on Fajada Butte near 1360 show a considerable color range, especially when the proximity of the sampled areas is taken into consideration (Figure 3.18). Raw clay samples recovered from the site likewise display a variety of colors. Since Cibola white and culinary wares exhibit a smaller range of colors, it would appear that particular clays were being selected. Ceramics from a producer site should have more consistency in clays used within each ware type than ceramics from a nonproduction site. The presence of ceramic groups exhibiting lower relative diversity in refired clay colors may reflect on-site pottery manufacturing. Comparison of ceramic groups from 1360 and 627 using Windes' color groups (maximum s = 3) produced the following results:

	627				1360			
	n	s	H'	J	n	s	H'	J
Red Mesa Black-on-white								
all undifferentiated sandstone groups	33	3	0.916	0.834	72	3	0.915	0.833
black paste	8	3	0.736	0.670	5	2	0.673	0.970



Refired colors of geologic and on-site clay samples

FS Number	On site provenience	unfired color		fired color (910°)		color group
25	Plaza 5	5Y 8/2	white	7.5YR7/7	reddish yellow	4
117	Room 4	2.5Y 8/2	white	10YR8/6	yellow	2
624	Pithouse B cist	10TR7/2	light gray	2.5YR5/8	red	6
272	Kiva A Level 1	5Y 8/2	white	7.5YR6/6	reddish yellow	4
79	Plaza 5	2.5Y N7	light gray	10YR7/6	yellow	2
520	Pithouse B Level 2	10YR6/4	light yellow-brown	7.5YR7/6	reddish yellow	4
314	Room 2	5Y 8/2	white	7.5YR7/6	reddish yellow	4
Clay from Menafee Formation, Lower Fajada Butte						
	1	10YR6/2	yellows-browns	7.5YR7/4	pink	2
	2	10YR7/2	yellows-browns	10YR8/4	very pale brown	1
	3	10YR6/2	yellows-browns	5YR6/6	reddish yellow	5
	4	10YR6/2	yellows-browns	7.5YR7/6	reddish yellow	4

Figure 3.18. Location of clay samples from Fajada Butte

gray clay with white sherd	17	3	1.024	0.932	25	3	0.704	0.641
gray clay with black and white sherd	8	3	0.956	0.870	7	3	0.736	0.670
Culinary								
tan paste	7	2	0.410	0.592	6	3	0.868	0.790
black paste	6	2	0.451	0.650	8	1	0.000	0.000

As can be seen, all but one of the 1360 groups are of lower diversity than similar groups from 627. The sample and site sizes for 627 give rise to many possible explanations for ceramic diversity, making it difficult to say whether the site was a ceramic producer or not. Site 629 is more like 1360 in size and length of occupation, but refiring questions being addressed were quite different and comparable individual groups do not exist. While 1360 ceramics do appear more homogeneous than sherds from 627 in clay color characteristics in the above comparison, it is unclear whether this signifies a single manufacturing unit contrasting with multiple units, decreased clay variation because of less consumption, or differences in the modes of ceramic procurement within the exchange system.

ATTRIBUTE GROUPS

To further examine the diversity of selected types, groups of attributes were isolated for each type by sorting the data on three variables. Within each type, sorts controlled for temper and paint color in the whitewares and for temper and primary surface manipulation in the graywares. Although all types were sorted in this manner (Table 3.13), only Red Mesa and narrow neckbanded were further examined to study the integrity of attribute groups (Appendix 2, Tables 14-16). Attribute groups for further study were selected on the basis of abundance, in order that some meaningful comparative tests might be performed. The following groups were selected:

Red Mesa Black-on-white (n = 512, 85 percent of sample)
- pink chalcedonic sandstone, black paint (n = 16)
- white chalcedonic sandstone, brown paint (n = 20)
- white chalcedonic sandstone, black paint (n = 78)
- undifferentiated sandstone, brown paint (n = 79)
- undifferentiated sandstone, black paint (n = 302)
- San Juan igneous and sandstone, black paint (n = 17)

Narrow neckbanded (n = 47, 31 percent of sample)
- undifferentiated sandstone, narrow clapboard (n = 18)
- undifferentiated sandstone, wide clapboard (n = 29)

Attributes were selected as criteria for sorting because they were felt to be the best indicators of source area. Despite the problems with differentiating sandstone sources, temper is the best specifier of source. Surface modifications on culinary vessels represent individual decisions on surface treatment (S. Plog 1977) that may be more uniformly executed within groups than between them, although considerable individual variation is certainly possible. Paint color is probably the least precise discriminator, but color differences, whether from chemical composition or firing practices, may aid in isolating producers.

Attribute grouping of ceramics shows culinary types to be more diverse than whiteware types because of the greater variety of possible surface treatments in graywares. As previously described, the majority of the paint is black, which reduces the number of potential whiteware attribute groups (Table 3.13). This is indicated by the higher number of low-frequency culinary groups and the greater number of groups required to make up significant amounts of the culinary collection. With the whitewares a reasonable option for investigating within-type variation would be to subdivide by grain size, a likely source discriminant. Given these qualifiers, the overall diversity of whitewares can still be seen to decline through time by virtue of the increasing number of larger-sized attribute groups. Such a trend is not clear for the culinary ware. In all but one pair-wise percentage comparison of each type's attribute group distribution for each small site, 1360 is less heterogeneous in attribute groups than its contemporaries (Appendix 2, Table 17).

Red Mesa Groups

Form

Chi-square tests of forms show that no significant differences exist between the groups when frequencies are compared within and between the main temper types. Diversity and evenness indices do not always follow the order of group frequency (Appendix 2, Table 14). Although the most and least diverse groups contain the largest and smallest membership respectively, some low-frequency groups, particularly brown-paint white chalcedonic sandstone and San Juan igneous with sandstone, approach the measures of the most abundant group (i.e., undifferentiated sandstone with black paint). In some respects, these similar values result because larger collections tend to contain low-frequency forms that slightly inflate the diversity but reduce the evenness measures. When comparing all chalcedonic vessels with undifferentiated sandstone and San Juan igneous groups, where the number of different forms differs considerably between the groups, this becomes clear (chalcedonic sandstone [$n = 114$, $s = 7$, $H' = 1.002$; $J = 0.515$]; sandstone [$n = 381$, $s = 12$, $H' = 1.129$, $J = 0.454$]; igneous on Appendix 2, Table 14). Undifferentiated sandstone, the most abundant group, has the largest number of forms and the lowest evenness index.

The Red Mesa groups show no significant differences in vessel-form distribution, either within temper types and across paint types or across temper types. This differs somewhat from 627 and 629; at those sites some differences in forms were found between paint groups. The

Table 3.13. Division of types into attribute groups* for 29SJ1360

Type	n	n of Attribute groups	Mean n of sherds per group	s.d.	Range of items per group	Members per group: 1	2–10	11–20	21–39	>40
BMIII-PI Mineral-on-white	90	20	4.50	8.68	1–30	13	5	0	2	0
Early Red Mesa Black-on-white	106	19	5.58	10.47	1–44	7	10	0	1	1
Red Mesa Black-on-white	599	34	17.62	53.45	1–302	12	15	4	0	3
Wide neckbanded	67	11	6.09	7.56	1–27	3	7	0	1	0
Narrow neckbanded	153	31	4.94	6.66	1–29	11	17	1	2	0
Neck Corrugated	48	24	2.00	1.96	1–9	13	11	0	0	0
Pueblo II Corrugated	45	18	2.50	2.94	1–12	10	7	1	0	0

	Diversity	Evenness	Number of groups accounting for 25%	50%	75%	90%
			(Cumulative Frequency)			
BMIII-PI M/w	2.001	.668	1	2	4	11
Early Red Mesa B/w	2.047	.695	1	2	5	11
Red Mesa B/w	1.899	.539	1	1	3	9
Wide neckbanded	1.879	.783	1	2	4	6
Narrow neckbanded	2.849	.830	2	4	11	19
Neck Corrugated	2.455	.849	2	6	12	19
Pueblo II corrugated	2.876	.905	1	3	8	14

Includes unidentified igneous, includes all grayware surface treatments except rim fillet only. Note that this table does not take into account subdivision of large groups by sandstone grain size.

* Attribute groups are based on type, temper, and paint (whiteware) or type, temper, and surface manipulation (grayware). See Appendix 2, Tables 14–15.

1360 findings are similar to the other sites, however, in that there are no differences between the temper groups. In both the chalcedonic- and undifferentiated-sandstone temper types, brown-paint groups show higher percentages of ollas than the black-paint groups, which conforms to findings at 627 and 629. Among the jars tempered with chalcedonic sandstone there are more brown-painted than black-painted vessels, but this pattern of paint colors is reversed for vessels tempered with undifferentiated sandstone (Appendix 2, Table 14).

Only estimated bowl diameters are sufficiently abundant for group comparisons on vessel size. Mean orifice diameters range from 152.5 mm (San Juan igneous, black paint) to 190.5 mm (undifferentiated sandstone, black paint). The low frequency and large standard deviation for the San Juan group make the standard error (21 mm) large enough to bring the mean for that group into the size range of the other groups. As at 627 and 629, fairly high coefficients of variation are present in all groups. These high coefficients strongly suggest that unrecognized subcategories are still present in these attribute groups (see Thomas 1976:84). On the whole, bowl sizes among groups appear similar.

Surface Treatment

Tests of surface treatment revealed few differences among the groups. Tests of the five most abundant motifs, for example, show no difference among the groups (Appendix 2, Table 14). This conforms with traditional typological expectations of uniformity in motif use. An examination of the diversity measures for each group suggests similar uniformity. Keeping in mind the effect of group size on these measures, it may be suggested that undifferentiated sandstone groups are more diverse than the exotic tempers.

Observations based on comparable numbers of motifs (s = 10) again underscore the remarkable similarity of motif use across temper categories. Appendix 2, Table 15 presents percentage breakdowns of the 10 main motifs. The smallest group, pink chalcedonic Red Mesa, shows the tightest clustering, with at least 80 percent of the design probably related to solid band motifs. Items tempered with white chalcedonic sandstone show slightly higher amounts of squiggle lines and Hatchure A-1, which could be related to source, but the association of these motifs with the temper type is not statistically significant.

Slip is the only surface attribute in which differences among the groups are apparent (Appendix 2, Table 14). In all tests, the primary difference is that brown-painted ceramics tend to be slipped on both sides; this difference is most marked in the chalcedonic bowls, where all members are slipped on both sides. Thus, slipping conforms to prior findings at 627 and 629 for the surface treatment of Red Mesa vessels tempered with chalcedonic sandstone; 1360 differs from 627 and 629 in that the amount and location of polish on Red Mesa vessels show no significant differences among the groups (Appendix 2, Table 14).

Paste

Paste differences are more apparent among the groups. Significant differences were found in texture, amount of sherd temper, and clay characteristic combinations in several tests (Appendix 2, Table 14). The results of these tests show a mixture of similarities and differences among groups. Comparison of all white chalcedonic sandstone with all undifferentiated sandstone shows that these two major temper classes are different in texture, sherd temper, and clay/temper paste type occurrence. The white chalcedonic sandstone temper/paint groups are similar in texture and sherd-temper distribution, but the undifferentiated sandstone paint groups differ in both clay and texture, being similar only in sherd-temper content. The San Juan igneous temper group differs from both the white chalcedonic sandstone group and the black-painted undifferentiated sandstone group in its low frequency of sherd-tempered items, but it is similar in texture to the chalcedonic sandstone group (Appendix 2, Table 14).

Items with undifferentiated sandstone temper have consistently higher percentages of sherd temper than both the chalcedonic sandstone and San Juan groups. This may be strictly the result of tradition, but it seems probable that potters using the more angular San Juan igneous and chalcedonic sandstone tempers had less need to add sherd temper, since the main advantage of the latter is that it bonds more effectively than sand (see Shepard 1956). The texture distributions in the undifferentiated sandstone groups are quite dispersed; there are large percentages of both very fine and medium or coarser items in the largest group (black-painted undifferentiated sandstone temper). The San Juan and chalcedonic sandstone groups, however, fall more heavily in the fine-to-medium group. These differences may be attributed to two related things: first, the high frequency of more than half sherd temper in the undifferentiated sandstone groups gives very fine texture index values (see whiteware paste discussion); second, the greater range of all attributes in the largest group indicates that it in fact represents several production areas. Differences between the black and brown paint with undifferentiated sandstone groups are minimal, suggesting that paint color does not discriminate producers well; the black-paint group in particular must represent several potters.

While the paste types are difficult to test because of sample sizes, it may be noted that each attribute group contains at least one paste type that occurs in a higher percentage in that group than in any of the others: pink chalcedonic sandstone and especially San Juan igneous temper associate with white clay; white chalcedonic sandstone with black paint is high in gray clay with white sherd temper (although this paste type is the most common in all the sandstone groups); white chalcedonic sandstone with brown paint has high relative frequencies of Chuska gray paste and black clay; and undifferentiated sandstone with brown paint has more black and white sherd than the other groups.

Narrow Neckbanded Groups

Appendix 2, Table 16 presents selected attributes that were coded for the two groups of narrow neckbanded. The following tests revealed no significant variability in the selected attributes between the two groups:

	n	Chi-square	df	p
Grain size: coarse/very coarse	43	0.490	1	0.484
Vitrification: absent/present	47	1.815	1	0.178
Texture: not coarse/coarse/very coarse	47	2.779	2	0.249
Clay combinations: no type/types	47	0.900	1	0.345

Narrow neckbanded jars with narrow clapboards seem to be slightly larger than those with wide clapboards. They also have narrower rim fillets, in keeping with the narrower coils used in construction, and they are similar in rim flare to the narrow neckbanded group with wide clapboards. Narrow coils may be requisite to the construction of larger jars, as they would provide more wall stability during manufacture.

The distribution of orifice diameters for narrow neckbanded, narrow clapboard is apparently more even than that for wide clapboard (Figure 3.19). Insofar as different orifice diameters represent different vessel sizes, the even distribution of narrow clapboards suggests that this surface manipulation is better suited to a broad range of vessel sizes. Distribution of wide clapboard is restricted; most notably it does not occur in vessels with the largest orifice diameters.

TECHNOLOGY, FUNCTION, AND PRODUCTION

Thus far, discussion has been based on typological divisions of the ceramic assemblage. This section uses technological attributes, provenience associations, and ceramic distribution to examine the assemblage for evidence of areal production emphasis, ceramic use at 1360, and on-site ceramic manufacture. Since the production and the composition of graywares and whitewares are so clearly different, they are kept separate. With the possible exception of the Basketmaker III-Pueblo I time period, it is quite certain that no carbon-painted wares, polished-smudged wares, or redwares were produced in Chaco during the occupation of 1360; all three groups are distinctive in several technological aspects and are thus readily separable and logically excludable in testing. The use of wares rather than types as the unit of discussion forfeits some time control, so that changing areal preferences through time become focal in the technological study. Because major portions of the collection have been examined for attribute association, many of the trends present have already been suggested--this section broadens the evidential base. Three unusual aspects of the ceramics at 1360 provide

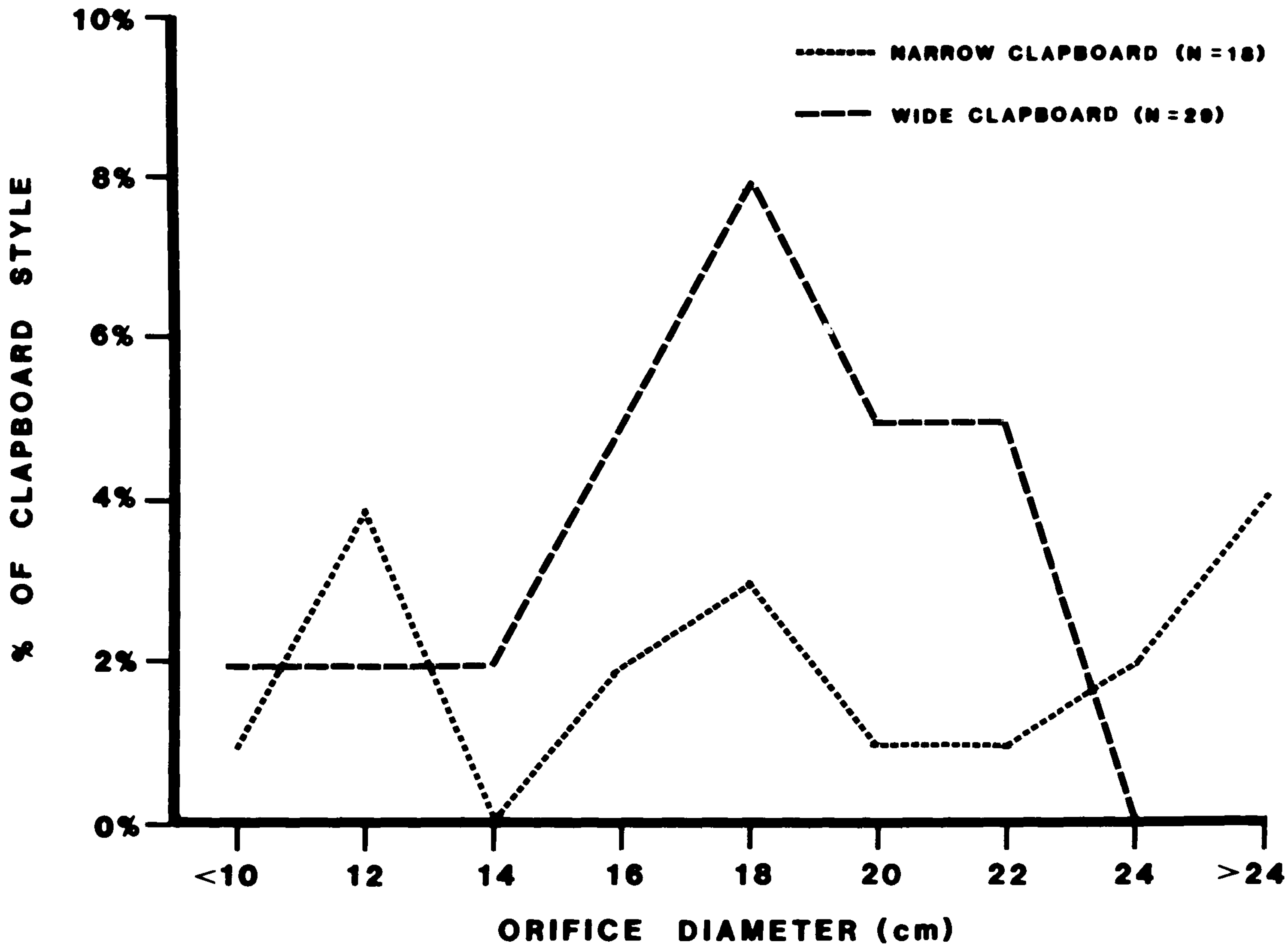


Figure 3.19. Narrow neckbanded attribute group orifice diameters (in cm)

opportunities for study that have been rare in other Chaco Canyon sites: there is a complete synchronic vessel assemblage with other associated artifacts in Pithouse B; the number of whole vessels is relatively large, allowing better-founded discussion of volume and function; and there is concrete evidence of ceramic manufacture, providing a different perspective on consumption and exchange of ceramics.

Technological Attributes

Paint

The association of mineral/carbon paint with San Juan tempers is clear (Tables 3.14 and 3.15) and reflects the presence of San Juan redwares, for which mineral/carbon paint is a default identification. Also clear is the association of carbon paint and trachyte, which indicates the greater abundance of Chuska series carbon-on-white in relation to other carbon-painted types. A chi-square test of the main mineral-paint colors (red, brown, and black) and lumped temper groups produces a significant value. In this test, chalcedonic and undifferentiated sandstone are higher than expected in brown mineral paint, while trachyte and San Juan with other igneous tempers are higher than expected in black mineral paint. Pair-wise tests suggest that significant differences between the groups exist only when compared with the lumped group of San Juan igneous. Iron-bearing sandstone items are too few to include in tests, but inspection of Table 3.14 shows their low distribution to be concentrated in the red and brown paints, which is similar to findings from other sites.

Paint types, when examined in relation to vessel forms, provide some information concerning the types of vessels imported (Table 3.15). Although mineral-paint color does not relate to any specific temper, its association with particular forms may suggest which vessels were most prone to variation in firing practice. Such variability may stem from source differences or degree of firing difficulty or both.

Excluding redware paint (mineral/carbon), comparison of four lumped decorated forms (bowls, ladles, special closed, and jars/ollas) indicates that significant differences in paint type by vessel form occur at 1360. The primary contributor is the greater-than-expected occurrence of carbon paint on special closed forms (here mainly pitchers--Table 3.15). Carbon-painted ceramics occur less often than expected only in open forms, which runs counter to the expectation that bowls would have been the favored import (S. Plog 1977; Whittlesey 1974). Since vessels from the Chuska and Red Mesa valleys include jars and other closed forms, while San Juan area vessels are primarily bowls, it would appear that these two areas participated in the ceramic exchange system in different ways (see discussion of ceramic catchment categories in Toll and McKenna 1983). Black and brown mineral paint differ in that they occur more often than expected on open and closed forms respectively, which seems to follow expectations that vessel form and size affect paint color during firing. Glazelike paints are too infrequent to test, but disproportionate percentages of these seem to occur in the San Juan

Table 3.14. 1360 Temper types tabulated by paint types, sherd temper, and vitrification (smudged and grayware excluded)

	Temper Types								
	Sandstone	Pink Chalcedonic Sandstone	White Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total
A. PAINT TYPE (excluding unknown, including redware)									
Unpainted	23	1	6	1	1	0	4	2	38
Mineral red	18	2	–	1	1	1	1	–	24
Mineral brown	184	8	42	–	2	7	10	6	259
Mineral black	537	21	107	–	2	69	42	42	820
Mineral green	6	–	2	–	–	1	–	–	9
Black "glaze"	4	–	2	–	–	4	1	1	12
Mineral/carbon	1	–	–	–	–	16	1	–	18
Carbon	8	–	–	–	–	2	53	1	64
Total	781	32	159	2	6	100	112	52	1244

Paint Tests (Black, Brown, Other Mineral)	n	x^2	df	p	C	Cells with <5
The following tests exclude mineral/carbon and unpainted:						
San Juan vs chalcedonic sandstone (San Juan less than expected in brown, greater in black; chalcedonic sandstone greater in brown)	275	11.391	2	.003	.199	1
San Juan vs undifferentiated sandstone (San Juan greater than expected in black and other mineral, less than expected in brown)	842	12.862	2	.002	.123	1
San Juan vs unidentified igneous	134	1.729	2	.421	.113	2
Trachyte vs San Juan and unidentified igneous (Carbon separated from other in this test; trachyte less than expected in black, greater in carbon; San Juan and unidentified igneous less than expected in carbon, greater in black)	240	76.230	3	.000	.491	2
The following tests exclude carbon and mineral/carbon but include unpainted:						
Trachyte vs San Juan and unidentified igneous	190	2.681	2	.262	.118	1
Trachyte vs chalcedonic sandstone	239	2.180	2	.336	.095	1
Trachyte vs undifferentiated sandstone	831	3.305	2	.192	.063	1
Pink vs white chalcedonic sandstone	191	.404	2	.817	.046	1
Undifferentiated vs chalcedonic sandstone	963	.499	2	.779	.023	
Black vs brown, all temper types excluding iron oxide and magnetitic sandstone (San Juan and unidentified igneous less than expected in brown; San Juan greater than expected in black)	1075	15.830	5	.007	.120	

(continued)

Table 3.14. (continued)

	Sandstone	Pink Chalcedonic Sandstone	White Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total
	Temper Types								
B. SHERD TEMPER (excluding redware)									
None	247	17	50	1	5	54	69	24	467
< 50%	172	7	59	-	-	20	30	17	305
> 50%	364	8	52	1	1	9	13	10	458
Total	783	32	161	2	6	83	112	51	1230

Sherd Temper Tests	n	x^2	df	p	C	Cells with <5
Pink vs white chalcedonic sandstone (pink less than expected in none)	193	5.906	2	.052	.172	
San Juan vs Trachyte	195	0.249	2	.883		
San Juan vs unidentified igneous	134	4.446	2	.108		
Chalcedonic vs undifferentiated sandstone	876	18.433	2	.000	.136	
San Juan vs undifferentiated sandstone (undifferentiated sandstone less than expected in >50%; both San Juan and chalcedonic sandstone less than expected in none and <50%)	866	46.542	2	.000	.226	
San Juan vs chalcedonic sandstone	276	23.606	2	.000	.281	
Trachyte vs chalcedonic sandstone	305	23.969	2	.000	.270	
Trachyte vs undifferentiated sandstone	895	54.389	2	.000	.239	
(In the above three tests, San Juan and Trachyte less than expected in none)						
All temper types (excluding iron oxide sandstone)	1222	108.880	6	.000	.286	

(continued)

Table 3.14. (continued)

	Temper Types								
	Sandstone	Pink Chalcedonic Sandstone	White Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total
C. VITRIFICATION (excluding redware)									
Absent	158	5	14	1	2	5	28	7	220
Present	526	25	120	1	4	58	72	37	843
Marked	97	2	27	-	-	20	12	7	165
Total	781	32	161	2	6	83	112	51	1228

Vitrification Tests	n	x^2	df	p	C	Cells with <5
Undifferentiated vs chalcedonic sandstone (chalcedonic sandstone is less than expected in absent)	974	11.358	2	.003	.107	
San Juan vs trachyte (trachyte is greater than expected in absent; San Juan in marked)	195	15.570	2	.000	.272	
San Juan vs undifferentiated sandstone (San Juan is greater than expected in marked, less than expected in absent)	864	15.651	2	.000	.133	
Trachyte vs chalcedonic sandstone (Chalcedonic sandstone is less than expected in absent)	305	12.715	2	.002	.200	
Trachyte vs San Juan and unidentified igneous (In above two tests, trachyte is greater than expected in absent)	246	13.477	2	.001	.228	
Pink vs white chalcedonic sandstone	193	3.314	2	.191		
San Juan vs unidentified igneous	134	3.810	2	.149		
San Juan vs chalcedonic sandstone	276	3.881	2	.144		
Trachyte vs undifferentiated sandstone	893	1.441	2	.487		
All temper types (excluding iron oxide sandstone)	1220	26.428	6	.000	.146	

Table 3.15. 29SJ1360 vessel forms tabulated by paint types, unknown forms and paint types omitted

					Paint Types				
Vessel form	Unpainted	Mineral Red	Mineral Brown	Mineral Black	Mineral Green	Mineral Glaze	Mineral +Carbon	Carbon	Total
White bowl	39	18	184	639	11	9	0	37	937
Ladle	3	1	25	105	1	3	0	5	143
Pitcher	2	0	9	37	0	2	0	10	60
Canteen	1	0	3	6	0	0	0	0	10
Seed jar	0	0	1	5	0	0	0	0	6
Tecomate	0	0	1	4	0	0	0	0	5
Gourd jar	0	0	6	3	0	0	0	2	11
Olla	4	1	13	41	0	0	0	1	60
Whiteware jar	50	7	59	171	1	2	0	15	305
Cylinder jar	0	0	0	1	0	0	0	0	1
Duck pot	0	0	2	1	0	0	0	1	4
Miniature	0	0	5	1	0	0	0	3	9
Effigy	1	0	1	5	0	0	0	0	7
Redware bowl	0	0	0	0	0	0	17	1	18
Redware ladle	0	0	0	0	0	0	1	0	1
Redware jar	1	0	0	0	0	0	2	0	3
Redware duckpot	0	0	0	0	0	0	1	0	1
Total	101	27	309	1019	13	16	21	75	1581

Chi-Square Comparisons:

Whiteware form groups--bowls, ladles, special closed, jar/olla

all paints except mineral+carbon	n=1443	X^2=30.280	df=15	p=.011	C=.143	9 cells<5
mineral red, brown, black; carbon	n=1414	X^2=24.225	df= 9	p=.004	C=.130	3 cells<5

carbon>E in special closed

black, brown, carbon	n=1387	X^2=20.233	df=6	p=.002	C=.120	1 cell <5

carbon>E in special closed

temper group and on pitchers and ladles. Once again, this distribution could be attributable to source or to firing accident; this paint type is sufficiently infrequent to suggest the latter.

Sherd Temper

The use of sherd temper (Table 3.14) clearly associates with different types of geologic temper. Undifferentiated sandstone with greater than half sherd temper is a very common combination. As suggested in the discussion of Red Mesa attribute groups, this probably has to do with angularity of temper particles and with paste bonding (Shepard 1956:131-132). Identification of geologic tempers becomes increasingly difficult as the relative quantity of sherd temper increases, making an assignment to "unidentified sandstone" more likely in such sherds. Paired tests involving the angular tempers indicate that differences occur along lines of general rock type; igneous-tempered pottery has less associated sherd temper than pottery tempered with chalcedonic sandstone. None of the igneous tempers show any difference among themselves in use of sherds, all being considerably higher than expected in the absence of grog. Chalcedonic-sandstone-tempered items, then, stand out since they contain some sherd, but these sherds usually constitute less than half of the temper.

Vitrification

Degree of vitrification (Table 3.14) is a visual assessment in this analysis. The continuum was segmented into "absent," "present," and "marked," based mostly on the extent to which the paste in a fresh break had a shiny appearance and somewhat on how hard the sherd was. Significant differences between temper groups are mostly generated by differences in the "vitrification absent" category. The groups tempered with undifferentiated sandstone and with trachyte both have relatively high frequencies of unvitrified items, while the San Juan and chalcedonic sandstone groups are relatively low. San Juan igneous and chalcedonic sandstone (especially the white subgroup) are also similar in having a somewhat higher proportion of markedly vitrified items. By far the most common state is the presence of some vitrification--the temper groups range from 64 to 75 percent in this category. These distributions are on the whole similar to those at 627 and 629, but there is some tendency toward less vitrification in the 1360 collection; some of this apparent difference is probably real, but the subjective nature of this attribute makes it likely that the difference is at least partially due to variability in identification. The greatest difference is in the San Juan temper group, which is more vitrified at 1360 than at the other sites. Toll suspects that this is in part due to temper identification problems involving coding of vitrified white-sherd temper as crushed rock.

Paste Types

Significant chi-square values were found for virtually every test of temper and paste types (Table 3.16). Not all paste and temper iden-

Table 3.16. 1360 whiteware and grayware temper types tabulated by paste types

Paste Type	Sandstone	Pink Chalcedonic Sandstone	White Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Uniden-tified Igneous	Total
	Temper Types								
A. WHITEWARES									
No type	186	12	40	1	5	43	20	22	329
Black clay/ white sherd	71	1	15	–	–	1	2	2	92
Gray clay/									
black sherd	23	2	2	–	–	–	2	1	30
white sherd	279	10	82	–	–	13	18	19	421
black and white	50	–	5	1	1	–	2	3	62
"Little Colorado"	1	–	–	–	–	–	–	–	1
Chuska Gray	6	1	3	–	–	–	59	–	69
Black clay/no sherd	16	3	6	–	–	2	1	1	29
White clay/no sherd	113	3	5	–	–	22	7	2	152
Total	745	32	158	2	6	81	111	50	1185

Paste Type Tests on Whitewares (excluding "Little Colorado")	n	x^2	df	p	C	Cells with <5
Chalcedonic vs undifferentiated sandstone	696	30.262	6	.000	.204	2
San Juan vs trachyte	129	59.676	3	.000	.562	2
San Juan vs unknown igneous	66	19.973	2	.000	.482	2
San Juan vs undifferentiated sandstone	590	29.774	2	.000	.219	1
San Juan vs chalcedonic sandstone	176	36.880	2	.000	.416	
Trachyte vs chalcedonic sandstone	229	107.568	3	.000	.565	
Trachyte vs undifferentiated sandstone	649	353.730	6	.000	.594	2
Tracyte vs San Juan and unidentified igneous	156	70.870	3	.000	.559	
All (excluding iron oxide sandstone)	856	488.736	12	.000	.603	2

(continued)

Table 3.16. (continued)

Paste Type	Sandstone	Pink Chalcedonic Sandstone	White Chalcedonic Sandstone	Iron Oxide Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total
	Temper Types								
B. GRAYWARES									
No type	146	23	18	5	4	2	3	1	202
Black clay/ white sherd	3	1	–	–	–	–	–	–	4
Gray clay/									
black sherd	1	–	–	–	–	–	–	–	1
white sherd	4	1	–	–	–	–	–	–	5
Chuska Gray clay	2	–	–	–	–	–	56	–	58
Tan clay	23	1	4	1	4	–	6	–	39
Black clay	28	4	6	–	–	1	1	–	40
White clay	26	3	3	1	1	–	4	–	38
Total	233	33	31	7	9	3	70	1	387

Paste Type Tests on Graywares	n	x^2	df	p	C	Cells with <5
Pink vs white chalcedonic sandstone	62	1.800	1	.180		
Chalcedonic vs undifferentiated sandstone	275	0.832	2	.660		
Trachyte vs chalcedonic sandstone	132	91.800	2	.000	.640	
Trachyte vs undifferentiated sandstone	275	200.740	2	.000	.650	

Contributors to whiteware tests:

1. Undifferentiated sandstone greater than expected in gray paste with black and white sherd; less than expected in gray paste with white sherd, and in black paste.
2. Combining pastes without sherd (excluding Chuska Gray) and all pastes with sherd (except gray paste with white sherd) yields San Juan greater than expected in gray paste with white sherd and paste without sherd, and less than expected in Chuska Gray.
3. Combining as above (2) yields San Juan greater than expected in pastes without sherd and less than expected in gray paste with white sherd.
4. Combining as above shows undifferentiated sandstone greater than expected in any paste with sherd and less than expected in pastes groups without sherd.

(continued)

Table 3.16. (continued)

Contributors to whiteware tests:

5. Combining pastes without sherd (excluding Chuska Gray) and all pastes with sherd temper (except gray paste with white sherd) shows San Juan greater than expected in paste without sherd and less than expected in paste with sherd.

6. Combining as above shows chalcedonic sandstone greater than expected in paste with sherd and less than expected in Chuska Gray.

7. Trachyte is greater than expected in Chuska Gray and less than expected in all other paste groups.

8. Combining as above (5) shows trachyte greater than expected in Chuska Gray and less than expected in all other paste groups.

9. Combining as above shows undifferentiated sandstone greater than expected in all pastes other than Chuska Gray; chalcedonic sandstone greater than expected in gray with white sherd and less than expected in all other paste types; San Juan is greater than expected in pastes without sherds and less than expected in all other paste groups; unidentified ignecus is greater than expected in gray paste with white sherd and approximately as expected in all other paste groups.

Contributors to grayware tests:

1. Trachyte-tempered vessels are greater than expected in Chuska Gray and less than expected in all other paste groups.

tifications are independent variables; with 64 percent of all trachyte-tempered specimens falling into "Chuska Gray," and 91 percent of Chuska Gray paste having trachyte temper, the identification of the paste is clearly influenced by the temper present. Gray clays, excluding the Chuska group, account for 43 percent of all whiteware cores assigned a clay color; since the "no type" group consists largely of variations of gray paste, the percentage is actually even higher. Because of its demonstrated association with sherd temper, undifferentiated sandstone exhibits higher-than-expected levels in core-color and sherd combinations, though chalcedonic-sandstone-tempered items are significantly higher in cores with gray clay and white sherd temper. Other paired combinations show pink-chalcedonic-sandstone-tempered pastes lack sherd temper more often than do white chalcedonic pastes. The San Juan igneous group contains relatively little sherd-tempered paste, even when compared with unidentified igneous and chalcedonic sandstone. San Juan shows the greatest association with white pastes.

Grayware differences in paste characteristics are primarily found between the trachyte and the sandstone tempers because of the very high frequency of Chuska gray clay in the trachyte group. No significant differences were found within sandstone groups.

Grain Size

Table 3.17 presents the distribution of grain sizes recorded for each ware and form. The distinct associations of whiteware with fine grains and grayware with coarse grains conform to expectations of ware differentiation for this ceramic assemblage. Grain sizes in various whiteware vessel forms are variable, but in the more common forms never exceed 15 percent coarse plus very coarse. Pitchers and ladles are characterized by finer grain sizes, while jars and ollas tend to have coarser temper grains. Twelve percent of the bowls are in the coarse range, but this may be in part attributable to the commonness of bowls in the Basketmaker III-Pueblo I types, which tend to be coarser grained. Some of the jar coarseness is attributable to the presence of early vessels as well. This relatively high frequency of coarse tempers in bowls leads to an indication of no association between grain size and vessel form in a lumped chi-square test, which is different from results of similar tests at other Chacoan sites. Grain size for the rarer vessel forms is quite erratic, but on the whole these forms tend to be coarser even than the jar/olla group. Some of this may again be attributable to time shifts--gourd jars and tecomates tend to be earlier and therefore have coarser temper. Other aspects of this difference may be source- or form-related; i.e., these forms may not have been subject to the same finishing constraints because of their unusual nature. The San Juan redwares show a distinct tendency toward having coarser tempers than the whitewares.

Coarser tempering material may make it easier to construct a large vessel, which would help to account not only for the coarseness of grayware temper but also for the somewhat higher percentage of coarse tempers in large whiteware forms. Probably more importantly, temper

Table 3.17. 29SJ1360 identifiable vessel forms by temper grain size

Vessel Form	Fine	Medium	Coarse	Very Coarse	Total
Serviceware					
Whiteware bowl	269	458	83	17	827
Ladle	40	85	8	--	133
Pitcher	25	23	1	1	50
Canteen	5	5	--	--	10
Seed jar	3	1	1	--	5
Tecomate	1	2	2	--	5
Gourd jar	5	2	2	--	9
Olla	17	25	7	--	49
Whiteware jar	36	68	13	4	121
Cylinder jar	1	--	--	--	1
Duck pot	1	1	1	1	4
Miniature	5	--	2	--	7
Effigy	2	3	2	--	7
Redware[a]	--	10	10	--	20
Smudged bowl	8	8	2	2	20
Subtotal	418	691	134	25	1268
% of servicewares	33.0	54.5	10.6	2.0	
Culinary					
Jar	4	60	166	108	338
Pitcher	--	4	3	4	11
Tecomate	--	3	9	12	24
Seed jar	--	--	--	1	1
Olla	--	--	1	2	3
Canteen	--	--	1	--	1
Effigy	--	--	1	--	1
Miniature	--	--	--	1	1
Subtotal	4	67	181	128	380
% of culinary	1.1	17.6	47.6	33.7	
Total culinary & service	422	758	315	153	1648
Total %	25.6	46.0	19.1	9.3	100

Chi-square 2x2 tests; (fine-medium vs coarse-very coarse)

	n	x^2	p
White vs gray	1608	691.951	.000
>E = white in fine-medium, gray in coarse-very coarse			
White open/closed	1237	3.531	.060
>E = open in fine, closed in coarse-very coarse			
White jars and ollas vs bowls	997	.531	.466
Red vs white	1248	22.996	.000
>E = red in coarse-very coarse, white in fine-medium			

[a]

Redwares	Medium	Coarse	Total
Bowls	8	7	15
Ladle	1	-	1
Duckpot	-	1	1
Jars	1	2	3

size likely relates to thermal-shock resistance--more porous vessels withstand repeated heating and cooling better than less porous ones (Rye 1976). The undifferentiated sandstone temper is somewhat more prone than the other culinary tempers to be very coarse. Trachyte temper is somewhat more likely to be coarse than to be very coarse; it also tends to occur in greater density. Since trachyte occurs more frequently in later vessels at 1360, this may further contribute to the observation that temper grain size decreases with time.

Grayware Sooting

Another aspect of thermal-shock resistance is relative expansion and contraction rates for temper and clay; pottery for which these rates are fairly equal is most resistant (Rye 1976:113-114). Sherd temper would be useful in this respect, but sherd temper is infrequent in culinary ware from this time in Chaco. According to Rye (1976:117), quartz, the main constituent of sandstone, has less desirable thermal properties than do feldspars, which are a major constituent of trachyte. Studies of association between temper types and sooting at 627, 629, and Pueblo Alto reveal significant association between trachyte and sooting in only one case (Pueblo Alto). No significant association of temper types with sooting was found when all items from 1360 were lumped, but within some more specific ceramic assemblages (e.g., Pueblo II corrugated vessels and contents of Pithouse B) tests do show significant associations, and trachyte-tempered sherds are sooted more often than expected.

Sooting at 1360 quite closely follows trends seen at other sites. There is a clear trend of increased sooting occurrence through time, as measured both by type occurrence and by time group (Table 3.18). Thus sooting is relatively scarce on Lino Gray and plain gray sherds, reaches 20-30 percent on neckbanded types, and is around 40 percent on the corrugated sherds (although neck corrugated shows slightly more sooting than does Pueblo II corrugated). The sequence is confirmed by the time/space groupings; the effects of depositional context are also shown in the AD 920-1020 group, which is large enough to subdivide into provenience groups (Table 3.18). The period of exposure to the elements is likely to have been different in each of the groups. The fill sherds have the least sooting--presumably they spent some time on the surface before being incorporated into structure fill; trash fill sherds were presumably exposed less than alluvially deposited sherds. Floor sherds, which are 58 percent sooted, may represent the closest approximation to actual distributions of sooting at time of occupation. It is probable, however, that these floor items are biased toward habitation floors because of the size of the Pithouse B assemblage; presumably vessels from storage rooms would have lower frequencies of sooting, though multiple functions for vessels are a continual source of noise in these analyses. That sooting will survive some exposure is seen in the presence of sooted items from the site surface, though these items are somewhat less frequent than expected as compared with the rest of the site.

Table 3.18. Sooting on graywares by type, time-space group, and temper by presence/absence of sooting at 29SJ1360. Unidentified corrugated (8) and fugitive red sherds excluded.

A. Type

	Lino Gray	Plain Gray	Wide Neckbanded	Narrow Neckbanded	Neck Corrugated	PII Corrugated	Total
Sooted	5	4	23	36	21	18	107
Not sooted	40	46	53	117	29	28	313
Total	45	50	76	153	50	46	420

B. Time-Space Group

Group	700-820 Midden	820-920 Fill	920-1020 Fill	920-1020 Trash Fill	920-1020 Floors	920-1120 Surface	Total
Sooted	2	13	32	27	15	9	98
Not Sooted	72	20	98	51	11	44	296
Total	74	33	130	78	26	53	394

C. Pithouse B

Types:	Lino Gray	Plain Gray	Wide Neckbanded	Narrow Neckbanded	Neck Corrugated	PII Corrugated	Total
Sooted	0	0	3	3	6	7	19
Not Sooted	1	1	3	11	6	11	33
Total	1	1	6	14	12	18	52

Tempers:	Undifferentiated Sandstone	Chalcedonic Sandstone	Magnetitic Sandstone	Trachyte	San Juan Igneous	Total
Sooted	8	1	0	11	0	20
Not Sooted	21	3	2	6	1	33
Total	29	4	2	17	1	53

Table 3.18. (continued)

D. Type by temper

Tempers:	Undifferentiated Sandstone	Chalcedonic Sandstone	Iron-bearing Sandstone	Trachyte	San Juan Igneous	Total
1. Lino Gray						
Sooted	3	0	2	0		5
Not Sooted	29	2	5	2		38
Subtotal	32	2	7	2		43
2. Wide neckbanded						
Sooted	12	5		3		20
Not Sooted	32	14		1		47
Subtotal	44	19		4		67
3. Narrow neckbanded						
Sooted	23	8	0	3	2*	36
Not Sooted	73	20	3	19	2	117
Subtotal	96	28	3	22	4	153
4. Neck corrugated						
Sooted	15	2	0	3		20
Not Sooted	16	4	2	6		28
Subtotal	31	6	2	9		48
5. PII corrugated						
Sooted	1	2	0	15		18
Not Sooted	12	3	1	11		27
Subtotal	13	5	1	26		45
TOTALS						
Sooted	54	17	2	24	2	99
Not Sooted	162	43	11	39	2	257
TOTAL	216	60	13	63	4	356

*includes 1 unidentified igneous

Table 3.18. (continued)

Sooting test	n	x^2	df	p	C	cells <5
a. All types	420	25.865	5	.000	.241	–
b. Time-space assignments	394	43.908	5	.000	.317	–
c. Pithouse B temper: sandstone, trachyte	46	6.091	1	.014	–	–
d2. Wide neckbanded temper: sandstone, chalcedonic sandstone	63	.006	1	.937	–	–
d3. Narrow neckbanded: sandstone, chalcedonic sandstone, trachyte	146	1.609	2	.447	.104	–
d5. PII corrugated temper: sandstone, trachyte	39	8.955	1	.003	–	–
d. Total: sandstone, chalcedonic sandstone, iron-bearing trachyte	352	5.195	3	.158	.121	1

Contributors:

a. Neck corrugated and PII corrugated > E sooted; Lino and plain gray < E sooted
b. Early proveniences < E soot; trash fill, fill > soot;
floors > E soot (27%); early proveniences > E no soot; floors < E no soot
c. Trachyte > E sooting, < E no soot
d2. Not significant
d3. Not significant
d5. Trachyte > E sooting, sandstone < E sooting
d. Not significant

E = expected
$\bar{X}$ = mean
df = degrees of freedom
p = probability
C = contingency coefficient

"Contributors" refers to cells in chi-square tables in which the observed value deviates sufficiently from the expected value to substantially contribute to a significant chi-square statistic

The relationship of sooting to vessel size is also of interest, since this might indicate whether size differences existed between sooted cooking and unsooted (storage?) vessels. Within-type t-tests of sooted and unsooted jars (no gray pitchers included) give mixed results. Narrow neckbanded, by far the most abundant type on the site, does show a significant difference (with sooted vessels being smaller), but none of the three other types tested do (Table 3.19). Somewhat confusingly, it can be said that sooted vessels show a narrower size range in each type than do unsooted vessels, except in narrow neckbanded. Probably, then, cooking vessels were basically similar to storage vessels, though perhaps on the average smaller. There may also have been greater size variability in vessels that were not used for cooking.

Vessel Form

There are two possible reasons for an association between temper and vessel form. Certain tempers may have favorable functional properties relative to particular vessel uses; alternatively, particular production areas might emphasize production of certain forms. The association of graywares with trachyte and chalcedonic sandstones has been shown in numerous contexts and is reiterated by a test of major forms and tempers at 1360 (Table 3.20). Similarly, redwares and San Juan igneous are clearly associated in the time period during which 1360 was occupied. The scarce (and generally early) iron-bearing sandstones are disproportionately present in graywares and closed forms. San Juan tempers are very rare in grayware and are found more often than expected in whiteware bowls (redwares were excluded from the test). Trachyte, especially because of its strong association with graywares, occurs less often than expected in bowls and ladles.

A test of the three most abundant tempers against six vessel categories indicates that there are a good many more trachyte pitchers than expected (echoing the carbon-paint occurrence) and correspondingly fewer undifferentiated-sandstone-tempered ones. In contrast with 627 and 629, trachyte at 1360 is found less often than statistically expected in jars and ollas. The two variants of chalcedonic temper are markedly different in vessel-type association because of a heavy emphasis on grayware jars in the pink group. While the two chalcedonic sandstone groups are shown to be different, the white chalcedonic sandstone and the undifferentiated sandstone groups are not, even when grayware is included in the test. This raises the possibility of identification problems with the white chalcedonic sandstone temper at 1360.

Primarily what has been shown here is an area/ware association, particularly an association of graywares with pink chalcedonic sandstone and trachyte. Perhaps these angular tempers and/or the potters with access to them made especially good grayware jars. There are some suggestions of area/whiteware-form associations, but these are not supported by large numbers of examples. One very intriguing case is that of the association of trachyte with pitchers and cylinder jars; both forms are commonly attributed to Chaco. The occurrence of a cylinder jar sherd at 1360 is remarkable, even though it is a solitary item.

Table 3.19. T-test comparisons of sooted and non-sooted jar diameters by type and time group, 29SJ1360

	n	Mean	s.d.	Range	Variance	t	p
A. By Type							
1. Wide neckbanded							
Sooted	16	167.5	41.392	90-250	=	.024	.981
Not Sooted	41	167.8	43.704	70-305			
2. Narrow neckbanded							
Sooted	33	159.8	47.999	50-330	=	2.541	.012
Not Sooted	102	184.6	48.862	100-290			
4. Neck corrugated							
Sooted	15	181.0	43.227	110-260	=	1.023	.312
Not Sooted	20	199.0	56.599	110-330			
5. PII corrugated							
Sooted	15	195.3	56.929	120-300	=	.417	.679
Not Sooted	26	202.9	55.284	105-350			
B. By Time Group							
1. 820-920							
Sooted	10	145.0	34.561	90-200	=	2.240	.036
Not Sooted	13	191.1	57.487	60-270			
2. 920-1020							
Sooted	52	180.7	50.430	100-300	=	.048	.962
Not Sooted	109	181.1	54.413	50-330			

t = student's t
p = probability

Table 3.20. Temper types tabulated by identifiable vessel forms and wares

	Undifferentiated Sandstone	Chalcedonic Sandstone		Iron Oxide Sandstone	Magnetitic Sandstone	San Juan Igneous	Trachyte	Unidentified Igneous	Total
		Pink	White						
Whitewares									
Bowls	537	24	109	2	4	56	65	33	830
Ladles	81	1	23	–	1	9	9	9	133
Pitchers	27	3	3	–	–	4	13	–	50
Canteens	7	1	1	–	–	–	–	1	10
Seed jars	3	–	1	–	–	–	1	–	5
Tecomates	4	–	–	–	–	1	–	–	5
Gourd jars	2	–	1	–	–	–	6	–	9
Ollas	37	–	3	–	–	6	3	–	49
Jars	75	2	19	–	1	8	12	4	121
Cylinder jars	–	–	–	–	–	–	1	–	1
Duck pots	3	–	–	–	–	–	1	–	5
Miniatures	3	1	–	–	–	–	–	3	7
Effigy	5	–	–	–	–	–	1	1	7
Red and Smudged Wares									
Redware bowls	2	–	–	–	–	12	1	–	15
Redware ladles	–	–	–	–	–	1	–	–	1
Jars	–	–	–	–	–	2	–	1	3
Duck pots	–	–	–	–	–	1	–	–	1
Smudged bowls	19	–	1	–	–	–	–	–	20
Graywares									
Jars	200	32	29	1	6	3	66	1	338
Canteen, San Juan, miniature	3	–	–	–	–	–	–	–	3
Tecomates	18	–	–	4	2	–	–	–	24
Ollas	2	–	–	1	–	–	–	–	3
Pitchers	6	1	1	1	–	–	2	–	11
Effigies	–	–	1	–	–	–	–	–	1
Unknown (all wares)	5	–	1	–	1	–	2	–	9
Total	1039	65	193	9	15	103	183	53	1660

(continued)

Table 3.20. (continued)

Chi-square comparisons	n	x^2	df	p	C	cells with <5
1. Undifferentiated, chalcedonic, and iron oxide sandstone, San Juan igneous and trachyte by whiteware bowls, ladles, and closed forms, gray jars	1507	58.705	12	.000	.194	3
2. Undifferentiated and chalcedonic sandstone and trachyte by whiteware bowls, ladles, pitchers, closed forms, ollas, and jars	1078	35.031	10	.000	.177	3
3. Pink vs. white chalcedonic sandstone	253	37.929	4	.000	.361	1
4. White chalcedonic and undifferentiated sandstone by bowls, ladles, closed forms, jar/ollas, and gray jars	1155	5.984	4	.200	.072	
Grayware by Whiteware, 2x2 tables:						
5. Chalcedonic vs undifferentiated sandstone	1270	.687	1	.407		
6. Iron oxide vs undifferenitated sandstone	1037	22.841	1	.000		
7. Chalcedonic sandstone vs trachyte	440	7.842	1	.005		

Contributors

1. Trachyte and iron oxide sandstone less than expected in bowls; San Juan greater than expected in bowls; trachyte and San Juan less than expected in ladles; chacedonic sandstone less than expected in closed forms; undifferentiated sandstone and San Juan less than expected in graywares; iron oxide sandstone greater than expected in grayware; trachyte much greater than expected in graywares (30% of chi-square)
2. Trachyte is much greater than expected in pithcers (41% of chi-square); sandstone is less than expected in pitchers, chalcedonic sandstone is less than expected in ollas; trachyte is less than expected in closed
3. Pink chalcedonic sandstone is less than expected in bowls, ladles, and jar/ollas, and much greater than expected in grayware (half of chi-square); white chalcedonic sandstone is greater than expected in ladles
4. Not significant
5. Not significant
6. Iron oxide sandstone is high in graywares, sandstone is high in whitewares
7. Trachyte is high in graywares, chalcedonic sandstone is high in whitewares

This form is extremely rare, and most known examples are from Pueblo Bonito; a single cylinder jar sherd was recovered from Pueblo Alto as well. The relatively common occurrence of trachyte temper in cylinder jars, including this one, raises interesting questions concerning vessel supply and possible control thereof.

Vessel Distribution and Function

Vessel Size and Distribution

Turner and Lofgren (1966) found that culinary jar sizes increased from AD 600-1300, as did the relative frequency of larger vessels. Their northeastern Arizona sample also showed that jars display a bimodal size distribution, while serving bowls are relatively constant in volume. Increased cooking-jar size is seen as related to increased household size and restructuring of cooking activities for larger, suprahousehold groups, such as kiva-based societies or clans (Turner and Lofgren 1966:127). Household or special needs would have been satisfied by the smaller range of cooking and serving vessels. The size of bowls also increased through time, but only slightly (larger bowls were excluded from the analysis, however). These trends are also apparent through typological time within wares at 1360 (Appendix 2, Tables 6-12; Figures 3.15 and 3.16).

The majority of the whole vessels from 1360 were recovered from Pithouse B, where vessels tend to be larger than in the rest of the site (Table 3.21; Figures 3.20 and 3.21); figures based on whole-vessel volumes at 1360, therefore, may be somewhat inflated relative to the actual vessel population at the site. Measured volumes for whole and reconstructable grayware and whiteware vessels from 1360 are presented in Appendix 2, Table 18; information on the correlation between volume and orifice diameter is presented in Figures 3.22 and 3.23. Mean volume for culinary jars is 9832 cc, but the volume distribution appears to be bimodal, with the larger mode predominant. Bowl capacity distribution is unimodal (mean = 1587 cc), with the bowl volume mode being about half the size of the smaller jar mode. This relationship between bowl and jar volume modes suggests a functional relationship between capacities of these two forms and may imply that the larger jar mode represents vessels serving some suprahousehold needs.

Plots of orifice diameter (Figures 3.20 and 3.21; Table 3.21) for whiteware bowl and grayware jar rims by major provenience indicate some differentiation in vessel size between proveniences, which in turn suggests differentiation in ceramic function. These plots omit Lino Gray but include Early Red Mesa, Red Mesa, and the majority of other whiteware and Pueblo II-Pueblo III mineral-on-white bowls in each provenience. The plots for Kiva A probably approximate the distribution for the general population, given the temporal position of this structure, the nature of its fill (purposely deposited trash), and the sample size. Only whole vessels from Pithouse B were used in this study in

Table 3.21. Distribution of orifice diameters for bowls and jars (see Figures 3.20 and 3.21)

	Number of Vessels	Orifice Diameter (cm) 0–9	10–12	13–14	15–16	17–18	19–20	21–22	23–24	>24
A. WARE DISTRIBUTION										
Culinary										
Pithouse B*	10	–	2	1	–	1	1	2	2	1
Kiva A	86	2	13	12	14	19	13	6	2	5
House 1 Rooms	16	1	2	5	1	1	1	1	–	4
Plaza Area 1	23	1	–	2	3	5	1	1	4	6
Plaza Areas 3 and 4	10	1	2	–	–	2	2	3	–	–
Plaza Area 5	21	–	1	1	4	5	4	2	1	3
Whiteware										
Pithouse B*	15	–	2	–	1	1	2	5	2	2
Kiva A	200	1	13	10	29	35	38	26	16	32
House 1 Rooms	23	–	3	6	2	3	2	3	–	4
Plaza Area 1	28	1	1	3	4	4	6	3	4	2
Plaza Areas 3 and 4	16	–	2	1	3	1	2	4	2	1
Plaza Area 5	19	–	–	–	4	6	6	–	1	2

Chi-square comparisons	x^2	df	p	C	cells with <5
A. Whiteware bowls, <18 vs >18 cm	4.625	3	.201	.123	
Pithouse B culinary vs Kiva A culinary	3.114	1	.078		
Culinary jars, <21 vs >21 cm	14.044	3	.003	.282	2

Contributors: Pithouse B and the extramural areas are greater than expected in large jars (>21 cm); Kiva A is less than expected in small jars (<21 cm)

(continued)

* Pithouse B total includes whole vessels only

Table 3.21. (continued)

	Number of Vessels	Orifice Diameter (cm) 0–9	10–12	13–14	15–16	17–18	19–20	21–22	23–24	>24
B. WHITEWARE BOWL DISTRIBUTION BY TEMPER GRAIN SIZE										
Basketmaker III – Pueblo I m/w										
Fine-grained temper	10	1	–	1	3	2	2	–	–	1
Medium-grained temper	25	3	–	5	5	2	4	1	3	2
Coarse – very coarse	23	–	6	1	3	3	5	2	2	1
Early Red Mesa B/w										
Fine-grained temper	16	1	3	1	1	–	–	5	4	1
Medium-grained temper	25	1	1	2	3	5	3	3	1	6
Coarse – very coarse	5	–	–	–	–	1	2	1	1	–
Red Mesa B/w										
Fine-grained temper	74	1	8	8	11	13	13	7	4	9
Medium-grained temper	145	1	8	12	18	26	24	23	9	24
Coarse – very coarse	23	–	2	1	4	2	7	4	2	1
Total	346	8	28	31	48	54	60	46	26	45

Chi-square comparisons	x^2	df	p	C	cells with <5
B. All bowls, fine-medium vs coarse-very coarse	3.036	1	.081		
Basketmaker III-Pueblo I, fine-medium vs coarse-very coarse	.029	1	.864		
Early Red Mesa B/w, fine-medium vs coarse-very coarse	.228	1	.633		
Red Mesa B/w, fine-medium vs coarse-very coarse	.168	1	.681		

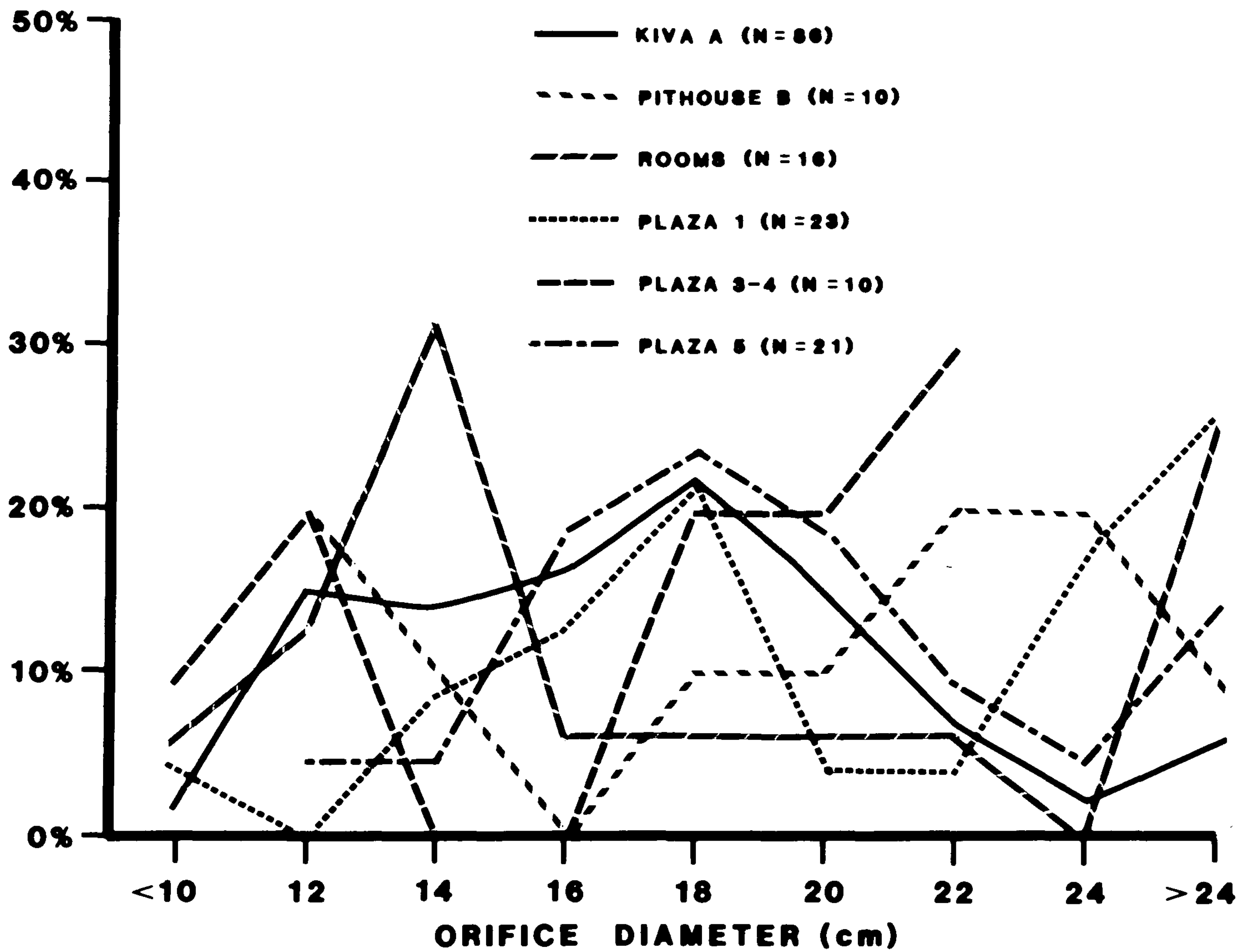


Figure 3.20. Distribution of culinary wares by orifice diameter (in cm)

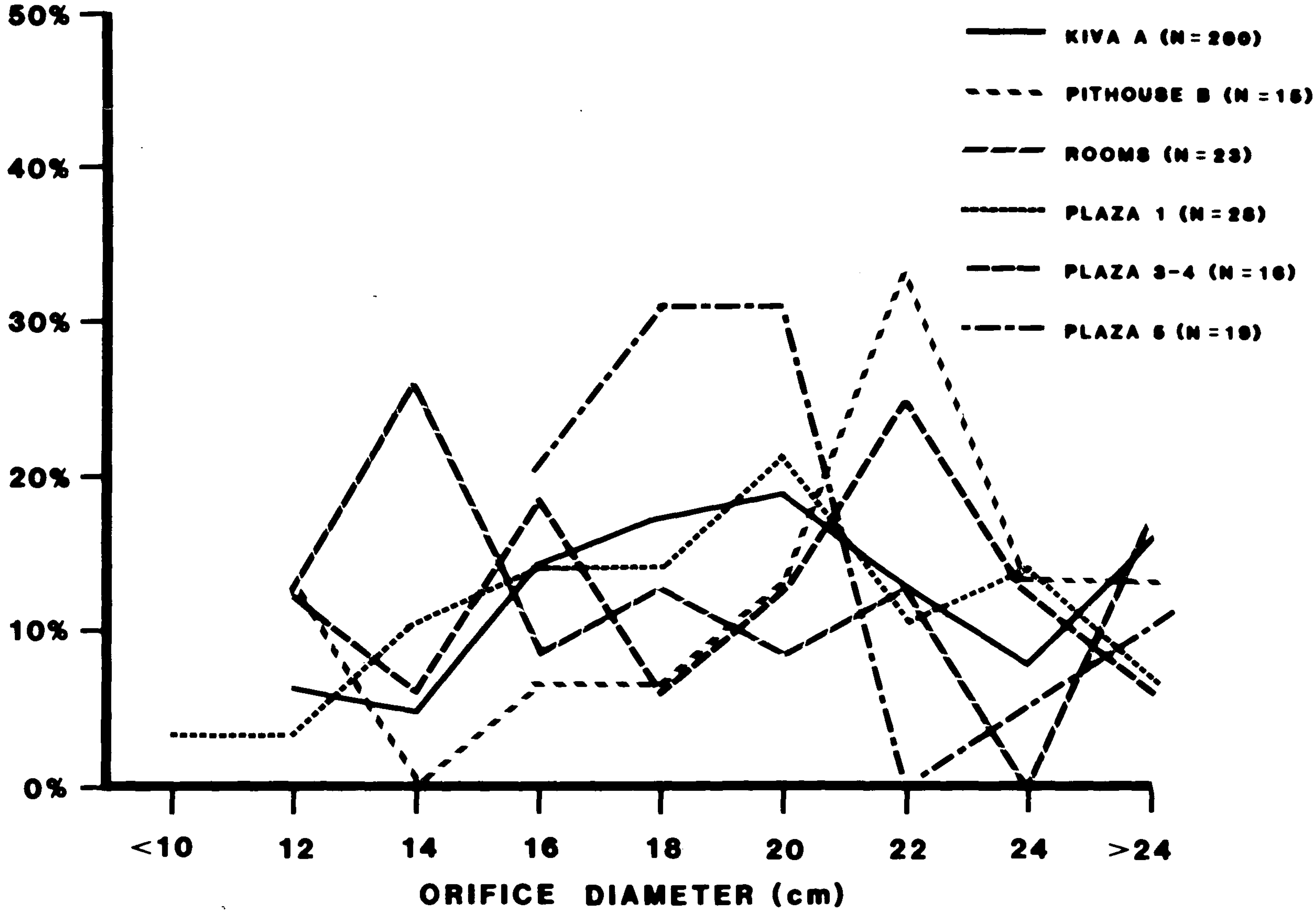


Figure 3.21. Distribution of mineral-on-white bowls by orifice diameter (in cm)

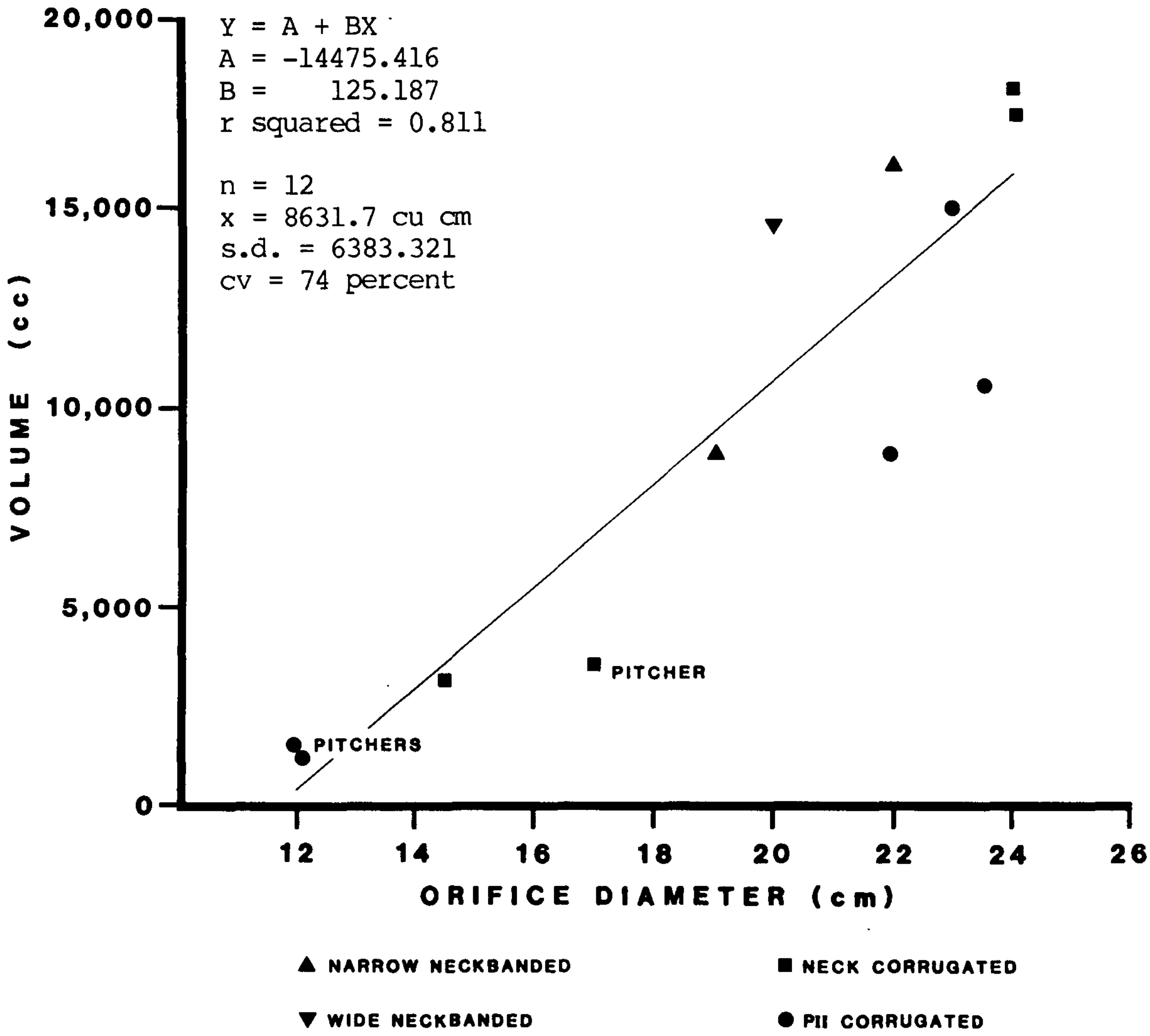


Figure 3.22. Regression of culinary ware orifice diameters (in cm) to volume (in cm^3)

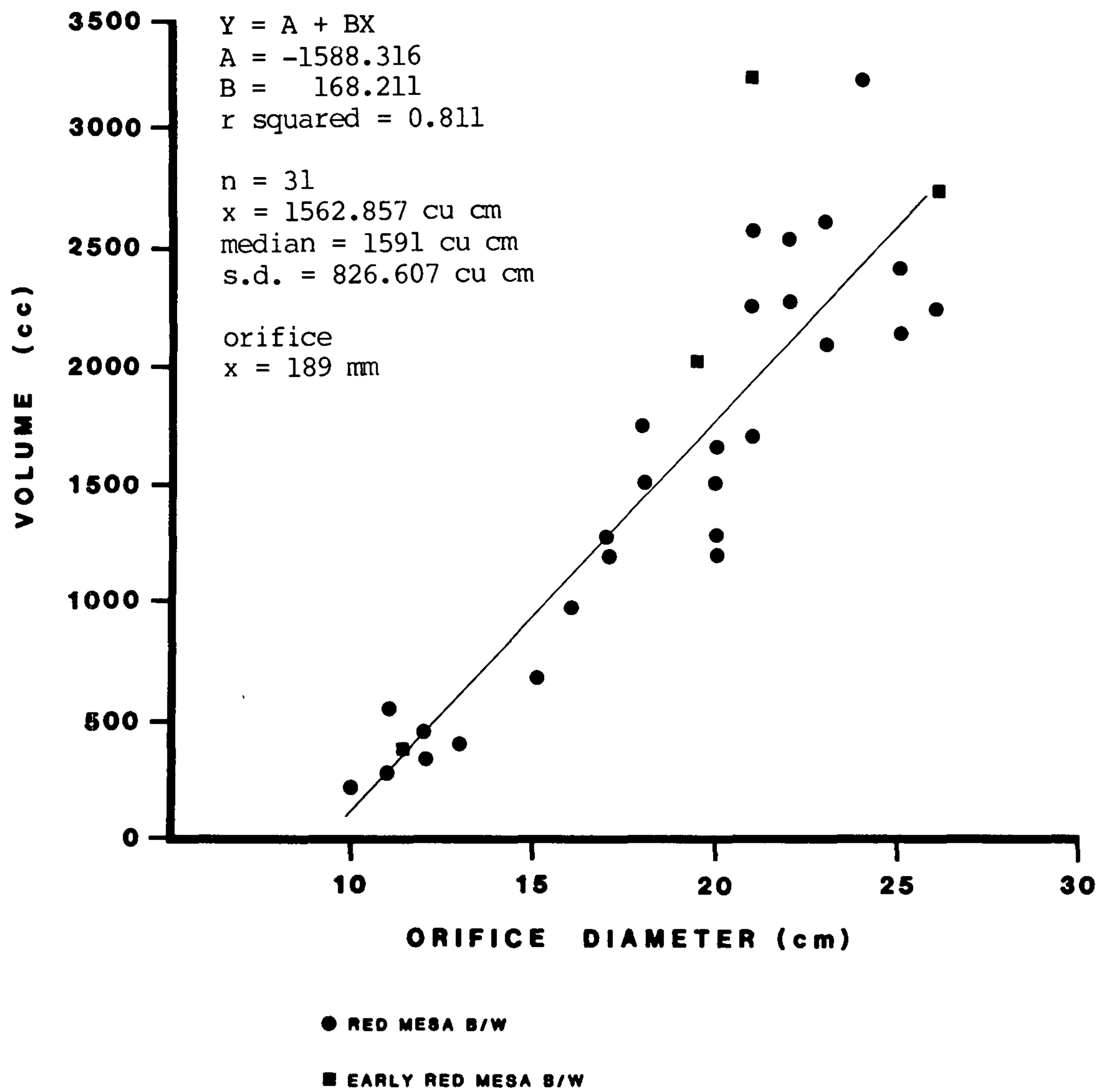


Figure 3.23. Regression of Red Mesa bowl diameters (in cm) to volume (in cm^3)

order to avoid ceramic "noise" from washed-in material from the surrounding extramural areas.

Pithouse B and House 1 rooms show a bimodal distribution of vessel size for both culinary and service wares, with the larger-sized vessels being the strongest component of Pithouse B. The smaller mode is more heavily represented in the House 1 rooms, suggesting a concentration of discrete activities involving ceramics. There is a sharp break between modes in room-associated culinary wares, indicating a dearth of mid-sized vessels. The vessels forming the upper size mode are larger than the large vessels from Pithouse B. Large vessels occur in Room 2 and in the two rooms with large central firepits (Rooms 7 and 11), which is a convenient correlation of oversized firepits with oversized jars; more will be said about the Room 2 ceramic assemblage below.

Vessel sizes in the plaza differ according to area. Those recovered adjacent to Pithouse B (Area 1) are similar in size distribution to the pithouse ceramics. Culinary orifices pattern bimodally, with the larger vessels predominating; whiteware bowls exhibit a unimodal distribution, although their volume is slightly smaller than that for the vessels from the pithouse. Plaza Area 3-4, associated with a mealing area, exhibits a larger bowl mode than Area 1 and a single jar mode for large jars; these aspects of the ceramic assemblage may imply drying, flour catching, and storage activities. Plaza Area 5 is a small area with a single firepit; it lies between Retaining Wall 1 and House 1 (Figure 1.3). This area, on the whole, exhibits smaller culinary jars and whiteware bowls; it is unique in containing a relative abundance of mid-sized vessels, a size class not strongly represented in the other plaza areas, Pithouse B, or the rooms. Area 5 may represent an isolated activity area for a small group.

Another contrast is the difference in orifice diameters between ceramics associated with Kiva A and those associated with House 1; Kiva A vessels have considerably smaller orifices. This suggests changes in social organization (Turner and Lofgren 1966) and patterns of storage, processing, and other activities in which ceramics were employed, and it may indicate an occupation hiatus in House 1 between the people who deposited the trash in Kiva A and the people who occupied the structure prior to its last abandonment. This suggestion of an occupation hiatus in House 1 is supported by the lack of matched ceramic items from House 1 and Kiva A trash; at the very least, the trash in these two areas was generated by distinct groups. Other material and physical evidence suggests that Pithouse B was occupied by an extended group; ceramics conform both to other lines of evidence and to Turner and Lofgren's expectations concerning ceramic patterns and group/service relationships. Nevertheless, any possible hiatus occurred within the typological lifespan of Red Mesa Black-on-white, which makes any implied shifts in social organization at the site as deduced from ceramic patterns in these two proveniences all the more striking.

Other distributional observations are less informative but do follow similar findings at other sites. House 1 rooms with bell-shaped storage pits (Rooms 1 and 2) contain mostly bowl sherds. The association of whiteware with the deeper room in sets of paired small rooms has been noted in other sites in Chaco. At 1360 the coincident occurrence of large whiteware bowls and large grayware jars in Room 2 suggests that this room may have served as a special bulk-storage area. The semi-subterranean architecture of Room 2 supports the suggested storage function; goods stored below ground may have been protected from the extremes of surface temperatures. Rooms 6, 7, and 11 are marked by ceramic counts of less than 50 percent culinary, which contrasts with other rooms and plaza areas where culinary is significantly more abundant (Fisher's Exact Test, significant at 0.025; Siegel 1956:99, 256-270). This, coupled with the presence of oversized culinary jars in Rooms 7 and 11, suggests that some special task beyond the usual "cooking" associated with daily consumption was performed in these rooms; parching, drying, or smoking of cultigens and/or wild plant foods are possible examples of such activities. The firepits of these two rooms also contained burned cobs and kernels of maize, which contrasts with other firepits at the site where the recognizable charcoal (when noted) comprised only "wood" and "brush." The firepit in Room 6 is different in size and location from those in Rooms 7 and 11, and it was covered with a later floor, which suggests that the room's primary use had changed. In contrast to the surface rooms, Pithouse B, whose domestic function is quite clear, contained 56 percent culinary ware.

Pithouse B

Pithouse B presents an unusual case of an intact Chacoan household assemblage (assuming that the Pithouse B household did not use surface storage structures as well); this permits the detailed examination of distributional and compositional aspects of a coherent functional unit of ceramics. The diversity and distribution of forms, sources, and design styles are all of particular interest as they relate to ceramic use, consumption, acquisition, and production.

At other sites, household vessel assemblages and rates of use are a matter of reconstruction and considerable qualification. Pithouse B provides one relatively intact household ceramic assemblage, composed of 24 vessels--14 whiteware and 10 culinary (Figures 3.4 and 3.5). Use of large bowl fragments for scoops, trays, or other purposes brings to 32 the number of ceramic tools and containers present.

Distribution of partial and whole vessels in Pithouse B suggests careful organization of household space. The bench and the area behind the wing walls (36 percent of the floor space) housed 75 percent of the ceramics. This apparently left the central activity area in the main chamber free of vessels not in immediate use. The bench was used as a short-term storage shelf for pottery in use as incidental or daily household tools and for small culinary pitchers. Pottery behind the wing walls probably served as bulk storage and consisted of large-volume culinary jars, whiteware ollas, jars, and pitchers. The main chamber exhibited a mix of pottery, with whiteware predominating; a single large-volume culinary jar was present in this area (Figure 3.5[2]). Two early Gallup Black-on-white pitchers were located on either side of the firepit (Figure 3.4[5 and 6]). Large Escavada and Naschitti Black-on-white ollas (Figure 3.4[1 and 2]) and three Red Mesa pots, including a smaller olla and a possible companion bowl (Figure 3.4[3 and 9]), were also present.

The pairings of open and closed decorated forms--two water ollas, two pitchers, two bowls--further suggest that an extended group was occupying Pithouse B. Culinary vessels also are roughly paired by form (two small pitchers, two large pitchers, three mid-sized and three large jars [Figure 3.5]). The abundance and diversity of vessels and wares alone would seem to be greater than what would be necessary to support a single residence group of four to six members.

Although it was not possible to examine every vessel for temper, preferences and differences are clear in some cases. Culinary items are mainly from the Chuska Valley; six of 10 vessels were trachyte tempered. All corrugated wares, probably the more recent acquisitions, were from the Chuskan source. Neck-decorated culinary are all of sandstone temper and may represent older vessels not sufficiently worn out for discard. Sources of decorated vessels are more diverse when all ceramic items are considered, but if the pottery is segregated into containers and tools it is clear that the trachyte/undifferentiated-sandstone dichotomy between late and early ceramics is maintained; vessels that still functioned primarily as containers are largely trachyte-tempered. The majority of the chalcedonic-tempered decorated items occurred as tools (Figure 3.6) or as containers for nonfood items. Such "vessels" bear evidence of extensive damage that would have reduced their utility as service wares but left them suitable for storage of easily mislaid or fragile small-item dry goods, such as bone tools (Figure 3.4[7 and 12]). Of the vessels in Figure 3.4, all those with checkerboard motifs were tempered with undifferentiated sandstone (Figure 3.4[1, 3, 9, 10, 13]). One pitcher (Figure 3.4[5]) and an olla (Figure 3.4[2]) are Chuskan mineral-on-white, and a miniature bowl (Figure 3.4[14]) is tempered with San Juan igneous material. These forms and sources conform to data on import and vessel form as suggested by the detailed analysis of all site ceramics.

The Pithouse B container assemblage permits an examination of emergent early eleventh century decorative patterns as suggested in other studies, and it also givès an idea of the reduced variation in design in terms of motif components and design styles at the household level. The heavy use of checkerboards, thick scalloped triangles, straight-line hatchure motifs, and completely corrugated pottery at the time of abandonment contrasts with the earlier vessels represented in the noncontainer category. Scrolls and paneled banded designs featuring extensive use of parallel lines and precisely ticked elements appear on these earlier service wares. The reduction in design variation discussed in the type descriptions is apparent when the earlier vessels in Figure 3.4(7 and 11) are compared with the later vessels in Figure 3.4(e.g., 3, 9, 10, and 13).

The combination of whiteware forms of all types constitutes an assemblage more diverse and evenly represented than that identified for any single whiteware type (n = 24, s = 8, H' = 1.932, J = 0.929). Grayware can be seen to serve storage and cooking functions, with a total estimated volume of over 90,000 cc devoted to such purposes in Pithouse B alone. Household activities served by whitewares can be suggested, based on the vessel forms shown in Figure 3.4. Implied activities include long-term water storage (vessels 3.4[1 and 3], water transport (vessels 3.4[2 and 4]), serving (vessels 3.4[8 and 9]), personal drinking (vessels 3.4[5 and 6]), material transfer (ladles; Figure 3.4[10]), recycling of vessels for dry-goods storage (vessels 3.4[7 and 12]), and ceremonial functions (vessels 3.4[13 and 14]). The ground half of a bilobate enclosed bowl and the miniature bowl (Figure 3.4[13 and 14]) suggest special use by their unusual form and size. Small bowls similar to the vessel in Figure 3.4(14) are discussed as "prayer meal" bowls in historical contexts; some similar vessels may have seen special daily use in Chaco. In addition, it appears to have been customary to include miniature vessels with burials (F.H. Ellis, personal communication). The lack of oversized whiteware bowls and the absence of smudged and redware ceramics in Pithouse B suggest that this assemblage does not include items used for specialized crafts, ritual, or other special activities.

Ceramic Consumption and Production

Ceramic Consumption Rates

A straight calculation using the analysis sample suggests that 16.7 pots were discarded per year at 1360, assuming that the site was in use for 125 years as suggested by the ceramic chronology. If three households were continuously in residence and ceramics were consumed at a constant rate, this translates to a consumption of 5.6 vessels per year per household.

The 2088 items in the detailed analysis do not represent all vessels at 1360, however, because not all of the site was dug. Portions of the trash mound, House 2, Kiva A, and the entire pit structures associated with Vents X and Y were not excavated. If the ceramic contents of the two unexcavated pit structures fall somewhere between those of Kiva A and Pithouse B, numbers of vessels may be projected, using the following excavation percentages:

	Vessels Recovered	Percent Excavated	Vessels Projected
Rooms	123	100	123
Pithouse B	266	100	266
Plazas	256	100	256
House 2	11	50	22
Kiva A	1109	90	1232
Trash Mound	213	10	2130
Surface	103	100	103

Pit Structure C	9	10	700*
Vent X house	0	0	700*
Vent Y house	0	0	700*
Total	2088		6232

* Averaging the projected numbers of vessels from Pithouse B and Kiva A ($\bar{x}$ = 749) and rounding to the nearest hundred

With a 125-year site life, the projection indicates a rate of 50 discarded vessels per year. Given the assumed three households, this comes to 16.6 pots per household.

The ceramics in Pithouse B provide a basis for discussing rates of use. The synchronic assemblage from the pithouse contains 24 vessels, implying a replacement rate range of 23 percent (consumption rate from sample) to 69 percent (consumption rate calculated from projected vessels), calculated as annual discard divided by household assemblage.

The deposits in Kiva A contained over half of the vessels in the final analysis as well as a substantial unit of trash deposition at the site. The rate of trash deposition in Kiva A appears to have been very rapid, inasmuch as sherd matching repeatedly found vessels spread throughout the vertical levels, while field notes and stratigraphic photographs do not suggest extensive displacement by rodents. The projected number of vessels in Kiva A would require 24.7 years of deposition by three households at the projected vessel calculation rate of 16.6 vessels per year, or 74.2 turnovers in vessel assemblage by a single household. Annual discard rates were apparently substantial, but an exact limit on annual breakage, discard, and replacement cannot be set. The replacement rate of nearly 70 percent implied by the projected vessel calculation is very high; Upham (1980:257-258) cites ethnographic rates of 15 to 16 percent annual replacement in household assemblages containing numbers of vessels similar to that in Pithouse B. Ceramic replacement in the lower end of the projected range would suggest that a longer period of deposition is represented by the trash in Kiva A. Typological changes apparent in the Kiva A ceramics also imply a span of deposition longer than 25 years. If the disposal rates are accurate, it would appear that Kiva A was subject to intermittent filling and/or that more than three households were present at the site.

Ultimately these figures suggest that the rate of ceramic consumption at 1360 was relatively high. The vessel assemblage in use at abandonment (Figures 3.4 and 3.5) was apparently acquired during a period of stylistic transition, with roughly half of the vessels consisting of new types (Escavada, early Gallup Black-on-white, and Blue Shale Corrugated). Although the actual replacement rate is not known, a gradual, possibly steady turnover rate is probable. That the replacement was gradual is suggested by the whiteware assemblage, where those items recycled as scoops (Figure 3.6) are all Red Mesa and are equal in number to the in-use bowls. The stylistic change is gradual within this group, with at least one considerably earlier style (Figure 3.6[8]) and another of contemporary vintage (compare Figure 3.6[4] with Figure 3.4[8]). When compared with the lower breakage rates projected for 629 and 627 (respectively 11.3 and 10.9 vessels per household-year), the volume of ceramic consumption at 1360 suggests that means other than continual import or gifts sustained pottery levels at 1360--specifically on-site production.

Arguments for On-Site Production

Contradictory ideas have been put forth concerning pottery production at Chaco. Traditionally, ubiquitous autonomous site production was assumed to be the mode of pottery manufacture among the Anasazi (as discussed by S. Plog [1980b]), but strong statements have been made to the effect that pottery production was virtually nonexistent in Chaco Canyon (Warren 1976, 1977a). In all likelihood neither of these extreme positions reflects the reality of production at Chaco, but hard evidence for ceramic manufacture at Chacoan sites is rare, especially after about AD 700. Pragmatic aspects of ceramic consumption and the ready availability of ceramic materials and skills argue against complete canyon-wide ceramic autonomy or complete dependence on nonlocal sources.

It could be assumed that a site at which ceramics were produced would exhibit larger and more diverse household pottery inventories and perhaps a higher rate of careless breakage, given the abundance and easy availability of replacement pots (Foster 1960). Few Southwestern archaeological reports (and none concerning Chaco) claim evidence of ceramic firing, and those reports that do make such claims rarely satisfy expectations of ceramic researchers in terms of kiln form and associated waste items (Rye 1981:110-111). Consequently, on-site pottery making is inferred in most cases from the presence of production tools, from an unusual diversity of forms, and from relatively lower variability in the pottery; aspects of all of these can be seen at 1360.

DeAtley (1979) proposes two criteria for recognizing part-time pottery specialization in archaeological contexts: stylistically uniform pottery and presence of tools of manufacture. The following list compares expected pottery-production equipment with the artifact assemblage from Pithouse B at 1360:

Expected Materials	Pithouse B Materials
mortars, pestles	pestle-form abraders
manos, metates	both present
kneading slabs	passive "lapidary" abraders (?)
puki (base mold)	not evident; possibly a basket
scrapers	sherd scrapers (Figures 3.7, 3.9)
smoothers	sandstone abraders
polishers	quartzite polishers
paint brushes	absent or not preserved
pigments, grinders	both present
stored raw clay	raw clay present but not stored

Since these items are all multifunctional, there is no evidence of a curated, full-time specialist's tool kit from this structure. Given the multifunctional aspects of a potter's tool kit and the possible emphasis on different crafts at different seasons, it may be that a pottery-making kit is present, but not recognizable as such. During the off-season, for example, polishers may have been used as hammers, raw materials would not have been stored, grinders could have been used to grind other materials. Most accounts describe summer as the pottery-making season because fuel is more easily spared, dry ground conditions promote firing success, there is no scheduling conflict with critical gathering and harvest times, and pottery dries in a satisfactory period (Arnold 1976). Elsewhere in this site report it is argued that the final occupation of Pithouse B was during the winter, which may account for the low visibility of some components of a pottery-making assemblage. This implication of seasonality in pottery production means that, even if specialization was present at 1360, it was used to augment, not to replace, basic subsistence activities. Given the presence of other unexcavated pit structures, the extent of pottery production across households is unknown even within the site.

Acquisition of pottery in several ways from several sources will obscure the stylistic uniformity of a pottery assemblage; thus the rather substantial exchange component at 1360 crosscuts various styles, making confident identification of on-site manufactured items difficult; still, there are consistent design-composition groups that may have been produced at 1360. As noted, there is a tendency toward stylistic routinization, as evidenced by the appearance of checkerboard and banded hatchure designs on several whole vessels in Pithouse B; multiple appearances of the same stylistic elements are also evident in the bowls (Figure 3.4[8]) and scoop/scrapers (Figure 3.6[4-6]). As the preceding section noted, there is less variation in paste groups and in attribute-group composition at 1360 than at other Chaco Project sites, although pastes of many of the whole pots were not examined. These factors, together with the relatively high rate of breakage and the large household inventory apparent in Pithouse B, suggest that 1360 may have been a producer site, although particular pots cannot be satisfactorily identified as having been produced at the site. Based on the present studies, however, the local product might be whitewares with a gray paste and a temper consisting of white or black and white sherds with lesser amounts of fine-to-medium-grained, undifferentiated sandstone and black shale plates. Surface finishing, other than design, would probably consist of a relatively thin, white, slip-slop application of kaolin, well-polished where slipped, but not achieving a uniformly high luster. Paint color would most often be a matte black. Assuming that imported pots came from a wide variety of sources, then selected metrics for the local products should display grouped, lower standard deviations than those for foreign products.

That potters were emerging as a special group of craft producers seems likely for several logical reasons involving inequality of personal skill, learning processes, local pottery resources, and unequal access to and/or insufficient quantity and quality of subsistence resources (Arnold 1980; DeAtley 1979). Archaeologically, ceramic specialization is evident from the increasing areal associations for certain pottery wares, forms, paints, and surface finishes. In addition, there is a general decrease in overall variation through typological time along with a decreasing frequency of identified ceramic tool kits. Given a combination of certain commodities (here ceramics) that saw relatively high consumption, an environment that was marginal and unpredictable, and a relatively dense population (Judge 1979; Schelberg 1982a), Chaco would have been a prime candidate for the development of multiple buffering mechanisms--among them craft production and exchange networks.

The operation of an extensive regional exchange system without complex and intensive local exchange seems highly improbable. Local ceramic producers could have provided one source of cohesion in a community of small sites by assuring that a ready supply of the most used or consumed ceramics was available without the stress and expense of import. At face value this statement would seem to contradict the fuel-shortage argument (H. Toll 1981:93; Warren 1976:55), which reasons that the shortage of wood for fuel precluded extensive pottery production in the central basin, particularly Chaco Canyon. Fuel shortages probably did adversely affect potters in terms of the number of firing opportunities. But such periodic shortages cannot be held to have been completely prohibitive, as brush or dried corn-plant parts were locally available, and juniper and pinyon were undoubtedly available on Chacra Mesa. Then, too, the canyon inhabitants were moving vast quantities of timber (up to 200,000 trees for Great House construction alone [Dean and Warren 1983:202-205]); the gathering and transport of a relatively small quantity of wood for firing ceramics is an unimportant problem in comparison. Still, increases in the quantity of ceramic imports in Chaco Canyon <u>do</u> correlate with expected depletions in local fuel wood.

Local ceramics from limited producers, when exchanged between or distributed among community sites, would not only serve as a means of community bonding but would assure the necessary freedom of some groups to pursue a variety of other activities. Although this would not negate the possibility of ceramic production at other sites, such as 627 or 629, 1360 appears to be the most likely instance of such activity. It is possible that a larger, more stable community unit was achieved and maintained partially through the diversification of subsistence-oriented craft activities among small sites of a segmented community.

As is discussed in the next section, it is possible to argue for levels of import to 1360 in excess of 85 percent for graywares and 30 percent for whitewares in all time periods (Table 3.23, below). These estimated figures for import at 1360 run even higher than those for 627 and 629. Once again, difference in temper identification may be in part responsible; some of the higher import levels seen in the 920-1040 whitewares are attributable to the larger quantities of San Juan and chalcedonic sandstone tempers recorded for 1360. Nevertheless, even with the levels of those tempers set equal to those for 627 and 629, 1360 is still slightly higher than the other two sites in conservative import estimate (Table 3.22, below).

This apparent high level of import provides an important perspective on this site, for which there is more evidence for ceramic production than at any other post-Pueblo I Chaco Project site. Three factors may account for this apparent incongruity: a) potters may have had more direct access to the subset of the exchange system dealing with pots, thereby facilitating ceramic acquisition; b) production of a limited number of wares and forms would have left potters as much in need of other forms and wares as were as other ceramic consumers; and c) chronic or periodic fuel-wood shortages could have limited production to some degree, necessitating replacement with nonlocal vessels. This putative production site seems to have participated in ceramic import to at least the same degree as the other sites, which suggests that production at the site was probably limited and that participation in the system was probably important for social reasons as well as being due to the need to acquire pots.

LEVELS OF IMPORT

Tables 3.22 and 3.23 summarize ceramic import through time at 1360. Items are placed in time segments in these tables by means of both type and provenience. A few types (such as neck corrugated) have been assigned dates that conform to the major periods shown in Table 3.24; such sherds are placed directly by type. More commonly, types are dated to more than one time segment (e.g., narrow neckbanded or the Red Mesa types) but are more likely to fall into a specific time group. These items are placed according to provenience date if they were recovered from a provenience whose date corresponds with part of the type's date range. If the items were recovered from some other context, they are given a probable time span. Finally, broader categories of ceramics (such as decorated redware or exotic mineral-on-white) have very long time spans; these items are placed strictly by dated provenience as long as the provenience date falls within the pottery's empirical time span and the provenience assignment is not more than 120 years. Table 3.24 shows the ranges of dates (derived from the Chaco Project time-space matrix) assigned to sherds from 1360 in the generation of Tables 3.22 and 3.23 (the system is discussed in more detail in H. Toll [n.d.]). Some ceramics from broad types and all sherds whose temper could not be identified were not included in the import analysis; Table 3.22 accounts for 93 percent of the 1660 sherds identified in the temper analysis (73.9 percent of the detailed analysis).

This procedure is designed to maximize the number of sherds in the analysis, but it does have some problems. One of these problems is the result of the nature of the site. Nearly all of the ceramics are quite correctly attributed to the period AD 920-1040, but this obscures some intrasite temporal change. The time periods preceding 920 have probably been somewhat elongated in the analysis because of difficulties in assigning narrow time spans to proveniences. All early types need to be placed in early default time groups.

Table 3.22. Summary of identifiable ceramic imports through time at 29SJ1360 calculated using types weighted by time segments, and time segment assignments.

Time/Type[a]	Grayware n	Grayware % of import	Whiteware n	Whiteware % of import	Redware n	Redware % of import	Smudged n	Smudged % of import	Overall n	Overall % of import
Pre-800/										
Trachyte	3	4.3	13	10.9	1	–	–	–	17	8.8
San Juan	–	–	9	7.6	1	–	–	–	10	5.2
Chalcedonic sandstone	2	2.9	10	8.4	–	–	–	–	12	6.2
Typological	–	–	2	1.7	–	–	–	–	2	1.0
Total import	5	7.1	36	30.3	2	100.0	–	–	41	21.1
Total n	70		119		2		3[b]		194	
Ware % of import		12.2		87.8		4.9				
Ware % of total		36.1		61.3		1.0		1.5		
800-920/										
Trachyte	5	7.2	3	3.4	–	–	–	–	8	5.0
San Juan	–	–	5	5.7	1	–	–	–	6	3.8
Chalcedonic sandstone	21	30.4	18	20.5	–	–	–	–	39	24.5
Typological	–	–	1	1.1	–	–	1	–	2	1.3
Total import	26	37.7	27	30.7	1	100.0	1	100.0	55	34.6
Total n	69		88		1		1		159	
Ware % of import		47.3		49.1		1.8		1.8		
Ware % of total		43.4		55.3		0.6		0.6		
920-1040/										
Trachyte	52	22.2	61	6.8	–	–	–	–	113	9.8
San Juan	3	1.3	58	6.5	10	90.9	–	–	71	6.1
Chalcedonic sandstone	38	16.2	147	16.4	–	–	1	7.7	186	16.1
Typological	–	–	12	1.3	1	9.1	12	92.3	25	2.2
Total import	93	39.7	288	32.1	11	100.0	13	100.0	405	35.4
Total n	234		897		11		13		1155	
Ware % of import		23.0		71.1		2.7		3.2		
Ware % of total		20.3		77.7		1.0		1.1		

(continued)

Table 3.22. (continued)

Time/Type[a]	Grayware n	Grayware % of import	Whiteware n	Whiteware % of import	Redware n	Redware % of import	Smudged n	Smudged % of import	Overall n	Overall % of import
1040-1200/										
Trachyte	5	–	6	22.2	–	–	–	–	11	31.4
San Juan	–	–	3	11.1	–	–	–	–	3	8.6
Chalcedonic sandstone	–	–	1	3.7	–	–	–	–	1	2.9
Total import	5	–	10	37.0	–	–	–	–	15	42.9
Total n	8		27		–		–		35	
Ware % of import		33.3		66.7						
Ware % of total		22.9		77.1						

Unplaced exotics: 6 redware, 3 polished smudged, 10 exotic mineral, 5 Chuska Whiteware

[a] See Table 3.24 for Type/Time assignment sources

[b] Lino Smudged tempered with coarse sandstone is not considered imported on a typological basis

Table 3.23. Grain size of unidentified sandstone throuah time for 29SJ1360, and maximum identifiable import totals from Table 3.22, assuming coarse sandstone is not local, and not including "typological imports."*

TIME/ Sandstone grain size	Grayware n	Grayware %	Whiteware n	Whiteware %	Smudged n	Smudged %	Total Time n	Overall Maximum Percent
pre-800/								
Fine			13	15.9			13	
Medium	5	8.5	27	32.9			32	
Coarse	25	42.4	26	31.7	1		52	
Very Coarse	29	49.1	16	19.5	2		47	
Total	59		82		3		145	
Total C+VC	54		42		3		97	
Maximum import	59	84.3	78	65.3	3		140	
Total n	70		119		3		194	72.2
800-920/								
Fine			18	35.3			18	
Medium	4	9.3	25	49.0			29	
Coarse	15	34.9	8	15.7			23	
Very Coarse	24	55.8					24	
Total	43		51				94	
Total C+VC	39		8				47	
Maximum import	65	94.2	35	39.8			102	
Total n	69		88				159	64.2
920-1040/								
Fine			204	35.5			204	
Medium	19	14.0	322	56.1			341	
Coarse	65	47.8	46	8.0			111	
Very Coarse	52	38.2	2	.4			54	
Total	136		574					
Total C+VC	113		48				161	
Maximum import	206	88.0	336	37.5			566	
Total n	234		897				1155	49.0

9 Sandstone with iron oxide considered local regardless of grain size; unidentified igneous and more sandstone than trachyte are not included in either table except totals

* See Table 3.24 for type/time assignment sources

Table 3.24. Type time assignments used in placing items in Tables 3.22-3.23; only abundant (≥10) types shown

Type	Breternitz (1966, 1974)	Chaco Project	Allowed Span	Default Span
Plain Gray		550-1050	pre-800-1040	none
All Lino Gray	575-875	550-850	pre-800-920	pre-800
BMIII-PI decorated		550-900	pre-800-920	pre-800
Wide neckbanded	775-900	775-900	pre-800-920	800-920
	(Moccasin Gray)			
Early Red Mesa	825-910	875-950	800-1040	920-1040
	(Kiatuthlanna)			
Narrow neckbanded	900-1050	900-1025	800-1040	920-1040
	(Tohatchi)			
Neck corrugated	890-1075	975-1050	920-1040	920-1040
	(Exuberant Corrugated)			
Red Mesa	850-1125	875-1050	800-1040	920-1040
Chuska Red Mesa design		920-1040	920-1040	920-1040
PII corrugated	900-1200	1000-1125	920-1200	1040-1100
Puerco B/w	1010-1125	1030-1200	920-1200	1040-1100
Gallup	1000-1125	1030-1200	920-1200	1040-1100
Chuska whiteware		800-1200+	800-1200+	none
Exotic mineral/w			pre-800-1200+	none
Unidentified whiteware			pre-800-1200+	none
Redwares			pre-800-1200+	none
Polished Smudged			pre-800-1200+	none

Vessels are considered imported if their temper is one of the three listed on Table 3.22--trachyte, chalcedonic sandstone, or San Juan igneous--or if they can be identified as nonlocal on the basis of surface characteristics (such as the San Juan whitewares). If an item is both typologically exotic and has an exotic temper, it is listed in the table under the temper; otherwise it is shown in the typological row. Sherds containing sandstone with rounded iron oxide, more sandstone than trachyte, and unidentified igneous temper are all considered local in these tables.

Entries on Table 3.22 show

1) Percent of Import--the percent of identifiable imports within the total number of a given ware in a particular time group.

2) Total Import--again the percent of the total number for each ware in a time group that is identified as imported.

3) Ware Percent of Import--the number of imported wares is divided by the total number of imports.

4) Ware Percent of Total--the total number of each ware is divided by the total number of the time period. This is useful for comparison with the ware percent of imports as an informal expected value.

The conservative import estimates generated for 1360 in this manner show a steady increase in percentage through time. This is different from 627 and 629, which have import estimates in the same range as 1360 in the earliest time period but show some subsequent decrease. Other differences at 1360 can also be noted. At the other two sites, San Juan igneous-tempered whitewares decrease to very small relative frequencies after the early time periods, whereas at 1360 they remain above 5 percent. Chalcedonic-sandstone-tempered materials reach much higher levels in the 1360 whiteware counts and attain higher frequencies in graywares. As noted, this temper type does peak and decline, but its 16.4 percent share of the whiteware in the 920-1040 time segment contributes very substantially to the relatively high 1360 estimate for all imports for that period. Chuska Valley imports are quite similar at all three sites, showing a steady increase among graywares, while whitewares occur in variable quantities. Dividing the sample by provenience and considering House 1 to be post-1000 and Kiva A to be 920-1000, there is a noticeable increase of San Juan igneous temper in House 1 (6.7 percent of the whiteware as opposed to 1.0 percent in Kiva A). The distribution of San Juan material concentrates too well in House 1 to be laid to the vagaries of analysis; misidentifications should be randomly spread throughout the site and certainly should be best represented in the Kiva A sherds, which constitute more than half the sample. Perhaps this isolated occurrence, which contravenes other sites' trends in the occurrence of San Juan igneous, is an example of specific segments of the Chaco population having ties with other regions not generally shared by other population segments in the canyon. Redwares and polished smudged wares occur as less than 3 percent of each time segment for all three sites, with San Juan as the major redware. The very small group of late sherds shows a dramatic jump in trachyte occurrence.

Sourcing the most abundant temper class--sandstones--is very important and even more difficult. Based on the absence of coarse-grained sandstone in central Chaco Canyon, Warren (1976:186, 1977a:56) assumed that all pottery tempered with this material was foreign to Chaco. Since grayware is predominantly coarse-tempered regardless of time, only fine-grained mineral-painted pottery was potentially produced in Chaco according to Warren's assumption. In fact, both coarse- and fine-grained sandstones are available within an ethnologically defined catchment area (Arnold 1980) for Chaco. Obviously this necessitates a re-evaluation of Warren's identification of imports based on sandstone grain sizes. Nevertheless, the occurrence of coarse-grained sandstone temper can be used to obtain a range of ceramic import percentages, even though the resulting estimates have many limitations. Some of the coarse sandstone temper may well occur in ceramics made in the canyon and, even more likely, some of the fine-grained-sandstone-tempered pottery was probably made elsewhere. But incorporation of grain-size information does provide some suggestion of the upper range for import figures.

The "maximum" rows on Table 3.23 combine the coarse-grained tempers with the conservative estimates from Table 3.22. Although the figures do not show as great a fall-off in estimated level of import as that found at 627, a reduction is evident. The high of 72 percent import in the pre-800 segment drops to 49 percent in the 920-1040 group. The conservative figures, as well as those in Table 3.23, reflect a jump in the occurrence of exotic goods in House 1 during the short period of time immediately after AD 1000; this increase fails to affect the combined figure (920-1040) noticeably because of the size of the Kiva A sample. At no point is there a level of import comparable with Warren's (1976:83-86) 80 to 90 percent figure for all periods of Chaco's occupation.

Inasmuch as pre-920 pottery tends to be coarse-grained anyway, the decline on Table 3.23 would seem to be less a matter of levels of import than of developments in ceramic technology. Grain size in pre-920 whiteware at 1360 is not as coarse as at other sites, which suggests that the majority of this pottery is closer to 920 than 700 (although vagaries in the recording process may be involved as well). This whiteware grain-size difference is a reason for 1360's less striking decline in maximum import levels between the pre-920 and post-920 groups. The similarity of import levels between the confidently identifiable pre-920 and post-920 import groups at 1360 and at other sites suggests that no marked decrease in import took place at 920.

In sum, a minimal increase of about 15 percent can be seen in the import level through time from a low of about 21 percent to a high of about 35 percent. The post-1040 group seen in Table 3.22 consists completely of typologically placed sherds; both its size and suggested date make it irrelevant to 1360. This minimum of import compares well with figures from 629 and 627 and exceeds the figures from the end of the occupation at 629. This is of some interest, as 1360 and 629 are very close in terms of site size, length of occupation, and ceramic assemblage; it suggests that differences in levels of ceramic import are due to site function rather than to length of occupation or some metaphysical urge to import. No two small sites in this small sample are exactly alike, but all are similar.

The relative levels of import and shifts in primary source have been found to be similar from period to period at all sites. That is, it has been shown that imports tend to follow a temporal pattern of early importing of San Juan igneous, followed by chalcedonic sandstones and trachyte, and then, with Mesa Verde Black-on-white, San Juan igneous again (Toll et al. 1980; H. Toll 1983). It is equally apparent, however, especially from this Pueblo II sample, that these trends are not the same from ware to ware and site to site. The imports at 1360 are more diverse and evenly represented in the last period than those from either 629 or 627, but the 1360 assemblage resembles 629 in its general favoring of chalcedonic-sandstone-tempered pottery and 627 in a final emphasis on trachyte culinary ware.

Although different general ceramic resource areas appear to have been favored during different periods, the slight variations in imports from site to site suggest that several avenues of acquisition and distribution were open to the residents of the various sites. It is possible that unequal "pulses" of import ceramics arrived at Chaco from surrounding source areas, with the frequency and intensity of these pulses creating the serial order of import preference mentioned above. It is tempting to correlate import pulses with unfavorable periods of precipitation in different postulated ceramic localities, given that ceramics may act as markers for exchange events, but such an approach is undoubtedly too simplistic. Furthermore, the refined areal precipitation data necessary for verifying this suggested correlation are simply not available. Certainly, other factors were involved in forming these pulses--real or fictive kin ties, regulated trade, the presence or absence of ceramic production at a particular site. The termination of a site's occupation during or at the end of one of these hypothetical pulses may give portions of a site an unusual import configuration in comparison with a normal pattern of imports as defined by multiple, long-term collections. Then, too, differences in modes of acquisition may have affected the proportions and distribution of import ceramics at particular sites. But the level and similarity of imported material speak strongly for the mutual participation by different small sites in a broader economic system rather than for autonomy or self-sufficiency in production or exchange.

SUMMARY AND DISCUSSION

This final section of the ceramics discussion will first review some of the more salient aspects of the 1360 ceramic assemblage, then compare the 1360 ceramics with assemblages from other Pueblo II sites excavated by the Chaco Project. Finally, there will be a discussion of the results of the 1360 ceramic analysis in relation to Judge's (1979) model of the Chaco system.

The 1360 Assemblage

The Sample

The sample was chosen on the basis of unique rim sherds and was geared toward extensive rather than intensive analysis. The sample was chosen so as to be representative of the 1360 ceramics in terms of vessels, ware proportions, and relative distribution. One of the striking aspects of the 1360 sample is its exceptionally unfragmented condition; an unusual number of specimens are very large sherds and there are many whole and restorable vessels. Table 3.2 reveals that the sample has whiteware, grayware, and smudged and redwares in the expected proportions for sites of this period. Given these types and their portions, with Red Mesa Black-on-white and a narrow neckbanded (like Tohatchi Neckbanded) as the predominant types, 1360 would date by ceramic chronology to ca. AD 950-1030. The two dominant types account for over 40 percent of the detailed sample and are primarily represented by bowls and jars (Table 3.3).

Types have been used here as preliminary subdivisions during the analytical description. These types lump ceramics of similar surface treatment and age, and they provide broad groups for examining temporal change and intratype variation and for making typological and/or intersite comparisons. The majority of the description and analysis has been focused on the Red Mesa and narrow neckbanded types in order to provide the broadest possible comparative base. Types attributed to earlier and later periods are considerably less frequent than Red Mesa. Those types dating before AD 925 are the second most abundant, which argues for a long, if not continuous, use of the 1360 location, a pattern relatively common in Chaco at this time (Hayes 1981). Ceramics dating ca. AD 1030 are present in traces that would usually be ignored were it not for their concentrated occurrence as whole pots in Pithouse B. Later varieties of the same pottery occur only as surface scatter. Thus the ceramics from the least extensive use of 1360 achieve the highest visibility by virtue of their condition, but they represent what is apparently only the very end of a lengthy "Red Mesa" occupation.

Variety in Types

The use of geologic tempering materials at 1360 follows the patterns found at the other contemporaneous sites: undifferentiated sandstone is most abundant, chalcedonic sandstone and trachyte occur in substantial quantity, and iron-bearing sandstone and San Juan and unidentified igneous materials are present in smaller amounts (Table 3.4). Chalcedonic sandstone occurs in similar proportions in culinary and service wares, while samples from other sites display greater association of chalcedonic sandstone with grayware. Two varieties of chalcedonic material are identified at 1360--pink and white, with pink tending to occur more often in culinary ware than in service ware. Trachyte tempering increases through time but associates most often with culinary ceramics and least of all with mineral-painted service wares. Iron-bearing sandstones occur most often in early ceramics. San Juan and other unidentified igneous materials occur in greater relative frequencies than at other sites, but still represent a minor tempering material associated primarily with mineral-on-white and most redwares. The presence of all exotic geological tempers increases through time.

Variation within types can be seen to decrease through time. Within the most abundant whitewares (Basketmaker III mineral-on-white, Early Red Mesa, and Red Mesa black-on-white), diversity of surface treatments, as measured by slip, polish, and paint color, declines through time. More effort seems to be devoted to finishing pottery at the end of this sequence, as the amount of slip and polish applied increases, and these become almost standard features. An examination of intratype variation also reveals a decline in variability, since the modal group of similar paint and temper becomes larger through time. The modal group accounts for 50 percent of Red Mesa pottery but only 33 percent of Basketmaker III-Pueblo I mineral-on-white ceramics at 1360. At 1360, only sandstone-tempered ceramics occur in sufficient numbers to merit further study. Differences in motif use among different sandstone groups are not clear, and motif association with source is not statistically significant. Percentage differences suggest patterns similar to samples from other sites, where hatchure and squiggled lines associate with chalcedonic sandstone sources. Temper diversity increases through time, and this, combined with the lack of source-associated motifs, suggests that an increasing number of sources were producing pottery but that the product was becoming increasingly standardized.

In several respects service and culinary ware patterns are quite different. Whiteware forms diversify while those of grayware become less variable; grayware sources are consistently more diverse and more equally represented; and whiteware and grayware pastes exhibit different textures due to variation in grain size and to selection of differing aplastics. The largest modal group of culinary materials occurs in the earliest type, wide neckbanded; the subsequent decline of group sizes may be another indicator of increasing diversity of culinary sources through time. No significant differences in technological attributes were found between the two largest groups of sandstone-tempered narrow neckbanded that cannot be explained by the requirements of constructing pots of different sizes; i.e., those differences do not seem to be due to differences in production group. There is some suggestion, then, that culinary production was even more routinized over a production area than service ware manufacture. Both ware categories exhibit significant increases in vessel size through time, with relatively more large culinary jars being produced. The similarity of these trends--source diversification, size similarity and increase, and standardization of surface treatment--to those of other Pueblo II sites in Chaco Canyon implies a regional basis for the pottery tradition represented at 1360.

Three temporal units have been segregated according to the Chaco Center's time-space matrix, but ceramic associations within those units are not altogether clear for reasons of mixing or faulty field cataloging; the lack of significant temporal separation is evident in the high values and clustering of association indices in Table 3.25. Typological distributions and attribute characteristics of the sample support the initial ordering of main site units by the raw count.

The Brainerd-Robinson matrix shown in Table 3.25 is not amenable to perfect ordering (see Marquardt 1978:265-271), but a reasonably good ordering is possible. Application of the Gelfand System II (Marquardt 1978:271) makes it apparent that these proveniences are, on the whole, quite similar in their content of these Cibola types, as would be expected at a site that was occupied primarily during the production span of Red Mesa. The trash mound is clearly the most distinctive deposit, having much lower agreement coefficients than most of the other proveniences. The three plaza groups all fall together, and Plaza Areas 1 and 3/4 are each close to the ideal monotonic ordering about the diagonal. The highest coefficients of agreement are among the plaza groups and Pithouse B, and between Kiva A and Room 3/10. This particular ordering of the matrix places Room 3/10, Kiva A, and the Pithouse B floor assemblage at the opposite end of the seriation from the trash mound, which is in accordance with other dating estimates. The sherds from Room 9 are the most variable in their agreement coefficients, and Room 9 causes the greatest anomalies in the matrix ordering. In the ordering shown, the squares of deviations from monotonic orderings are 18 percent of the total sum of the squares of differences (see Robinson 1951:300-301).

The trash mound is the location of greatest ceramic mixing and temporal depth, while the other main deposits are relatively pristine units in terms of ceramic assemblage and time. Based on the sample and raw counts, a continuum of typological time can be seen extending (from earliest to latest) from the lower levels of the trash mound, to the trash fill of Kiva A, to the structures of House 1. Evidence in House 1 suggests that catastrophic abandonment took place with many ceramics remaining in primary context. Study of ceramics as associated with main provenience units reveals patterned distributions of both wares and vessel sizes.

The sample may be separated into three fairly distinct units in terms of site growth and use, but the assemblage still falls mainly within a single unit of typological time. Types, forms, and other ceramic characteristics of the earlier and later ceramic units are too infrequent and, in the case of the more recent material, too conjectural to permit satisfactory tests of differences. Forms associated with earlier types, such as tecomates and Lino ollas, do cluster in the trash mound, however, while pitchers, a later form, are absent from those deposits. The remainder of the site is temporally too uniform for any meaningful separation of forms to be suggested, although service bowls and culinary jars in Kiva A were found to be relatively smaller than vessels from House 1, which suggests some temporal and functional displacement between deposits in these two proveniences.

Table 3.25. Brainerd-Robinson coefficients of agreement for Cibola Whiteware types from major proveniences, 29SJ1360; proveniences of high association have been lumped (Robinson 1951)

	Rooms 3-10	Kiva A	Pithouse B floor	Plaza 3/4	Plaza 5	Plaza 1	Room 2	Rooms 7-11	Room 9	Trash Mound
Rooms 3-10		191	167	163	153	176	170	128	119	135
Kiva A	191		176	170	163	161	164	144	170	127
Pithouse B floor	167	176		194	185	183	186	166	140	128
Plaza 3/4	163	170	194		193	188	170	170	144	130
Plaza 5	153	163	185	193		193	173	173	174	133
Plaza 1	176	161	183	188	193		177	167	142	131
Room 2	170	164	186	170	173	177		183	153	136
Rooms 7-11	128	144	166	170	173	167	183		174	143
Room 9	119	170	140	144	174	142	153	174		130
Trash Mound	135	127	128	130	133	131	136	143	130	

types used:
BMIII-PI M/w, Early Red Mesa, Red Mesa, Puerco-Escavada-Gallup lumped

Distribution of vessel sizes in House 1 correlates with presence of features. Large-capacity bowls and jars occur in site areas containing large or multiple features, such as Pithouse B, the extramural mealing area, and House 1, Rooms 7 and 11. Grayware usually constitutes the majority of bulk ceramic samples in Anasazi sites, but this was not the case at 1360. Proveniences containing a heavy proportion of whiteware include Kiva A, Pithouse B, and House 1, Rooms 7 and 11. In the pithouse and Rooms 7 and 11 the grayware vessels tended to be of exceptional size rather than being numerous. The rest of House 1 contained primarily grayware. On the basis of vessel size, some areas of House 1 seem to have been devoted to bulk processing, storage, and cooking. Judging from the ceramic distributions, however, these activities were not universally practiced throughout House 1 components.

Intersite Comparisons

Throughout this report there have been frequent comparisons of 1360 with sites 629 and 627; although the similarities among these three sites, especially in the early Pueblo II ceramics (i.e., Red Mesa and neck-decorated grayware), are marked, there appear to be some differences among the sites that are not related to temporal considerations. These differences and similarities merit summarization.

Technical studies show the unity of Red Mesa as distributed across sites. All three Red Mesa collections have the same major temper categories and conform to similar trends toward a higher percentage of black paint through time. Other similarities include paste composition and color as associated with main temper classes, the presence of less sherd grog in items containing more angular geologic temper, the association of certain grain sizes and temper types with vessel forms and source areas, and the relative sizes of the modal attribute groups. With certain qualifications, narrow neckbanded follows the same pattern.

Appendix 2, Table 17 compares selected attributes of Red Mesa ceramics from 1360 with those of Red Mesa ceramics from 627, 629, and Pueblo Alto and displays information on neck-decorated culinary from the three small sites. The Red Mesa sample from Pueblo Alto has been included to provide a sample not only from a town, but from a location somewhat removed (ca. 6.4 km northwest) from this cluster of small sites. Proximity of sites is usually taken to affect similarity coefficients positively, assuming that interaction is being measured and that distance directly affects interaction. Site 627 is roughly 150 m east of 629, and these two sites are about 1.75 km northwest of 1360. Based on distance alone, a high-to-low "normal" series of similarity coefficients would be expected to read as 627-629-1360-Alto, but deviations from this pattern could not be attributed solely to level of interaction, because at least some differences are a product of functional and temporal variability.

The occupations of these four sites quite surely overlapped in time, if fairly continuous use of each may be assumed. They are, however, also quite different in full span and in period of heaviest use.

Since types change through time, similarity coefficients will be affected by period of site use. This is especially true in a comparison involving long-lived types, since these necessarily lump early and late attributes. An ordering of heaviest periods of occupation from early to late would be 629-1360-627-Alto. The three small sites probably spanned the production of Red Mesa, with heavier use earlier at 629 and 1360 than at 627. Since the occupation of 627 lasted well past the end of the production of Red Mesa, the later phases of both Red Mesa and narrow neckbanded are probably better represented at that site than at 629 or 1360. The occupation at Alto began during the production of Red Mesa, but probably toward the end of the production period, ca. AD 1000. Red Mesa at Alto, then, is drawn almost exclusively from the last manifestations of this type.

The comparisons shown in Appendix 2, Table 17 entail a number of data modifications intended to standardize the information from all sites and to treat major categories of information rather than rarities. These modifications include

1) exclusion of unknown vessel forms and tempers
2) exclusion of unidentified igneous temper
3) combination of white and pink chalcedonic sandstone varieties (the two were not distinguished at 627)

The majority of the Brainerd-Robinson matrices include only sandstone-tempered bowl sherds with black and brown paint; as suggested above, bowls from these groups are perhaps the most likely to have been locally produced.

Summary of ceramic similarity and agreement indices comparing 1360 to other sites (see Appendix 2, Table 17)

	Similarity to 1360			
	Most		Least	High Pair
Jaccard's Coefficient (S_J)				
Red Mesa motifs occurring on >2% of inventory	629	627	Alto	629-1360
Red Mesa motifs	629	627	Alto	627-629
Vessel forms	627	629	Alto*	627-1360
Brainerd-Robinson Agreement Coefficient				
Red Mesa vessel forms	629	627	Alto	627-Alto
Attribute group membership	627	Alto	629	Alto-629
Texture, all sandstone-tempered Red Mesa	Alto	627	629	Alto-627/ 627-629
Red Mesa 10 most common motifs, black and brown groups combined	629	Alto	627	Alto-627/ 627-629/ 629-1360

Black group motifs	629	Alto	627	627-629
Brown group motifs	629		Alto/627	627-Alto
Black group texture	Alto	627	629	627-629
Brown group texture	627	629**	Alto**	627-629
Narrow neckbanded texture	629		627	629-1360
Narrow neckbanded surface	627		629	627-1360

* small vessel-form inventory (n = 7 at Alto, 10-13 at other sites)
** few texture categories (Alto has a small number in the brown group)

The Red Mesa comparisons summarized here from Appendix 2, Table 17 suggest that more often than not the ceramics at 1360 are more similar to 629 than to 627 and Alto, and that 627 is intermediate between Alto and 629. Since site-sample similarities are variable and since agreement coefficient values are often close, the overall conclusion from these comparisons is that the Red Mesa from all sites is remarkably similar. Nevertheless, there are slight differences within that overall similarity. In presence/absence of major motifs, Alto is least like 1360 and registers the lowest similarity in all site comparisons. The Alto sample is the smallest of the four and is from the most restricted temporal and spatial source (nearly all from the earliest component of the Alto trash mound). A lack of similarity is therefore expectable, but it is surprising that the Alto Red Mesa assemblage exhibits the highest diversity index for total motif inventory. The motif and temper diversities are the best indicators that Alto may have drawn from a wider variety of sources than the smaller sites, as would be predicted by social models holding towns to be central places of some sort.

The vessel-form assemblage comparison again shows Alto to be least similar to 1360, but here Alto and 627 are remarkably similar and 1360 and 629 form another slightly less close pair. The smaller sample from Alto seems to have led in part to fewer forms being represented, but the relative frequency distribution of common forms is very close to that of 627. Both 1360 and 629 have lower relative frequencies of bowls and more jars and ollas, giving 1360 and 629 higher vessel-form diversities. It is perhaps significant that perfect ordering of the vessel-form agreement coefficient matrix is possible, and that it is the same as the subjective temporal ordering of the sites. That the primary reason for that ordering is in jar frequencies (which are lower at 627 than at Alto) suggests that a complex combination of vessel function, time, and classification are a part of the site differences in vessel-form assemblage. This suggestion stems from the fact that closed forms are more frequent in later types, such as Puerco and Gallup Black-on-white, at the sites (Alto and 627) where the later types are present in quantity. In both motif and vessel-form presence (as measured by Jaccard's coefficient), the 1360 sherds share more attribute states with other sites than do sherds from any other site pairs. In spite of these overlaps in occurrence, 1360 appears relatively infrequently in the high Brainerd-Robinson coefficient pairs; these high pairs are dominated by 629 and 627.

Comparisons of the brown- and black-painted, sandstone-tempered bowl-sherd groups are somewhat hampered by the small size of the Alto brown-painted group (note the low intrasite coefficient for Alto). In these comparisons the postulated temporal ordering of sites is most often the optimal matrix ordering, though the locations of 629 and 1360 seem interchangeable, and there are exceptions (such as the black paint/texture comparison). This consistency in ordering could be variously interpreted, but three conclusions seem warranted: time does play an important role even within types; the smaller sites tend to fall out together; and 629 has the closest affinity with 1360.

Narrow neckbanded assemblages are quite similar in terms of major temper categories and distribution, texture, and grain size. Minor differences between sites do exist in low-frequency tempers and in the uses of surface manipulation. In spite of the differences in source of minor imports, the occurrence at all three sites of narrow neckbanded not tempered with sandstone ranges between 32 and 33 percent, suggesting consistent grayware acquisition patterns among the sites. When divided into groups determined by site, type, temper, and surface manipulation, narrow neckbanded comprises relatively more groups than do other types, particularly early ones. Although sample size and number of possible attribute combinations influence such results, there is reason to suspect that this occurrence results from the establishment of relationships between Chaco and a wider area and larger number of potters. Relationships of this sort seem to have continued for some time. The limited similarity testing among small sites reveals no clear pattern, with different site associations on different attributes. On the whole, then, the narrow neckbanded ceramics at 629, 627, and 1360 seem to have been drawn from largely the same ceramic pool.

The Question of Redistribution

Redistribution of goods as a coping strategy has been offered as one mechanism of adaptation at Chaco (Judge 1979; Judge et al. 1981). The ceramic data support some subsets of the model; e.g., there is an association of vessel forms with site types, and there is a greater diversity of source areas represented at Pueblo Alto (one of the proposed sites of redistribution) than at the smaller sites; but there is no evidence for regionally based ceramic redistribution (H. Toll 1981, 1983). At the same time, it is difficult to observe redistributive activity from the putative center of the region without comparative data from the periphery.

Nonlocal ceramics, particularly from the Chuska Valley, are relatively (and probably absolutely) more abundant at the larger sites (as represented by Alto) than at the smaller ones (H. Toll 1981, 1983; Toll and McKenna 1983). Conceivably this difference is in part due to fall-off from points of distribution, but major questions of contemporaneity among these sites remain, particularly in the period of highest occurrence of Chuskan pottery (1040-1100).

Pires-Ferreira and Flannery (1976:289-292) discuss the material correlates that distinguish reciprocal from redistributive exchange. Redistribution may be inferred if a site contains amounts of nonlocal material that exceed quantities predictable on the basis of distance-to-source measures under conditions of direct-procurement or simple reciprocal exchanges (see also Renfrew 1975). The pattern of nonlocal material in a reciprocal or direct-procurement economy should be much more variable in terms of source and proportions than the pattern that appears in the present data. The intersite examination has revealed relatively high levels of nonlocal ceramics in fairly similar proportions at all the small sites examined. This implies some organized distribution of nonlocal resources or goods, but it does not indicate, at least from a ceramic viewpoint, what importance Chaco may have had as a redistributive center for the rest of the inhabitants of the San Juan Basin. A direct correlation of high import volumes with social complexity is too simplistic; the possibility of multiple levels of ceramic exchange should not be ignored. In such a system Chaco would occupy a more balanced position in a system of ceramic exchange rather than being viewed simply as a ceramic sink into which all pots were poured, never to reemerge.

CHAPTER 4

Lithic Artifacts

CHIPPED STONE

The sample of chipped stone recovered from 1360 was extremely small in comparison with assemblages from contemporary sites. Lithic densities of 6.3 and 5.5 items per cubic meter of fill in trash deposits from Kiva A and from the trash mound are far below the trash densities calculated for other sites in Chaco (Windes 1980). In addition, the information content of the collection is diminished by the amount of material recovered from the backdirt (36.2 percent of the assemblage), although such material does permit lithic resource comparisons with other sites and periods in the canyon. Table 4.1 describes the entire collection by lithic material type and functional/morphological category. The source codes are ultimately derived from the work of A.H. Warren (1979b); material identification is based on Warren's system and on a type collection available at the Chaco Center. Table 4.2 provides material type and functional/morphological information for excavated materials from each general provenience; Appendix 3, Tables 1-6 break down the general proveniences into materials from each specific recovery unit.

Cathy Cameron (1980a) and Steve Lekson (1980) were the principal analysts of lithic material from the site; Cameron provided the bulk of material and artifact identification, and Lekson examined the formal tool attributes. Although final figures in this report differ from those presented by Cameron (here n = 1007; for Cameron n = 1047), her general statements about the distribution of the collection are not affected, and both her general comparisons with other sites and her description of the nature of the collection are used here.

Raw Materials

Cameron has documented that 1360 lithic materials closely resemble those of assemblages from the middle period (e.g., Pueblo II) sites in Chaco, which corresponds well with the interpretations of the ceramic assemblage from the site. Differences noted between the survey lithics

Table 4.1. Chipped stone from 29SJ1360

Material Type (Source Code)	Utilized		Retouched		Whole Flakes		Debitage		Cores		Corner-Notched Points	Side-Notched Points	Other Points	End-Scrapers	Knife	Drill	Subtotal		Total	Percent of Total
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Non-C	Non-C	C	Non-C	Non-C	Non-C	C		
Petrified Wood																				
Conchoidal*	152	171	17	14	71	53	123	119	15	17	-	1	-	2	-	1	380	376	756	75.1
Nonconchoidal (1110-1119)	1	5	-	-	-	4	10	24	1	3	-	-	-	-	-	-	12	36	48	4.8
Chinle (1160)	3	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3	1	4	0.4
Chalcedony*	16	8	2	-	10	12	15	12	3	2	3	1	-	-	-	-	50	34	84	8.3
Chert*	6	5	-	1	1	-	5	5	-	1	1	1	-	-	-	-	14	12	26	2.6
Fossiliferous (1010)	7	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	8	1	9	0.9
San Juan fossiliferous (1011)	3	2	-	-	1	1	-	-	-	-	-	-	-	-	-	-	4	3	7	0.7
Chinle (1072)	-	1	-	-	1	-	-	-	-	1	-	-	-	-	-	-	1	2	3	0.3
Brushy Basin (1040)	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	2	-	2	0.2
Morrison Formation (1020)	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	2	-	2	0.2
Nacimiento (1021)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0.1
Washington Pass (1080)	6	4	-	1	-	-	-	1	-	-	-	-	-	-	-	-	6	6	12	1.2
High-surface (1054, 1014)	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	0.3
Quartzite (4001, 4005)	3	2	-	-	3	6	-	2	-	-	-	-	-	-	-	-	6	10	16	1.6
Nacimiento (2202)	2	1	-	-	3	1	-	1	-	-	-	-	-	1	-	-	5	4	9	0.9
High-surface (2200, 2221)	3	3	-	-	1	2	-	-	1	-	-	-	-	-	-	-	5	5	10	1.0
Obsidian																				
Polvadero (3530)	-	-	1	-	-	-	-	-	-	-	2	-	1	-	1	-	5	-	5	0.5
Jemez (3520)	4	-	1	-	-	-	1	-	-	-	1	1	-	-	-	-	8	-	8	0.8
Grants (3510)	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	2	0.2
Subtotal	207	206	21	16	92	79	155	166	21	24	9	4	1	3	1	1	513	494	1007	100.1
Total	413		37		171		321		45		9	4	1	3	1	1	1007		1007	
Percent of total	41.0		3.7		17.0		31.9		4.5		0.9	0.4	0.1	0.3	0.1	0.1				100.0

Non-C = noncortical; C = cortical

* Source codes from Warren 1979b; Conchoidal petrified wood (1112, 1113, 1140, 1142, 1143, 1145), Chalcedony (1052, 1053, 1200, 1210, 1221, 1345), Chert (1030, 1044, 1050, 1060, 1070, 1230, 1640)

Table 4.2. Chipped stone assemblage by provenience

Provenience/ Material Type	Utilized		Retouched		Whole Flakes		Debitage		Cores		Corner-Notched Points	Side-Notched Points	Other Points	End-Scrapers	Knife	Drill	Subtotal		Total
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Non-C	Non-C	C	Non-C	Non-C	Non-C	C	Total
KIVA A																			
Petrified Wood																			
Conchoidal	30	28	3	-	8	7	18	16	2	3	-	-	-	1	-	-	61	55	116
Nonconchoical	-	-	-	-	-	-	2	5	-	-	-	-	-	-	-	-	2	5	7
Chalcedony	2	2	-	-	1	3	-	3	-	1	2	-	-	-	-	-	5	9	14
Chert	-	-	-	1	-	-	1	2	-	-	-	-	-	-	-	-	1	3	4
Fossiliferous	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
San Juan fossiliferous	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
High-surface	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Brushy Basin	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1
Quartzite	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-	3	3
High-surface	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	2
Nacimiento	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
Obsidian																			
Polvadero	-	-	1	-	-	-	-	-	-	-	2	-	1	-	1	-	5	-	5
Jemez	1	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	3	-	3
Grants	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1
Subtotal	35	32	4	1	9	13	21	27	2	4	7	1	1	2	1	-	81	70	160
Total	67		5		22		48		6		7	1	1	2	1	-	160		160
PITHOUSE B																			
Petrified Wood																			
Conchoidal	27	47	2	1	14	6	34	24	-	4	-	-	-	-	-	-	77	82	159
Nonconchoidal	-	3	-	-	-	1	2	10	-	-	-	-	-	-	-	-	2	14	16
Chinle	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Chalcedony	3	1	-	-	1	4	2	3	-	-	-	1	-	-	-	-	7	8	15
Chert	-	3	-	-	1	-	-	-	-	-	-	1	-	-	-	-	2	3	5
Fossiliferous	4	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	5	-	5
Brushy Basin	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	1
Nacimiento	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Washington Pass	3	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3	3	6
Chinle	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
Quartzite	2	1	-	-	2	1	-	-	-	-	-	-	-	-	-	-	4	2	6
Nacimiento	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3	-	3
High-surface	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Obsidian																			
Jemez	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Subtotal	43	58	2	1	20	12	39	38	1	5	-	2	-	-	-	-	107	114	221
Total	101		3		32		77		6		-	2	-	-	-	-	221		221

(continued)

Non-C = noncortical; C = cortical

Table 4.2. (continued)

Provenience/ Material Type	Utilized Non-C	Utilized C	Retouched Non-C	Retouched C	Whole Flakes Non-C	Whole Flakes C	Debitage Non-C	Debitage C	Cores Non-C	Cores C	Corner-Notched Points Non-C	Side-Notched Points Non-C	Other Points Non-C	End-Scrapers C	Knife Non-C	Drill Non-C	Subtotal Non-C	Subtotal C	Total
EXTRAMURAL AREAS																			
Petrified Wood																			
Conchoidal	20	22	1	2	4	3	17	19	5	2	–	1	–	–	–	–	48	48	96
Nonconchoidal	–	1	–	–	–	–	2	1	1	2	–	–	–	–	–	–	3	4	7
Chinle	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Chalcedony	4	1	1	–	2	1	1	–	1	–	1	–	–	–	–	–	10	2	12
Chert	2	–	–	–	–	–	1	3	–	–	–	–	–	–	–	–	3	3	6
Chinle	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Morrison Formation	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Fossiliferous	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	1
Washington Pass	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Quartzite	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Nacimiento	–	1	–	–	1	–	–	1	–	–	–	–	–	–	–	–	1	2	3
Grants Obsidian	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Subtotal	29	25	2	2	10	4	21	25	7	4	1	1	–	–	–	–	71	60	131
Total	54		4		14		46		11		1	1	–	–	–	–	131		131
ROOMS																			
Petrified Wood																			
Conchoidal	8	9	2	–	3	8	5	8	2	1	–	–	–	–	–	–	20	26	46
Nonconchoidal	–	–	–	–	–	–	3	3	–	1	–	–	–	–	–	–	3	4	7
Chalcedony	1	–	1	–	–	–	1	1	–	–	–	–	–	–	–	–	3	1	4
Chert																			
Fossiliferous	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Washington Pass	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2
Subtotal	9	11	3	1	3	8	9	12	2	2	–	–	–	–	–	–	26	34	60
Total	20		4		11		21		4		–	–	–	–	–	–	60		60
TRASH MOUND																			
Petrified Wood																			
Conchoidal	16	10	–	–	8	2	7	8	–	1	–	–	–	–	–	–	31	21	52
Chinle	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Chalcedony	3	2	–	–	–	–	2	2	–	1	–	–	–	–	–	–	5	5	10
Chert	1	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	2	3
Chinle	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Washington Pass	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Quartzite	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2	2
Subtotal	22	15	–	–	8	3	9	10	–	2	1	–	–	–	–	–	39	31	70
Total	37		–		11		19		2		1	–	–	–	–	–	70		70
Combined Subtotal	138	141	11	5	50	40	99	112	12	17	9	4	1	2	1	–	324	318	642
Combined Total	279		16		90		211		29		9	4	1	2	1	–	642		642

Non-C = noncortical; C = cortical

and the excavated material from the site suggest that the survey collection is not representative. This discrepancy is probably due to the survey collection having come from the trash mound, a standard collection practice for Chaco survey crews. The trash mound constitutes one of the earlier excavated deposits at the site, and both the survey collection and the excavated material from the trash mound contain siliceous material similar to that commonly found in the earlier period lithic assemblages (see Cameron 1980a:Tables 1, 2, and 10).

Lithic raw materials at 1360 are principally petrified woods (79.9 percent), most notably dark and light variegated material with a waxy luster (material codes 1112 and 1113 respectively) and a chalcedonic white or light-colored wood (code 1140); all of these are apparently available within 15 km of Chaco Canyon. Certainly the dark and light wood varieties were the most popular, with the lighter wood occurring more frequently at 1360 than at any other contemporary site examined (Cameron 1980a:Table 1). Exotic materials occur in relatively low frequencies (4.5 percent) as is characteristic of this time period (4.3 percent in Cameron 1980a:Table 1). Such exotic materials as yellow-brown, Washington Pass, and Brushy Basin chert and various obsidians exhibit exceptional fracture and edge-producing characteristics, making their value understandable. The distribution patterns of these exotics are important to inferences concerning lithic material acquisition and tool production. First, the question of the source of these exotics must be examined.

Ten of the 14 obsidian specimens were subjected to x-ray fluorescence analysis, which identified the Jemez Mountains and the Polvadero Peak area in the Piedra Lumbre Valley as the first and second most common sources of obsidian at the site (Sappington 1980:Table 1). This analysis indicates that the remaining obsidian, classified and tabulated herein as "Grants," comes from Red Hill, a source area about 140 miles (225 km) south of Chaco near Quemado, New Mexico. These relative frequencies for obsidian sources are in keeping with the general frequencies for source representations recorded throughout the canyon and for this specific time period and site type (Cameron 1980b). Certainly the eastern mountains were the principal source area for obsidian; the unusually high incidence of Polvadero material at 1360 may be an artifact of the recovery procedures--which focused on larger, often finished items--since it is in this form that Polvadero obsidian most often occurs in Chaco Canyon (Cameron 1980b:4).

Certain areas of the site have been isolated as containing distinctive concentrations of certain material types. Cameron (1980a:Table 5) has computed standard deviations on cross-tabulation column percentages of material types in various site localities. This table is based on the very limited numbers of specimens available from excavation and must be interpreted with caution because of this small sample size. If the cells in the table based on single items are eliminated, a few patterns emerge.

Table 4.3 reveals that the trash mound, as mentioned, is distinct from the remainder of the site in containing relatively higher amounts of chert and chalcedony and lower amounts of conchoidally fracturing petrified woods. House 1, Rooms 2 and 4, suspected of being part of an earlier Pueblo I component and therefore associated with the trash mound, are also distinct, but unlike the trash mound, they contain petrified wood almost exclusively. The remainder of the site is essentially dominated by the petrified wood assemblage; the only noticeable deviations are concentrations of the rarer, exotic materials--obsidians and quartzite in Kiva A and various exotic cherts in Pithouse B and the neighboring plaza surfaces.

Cameron has noted (1980a:1) that finished artifacts at the site are consistently of exotic or rarer materials, i.e., obsidians, cherts, or chalcedonies. Although it has been suggested that this indicates trade in finished chipped stone tools, these artifacts could also represent survivals from earlier periods. Alternatively, this pattern may reflect traditional material selection as part of a conservative technology related to production of formal artifacts (particularly points), or it may even represent direct acquisition of materials as surface finds not related to finished tool trade. Since recovery procedures were not sufficiently fine-grained to detect small pressure flakes, it is impossible to determine whether on-site production took place with specific materials.

Formal Tools

A certain conservancy in material selection is suggested by Lekson's (n.d.) study of the attributes of formal tools from Chaco Canyon. The term "conservancy" as used here simply means consistent use of the best quality chipping material available. Points are typically produced by pressure flaking using suitable flakes; points exhibit no erratic stylistic changes within periods or through time, implying stability of both production and use patterns. Generally, earlier points in Chaco are corner-notched; about AD 1000 there is a transition to notching slightly above the corner, and by about AD 1150 points are fully side-notched. In these respects the collection from 1360 is not remarkable (Lekson 1980). Almost all of the points fit into the transitional mid-period--particularly the two in Burial 2 from Pithouse B (Figures 4.1[4], 4.2[2])--although most are too fragmentary for this detemination to be made with certainty (Figures 4.2, 4.3). One exceptional obsidian specimen, possibly side-notched, with an unusually long, incurvate blade, was located on the surface of Kiva A (Figure 4.3[4]).

In addition to these projectile points, other tools from the site include two "fortuitous perforators" (called retouched flakes in the tables); a small drill similar to items from 627 and 629 that were believed to be lapidary tools (Figure 4.2[1]); a large corner-notched point or knife; two asymmetrical knives (Figure 4.4[1,2]); three end-scrapers, two of which were determined to be unutilized retouched flakes; and a possible petrified wood flesher (Figure 4.5). Abbreviated tool descriptions and dimensions are presented in Table 4.4. Tools affiliated with on-site usage, such as drills, scrapers, and retouched flakes, tend to be made of finer quality, locally available

Table 4.3 Concentrations of lithic materials one standard deviation above and below the mean in major site localities (Cameron 1980a:Table 5)

Provenience/Fill Type

Trash Mound/ Trash	House 1 Rooms 2 and 4/ Room melt	House 2 Rooms/ Room melt	Kiva A/ Trash	Pithouse B/ In situ	Plazas/ Room melt
+ cherts	+ petrified wood	+ chalcedony	+ obsidian	+ fossiliferous chert	+ Chinle chert
+ chalcedony			+ quartzite		
- petrified wood				+ Washington Pass chert	

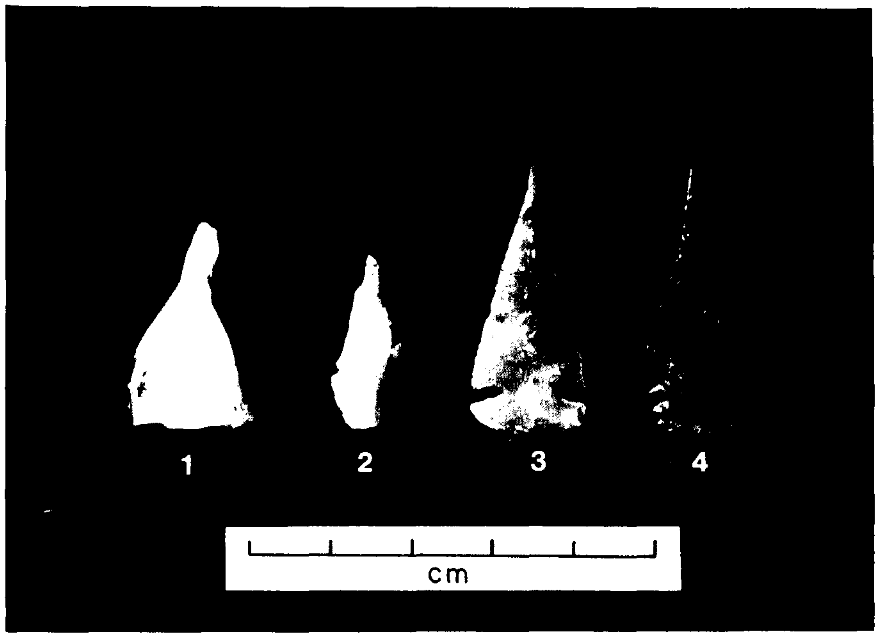


Figure 4.1. Drills and projectile points: (1-2) petrified wood drills from Plaza Area 5 and Trash Mound, petrified wood (3) and chalcedony (4) modified corner-notched points from Plaza Area 5 floor and Pithouse B, Burial 2

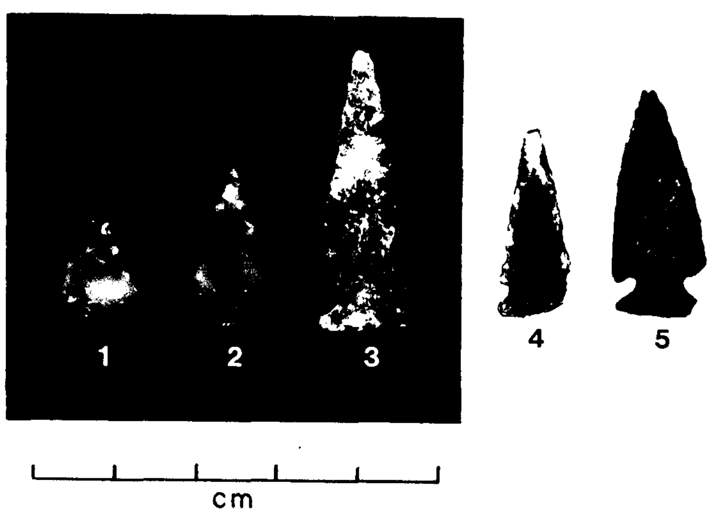


Figure 4.2. Drill and projectile points: (1) petrified wood microdrill from backdirt; (2) modified corner-notched chalcedony point from Pithouse B, Burial 2; (3) petrified wood point from Kiva A, Level 1; (4) corner-notched Jemez obsidian point from Kiva A, Level 2; and (5) corner-notched chert point from Trash Mound, Level 3.

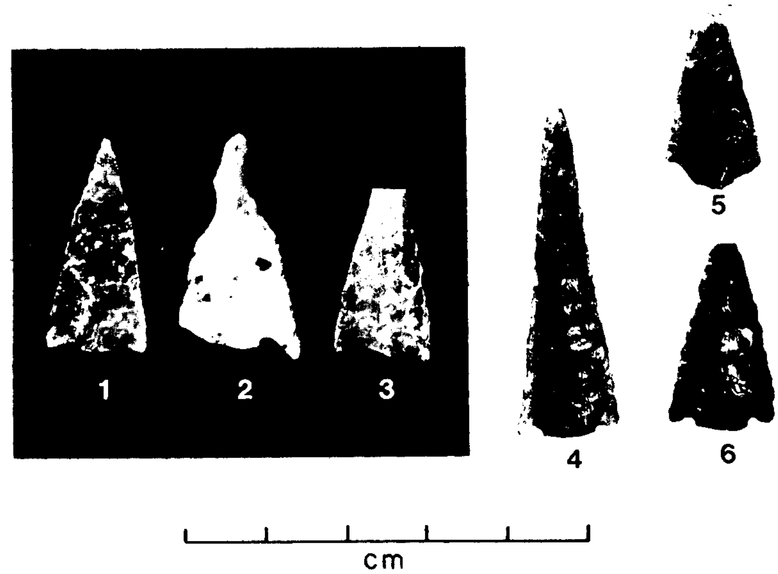


Figure 4.3. Projectile point fragments: (1-2) corner-notched chalcedony points from Kiva A, Level 2 and from the site surface; (3) corner-notched petrified wood point from ramada fill; (4) side-notched Polvadero obsidian point, corner-notched Polvadero obsidian point; and (5) corner-notched Jemez obsidian point from Kiva A, Level 1.

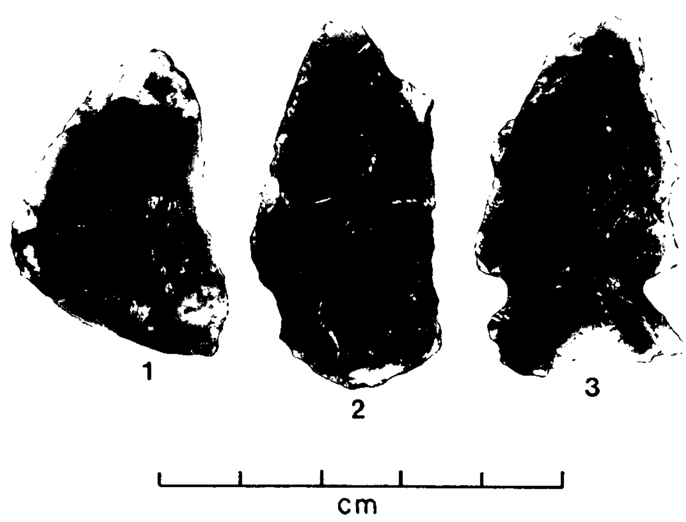


Figure 4.4. Knives and heavy point or knife: (1) heavy point or knife of Jemez obsidian from Kiva A, Level 1; (2) Jemez obsidian knife from Kiva A, Level 2; (3) preform or knife of Polvadero obsidian from Kiva A, Level 2.

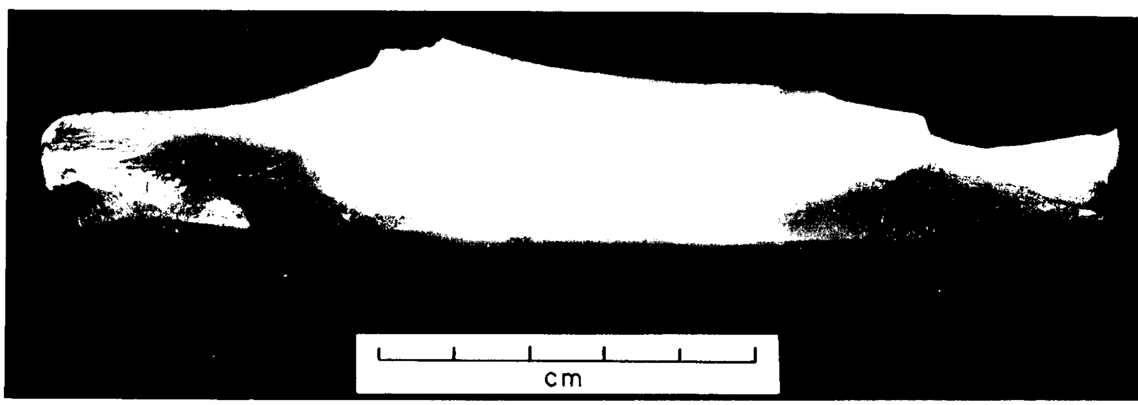


Figure 4.5. Possible flesher, petrified wood tool from Pithouse B bench

Table 4.4. Formal artifacts

Provenience	Tool	Material Type	Hafting	Condition	Maximum Dimensions (mm)		
					Length	Width	Thickness
Trash Mound							
Grid AX fill	Drill (irregular base)	Wood (1140)		Complete	22	8	5.0
Lateral Level 3	Light point	Chert (1030)	Corner-notched	Lacking basal-notch tangs	28	12	3.0
Extramural Areas							
Ramada fill	Light point	Wood (1140)	Probable corner-notched	Blade	21	12	3.1
Area 5 fill	Drill (unmodified base)	Wood (1140)		Complete	25	15	-
Kiva A							
Level 1	Endscraper	Wood (1113)		Half	27	17	9.2
	Light point	Jemez obsidian (3523)	Probable corner-notched	Blade	23	13	3.2
	Light point	Polvadero obsidian (3530)	Probable side-notched	Blade	22	12	3.4
	Light point	Polvadero obsidian (3530)	Probable corner-notched	Blade with tip	40	13	3.8
	Light point	Chalcedony (1052-1053)	Modified corner-notched	Lacking notch tang	35	12	3.0
	Heavy point or knife	Polvadero obsidian (3530)	Not hafted	Complete	35	28	5.8
Level 2	Backed knife	Jemez obsidian (3520)		Blade with base	46	23	4.9
	Light point	Chalcedony (1052-1053)	Probable corner-notched	Blade plus tip	26	12	3.2
	Light point	Jemez obsidian (3520)	Corner-notched	Blade with base	23	10	4.1
	Preform	Polvadero obsidian (3530)	Corner-notched	Complete	45	25	5.4
Level 3	Endscraper	Wood (1113)		Quarter	24	23	9.9
	Heavy point or knife	Brushy Basin chert (1040)	Corner-notched	Lacking basal tang; blade with base	40	25	6.0
Pithouse B							
Bench	Flesher (?)	Wood (1140)		Complete	143	28	9.2
Burial 2	Light point	Wood (1140)	Modified corner-notched	Complete	33	14	3.8
	Light point	Chalcedony (1052-1053)	Modified corner-notched	Complete	33	14	3.6
Surface							
	Unknown	Wood (1112)		Complete	34	24	-
	Light point	Chalcedony (1200)	Probable corner-notched	Blade with tip	28	15	3.9
Backdirt							
	Drill (unmodified base)	Wood (1140)		Complete	12	3	1.0
	Endscraper	Wood (1113)		Complete	33	29	12.0

Material codes from Warren 1979b

woods, while projectile points exhibit a wider range and greater number of exotic materials, suggesting production elsewhere and subsequent trade.

Cameron (1980a:2) has noted the extremely high proportion of utilized flakes and cores at 1360 and the anomalously low proportion of unutilized whole flakes and debitage, in comparison with contemporary sites. Cores of conchoidal-fracturing woods, single cores of yellow-brown and Brushy Basin chert, and some Washington Pass chert indicate possible on-site flaking of exotic raw materials. Antler-tine flakers from Pithouse B and Kiva A indicate some reduction by pressure flaking; although this is strongly suggestive, it does not necessarily indicate production of finer items, such as points. The remodification of exotics and local woods into such tools as asymmetrical knives and the production of utilitarian tools, such as endscrapers, drills, and casually retouched flakes for on-site use, could account for the presence of antler-tine flakers.

Production and Use of Chipped Stone

Because recovery of debitage was limited to larger items, the loci of cores alone must serve to indicate the location of flaking activities at 1360. Other sources of information on potentially distinctive work areas include the distribution of retouched flakes and tools (in conjunction with the technology of manufacture) and generalized functional differences between lithic artifacts--as suggested by directional patterns on flakes. Disregarding single cores and cores from trash, two possible flaking stations may be suggested. Plaza Area 5, between Retaining Wall 1 and the House 1 rooms, had the highest concentration of cores of all proveniences (n = 11 or 37.5 percent of all cores). The floor and bench of Pithouse B are the next most likely candidates for a flaking station (number of cores = 7, 24.1 percent); the remaining cores (38.4 percent) are scattered throughout the site, principally in the trash of Kiva A.

Cameron has provided a detailed analysis of 36 utilized and retouched flakes and tools or biface fragments at 1360 (12 percent of the chipped stone assemblage). This analysis concentrates on the technology of manufacture and generalized use patterns. The general terminology used in Tables 4.5 through 4.7 is discussed in Cameron (1979); description of flake orientation mainly follows Crabtree (1972). In terms of the material types, the items analyzed are roughly representative of the general collection, being ca. 80 percent petrified wood. Approximately 10 percent of the utilized flakes and a total of 25 of the retouched flakes were included in this detailed analysis.

As suggested by Table 4.6, the technology of flake production is rather unsophisticated. The amount of cortex present and the unprepared nature of striking platforms suggest that unprocessed cores were brought to and reduced at 1360. This is underscored by the fact that most of the indeterminable tool fragments, which are principally of obsidian, fall into the absent/none cell in Table 4.6, indicating that petrified

Table 4.5. Location and composition of detailed chipped-stone analysis sample

		Utilized					
Provenience	Retouched Flakes	Whole Flakes	Angular Debris	Fragments	Rejuvenation Flakes	Total	% of Total
Kiva A fill							
Petrified wood	2	12	-	4	-	18	
Jemez obsidian	1	-	1	-	-	2	
Polvadero obsidian	1	-	-	-	-	1	
Chalcedony	-	1	-	-	-	1	
Total						22	61.1
Pithouse B bench							
Petrified wood	-	3	2	-	-	5	13.9
House 1, Room 7 firepit							
Petrified wood	1	2	-	-	-	3	
Chert	-	1	-	-	-	1	
Total						4	11.1
House 1, Room 1 fill							
Petrified wood	1	-	-	-	-	1	2.8
Plaza Area 2 fill							
Petrified wood	1	-	-	-	-	1	<1
Plaza Area 5 floor							
Nacimiento quartzite	-	-	-	-	1	1	<1
Backdirt							
Petrified wood	1	-	-	-	-	1	
Chalcedony	1	-	-	-	-	1	
Total						2	5.6
Total	9	19	3	4	1	36	100.1
Percent of total	25.0	52.8	8.3				100.0

	Petrified Wood	Obsidian	Chert	Chalcedony	Nacimiento Quartzite	Total
n	29	3	1	2	1	36
%	80.5	8.3	2.8	5.6	2.8	100.0

Table 4.6. Principal attributes: technology of chipped stone production

A. ATTRIBUTES IN CORE REDUCTION

Cortex	Absent	Prepared	Retouched	Wear	Plain, Unprepared	Ground	Collapsed	n	%
	Platform Treatment								
None	13	–	–	–	8	–	–	21	58.1
Platform only	–	–	–	–	2	–	–	2	5.6
>50%	2	–	–	–	1	–	–	3	8.3
<50%	2	–	–	–	–	–	–	2	5.6
Cortical platforms									
>50%	–	–	–	–	1	–	–	1	2.1
<50%	–	–	–	–	2	–	–	2	5.6
Interior platforms									
>50%	–	–	–	–	3	–	–	3	8.3
<50%	–	–	–	–	2	–	–	2	5.6
Total	17	–	–	–	19	–	–	36	100.1

B. ATTRIBUTES OF FLAKE MODIFICATION

Flake Type	None	Retouched: Marginal Unidirectional	Retouched: Marginal Bidirectional	Retouched: Unifacial	Retouched: Bifacial	Use Only	n	%
Retouched flakes	–	6	–	–	3	–	9	25.0
Utilized								
whole flakes	19	–	–	–	–	–	19	52.8
angular debris	3	–	–	–	–	–	3	8.3
fragments	4	–	–	–	–	–	4	11.1
Rejuvenation flake	1	–	–	–	–	–	1	2.8
Total	27	6	–	–	3	–	36	100.0
% of total	75.0	16.7	–	–	8.3			

Table 4.7. Wear and modification patterns of chipped stone

A. EDGE MORPHOLOGY AND SURFACE USED ON CHIPPED STONE ARTIFACTS BY RAW MATERIAL

	Unifacial				Bifacial					Ventral		Dorsal				Edge			Projection	Subtotal of Edges				Percent
				Tip and					Tip and						Tip and				Tip and	Edge	Edge	Edge	Total	of
	Irr	Cvx	Str	Edges	Irr	Cve	Cvx	Str	Edges	Irr	Str	Irr	Str	Oth	Edges	Irr	Con	Str	Edges	1	2	3	Artifacts	Total
KIVA A																								
Petrified Wood																								
Edge 1	2	1	-	-	1	-	2	4	1	1	-	1	1	-	1	1	1	1	-	18			18	50.0
Edge 2	2	1	3	-	-	-	1	3	-	-	1	-	-	-	-	-	-	-	-		11			
Edge 3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-			2		
Obsidian																								
Edge 1	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	3			3	8.3
Edge 2	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-		3			
Edge 3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-			1		
Chalcedony	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1			1	2.8
PITHOUSE B																								
Petrified Wood																								
Edge 1	1	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	1	1	-	5			5	13.9
Edge 2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1			
PLAZA AREAS																								
Plaza Area 2																								
Petrified Wood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1			1	2.8
Plaza Area 5																								
Nacimiento quartzite	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1			1	2.8
HOUSE 1																								
Room 1																								
Petrified Wood	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1				
Room 7																								
Petrified Wood																								
Edge 1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3				
Edge 2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1			
Chert	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1			5	13.9
BACKDIRT																								
Petrified Wood	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1				
Chalcedony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1			2	5.6
Subtotal	6	3	8	1	6	1	5	10	1	1	1	1	1	1	1	1	2	3	2	36	16	3	36	100.1
Total	18				23					2		4				6			2	55			36	
Percent of total	32.7				41.8					3.6		7.3				10.9			3.6					

(continued)

Irr = irregular; Cvx = convex; Str = straight; Cve = concave; Oth = other

Table 4.7. (continued)

B. EDGE-WEAR PATTERNS BY SUBJECTIVELY DEFINED FUNCTIONS

	Number of Artifacts	Edge-Wear Patterns: Edge 1	Edge 2	Edge 3	Number of Edges
Facets					
Scraping	13	1 step	1 feather		19
		1 feather	1 edge rounding		
		3 edge rounding	1 feather/edge rounding		
		6 feather/edge rounding	1 step/edge rounding		
		2 step/crushing	1 edge rounding/crushing		
			1 step/nibbling		
Cutting	10	1 step	1 nibbling	1 feather/scoops	13
		2 feather	1 feather/scoops		
		1 nibbling			
		1 edge rounding			
		1 scoops			
		1 feather/edge rounding			
		1 step/crushing			
		1 feather/nibbling			
		1 feather/rotary			
Scraping/ Cutting	4	1 edge rounding	2 step	1 step	10
		1 step/crushing	1 feather/crushing	1 step/edge rounding	
		1 feather/nibbling	1 step/feather		
		1 step/feather			
Tools					
Gravers	1	1 feather/edge rounding			1
Drills	3	1 step	1 step/edge rounding		4
		2 edge rounding			
Scrapers	2	2 step	1 step		3
Knife	1	1 feather/edge rounding			1
Hammer	1	1 battering			1
Wedge	1	1 step/edge rounding	1 step/crushing		2
Total	36	36	15	3	54

(continued)

Table 4.7. (continued)

C. LOCATION OF EDGE WEAR

Location of Edge Wear	Edge 1	Edge 2	Edge 3	Total	Percent of total
Lateral	14	2	1	17	32.7
Distal	4	2	–	6	10.9
Platform	1	–	–	1	1.8
Unidentified	15	–	–	15	27.3
Projection	1	–	–	1	1.8
Medial	1	11	2	14	25.5
Total	36	15	3	54	100.0
Percent of total edges		29.1	5.4		

woods were indeed the principal materials being locally treated. Disregarding retouched specimens and the hammerstone fragment, it is also clear that whole flakes were selected for use as nonformal tools (Table 4.6). Additionally, the amount of cortex on flakes suggests that cores were not extensively flaked prior to selection of use flakes. This may reflect either the size of the raw material chunks available/selected or a technology that did not require extensive initial core reduction for production of suitable flakes/tools.

Table 4.7 presents wear and modification patterns from the sample. The number of formal tool fragments has inflated the representation of bifacially used items. If these formal tools are removed from consideration, it becomes clear that unidirectional use (with the resultant unifacial wear) was the most common form of flake-tool manipulation. Sections B and C of Table 4.7 suggest that mid-lateral edges were the most used areas on flakes; this location exhibits a wide array of edge damage. Flake tools identified as multipurpose or scraper/cutters differ from those identified specifically as cutters or scrapers only in that they exhibit more used edges per specimen, not in uniqueness of edge damage. Rather than being multipurpose implements, these specimens would appear, from the wear patterns, to be worn-out, discarded flake tools that had seen maximum use and edge damage. Only 29.1 percent of the edges show discrete, single damage; 40 percent exhibit edge rounding in some form. Use evidence on multiple edges is infrequent (29.1 percent). Distribution of multiple use-edges is not random; this wear pattern occurs in trash contexts (Kiva A; the House 1, Room 7 firepit) and activity areas (Pithouse B bench). Trash deposits contain the only tools with three use-edges, i.e., the many-edged scraper/cutters. Although based on small samples, the distribution suggests a progression of use for flake implements rather than separation into single- or multifunctional tool types. Suitable edges on each flake seem to have been sequentially or simultaneously used until rounding occurred. When all usable edges had been dulled, the flake was simply discarded. There is no evidence for resharpening of flake tools.

While this analysis of chipped stone provides some technological and morphological description of the assemblage, it does not permit us to identify activity areas within the site. The bench provenience in Pithouse B has particular potential in this regard, as it contained bone tools, lapidarian work, and utilized flakes. The core (alternatively classified as a scraper) of Chinle chert from the bench could adequately remove tendons and bone periosteum and suitably incise artiodactyl long bones as the first step in the preparation of tool blanks. How, whether, or to what degree the lithic items on the bench were used in this activity cannot be directly ascertained from the current analysis, but some such use is almost certain.

Summary

Locally available, conchoidally fracturing petrified woods are the most commonly used materials in the approximately 1000 chipped stone objects recovered from 1360. Artifacts made from these local materials include informal flake tools and a few basic utilitarian items, such as drills and endscrapers. Whole flakes were preferred for retouching. More formal tools, particularly points, are of rarer and exotic materials, such as chalcedony, cherts, and obsidian.

Both the lithic material assemblage and point styles resemble those of other sites from approximately AD 1000.

Co-occurrence of cores and debitage suggests that flaking of most materials took place at the site. Only obsidian tools are not represented by attendant cores and debitage. While antler-tine flakers strongly suggest pressure flaking of tools, this cannot be specifically verified; deposits were not screened, and this would preclude recovery of minute pressure flakes.

The concentrated disposal of reworkable obsidian in Kiva A despite the excellent cutting properties of this material argues strongly that obsidian was not acquired for or used as raw material for tool manufacture at 1360.

It has been argued elsewhere that the materials from Kiva A and Pithouse B are ceramically distinct. This pattern is not as clear for the lithic assemblages; the petrified wood flake-and-tool complexes are similar, for example, except for the condition of the edges. Items from Kiva A fill tend to have rounded edges; those from Pithouse B have sharper edges. These differences would appear to reflect the trash context of items from Kiva A and the use context of items from Pithouse B.

HAMMERSTONES

Wills (1977) has provided an excellent preliminary report on hammerstones from Chaco Canyon. A few reorderings of his data and additional collection do not significantly alter his observations and findings. Naturally, the breadth of his report cannot be matched in a single-site report; the intent of this discussion is to describe the 1360 collection and to point out any major differences from Wills' general findings.

A total of 119 hammerstones were recovered from 1360; Wills analyzed 80 of these. Twenty-five of the hammerstones that Wills analyzed are unclearly identified (Wills 1977:2, 6), and unless otherwise stated these items are isolated from the bulk of the hammerstones in both discussions and tables. Akins (1980) has analyzed 15 quartzite polishers as secondary hammerstones; six of these have been reevaluated as hammerstones and incorporated into this analysis (Table 4.8). The remainder of these quartzite artifacts were classified as ambiguous specimens (Table 4.9), and they are subsequently discussed as abraders. Conversely, Wills' analysis includes two pestle-form, hard active abraders that are also omitted from this section and discussed with the

Table 4.8. Hammerstones from 29SJ1360

		Provenience																						
		Kiva A					Pithouse B					House 1 Room Fill				Ramada		Plaza Areas			Trash Mound			
			Levels:						Wing												Grid Fill			
Shape	Weight*	Fill	1	2	3	4	Level 1	Bench	Wall Area	Fire-pit	Pit 8	1	2	7	3/10	Fill	Floor	2 Fill	3 Floor	5 Fill	BX	CX	Back-dirt	Total
QUARTZITE																								
Angular	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	2
	3	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	3
	4	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Spherical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	4
	3	-	2	1	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	7
	4	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	6	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	8	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total																								24
CONCHOIDAL WOOD																								
Angular	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2
	2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4
	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
Spherical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2
	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	5	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total																								14
NONCONCHOIDAL WOOD																								
Angular	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	5
	2	1	-	-	1	-	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	12	17
	3	-	1	-	-	-	-	-	-	-	-	1	1	-	-	2	-	-	-	1	-	-	-	6
	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	8	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Spherical	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Total																								31
NACIMIENTO QUARTZITE																								
Angular	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	3
Spherical	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Total																								6
QUARTZITIC SANDSTONE																								
Angular	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	3
Spherical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Total																								5

(continued)

Table 4.8. (continued)

Shape	Weight*	Kiva A: Fill	Kiva A Levels: 1	2	3	4	Pithouse B: Level 1	Bench	Wing Wall Area	Fire-pit	Pit 8	House 1 Room Fill: 1	2	7	3/10	Ramada: Fill	Floor	Plaza Areas: 2 Fill	3 Floor	5 Fill	Trash Mound Grid Fill: BX	CX	Back-dirt	Total
CHERT, GENERAL																								
Angular	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Spherical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
Total																								4
CHALCEDONY																								
Angular	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	2
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Spherical	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Total																								4
MORRISON CHERT																								
Angular	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Spherical	8	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total																								2
SANDSTONE																								
Angular	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Spherical	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Total																								2
GREENSTONE																								
Angular	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
METARHYOLITE																								
Angular	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
SUBTOTAL		3	14	3	3	3	3	2	1	2	1	1	2	1	1	7	1	1	2	2	1	1	38	94
TOTAL				26					9					5		8			5		2		38	94

* Weight (in g): 1 = 0-99; 2 = 100-199; 3 = 200-299; 4 = 300-399; 5 = 400-499; 6 = 500-599; 7 = 600-699; 8 = 700-799; 9 = 800-899; 10 = 900-999

Table 4.9. Objects reused as hammerstones

Provenience	Shape	Weight*	Masonry Petrified Wood Non-C	Masonry Petrified Wood C	Unknown Quartzitic Sandstone	Choppers Petrified Wood Non-C	Choppers Petrified Wood C	Abraders Petrified Wood Non-C	Abraders Petrified Wood C	Polishing Stones Quartzite	Manuports Petrified Wood Non-C	Total
Kiva A (n=9)												
Level 1	A	1	–	–	–	–	1	–	–	–	–	1
	S	4	–	–	–	–	–	–	–	1	–	1
		5	–	–	–	–	–	–	–	1	–	1
Level 2	A	2	–	–	–	–	1	–	–	–	–	1
	S	1	–	–	–	–	–	–	–	1	–	1
Level 3	A	2	–	–	–	–	–	3	–	–	–	3
Level 4	A	3	–	1	–	–	–	–	–	–	–	1
Pithouse B (n=4)												
Fill	A	2	–	–	–	–	–	–	–	1	–	1
Level 4	A	5	1	–	–	–	–	–	–	–	–	1
Bench	S	4	–	–	–	–	–	–	–	2	–	2
House 1 (n=3)												
Room 2 fill	A	2	–	–	–	–	–	–	1	–	–	1
Room 7 fill	A	2	–	–	–	1	–	–	–	–	–	1
Room 11 fill	A	2	–	–	1	–	–	–	–	–	–	1
Ramada Fill	S	5	–	–	–	–	–	–	–	1	–	1
Plaza Area 3 (n=3)												
Fill	S	4	–	–	–	–	–	–	–	1	–	1
Floor	A	2	1	–	–	–	–	–	–	–	–	1
		6	–	–	–	–	–	–	–	–	1	1
Plaza Area 5 (n=4)												
Fill	A	3	–	1	–	–	–	–	–	–	–	1
Backdirt	A	1	–	–	–	–	1	–	–	–	–	1
		2	–	–	–	–	1	1	–	–	–	2
		10	–	1	–	–	–	–	–	–	–	1
Subtotal			2	3	1	1	4	4	1	8	1	25
Total			5		1	5		5		8	1	25
% of total			20.0		4.0	20.0		20.0		32.0	4.0	100

* Weight ranges are defined on Table 4.8

S = spherical; A = angular; Non-C = nonconchoidal; C = conchoidal abraders. The majority of hammerstones are petrified woods (51.3 percent) and quartzite (37.0 percent), with a few chert, metamorphic, and sandstone specimens (Table 4.10).

Wills (1977:24) argues for two types of hammerstones--angular and spherical. These shape differences are apparently the result of selection, creation, and use rather than being stages of hammerstone attrition. While these basic shapes are present at 1360, they conform to neither the size ranges nor the proportional distributions of angular and spherical forms within size ranges noted by Wills (1977:24, Figure 2). Rather, both shapes cluster below 300 g ($n = 79$, 89 percent; Table 4.11). Wills' (1977:24) analysis suggests that tasks requiring spherical hammerstones were more likely, proportionally, to require a medium-sized implement (401-900 g). In comparison with this canyon-wide sample, hammerstones at 1360 are smaller (Table 4.12). Although proportional percentages of hammerstone shapes are generally comparable, this is due to low frequency in the larger weight ranges at 1360 and does not accurately reflect spheroid size distribution. Wills finds that, canyon-wide, spheroid artifacts concentrate in the 401-to-900-g range, but at 1360 spheroids concentrate in the 100-to-300-g range.

Wills' point that these shapes represent independent tool groups (1977:30-32) is independently supported at 1360 by the distribution of rounded hammerstones. If such forms were indeed worn-out discards, the majority would be expected to fall in or below the size range for the main population of angular hammerstones; in fact, the opposite occurs, with most of the rounded forms occurring in the size range above the majority of angular specimens (Table 4.11). If the entire population (including reused or ambiguous specimens) is included, spherical hammerstones peak in weight class 3 (200-299 g) and angular stones in the lighter class 2 (100-199 g).

In regard to other attributes of hammerstone morphology, the 1360 sample is unexceptional. As Wills has found, the original shape of the stone tends to contribute to use form (Table 4.13). Of the non-conchoidal-fracturing wood (code 1110) items, approximately 60 percent show use of the raw material without prior modification. Elimination of reused specimens from this sample increases the proportional use of unmodified stone to 80 percent. This contrasts with conchoidal-fracturing wood items, of which 42.9 percent were modified prior to use; fewer reused specimens (45.5 percent) were altered prior to use. There was a trend, although not a significant one (chi square = 1.075, df = 1, $0.2 < p < 0.1$), to alter and reuse better-quality silicified wood hammerstones, possibly a curatorial measure after a prior function had been discontinued.

Wills' question about specific hammerstone tasks cannot be resolved using the 1360 collection. The provenience information from the site does not lend itself to addressing the question by examining locational contexts of tool shape, size, and material. Over half the collection (54.5 percent) comes from uninformative contexts, including 35.5 percent from backdirt (Tables 4.8 and 4.9). Although the proportion of angular and spherical tools generally is about 2:1 across proveniences, this is

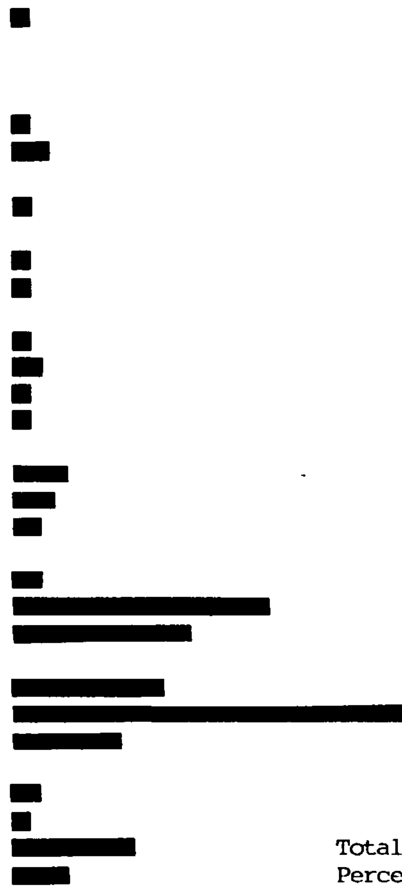
Table 4.10. Hammerstone material types

		Artifact		Group	
Material Type	Code	n	% of Total	n	% of Total
Chert	1011	1	0.8		
	1040*	2	1.7		
	1050	1	0.8		
	1070	1	0.8		
	1073	1	0.8		
Total				6	5.0
Chalcedony	1053	4	3.4	4	3.4
Petrified Wood	1110	39	32.8		
	1112	20	16.8		
	1120	1	0.8		
	1130	1	0.8		
Total				61	51.3
Sandstone	2200	1	0.8		
	2126	1	0.8		
Total				2	1.7
Quartzitic Sandstone	2201*	2	1.7		
	2202*	7	5.9		
	2204	3	2.5		
Total				12	10.1
Quartzite	4000	21	17.6		
	4002	4	3.4		
	4005	7	5.9		
Total				32	26.9
Metarhyolite	4370*	1	0.8	1	0.8
Metamorphic miscellaneous	4525*	1	0.8	1	0.8
Total		119	99.7	119	100.0

*exotic material; n = 13, 11%

Material codes from Warren 1979b

Table 4.11. Hammerstone distribution by weight and shape



Weight Class			Angular n	Angular %	Spherical n	Spherical %	Total n	Total %	Reused
10	RA		–	–	–	–	–	–	1
9			–	–	–	–	–	–	–
8	A		1	1.6	2	6.3	3	3.2	–
	S								
7	S		–	–	1	3.1	1	1.1	–
6	RA		–	–	1	3.1	1	1.1	1
	S								
5	RA		1	1.6	1	3.1	2	2.1	3
	RS								
	A								
	S								
4	RS		3	4.8	2	6.3	5	4.3	4
	A								
	S								
3	RA		19	30.6	13	40.6	32	34.0	2
	A								
	S								
2	RA		29	46.8	8	25.0	37	38.3	11
	A								
	S								
1	RA		9	14.5	4	12.5	13	13.8	3
	RS								
	A	Total	62	99.9	32	100.0	94	99.9	25
	S	Percent	66.0		34.0		Ratio A:S = 1.9:1		

A = angular; S = spherical; RA = reused angular; RS = reused spherical; weight classes defined on Table 4.8

not consistent. Kiva A exhibits an even distribution of spherical to angular hammerstones, especially when the three hammered quartzite specimens considered to be primarily polishers are incorporated (11 spherical to 15 angular or 14 spherical to 15 angular). The slightly higher number of quartzite hammerstones in Kiva A may be a subtle reflection of the temporal shift in material preference to petrified wood that is noted by Wills.

Table 4.12. Comparison of angular hammerstone size distributions between 1360 and canyon-wide sample.

Size Range of Angular Tools	Percent of Tools That Are Angular All Sites	1360
1-200 g	92	76
201-400 g	80	59
401-900 g	60	28
+900 g	100	100

The small number of rejuvenation flakes (Table 4.14) and the use of unmodified stones suggest that petrified wood, particularly nonconchoidal wood, was selected specifically for use as a hammerstone. The apparent nature of these flakes (impact shatter and not concerted hammerstone redressing) suggests that petrified wood was used extensively on more massive objects, e.g., in dressing manos and metates or in shaping masonry.

Wills argues that reduction in quartzite/quartzitic hammerstones may reflect a decrease in the range of flintknapping activity. He also suggests that petrified wood (because of its angularity) could have served quite well in the later stages of lithic reduction (Wills 1977:40-42). The general collection and the provenience structure of 1360 indicate a declining minority of quartzite hammerstones (Table 4.11; Wills 1977:Figure 1) through time. The ubiquity of petrified wood hammerstones certainly suggests that they were a general-use item rather than a task-specific tool.

Finally, additional collection subsequent to Wills' analysis has reordered the material percentages and indicates that 1360 is not anomalous for its period in the proportion of chert hammerstones, as Wills suggested (1977:42, Figure 2). Rather, the site reflects the expected gradual decline from the earlier Basketmaker and Pueblo I levels in chert materials (Table 4.10).

Summary

The predominant hammerstone type from 1360 is a small, angular object, usually made of a brittle, nonconchoidally fracturing petrified wood. Other principal materials are quartzite and conchoidally fracturing petrified wood. Only a few specimens of exotic material could be

Table 4.13. Factors determining hammerstone morphology

A. USE MORPHOLOGY

Raw Material	Angular n	Angular column %	Angular row %	Spheroid n	Spheroid column %	Spheroid row %	Total n	Total % of n
Cobble	12	19.4	60.0	8	44.4	40.0	20	25.0
Petrified wood	38	61.3	90.5	4	22.2	9.5	42	52.5
Other and unknown	12	19.4	66.7	6	33.3	33.3	18	22.5
Total	62	100.1	77.5	18	99.9	22.5	80	100.0

B. PRE-USE MODIFICATION

Raw Material	Flaked n	Flaked column %	Flaked row %	Battered n	Battered column %	Battered row %	Unshaped n	Unshaped column %	Unshaped row %	Total
Cobble	6	40.0	30.0	1	6.2	5.0	13	26.5	65.0	20
Petrified wood	4	26.7	9.5	13	81.3	31.0	25	51.0	59.5	42
Other and unknown	5	33.3	27.8	2	12.5	11.1	11	22.5	61.1	18
Total	15	100.0	18.7	16	100.0	20.0	49	100.0	61.3	80

Petrified wood	Flaked n	Flaked (n reused)	Battered n	Battered (n reused)	Unshaped n	Unshaped (n reused)	Total
Nonconchoidal	-	-	8	5	17	5	25
Conchoidal	4	2	5	2	8	2	17
Total	4		13		25		42

Table 4.14. Rejuvenation flakes

		Material Type						
		Petrified Wood						
Provenience		C	Non-C	Chalcedony	General Chert	Quartzite	Nacimiento Quartzite	Total
Backdirt		4	14	1	-	-	1	20
Trash Mound								
Grid BX		-	-	-	1	-	-	1
Pithouse B								
Level 1		-	-	-	-	1	-	1
Level 4		1	-	-	-	-	-	1
Total		5	14	1	1	1	1	23
% of total		21.7	60.9	4.3	4.3	4.3	4.3	99.9
	(other)							
% of hammerstones by material type	12.5	15.9	35.2	4.5	4.5	20.5	6.8	99.9

C = conchoidal, Non-C = nonconchoidal

isolated, suggesting that selection of hammerstones was largely a matter of local procurement.

In comparison with the general sample from Chaco Canyon, 1360 seems anomalous in the small size of its hammerstones: nearly 90 percent are below 300 g. In other respects the sample is average in composition for the time period. Through time, quartzite declines in popularity relative to petrified woods, and there are only a few incidents of chert, chalcedony, or other material being used as hammerstones.

It has been suggested that this reduction in hammerstone material variability and size range represents a constriction in the lithic technology. Secondary flaking may have occurred, but the incidence of primary core reduction seems to have diminished through time. The local reduction of large cores appears to decline concomitantly with the decrease in numbers of quartzite hammerstones. Angular hammerstones are purportedly more suitable for the final stages of lithic reduction, but angular hammerstones were also being used at this time to dress massive stone tools.

AXES, MAULS, AND CHOPPERS

Two axes, a maul fragment, and a possible unhafted chopper were recovered from 1360. Table 4.15 presents measurements, provenience, and materials used for these items. C. Breternitz (1976) has described the axes from 1360 in his summary of axes and mauls from Chaco Canyon, but he did not discuss the maul or possible chopper due to misclassification of the former and irrelevance to his study of the latter. The import of Breternitz's study is briefly summarized below.

The maul and two axes both came from the trash fill of Kiva A (Figure 4.6). All were made of exotic igneous material, probably from the San Juan River cobble beds. Both axes exhibit two opposing pecked notches for hafting and considerable grinding and polishing. One axe is represented by only the poll and grooved portion. This fragment's poll edge is abraded, suggesting use in grooving or engraving, possibly after the axe broke. The complete specimen has several small flake scars along the bit, but the edge shows no later battering or abrasion. The maul is a small, full-grooved fragment, which is bilaterally broken at or near the center of the groove. As it exhibits some evidence of burning, it was originally classified as a "firedog" (a pot support in a firepit), a possible postbreakage use.

The possible chopper was located in ramada fill north of Pithouse B. Originally a roughly oval cobble, this artifact is D-shaped due to the removal of large alternating flakes at one end and angular, irregular blocklike chunks at the other. The convex end may have served a chopping function, but this sinuous edge exhibits no extensive secondary battering, suggesting either inconsistent use as a chopper, use on soft material, or use as a core. Flake-scar junctures with the unmodified central body surface exhibit edge rounding and abrasion on both faces.

Table 4.15. Dimensions and distribution of axes, mauls, and choppers

Provenience	Tool	Total Length	Total Width	Total Thickness	Poll Length	Face Width	Bit Width	Weight	Material
Kiva A									
Level 1	Axe fragment	9.6	9.2	2.9	5.9	-	-	400	igneous (?)
Level 3	Complete axe	94.8	7.8	3.4	4.6	7.6	4.7	708	hornblende gneiss
Fill	Maul fragment	-	-	-	-	-	-	-	
Ramada Area 1	Chopper	8.8	10.7	5.3	-	-	-	670	andesite

Dimensions measured in mm; weight measured in g.

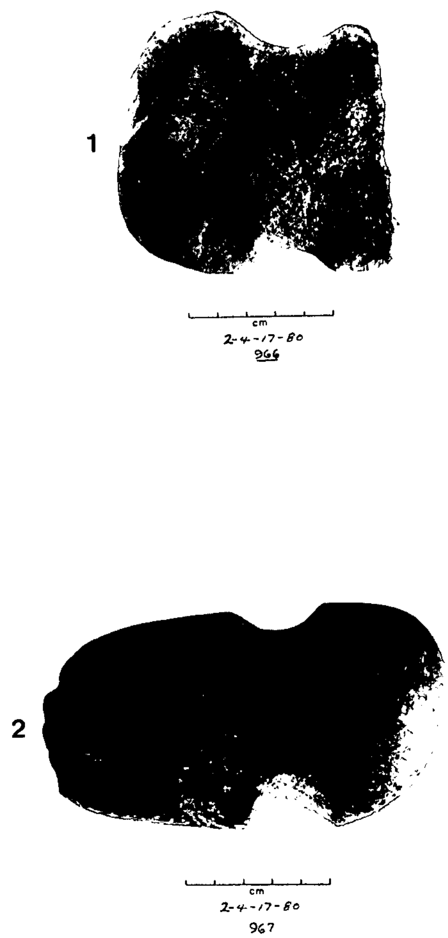


Figure 4.6. Axes from Kiva A: (1) axe fragment of unidentified igneous material, (2) axe made from hornblende gneiss

The flattened end exhibits lateral chipping and edge rounding, possibly to facilitate gripping. The presence of abrasion, lack of secondary battering, and apparent preparation of a hand platform suggest that this specimen was used as a hide processor or fleshing tool.

Breternitz cites some interesting trends in the whole assemblage that relate both to the general scope of Chaco's prehistory and to 1360's place therein. He notes that axes seem to have been most abundant during Pueblo II, and that through time these tools are increasingly made of exotic materials. Site 1360 conforms to both of these trends. Axes and mauls in Chaco occur at a 1.9:1 ratio and generally exhibit the lowest ratio of artifact type per number of rooms present; again 1360 is typical in these respects. But, as Breternitz points out, what is atypical is the paucity of axes in Chaco as a whole (C. Breternitz 1976:20). Accordingly, he postulates that the decrease in the number of axes through time was the result of differential architectural requirements and/or the depletion of local timber resources by the time of town construction (C. Breternitz 1976:23-24). One must concur with the functional logic of his position: no local timbering, no axes. Harvesting and processing of the ponderosa pine and douglas-fir used in the Great Houses would have required more axes than are found in these sites. Small-site construction and some fuel processing involving purely local sources would easily account for the small number of axes found in Chaco.

Summary

Site 1360 produced two axes, a maul, and a chopperlike artifact that was probably used as a fleshing tool. Although not abundant, the axes and the maul are present in ratios typical of other contemporary site assemblages. Occupants of 1360 selected harder, more serviceable materials from the San Juan cobbles for use in heavy-duty chopping. The small number of these tools and their absence from deposits other than trash suggest that harvesting of live trees was never an extensive activity at 1360.

MANOS

Site 1360 produced 227 manos: 175 whole artifacts and 52 fragments (Table 4.16). Cameron (1977) analyzed 96 specimens from the then-available collection of 134 in her descriptive analysis of manos from 10 sites in Chaco Canyon. The 1360 specimens constitute only about 10 percent of her sample, but they are a valuable subset as they make up the third largest mano collection from the small sites excavated by the Chaco Center. As such, they contribute substantially to the characteristics described for manos in Chaco. This discussion focuses on the distinct characteristics of manos from 1360 and on their distribution.

Table 4.16. Mano distribution

	Mano form									
	Unknown			Rectangular		Ovoid		Triangular		
Provenience	Whole	Fragment	Biscuit	Whole	Fragment	Whole	Fragment	Whole	Fragment	Total
Backdirt	6	3	1	–	–	–	–	1	–	11
Trash Mound										
Lower fill	1	–	–	–	–	1	–	3	2	7
House 1										
Fill	1	2	–	1	–	–	–	–	–	4
Surface	9	–	–	–	–	–	–	–	–	9
Room 1 fill	1	–	–	–	–	–	–	–	–	1
Room 2 fill	–	–	–	–	–	–	–	1	–	1
Room 4 wall construction	1	–	–	–	–	–	–	–	–	1
Room 4 Floor 1 Pit 1	1	–	–	–	–	–	–	–	–	1
Room 6 Floor 1	1	–	–	–	–	–	–	–	–	1
Room 6 Floor 2	2	–	–	–	–	–	–	–	–	2
Room 7 fill	–	–	–	–	–	–	–	1	–	1
Room 7 Floor 1	1	1	–	–	–	–	–	–	–	2
Room 8 fill	1	–	–	–	–	–	–	–	–	1
Room 8 Floor 1	1	–	–	–	–	–	–	–	–	1
Room 11 Level 2	–	–	1	1	–	–	–	–	1	3
Total										30
Kiva A										
Fill	3	4	–	–	–	–	–	1	–	8
Level 1	9	–	–	–	–	–	–	5	8	22
Level 2	4	4	–	3	–	–	–	2	2	15
Level 3	6	–	–	–	–	–	–	–	–	6
Level 4	3	2	–	–	–	–	–	–	–	5
Total										56

(continued)

Table 4.16. (continued)

	Mano form									
	Unknown			Rectangular		Ovoid		Triangular		
Provenience	Whole	Fragment	Biscuit	Whole	Fragment	Whole	Fragment	Whole	Fragment	Total
Pithouse B										
Fill	7	1	–	–	–	–	1	–	–	9
Level 1	4	1	–	–	–	–	–	–	–	5
Level 2	–	–	–	–	1	–	–	3	–	4
Level 3	1	–	–	–	–	–	–	3	–	4
Wing wall										
area fill	3	3	–	–	–	–	–	–	–	6
floor	–	–	–	–	1	–	–	1	–	2
Total										30
Plaza Areas										
Area 3 fill	1	1	–	–	–	–	–	–	–	2
Floor 1	6	2	–	7	–	3	–	13	1	32
Floor 2	1	1	–	–	–	–	–	–	–	2
Catchment										
Basin 3	–	–	–	2	–	–	–	–	–	2
Area 5 fill	–	1	–	1	–	–	–	–	–	2
Area 5 floor	6	–	1	–	–	–	–	1	–	8
Total										58
Ramada										
Central fill	16	–	2	–	–	–	–	–	–	18
Ventilator X	2	1	–	–	–	–	–	–	–	3
East end										
fill	–	2	–	–	1	–	–	1	–	4
floor	1	1	–	2	–	3	–	11	3	21
retaining wall	1	–	–	–	–	–	–	–	–	1
Total										47
Total	100	30	5	17	3	7	1	46	18	227
Total by form	130		5	20		8		64		227
% of analyzed sample	3.1		1.0	20.8		8.3		66.7		99.9

Cameron has identified two types of manos, with two varieties of the main type. Form names are derived from the cross-sectional shape of the artifact. The first type, biscuit or one-hand manos, is more common to earlier horizons, such as the Basketmaker and Desert Culture periods, where it is associated with milling of small, hard seeds in basin metates (Bartlett 1933). The floor-associated locations of some specimens of this type at 1360 support the suggestion that these tools continued to form a small part of the grinding kit in later Pueblo periods (Hayes and Lancaster 1975:154). Typological ambiguity is evident in the identification and analysis of two specimens as both hard active abraders and one-hand manos. These particular specimens have been deleted from this section and are discussed as a pestle-form abrader and a floor polisher below. Analysis of other specimens from this period suggests that the mechanics of grinding had changed from rotary to reciprocal strokes.

The principal form of mano is a rectangular-to-squarish object of sandstone, usually (93 percent of the cases) a fine-grained, hard sandstone (Figures 4.7-4.10). Such sandstones are available locally. Complete manos range from 23.1 to 13.8 cm in length and from 13.0 to 8.1 cm in width (length mean = 17.8 cm, s.d. = 3.1 cm). One variety of this basic mano type, the narrower discoidal specimens (n = 8), probably results from the expedient use of narrow-bedded sandstone. The majority (75 percent) of these manos are made of soft sandstones. The other variety, wedge-shaped or multifaceted specimens, is the end result of wear on the original square form. Among the known forms, this variety has the lowest ratio of fragmentation and the highest level of reuse (Table 4.17). This, coupled with Cameron's analysis, strongly suggests that wedge shapes are the end of the use continuum, with artifacts of this shape subsequently ending up in the trash or being recycled as another tool.

Site 1360 exhibits few exceptional characteristics in mano morphology and distribution. Manos from the site do include a surprisingly high percentage (26.5 percent) of artifacts with finger facets along one longitudinal edge. These finger (and undoubtedly thumb) indentations probably facilitated grip and control during grinding (Figure 4.10[2]). The site also had an exceptionally high number of complete manos (75 percent), which cannot be wholly attributed to selective collection. Cameron expresses a largely subjective opinion that manos from 1360 are distinct and exceptional from the standpoints of form, balance, and general appearance of the material and grinding surface(s).

The extramural areas around Pithouse B, particularly those near the L-shaped wall, had many manos on the occupational surface (Figure 4.11). This area displays a clustering of the largest specimens, as well as most of the complete items and most of the finger-beveled specimens from the site. The presence of three catchment basins, the center one containing two manos, to the south of the L-shaped wall further suggests that this was a milling area. The absence of in situ metates and bin walls points to the salvage of the metates, the probable impermanence of this location as a milling area, and the comparatively low value placed on the abundant manos. Distribution of mano wear (Table 4.17) implies

Figure 4.7. Mano from House 1 fill

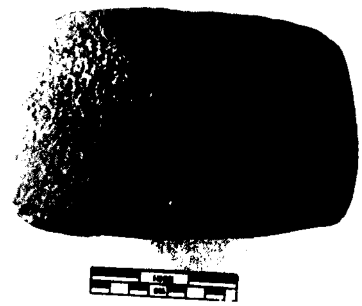


Figure 4.8. Mano from Plaza Area 3, Floor 1

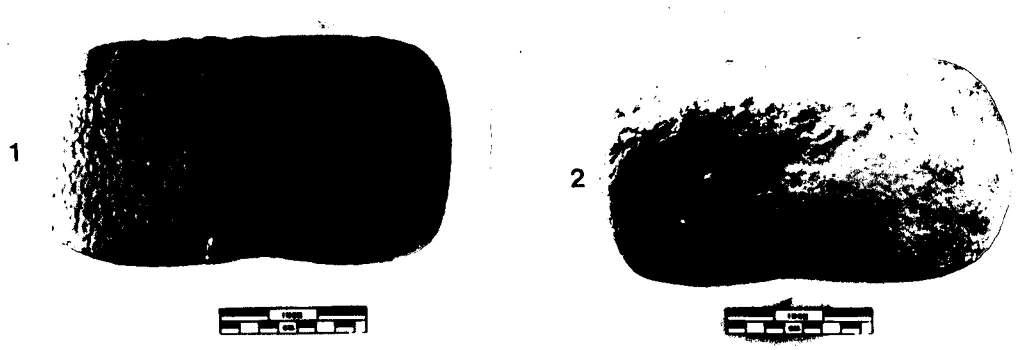


Figure 4.9. Mano from Plaza Area 3, Floor 1: (1) use face, (2) opposite face

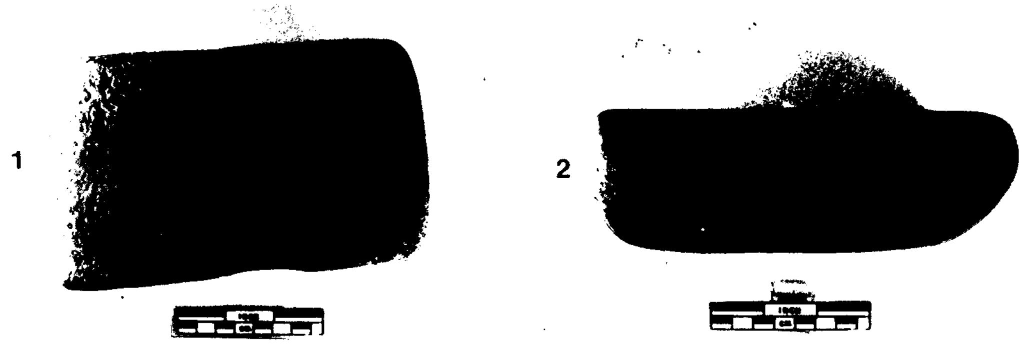


Figure 4.10. Mano from Room 2, upper fill: (1) use face, (2) finger bevel

Table 4.17. Reuse and wear on manos

	Mano Use Only			Slight Grinding/ Minor Unused Surface			Total			
	Whole		Fragments	Whole		Fragments	Whole		Fragments	
	L	S	S	L	S	S	L	S	S	Total
Pecking evident										
no abrasion	1	2	1	2	1	1	3	3	2	8
moderate abrasion	4	5	6	9	7	3	13	12	9	34
heavy abrasion	3	3	2	9	3	3	12	6	5	23
No pecking visible	-	1	2	3	1	-	3	2	2	7
Total	8	11	11	23	12	7	31	23	18	72
Total by group	19		11	35		7	54		18	72
Grand total	30			42			72			

Artifact Type	Secondary Use	Tertiary Use
Hammer	1	-
Pallette	4	-
Anvil	4	-
Abrader	8	1
Unknown	49	6

Location of Reuse	Secondary Use	Tertiary Use
Major use face	12	-
Minor unused face	50	7
Edge	1	-
End	1	-
Use face and edge	2	-

Character of Use	Secondary Use	Tertiary Use
Battering	1	-
Chipping	1	-
Pecking with chipping	1	-
Pigment	1	-
Pigment and grinding	3	-
Grinding	12	1
Grinding and polish	1	-
Grinding and pecking	4	-
Slight grinding and polishing on unused surface	42	6

L = large; S = small

(continued)

Table 4.17. (continued)

	Number	Percent	Number	Percent of Total
Mano Use Only				
Unifacial	61	84.7		
Bifacial	11	15.3		
Subtotal	72	100.0	72	75.0
Mano Reuse				
Percussion	3	12.5		
Grinding	21	87.5		
Subtotal	24	100.0	24	25.0
Total			96	100.0

	Mano Form		
	Rectangular	Ovoid	Triangular
Ratio -- Whole:Fragments	5.6:1	7:1	2.5:1
Manos reused as another tool			
number	1	2	14
percent	5	28.6	21.9
Number of fragments	3	1	18

the presence of an active grinding kit rather than simply discarded items. If all or most of the manos were discards, fragments and/or specimens with completely abraded surfaces would be much more common. Both the distribution of mano wear and the ubiquitous use of hard, fine-grained sandstone indicate that mano sets with graduated degrees of material coarseness were not maintained for milling.

The percentage of manos reused specifically as other tools seems low (12.7 percent), but this figure is similar to those from other sites examined in this regard. This infrequent reuse of manos may point to both the ready availability of sandstone and the unsuitability of the worn-out mano shape for other specific tasks. Those manos with slight use on the side opposite the grinding surface probably represent specimens that were occasionally used on this back side or items that were smoothed for comfort during use. Certainly their wear distribution is the same as that of manos without this incidental use, and there appears to be no reason to posit some mysterious or unknown function for these items. Manos were mostly reused as abraders (Table 4.17) or as bases for other work. Use of worn-out manos as posthole shims, a common practice at other sites, could not be demonstrated here since none of the ramada postholes were excavated.

Although 53 percent of the manos at 1360 were found on plaza/ramada surfaces, mostly around the L-shaped wall, manos frequently appear in rooms or pit structures used for habitation. The ratio of manos to habitation areas (rooms plus pit structures) at 1360 is consistent with Cameron's observation (1977:24) that this ratio increases through time. If such calculations are made using a figure of 18 excavated habitation areas, there are approximately 12 manos per area (number of manos = 227), which conforms with the data presented by Cameron (1977:Figure 17) for the entire site but would appear to conflict with the observation of an increasing ratio through time. Elimination of rooms that are ceramically "early" leaves eight habitation areas for consideration as contemporaneous during the final occupation of the site: Pithouse B; House 1, Rooms 1, 6, 7, 8, 9, and 11; and the L-shaped wall area. If manos recovered from trash and the earlier rooms are also eliminated, the ratio of manos per area is 17:1, more in keeping with the ratios for 1360's closest contemporaries, 627 (20:1) and 629 (22:1). Other than the distinct architectural placement of the mealing area, 1360 does not appear to differ from similar contemporary sites in the milling activities carried out during the terminal occupation.

Summary

Excavations at 1360 recovered 227 manos. Most are made of hard sandstone and were used in a unidirectional or reciprocal grinding stroke. Most specimens exhibit unifacial, unifaceted wear. Manos from 1360 are remarkable in the number of finger bevels present. A few one-hand manos are present, but their use wear suggests that there was an occasional need for a smaller, compact grinder that was then manipulated in a manner similar to the larger two-hand specimens.

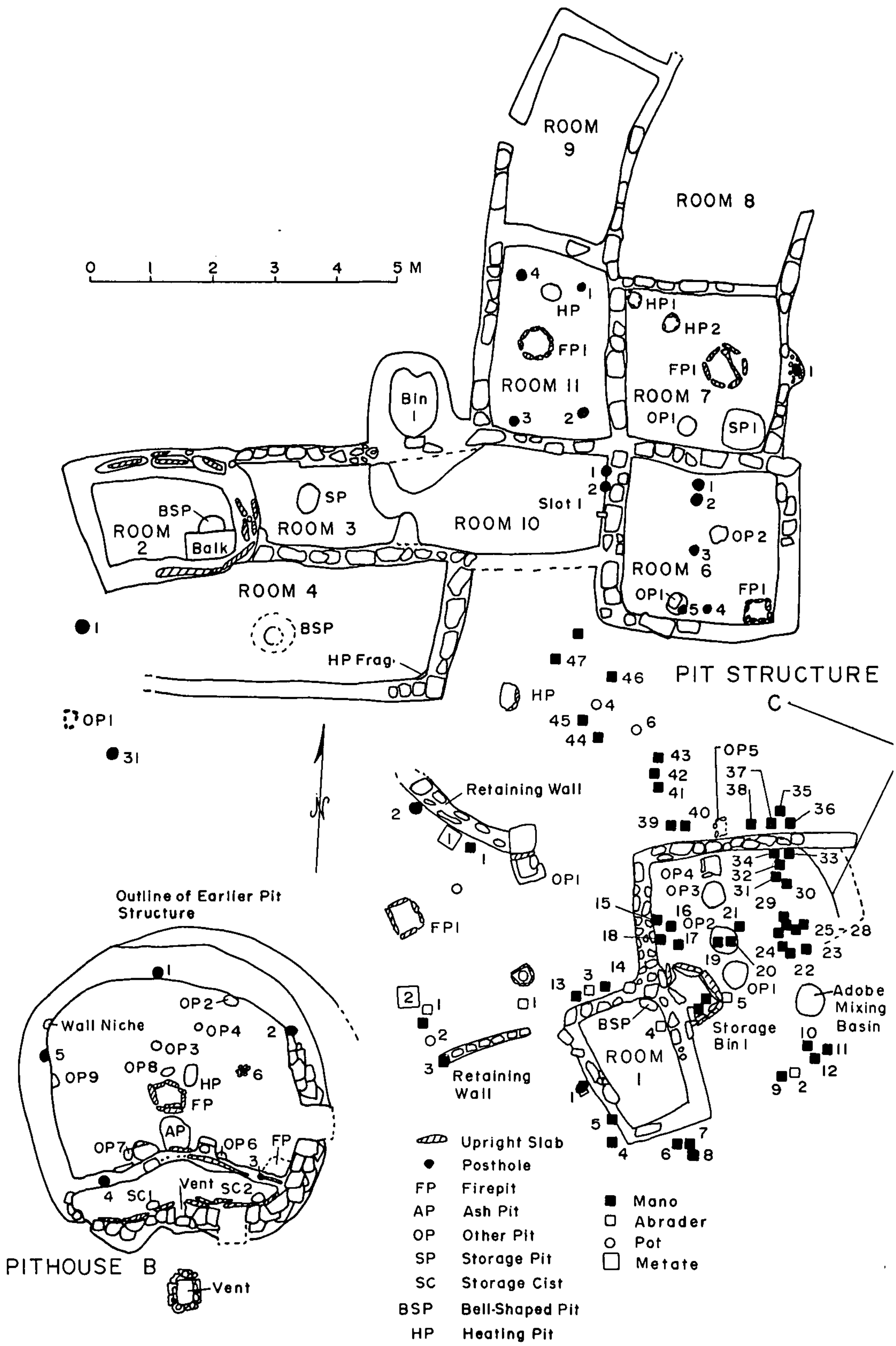


Figure 4.11. Floor artifacts from House 1 Plaza Areas

KEY TO FIGURE 4.11

Pots

p-1 Mancos Black-on-white canteen (?)
-2 Tohatchi jar
-3 culinary jar
-4 Tohatchi jar
-5 Newcomb Corrugated
-6 Gray Hills gray

Abraders

a-1 passive
-2 soft active
-3 unidentified
-4 anvil
-5 passive
-6 anvil (mano)

Manos

m-1 through 47

Manos from the site are rectangular-to-squarish, discoidal, or wedge-shaped and sharply faceted in cross section. The two latter shapes seem to be exhausted forms of the rectangular mano. The discoidal manos are apparently produced by the use of narrow, conveniently bedded sandstones; the thick, squarish forms probably represent the least used specimens on the use-form continuum. Reuse of manos and extreme use-faceting on manos occur in low frequencies, strongly suggesting the low value of manos as reworkable or curatable objects. The availability of hard sandstone throughout Chaco Canyon probably accounts for the casual treatment of manos.

Only one mealing area could be identified. The area immediately south of the L-shaped wall contained three likely catchment basins, and the surrounding area was littered with manos. The uniformity of mano hardness and grain size indicates that no graduated sets of manos with variable coarseness were created through the use of differentiated materials. Examination of artificially roughened surfaces suggests a continuum of use attrition was present, with moderately roughened specimens being the most common. This suggests that grades of coarseness on mano use surfaces were probably artificially maintained through manual dressing.

Both the nature of the manos and the ratio of manos to habitation areas seem to suggest that there was nothing distinctive in either the quality or quantity of mealing activities that occurred at 1360. Cameron's observation that production and use of manos appear to have been stable, conservative pursuits throughout the Anasazi period in Chaco is certainly supported by the collection from 1360.

METATES

Most of the 49 metates recovered from 1360 (Table 4.18) were discarded in the field following minimal measurements of form and use surfaces. In 1976 L.J. Hooton recorded attributes on 17 specimens from the site that had been brought back to the lab for more extensive analysis. The following discussion covers both of these data sets.

All of the recovered metates are of the trough type and are made of hard sandstone. With few exceptions these trough metates are open only at one end; often they exhibit small shelves at the closed end of the trough. These shelves occasionally show evidence of incidental use ranging from anvils to palettes. Metate length varies from 66 to 39.5 cm and width from 45 to 25 cm, with relatively little variation (n = 25; mean length = 50 cm, s.d. = 6; mean width = 35 cm, s.d. = 6 cm). Such figures suggest that metates at 1360 were a fairly standardized product.

Table 4.18 indicates that most metates were located in the fill of the area behind the wing walls of Pithouse B. These metates are mostly fragments of worn-out specimens reused as masonry in the southern wall of this structure. All appear to be trough metates of the single open-

Table 4.18. Metate distribution

	Metate Form*					
	Undifferentiated Trough		Whole Trough			
Provenience	Whole	Fragment	Form 1	Form 2	Subtotal	Total
Plaza Areas						
Area 2 surface	1	–	–	–	1	
Area 3 fill	–	1	–	–	1	
Area 3 floor	–	1	–	–	1	3
Ramada						
Central	–	2	–	–	2	
East side fill	–	2	–	1	3	
East side floor	–	–	1	–	1	6
House 2 surface	–	1	–	–	1	1
Trash Mound fill	–	1	1	–	2	2
Kiva A fill	2	5	–	–	7	7
Pithouse B						
Fill	–	2	–	–	2	
Wing wall area fill	5	17	–	–	22	
Wing wall area floor	–	–	3	1	4	
Bench	–	1	–	–	1	
Vent	–	–	1	–	1	30
Total	8	33	6	2	49	49

* Form 1  Form 2 

ended variety. Few metates can be identified as in-use specimens at the time of abandonment. Two exceptionally similar metates come from the floor of the area behind the wing wall of Pithouse B; one has a single open end, the other is open on both ends of the trough. Another double open-ended metate lay near Pithouse B on the eastern side of the ramada. It is suggested that these metates are temporally associated with the occupation of Pithouse B because of their locations and similarity of attributes. Although it is often suggested that through time double open-ended metates replaced the single open-ended variety in popularity (Bartlett 1933; F. Plog 1974; Woodbury 1954), at 1360 it would appear that single open-ended and double open-ended metates represent a continuum of use wear rather than constituting separate types. The large number of metates reused as masonry in Pithouse B precludes accurate assessment of the contemporaneity of any one group of metates and obscures evidence of milling activity in this area of the pithouse.

Table 4.19 presents data on the percentage of wear as represented by the ratio of the trough depth to original stone thickness. The use percentage indicates a proportionally high number of heavily used metates, implying a metate assemblage of long-used items and discards. This generally supports the contention that metates recovered at 1360 are mostly discarded or reused nether milling stones, and that in-use specimens at the site were largely salvaged at the time of abandonment. Metates in any form, much less those in serviceable condition, are conspicuous by their absence.

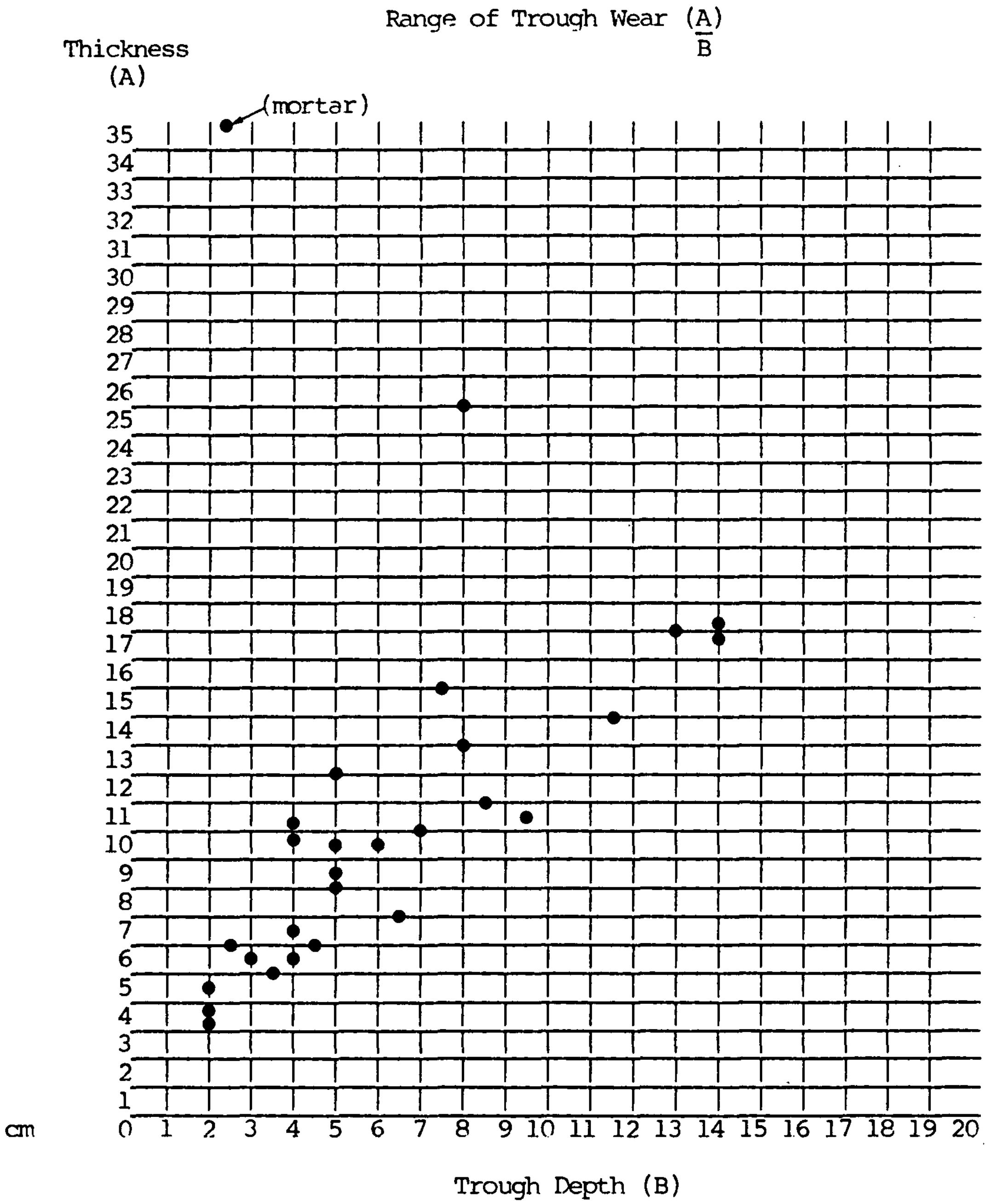
Metates were not extensively reused except in masonry. Evidence of incidental use as anvils and possibly as pigment palettes does occur. Anvil use most often appears on fragments found in masonry or trash fill. Often such wear is found on the back side of the metate. One specimen from Kiva A trash exhibits what was identified as a "kill hole" but is probably damage incidental to reuse of the metate as an anvil. Two fragments, one located in the Pithouse B vent, had red pigment on the lateral trough shelves; another fragment found on the floor behind the pithouse wing walls also exhibited pigment. This area of Pithouse B is the only intramural area with appreciable amounts of ochre; this portion of the structure may have been, in part, a locus of pigment storage, grinding, and processing. Another metate fragment on the bench in Pithouse B was extensively reused as an anvil and shows grinding, battering, gouging, and chipping. It was apparently the only metate fragment actively in use as a tool at abandonment.

Summary

Site 1360 produced relatively few (n = 49) metates, most of which are functionally unserviceable fragments. All are hard sandstone trough metates, and most are of the single open-ended variety.

Most metates are from structural rubble and represent reuse as masonry. Other reuse of metates as tools was restricted to heavy-duty functions, such as anvils and palettes. The low number of metates

Table 4.19. Metate wear



Percent of Artifact Showing Utilization	Number of Artifacts	Percent of Total
0-25	1	3.1
25-49	6	21.4
50-69	9	32.1
70+	12	42.9
Total	28	99.5

reused as tools suggests that exhausted metates were an expendable, low-value object subject to discard or casual reuse.

The absence of bins in the L-shaped wall area suggests that structured, formalized grinding areas or rooms were not yet fully developed. But the presence of the three catchment basins does suggest that a transition to permanent, formal mealing areas may have been underway. Although it has been suggested that changes in social organization were responsible for the formalization of grinding locations, it may be that a change in milling technology accounts for this shift to permanent mealing facilities. With the introduction of sets of metates of graduated coarseness, permanent grinding bins might have been more practical.

The few possible in-use metates were located in Pithouse B and the adjacent ramada. There is a possibility that metates were resting against the exterior south wall of Pithouse B and fell, with the collapse of the masonry, into the southern portion of the pithouse, which would caution against automatically interpreting the wing-wall area of Pithouse B as a grinding area. The presence of metates with troughs open at both ends in these two late proveniences suggests either that this form was just coming into use when 1360 was abandoned, or that the single and double open-ended forms represent only a minor variation in grinding pattern on trough metates. Metates were absent in the only discernible mealing area. This absence and the high incidence of used-up metates suggest that serviceable specimens were salvaged from the site upon or after abandonment.

ABRADERS

Akins (1980) has analyzed 89 of 93 nonspecific ground stone items from 1360. As the term "abraders" implies, this broad class of tools accomplished the multiplicity of tasks involving grinding, rubbing, and use of a platform upon which to strike, gouge, or drill. These artifacts were also used to provide support for more detailed grinding or working. Broad classes of active and passive abraders, grooved abraders, polishing stones, and anvils characterize the range of abrading tools from the site (Table 4.20). The following discussion slightly modifies and briefly summarizes Akins' work as it pertains to 1360.

In order to discuss abraders it is necessary to highlight key elements of Akins' extensive descriptive analysis. Details of tool sizes are available in Table 4.21. Active and passive abraders constitute the bulk of the collection (55 percent; Table 4.20) and are, in essence, counterparts of one another. Active abraders are often smaller and have flat or slightly convex surfaces while passive abraders, like most nether grinding stones, are larger and have a slight concavity. Among the active abraders, three types are apparent beyond the morphological differences implied by specific names. Those made of soft, whitish sandstone (Figures 4.12, 4.13) constitute one easily recog-

Table 4.20. Abrader distribution

Provenience	Active Abraders: General S	Active Abraders: General H	Active Abraders: Faceted	Active Abraders: Lapidary	Active Abraders: Ochre Stones	Active Abraders: Paint Grinders	Active Abraders: Edged	Active Abraders: Anvil Wear	Passive Abraders: General	Passive Abraders: Anvil Wear	Passive Abraders: Lapidary	Grooved Abraders: General	Polishing Stones: General	Polishing Stones: Polishers: Pot	Polishing Stones: Polishers: Floor	Polishing Stones: Broken Abraded	Anvils: General	Anvils: Anvil/ Abrader	Total
House 1, fill	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Room 1 floor	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	2
Room 4 fill	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Room 9 fill	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3
Room 11 floor fill	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2
Total																			9
Kiva A, fill	2	2	1	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	8
Level 1	2	2	1	-	1	-	-	-	-	-	-	1	3	-	1	-	1	-	12
Level 2	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-	-	-	1	6
Level 3	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	3
Level 4	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
Total																			31
Pithouse B, fill	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	5
Level 4 floor fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Floor:																			
Main chamber	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	3
Wing wall area	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3
Bench	3	-	-	-	-	-	-	-	-	-	1	-	3	2	1	-	-	-	10
Wall construction	-	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	3
Total																			25
Plaza Areas																			
Area 3 fill	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Area 3 floor	1	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	3	-	6
Area 5 floor	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total																			8
Ramada (East End)																			
Fill	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	4
Floor	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	1	4
Total																			8
Trash Mound	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	2
Backdirt	-	3	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-	6
Totals	13	15	4	1	1	1	3	1	2	4	4	2	18	6	3	1	8	2	89
Grouped Totals				39						10		2		28			10		
% of total				43.8						11.2		2.2		31.5			11.2		

S = soft, H = hard

Table 4.21. Abrader measurements

	Active Abraders									Passive Abraders			Grooved Abraders	Polishing Stones				Anvils	
	Hard					Ochre	Paint		Anvil		Anvil				Polishers:		Broken		Anvil/
	Pestle	Tabular	Soft	Faceted	Lapidary	Stones	Grinders	Edged	Wear	General	Wear	Lapidary	General	General	Pot	Floor	Abraded	General	Abrader
Complete	5	12	8	3	-	1	1	3	1	3	2	7*	2	8	7	4	1	5	2
Fragments	-	-	5	1	1	-	-	-	-	-	1	-	-	2	1	-	-	1	-
Missing	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	1	-
Weight																			
$\bar{x}$	896.4	329.6	264.2	210.0	-	91	262	25.0	732	1459.3	1273.0	852.1	326.0	186.8	75.1	559.3	126	1083.2	982.0
s.d.	412.7	121.1	124.0	71.4	-	-	-	6.1	-	1840.1	350.7	603.0	210.7	158.8	48.8	141.5	-	738.0	595.4
range	445-1509	94-492	140-478	132-272	-	-	-	18-29	-	338-3583	1025-1521	223-1928	177-475	32-401	3-7	397-717	-	475-2289	561-1403
Length																			
$\bar{x}$	12.2	9.8	9.8	10.0	-	6	12	5.7	12	21.0	15.5	20.4	9.0	6.9	5.4	10.3	6	16.0	18.5
s.d.	2.2	1.5	2.1	2.3	-	-	-	0.6	-	7.5	3.5	6.6	1.4	1.4	1.2	1.8	-	5.4	0.7
range	9-15	6-12	6-13	7-11	-	-	-	5-6	-	13-28	13-18	14-30	8-10	5-8	3-7	9-13	-	11-23	18-19
Width																			
$\bar{x}$	8.6	7.1	7.1	7.2	9	6	8	4.7	10	17.3	12.5	15.0	7.5	5.3	4.4	7.8	3	11.7	11.5
s.d.	2.6	1.8	2.4	1.5	-	-	-	1.2	-	4.0	0.7	1.2	2.1	1.2	1.1	2.1	-	1.6	2.1
range	7-13	5-9	1-10	5-8	-	-	-	4-6	-	13-21	12-13	12-17	6-9	3-7	3-6	5-10	-	10-14	10-13
Thickness																			
$\bar{x}$	5.6	2.8	2.5	2.3	3	2	2	1.0	3	2.3	3.3	1.2	5.0	3.1	2.1	4.8	4	4.2	3.0
s.d.	1.5	0.5	1.0	0.5	-	-	-	-	-	1.5	0.6	0.5	-	1.6	0.8	1.3	-	3.5	1.4
range	4-8	2-3	1-5	2-3	-	-	-	(1)	-	1-4	3-4	1-2	(5)	1-5	1-3	3-6	-	2-11	2-4
Surface																			
$\bar{x}$	51.8	44.3	56.6	49.0	-	12	38	10.3	72	311.0	153.5	247.3	-	18.8	12.8	35.0	8	122.6	112.5
range	38-68	11-68	33-89	30-64	-	-	-	2-27	-	148-470	127-180	132-493	-	4-30	4-22	19-56	-	62-183	100-125

*Passive Lapidary Abraders:

	Group 1 (n = 3)					Group 2 (n = 4)				
	Weight	Length	Width	Thickness	Surface	Weight	Length	Width	Thickness	Surface
$\bar{x}$	1415.3	27.3	15.6	1.6	340.0	429.8	15	14	-	177.8
s.d.	445.6	2.3	1.2	0.6	-	199.3	1.0	1.6	-	-
range	1121-1928	26-30	15-17	1-2	213-493	223-686	14-16	12-16	(1)	132-196

Weight measured in g; Length and Width measured in mm; Surface measured in mm sq nizable group of tabular tools, while those of the harder, more common, gray to tannish Cliffhouse Formation sandstone (Figure 4.14) may be subdivided into tabular (Figures 4.14, 4.15) and pestle forms (Figures 4.16, 4.17). Pestles or "cornbreakers" are distinctive tools that exhibit extensive abrasion on all sides of the shaft between the battered poles. These tools are uniquely designed to act as both hammerstones and grinders after the fashion of biscuit or one-hand manos. Woodbury (1954:89-90) provides a description of these pestles as cylindrical hammerstones used primarily in food processing. Hard tabular active abraders were subject to little formal investment in tool shaping in comparison with either soft tabular forms or the hard pestle abraders (Figure 4.15). While most active abraders appear to have been specially made for that use, the subset of hard active abraders is mostly the result of extensive use of appropriately shaped unmodified stones or old manos.

Passive abraders and anvils are made exclusively from hard sandstone. Two types of general passive abraders exist: thin flat slabs with no concavity; and thicker, larger stones with a marked centralized depression (Figures 4.18, 4.19). Three of five general passive abraders have hematite ochre stains, suggesting at least some pigment processing function. Those with anvil wear are unexceptional beyond the percussion scarring (Figure 4.20). The definitions for both active and passive lapidary stones are couched in contextual terms; debris and finished pieces of ornamental material, principally turquoise, co-occur with these lapidary tools at 1360. Akins notes that passive lapidary abraders are rare prior to the Pueblo II period.

Grooved abraders (2.2 percent of the abrader assemblage) are often discussed as shaft smoothers or straighteners or as awl sharpeners; they possess small semicircular grooves, as the name implies (Figure 4.21). These implements occur throughout the Chacoan Anasazi record, but they tend to become more formalized in later periods.

Polishing stones (26.1 percent of the assemblage), mostly of quartzite, are distinguished from naturally smoothed local quartzite pebbles by the presence of either areas of more intense patina or well-smoothed and polished facets (Figures 4.22, 4.23). Size is the principal distinguishing characteristic between those polishers purportedly used for compacting architectural plasters (i.e., floor polishers) and those inferred to be pottery polishers. Three distinct metamorphic specimens--a complete polisher from the bench of Pithouse B and fragments from House 1, Room 9 and the ramada fill--are probably all examples of floor polishers. The specimen from the ramada has been identified as a rare "edged polisher," but it is merely an exotic material item with polish on the exterior face and abrasion along a broken interior edge. The lack of surface blemishes from use in hammering distinguish pottery polishers from general polishing stones; the latter exhibit extensive, diverse uses, such as hammering and possible compaction and smoothing of rough surfaces on digging-stick shafts or bone tools.

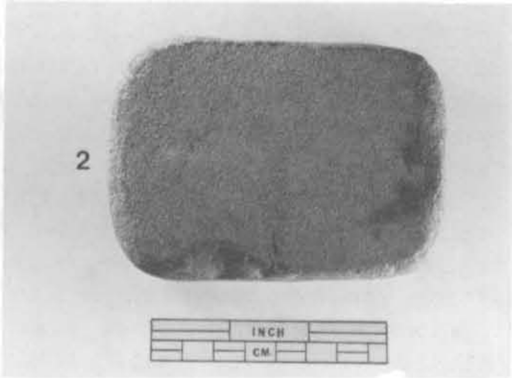


Figure 4.12. Soft tabular active abrader from Pithouse B bench: (1) side view; (2) full face

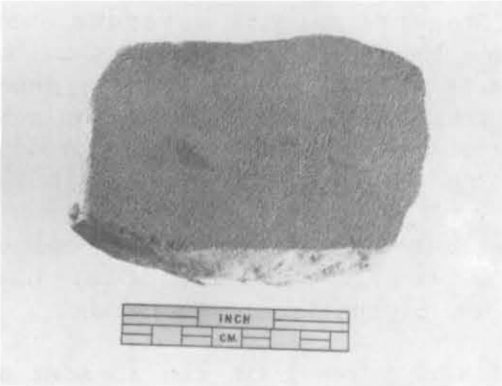


Figure 4.13. Soft active abrader from Plaza Area 3, Floor 1

Figure 4.14. Hard active abrader with pigment from Kiva A fill

Figure 4.15. Hard active abrader used as a paint grinder from Pithouse B wall construction

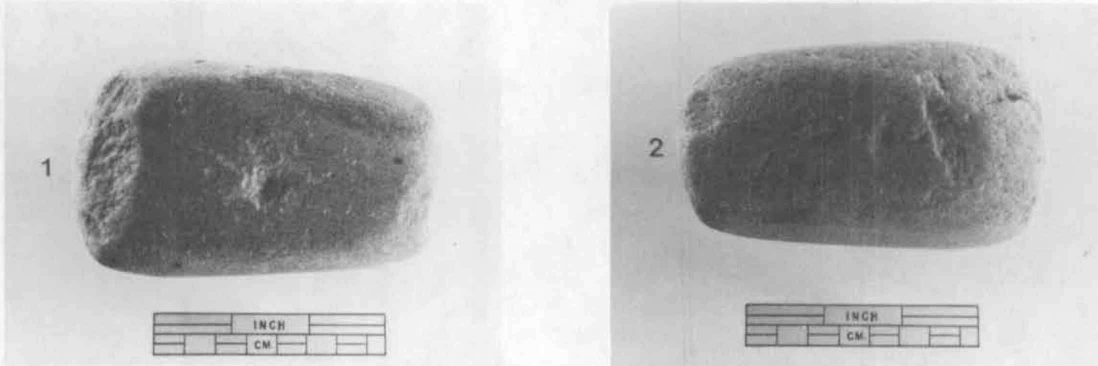


Figure 4.16. Hard active abrader, pestle form, from Pithouse B wing wall area: (1) anvil wear, (2) opposite face; note battering on poles

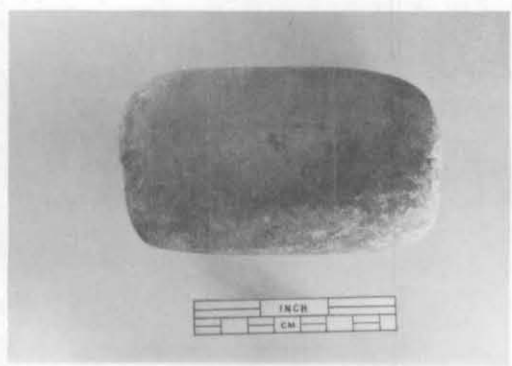


Figure 4.17. Hard active abrader, pestle form, from Pithouse B main chamber floor

Figure 4.18. Passive abrader with anvil wear from Ramada, Floor 2

Figure 4.19. Passive abrader from Pithouse B wall masonry

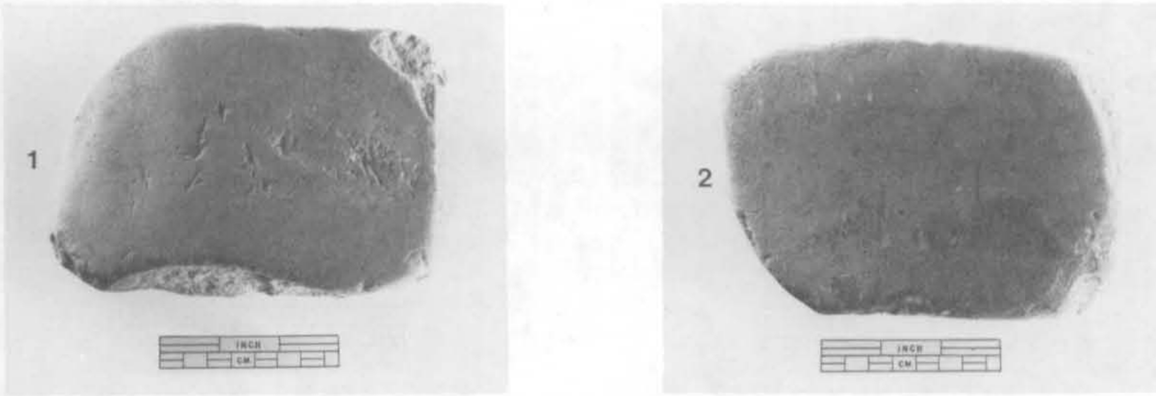


Figure 4.20. Passive abrader with anvil wear from ramada floor: (1) anvil scars, (2) concave passive abrader surface

Figure 4.21. Grooved abrader from Trash Mound

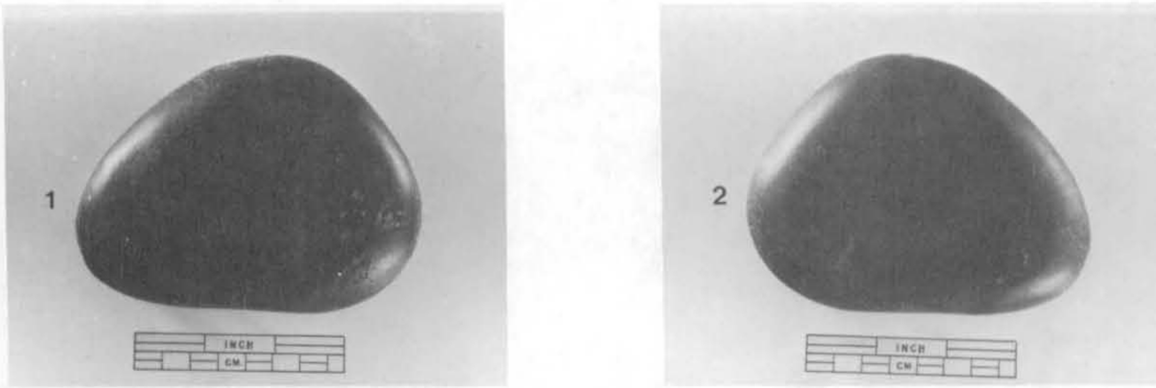


Figure 4.22. Floor polisher from Pithouse B bench: (1) slightly scarred face, (2) unblemished face

Anvils (9.8 percent of the assemblage) are generally heavy tools that were often used for both grinding and pounding (Figures 4.24, 4.25). Anvils, as bases upon which some tasks were performed, are characterized by a low degree of investment in formal preparation. They are often unaltered stones or reused broken artifacts, such as manos or metates, upon which subsequent use as an anvil is indicated by the extensive pitting, gouging, and some grinding. This latter wear contrasts with the normal wear patterns of the original tool use (Figure 4.24). Anvil-abraders, at least at 1360, constitute the least valid class of artifact; both specimens are complete manos, one of which exhibits percussion on the unused face (Figure 4.20).

The abrader assemblage at 1360 is distinct in a few respects. Precision grinding requiring a narrow edge is strongly suggested by the relatively high occurrence of active faceted and edged abraders (Figures 4.26, 4.27). These make up 4.5 and 3.4 percent of the analyzed sample respectively--the highest percentage representations for these tools among the 13 sites examined by Akins. Polishing stones, which are common in earlier sites, are unusually abundant at 1360, considering the time period represented. It is clear from the size ranges (Table 4.21) and secondary modification noted for polishing stones that the majority of these items cannot be classified as either plaster or pottery polishers. This suggests that many of these artifacts were multiple-use tools, only one aspect of which may be accounted for by the "abrader" usage.

Finally, Akins (1980) has suggested the existence of a lapidary tool kit in Pithouse B. This kit is minimally composed of an active lapidary abrader (Figure 4.28), a lapidary anvil (Figure 4.29), and passive lapidary abraders (Figures 4.30-4.32). Although other tools of the lapidary class were found at 1360, they were found in contexts not definitely affiliated with Pithouse B.

Some anomalies in the 1360 assemblage (relative to the time period represented) may be explained as resulting from field sampling and discard procedures. The low occurrence of abrader/anvils and passive abraders, the absence of palettes, and the disproportional representation of soft active abraders (22.5 percent) may relate to discard of many metates, manos, and other ground stone items (n = 107) prior to analysis. Cameron's analysis (1977) of manos and L. Jean Hooton's partial analysis of metates indicate that these tools were prime candidates for reuse as abraders, palettes, and anvils. Mealing equipment was made exclusively of hard sandstone, and field discards undoubtedly increased the representation of soft active abraders. Mealing equipment was discarded after only minimal recording, and the measurements recorded were based on classifications of general tool type (i.e., items were not scrutinized for reuse as abraders prior to discard). Approximately 80 percent of the abraders show medium to heavy use (Figure 4.33). This information contrasts strongly with similar data from other contemporary sites, suggesting that whole abraders were only collected as artifacts if they had undergone a marked degree of modification.

Figure 4.23. Floor polisher from Kiva A, Level 2

Figure 4.24. Anvil from floor of Plaza Area 3

Figure 4.25. Anvil from Kiva A fill

Figure 4.26. Faceted abrader from Kiva A, Level 1

Figure 4.27. Edged abraders from Kiva A, Level 3; edges exhibit considerable abrasion and are smooth

Figure 4.28. Active lapidary abrader from Pithouse B fill

Figure 4.29. Passive lapidary abrader from Pithouse B bench

Figure 4.30. Passive lapidary abrader from Pithouse B, north floor

Figure 4.31. Passive lapidary abrader from Pithouse B, west floor

Figure 4.32. Passive lapidary abrader from Pithouse B, west floor

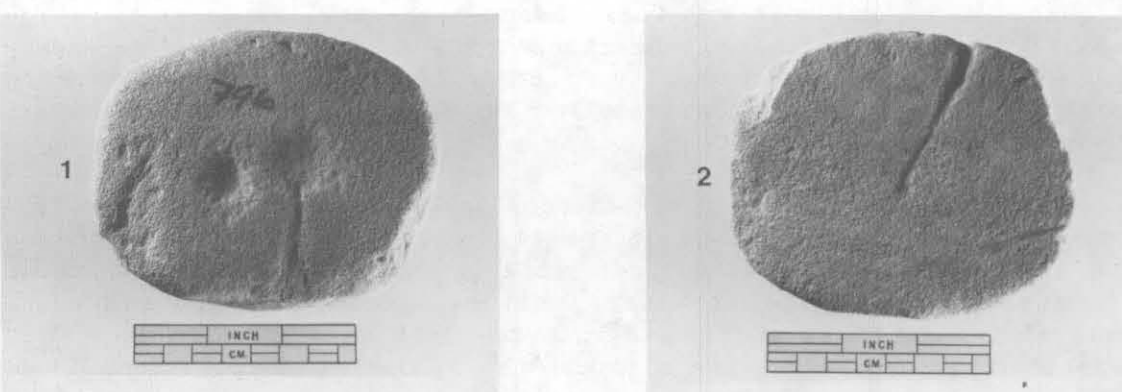


Figure 4.33. Soft tabular active abrader from floor of Plaza Area 5: (1) pitting from anvil use or possibly from bead drilling, (2) opposite face exhibiting grooved abrasion

Akins' conclusions agree with those of other analysts; manos were the most commonly reused tool, with 16 of 19 (84 percent) exhibiting some reuse, and that reuse was generally as active abraders (62.5 percent of the reused items) or anvils (37.5 percent). Abrader reuse on implements such as manos is distinguishable by distinct use facets and by rounded edges on reused fragments. The ready availability of such raw materials as quartzite (n = 27) and sandstone (n = 35) probably contributed heavily to the preference for using unmodified stone (69.9 percent, n = 62) as abraders. Items selected for reuse as abraders were apparently favored tools; slightly more than half (53 percent, n = 10) of these had already undergone some other secondary use.

Monitoring of secondary or coincidental use indicates that 38 percent (n = 35) of the abraders exhibited alternative use wear. Secondary functions originally included four cornbreakers, 14 choppers, 22 hammerstones, and one grooved abrader, but examination of the tools resulted in recategorization of some quartzite specimens as hammerstones and in the development of the pestle category. With the exception of the secondary use of the active lapidary stone as a grooved abrader, all secondary functions are related to percussion. Consequently, evidence of such functions was noted only on implements of hard sandstone and quartzite; soft active and passive lapidary abraders exhibit no secondary use. All anvils, 75 percent of the polishing stones, and 22 percent of the hard active abraders are described as exhibiting secondary use. Examination of anvils and active abraders, however, strongly suggests that the attributes used as indicators of secondary use are, in fact, results of the manufacturing processes of the original tool (e.g., the edge chipping, pounding, and grinding common to mano production).

The amount of secondary wear on quartzite polishing stones varies, but it is least on pottery polishers. Secondary wear is light on the marginal edges of mid-sized and larger polishers, but it never obscures the polishing facets and polishing utility of the specimens. Those polishers on which secondary wear obscured the utility faces were reclassified as hammerstones. Those implements whose designated secondary use is "chopper" were invariably found in trash deposits, suggesting that one hard stroke too many resulted in a broken, discarded tool and not in a functional chopper.

Examination of abrader proveniences reveals additional information on the contextual level. Ten of the 14 broken or fragmented abraders came from trash fill or structural rubble. This suggests that worn-out abraders, especially broken ones, were reused as building material. Reuse of two unbroken specimens in Pithouse B masonry indicates that unwanted larger abraders were also used as masonry. No faceted or edged abraders were found in floor-associated contexts. All were located in trash or alluvial fill, so that no specific use can be suggested for them on the basis of context. Floor areas of Pithouse B, the eastern end of the ramada, and Plaza Area 3 around Room 1 and the L-shaped wall are the most informative contexts.

Abrader diversity is greatest in Pithouse B and the adjacent ramada area. Conversely, Plaza Area 3 around the L-shaped wall mealing area exhibits a concentration of anvils. Within Pithouse B there are differential concentrations of abraders. Polishing stones and soft active abraders were concentrated on the bench, while a pestle and passive lapidary abraders were located on the floor of the main chamber. The area behind the wing walls contained two other pestles and an anvil. This concentration of pestles away from the lapidary workshop suggests that cornmeal or wild fruits may have been processed into flour in the pit structure. The bench was probably a multipurpose work area or a place of temporary storage for projects momentarily laid aside. The polishing stones, large sherd scrapers, soft active abraders, and bone tools found there may be functionally interrelated items that indicate a wide range of tasks. The presence of both active and passive lapidary abraders and of an item that Hooton identified as a metate-fragment/anvil suggests an even broader range of tasks for the bench. The multiple use of the passive lapidary abraders on the main floor is underscored by the use of one as a pillow for at least one of the individuals found on the structure floor (Burial 5). Personal use as lapstones or palettes is suggested by the paired sets of six lapidary abraders on the main floor: three small roundish and three large rectangular stones. One small and two large specimens were found leaning along the western wall near Burial 2; another large specimen was centrally located along the north wall, while the last small, round stone is located beside the lower right leg of Burial 2. As discussed in the next section, this last specimen is the most problematical. The uniformity of size and finish of these six specimens (Figures 4.30-4.32) is in sharp contrast to the use surface of the single specimen on the bench (Figure 4.29). Their relatively unmarred finish suggests that the passive lapidary abraders in the main chamber did not receive hard use and that they may have been kept for a variety of daily tasks beyond lapidary production.

Summary

The abrader collection from 1360 is generally similar to others of the same period, but it is unusual in the high number of materials that came from identifiable activity surfaces. These in situ tools include a large number of quartzite polishing stones. The number and size of these polishers suggest that pottery was produced at the site. At other sites, hard active sandstone abraders usually replace quartzite as a material of choice during this period and vastly outnumber soft sandstone abraders. Apparent discrepancies from these trends at 1360 are probably due to field discard of manos, a tool consistently made of hard sandstone and most commonly selected for abrading reuse.

If anvils reflect heavy-duty pounding, such as redressing of hammerstones or edge- and surface-dressing of ground stone objects, the L-shaped wall mealing area seems to have been a locus for this activity. The abrading tools present in Pithouse B imply a broad range of tasks. Final processing of cornmeal, working of bone, smoothing and polishing of pottery, processing of ochres, and lapidarian ornament production may all be inferred. A secondary, personal use role has been suggested for some select specimens located away from the main, active tool cache.

If the assessment of secondary use characteristics is valid, abraders would seem to form an end point in the curation and reuse of broken ground stone implements. After use as an abrader, a tool was apparently discarded. Polishing stones of sufficient bulk and suitable shape were reused as hammerstones; those that broke produced the "choppers" that are recovered from trash deposits.

The variety and frequency of abraders from 1360 suggest that a range of grinding and pounding activities beyond basic mealing were taking place. These activities appear to have included material production and finishing of both domestic tools and ornaments of turquoise, shell, and shale.

OTHER SHAPED STONE

Miscellaneous shaped stone artifacts recovered from 1360 include pot lids, mano blanks, cist covers, ground concretion bowls, and architectural slab fragments. Powers (n.d.) has provided preliminary notes, descriptive comments, and interpretations of this technologically similar group of shaped stones. All items are of sandstone; locations and types of miscellaneous shaped stone may be found on Table 4.22, with measurements on Table 4.23.

Mano blanks are rectangular, tabular pieces of sandstone that have been chipped around all edges to rough-out the basic mano shape (Figure 4.34). Some exhibit marginal abrasion on the flat faces. One specimen developed an extensive break along a bedding plane during the shaping process, which possibly rendered it unacceptable for use as a mano. This specimen was used as an anvil, then discarded. Subsequently it was alluvially redeposited in Pithouse B (Level 1). It is discussed and tabulated among the abraders, but it is included here to account for all mano blanks. The majority of the mano blanks were found around or on the Plaza Area 3 mealing floor in conjunction with numerous manos. In the preliminary sort, these items were identified as "slab pounders," but it is fairly certain they actually represent the very beginning of the use continuum for manos. This would support Cameron's (1977) claim that manos all begin as rectangular shapes and develop bevels or facets as a result of use.

Powers (n.d.) found that pot lids display the most variable use among the miscellaneous stone artifacts. Like abraders, these thin, roundish sandstone discs are made of both soft and hard sandstone (Figure 4.35[1]). Two size groups are evident in Chacoan sites: one is ca. 8.2 cm in diameter and 0.8 to 1.5 cm thick; the other is 5.5 to 6 cm in diameter and 0.4 to 0.6 cm thick. Use differences are also apparent; those with more labor investment, such as extensive abrading of facets and edges, exhibit less evidence of hard use (e.g., wear and burning). All pot lids are worked--producing mainly chipped and/or ground beveled edges--around their entire circumference; this working may provide a better seal against dirt, insect and mammal pests, and weather. Only

Table 4.22. Distribution of other shaped stones

Provenience	Mano Blanks	Pot Lids	Cist Covers	Stone Bowls	Architectural Slabs	Total
Kiva A						
Level 1	1	-	-	-	1	2
Level 2	1	1	-	-	-	2
Level 3	-	-	-	1	-	1
Level 4	-	-	-	1	-	1
Pithouse B						
Level 1	-	3	-	-	1	4
Level 3	-	1	-	-	-	1
Storage Cist 2	-	-	1	-	-	1
House 1						
Room 7 fill	1	-	-	-	-	1
Room 11 fill	-	-	-	-	1	1
Plaza Area 3						
fill	1	-	-	-	-	1
floor	3	-	-	-	-	3
Ramada						
fill	-	-	-	2	-	2
floor	-	1	1	-	1	3
Trash Mound						
upper fill	-	1	-	-	-	1
lower fill	1	-	-	-	-	1
Total	8	6	2	4	4	24

Table 4.23. Dimensions of other shaped stones

		Mano Blanks "Slab Pounder"	Pot Lids	Cist Slabs	Concretion Bowls
Complete		9	2	2	4
Fragments		-	4	-	-
Weight (in g)	$\bar{x}$	1493.4	-	-	608.3
	s.d.	779.0	-	-	339.0
	Range	574-3000	693-1119	3250-9250	252-1069
Length, Diameter (in mm)	$\bar{x}$	18.5	13.9	-	10.0
	s.d.	3.4	2.5	-	1.8
	Range	130-240	11-17	335-510	83-124
Width (in mm)	$\bar{x}$	12.9	-	-	-
	s.d.	1.4	-	-	-
	Range	105-150	-	240-350	-
Thickness (in mm)	$\bar{x}$	3.5	0.8	-	-
	s.d.	1.5	0.6	-	-
	Range	20-70	4-18	17-22	-
Height (in mm)	$\bar{x}$	-	-	-	6.3
	s.d.	-	-	-	1.9
	Range	-	-	-	39-86
Volume (in mm^3)	$\bar{x}$	-	-	-	46.3
	s.d.	-	-	-	45.0
	Range	-	-	-	5-90
Bowl Diameter (top) (in mm)	$\bar{x}$	-	-	-	5.5
	s.d.	-	-	-	2.1
	Range	-	-	-	33-77
Bowl Depth (in mm)	$\bar{x}$	-	-	-	4.0
	s.d.	-	-	-	1.7
	Range	-	-	-	22-61

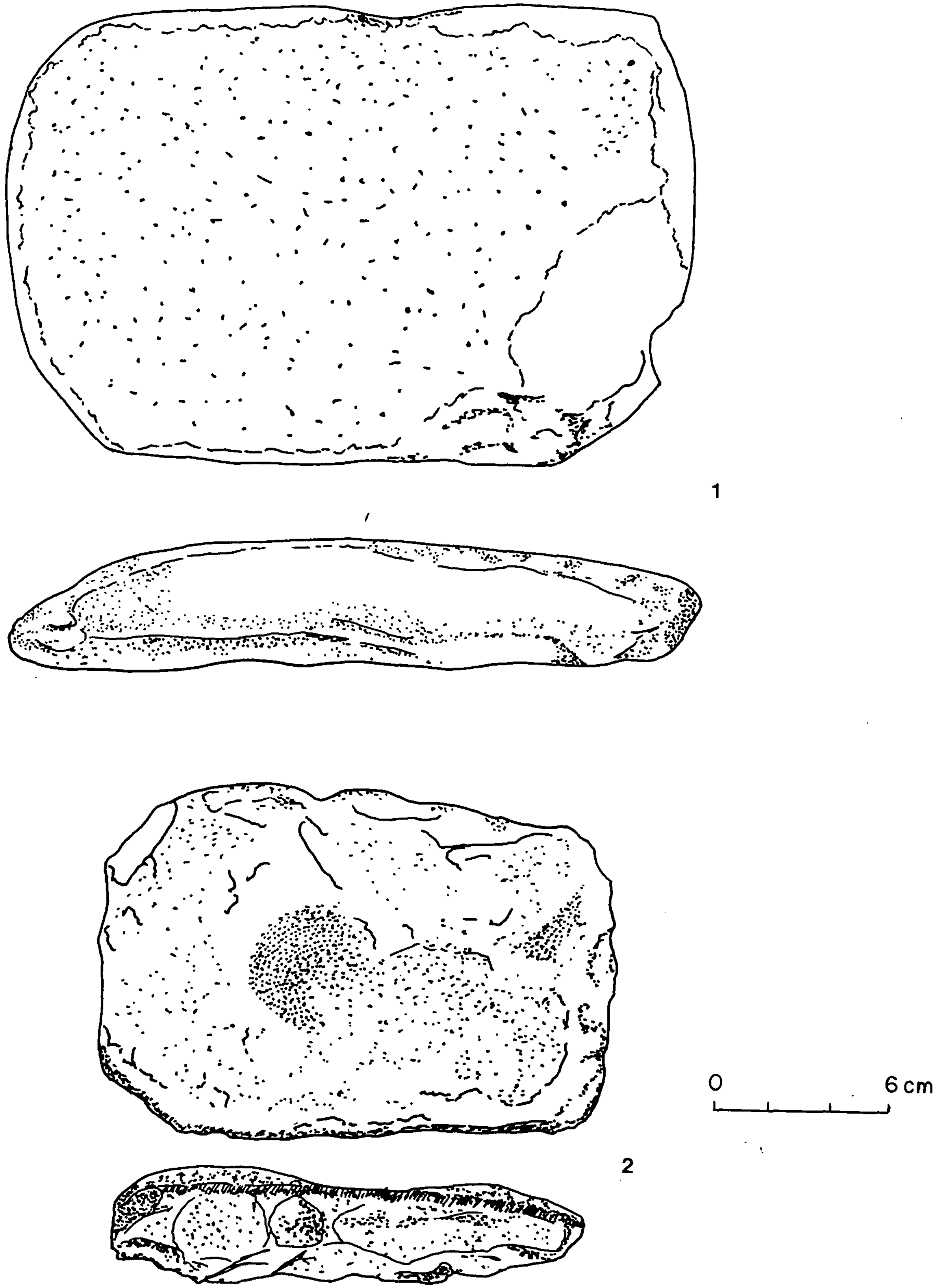


Figure 4.34. Mano blanks: (1) from floor of Plaza Area 3,
(2) from lower fill of Trash Mound

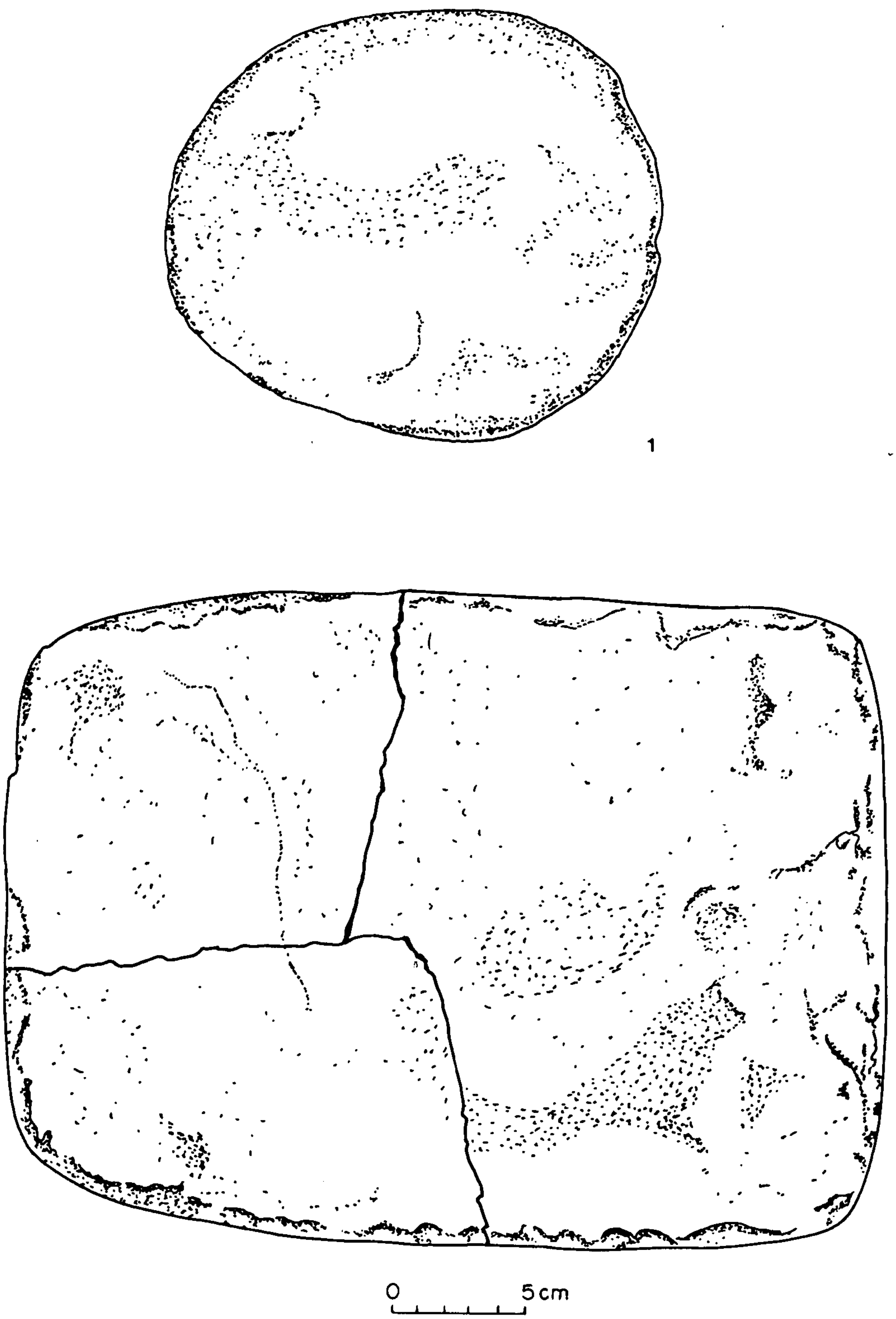


Figure 4.35. Other worked stone: (1) pot lid from Room 7 fill, (2) cist cover from ramada floor

specimens in the larger size range were recovered from 1360. Most complete specimens are of hard sandstone; softer, orange sandstone examples with some burning are also present but mostly in fragmentary condition. One complete specimen from beside the lower right leg of Burial 2 is of this soft, orange material, but this artifact exhibits abrader characteristics and is discussed in that section. The uneven nature of the wear and the friable, burned appearance of this specimen may indicate use as a culinary cover rather than for lapidary work.

Four stone bowls were recovered: two from ramada fill and two from lower Kiva A trash. The latter two specimens exhibit the most extensive work and greatest uniformity of shape. The largest specimen in terms of overall size and bowl volume is a deep, completely pecked and ground bowl from Kiva A, Level 4 (Figure 4.36[1]). The other bowl from Kiva A is slightly oblong and has a small, 1.2-cm-diameter and 1-cm-deep pit in its bottom. This could be a basal hole for spindle shafts, or it could have been used in smoothing and rounding shaft tips; technically it is a grooved abrader (Figure 4.36[2]).

Concretion bowls were made by selecting an appropriate-sized concretion nodule and either using the vacated, soft ochre interior as it was or enlarging it. The exterior was pecked and/or ground. The crudest examples of such bowls exhibit marginal exterior grinding with a pitted, unmodified interior. Woodbury's (1954:116-119) description of bowl-shaped mortars accurately characterizes the shape of these artifacts, but it is evident from the variety of interior wear on these specimens--pecked and ground, ground, groove abrasion, and unused--that simply designating them as a group of mortars is not appropriate. Concretions seem to have been selected for a variety of uses involving a small concavity, one of which may have been as a mortar.

Two cist covers were recovered, one located directly over a cist in the eastern side of the wing wall area in Pithouse B (Figure 2.53) and the other lying on the ramada surface next to Pithouse B (Figure 4.35[2]). Both are edge-shaped but show little work on the flat faces.

Like most other shaped stone, architectural slabs analyzed at 1360 exhibit edge chipping and abrasion with slight surface abrasion. These slabs are all fragmentary, consist of hard sandstone, and purportedly represent elements of features, such as bin walls, slab-lined cists, storage partitions, upright slabs along structure bases, and a host of other features that are found in Anasazi masonry architecture. These items occur in low frequencies, and neither their distribution nor their morphology is particularly informative at 1360.

Summary

The category of other shaped stone includes a small, heterogeneous group of worked stone that does not lend itself to concise or comprehensive summarization. Included are nine probable mano blanks, six or seven pot lids, four stone bowls, at least two cist covers, and a scattering of architectural slab fragments.

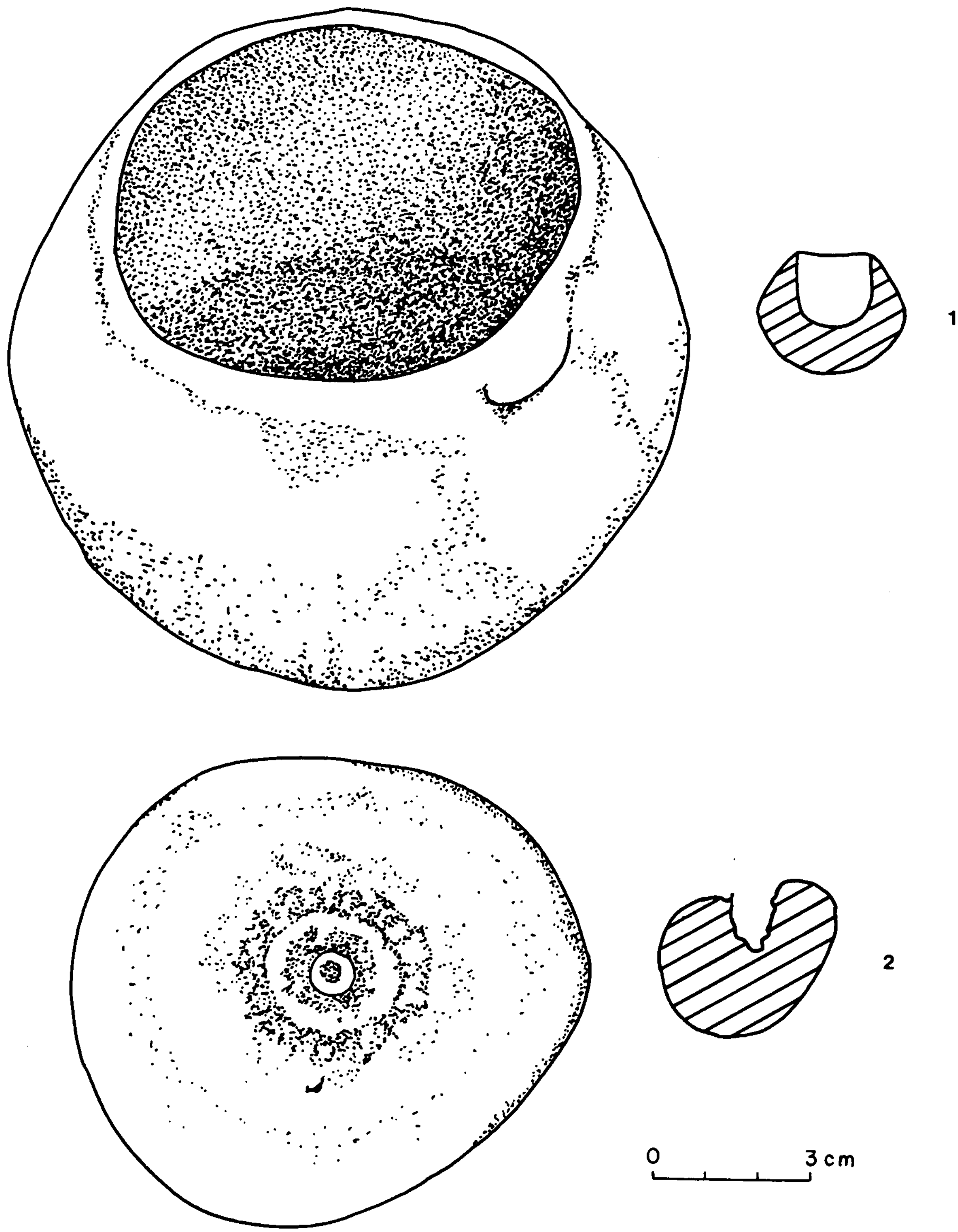


Figure 4.36. Stone bowls: (1) from Kiva A, Level 4,
(2) from Kiva A, Level 3

Mano blanks were associated with concentrations of manos in the L-shaped wall area or in related alluvium. The pot lids exhibit evidence of use in both culinary and dry-storage contexts. The most formal stone bowls were found in early contexts; otherwise, their diversity and small numbers preclude any assessment of general use. Two sandstone slabs could be identified as cist covers by virtue of their context and the completeness of the specimens. Other architectural slab fragments, common to Anasazi sites, were found scattered throughout the site.

CHAPTER 5

Other Artifacts and Perishable Materials

ORNAMENTS AND MINERALS

Ornaments and minerals constitute an overlapping class of materials that are most efficiently discussed as a unit. Table 5.1 presents a breakdown of all minerals and materials from which ornaments or small esoteric items at the site were made. Table 5.2 breaks down finished material and raw material by location and artifact type. Table 5.3 lists the range of artifact sizes.

The 4317 items on Table 5.1 are made of 19 different materials of uncommon occurrence at the site and three materials more commonly used in architectural construction (sandstone, lignite, and raw clay). Ten minerals occur only as raw material, six materials only as finished items, and six material types occur as both raw material and artifacts.

Ornaments

There are few ornaments of remarkable type or quality. A jet ring (Figure 5.1) was recovered from the upper fill of Kiva A. *Glycymeris gigantea* is the only type of shell recovered at 1360; bracelet fragments of this shell were found scattered throughout the trash deposits and on the floor of Bin 1 (Figure 5.2). For a discussion of source areas and distribution routes for this commonly imported West Coast shell see Jernigan's (1978) treatise on prehistoric Southwestern jewelry. It is possible that radically modified pieces of this shell formed part of the shale heishi necklace found in association with Burial 2.

Most of the ornaments are pendants, beads of various forms, and fetishes. The most numerous items are heishi beads of shale; these constituted most of the 3889-bead necklace found with Burial 2 in Pit-house B (Figure 5.3). Another 72 of these tan and gray-to-black beads were located on the surface of Plaza Area 5. The Burial 2 necklace also included the possible *Glycymeris* beads mentioned above and at least eight serpentine heishi beads. The beads in this necklace show little range in size, with only 11 percent (ca. 440 beads) being too large to

Table 5.1. Material types of ornaments and minerals recovered

Mineral/Material		Artifacts	Raw Material	Total
ARA	Aragonite (bulk and fetish)	1	1	2
ARG	Argillite (beads)	2	-	2
AZU	Azurite (bulk and modified bulk)	6	6	12
BON	Bone tinklers (*Lepus* sp.)	-	6	6
CAL	Calcite (bulk)	-	1	1
CLA	Clay (bulk)	-	14	14
FEL	Feldspar crystal	-	1	1
GLY	*Glycymeris gigantea* (bracelet, beads)	10	-	10
GQZ	Green quartz (bulk)	-	1	1
GYI	Gypsite (bulk)	-	6	6
GYU	Gypsum (bulk and modified bulk)	-	6	6
JET	Jet (ring)	1	-	1
HEM	Hematite (bulk and modified bulk)	-	17	17
LIG	Lignite (pendant)	1	-	1
LIM	Limonite (bulk, modified bulk, and paint stone)	1	10	11
MAL	Malachite (bulk)	-	2	2
SAN	Sandstone (pendant and anthropomorph)	2	-	2
SEL	Selenite (bulk, pendant blanks, and fetish)	4	140	144
SER	Serpentine (beads)	8	-	8
SHA	Shale -- tan/gray/black	3948	2	3950*
	red	1	-	1
	(necklace, beads, heishi, bulk, fetish)			
SUL	Sulphur (bulk)	-	1	1
TUR	Turquoise (artifacts and bulk)	20	97	117
UNI	Unidentified (petrified wood [?] crescent)	1	-	1
Totals		4006	311	4317

* mostly one necklace; see Figure 5.3

Abbreviations are used on Table 5.2

Table 5.2. Distribution of minerals and ornaments

Provenience	ARA	ARG	AZU	BON	CAL	CLA	FEL	GLY	GQZ	GYI	GYU	JET	HEM	LIG	LIM	MAL	SAN	SEL	SER	SHA	SUL	TUR	UNI	n	N
Kiva A, Level 1	-	-	-	1	-	2	-	-	-	-	-	1	3	-	1[a]	-	-	8	-	-	-	15[b]	1	32	
Level 2	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	4	-	-	-	-	-	6	
Level 3	-	-	-	2	-	-	-	2[c]	1	1	1	-	-	-	-	-	-	5	-	-	1	8[b,d]	-	21	
Level 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	
Fill	-	2	2	-	-	-	-	1[c]	-	-	1	-	-	-	-	1	-	-	-	-	-	7[b,d]	-	14	
Floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	76
Pithouse B, Fill	-	-	-	-	-	2	-	-	-	-	2	-	-	-	1	-	-	5	-	-	-	-	-	10	
Level 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	2[d]	-	13	
Level 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3[b]	-	3	
Level 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	5[b]	-	6	
Floor: Wing wall	1	-	-	-	-	-	-	-	-	1	-	-	2	-	2	-	-	3	-	-	-	-	-	9	
Bench	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	1	1[e]	-	-	-	-	34[b,d]	-	39	
Burial 2	-	-	-	-	-	-	-	5[f]	-	-	-	-	-	-	-	-	-	-	8	1[g]	-	-	-	14	
Cist	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Subfloor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1[h]	-	-	-	3[b,d]	-	4	100
Pit Structure C fill	-	-	-	-	-	-	-	-	-	-	-	-	3	-	2	-	-	3[h]	-	-	-	-	-	8	8
Bin 1 floor	-	-	-	-	-	-	-	1[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
House 1, Room 1 floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
Room 2 fill	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	4	
floor	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	5
Room 3 fill	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	1[i]	-	-	-	1[d]	-	5	
floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1[d]	-	2	7
Room 4 surface	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	
fill	-	-	-	-	-	6	-	-	-	1	-	-	-	-	-	-	-	5	-	-	-	-	-	12	
floor	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	
bell-shaped pit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1[j]	1[h]	-	-	-	1[d]	-	3	18
Room 7 fill	-	-	-	-	-	-	-	-	-	-	-	-	-	1[e]	-	-	-	-	-	-	-	-	-	1	
floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	2
Room 9 fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1
Room 11 fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	-	52	
floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1[b]	-	1	53
Ramada fill	-	-	1	-	1	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	1[b]	-	6	6
Plaza Area 2 fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	1[d]	-	5	
Area 3 fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	-	-	-	3[b]	-	29	
Area 5 fill	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	7	
floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72[f]	-	10[b,d]	-	82	123
House 2, Feature A	1[i]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Trash Mound	-	-	2	-	-	-	-	1[c]	-	-	-	-	6	-	-	-	-	4	-	1[i]	-	3[b,d]	-	17	17
Surface	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	5[b,d]	-	7	7
Backdirt	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	1	-	-	-	7[b,d]	-	11	11
Total	2	2	7	6	1	12	1	10	1	6	6	1	17	1	11	2	2	144	8	76	1	117	1		437

All minerals are in bulk form unless noted: [a] paint stone; [b] debris; [c] bracelet; [d] artifacts; [e] pendant; [f] beads; [g] necklace; [h] pendant blank; [i] fetish; [j] anthropomorph

Abbreviations defined on Table 5.1

Table 5.3. Dimensions of ornaments and small artifacts (in mm)

Provenience and Artifact Description	Length	Width	Thickness
Turquoise			
House 1, Room 3 fill, pendant	153	124-172	37-21
floor, bead	59	41	20
Room 4, basin-shaped pit, pendant	115	117	26
Kiva A, Level 3, pendant blank	71	68-27	23-20
bead blank	67	67	13
pendant	71	51	30
other artifact	23	22	10
other artifact	40	45	15
fill, bead	38	28	10
Pithouse B, Level 1, inlay	123	80	31-29
pendant	125	75	14
bench, pendant blank	104	84-39	31-12
pendant blank	93	77	22
pendant blank	118	99-78	21-18
bead blank	44	31	13
bead blank	42	39	17
other artifact	63	52	24
subfloor, pendant blank	80	63	16
Level 3, other artifact	96	62	24
Plaza 5 floor, bead blank	49	26	19
Plaza 2 fill, pendant blank	149	108	21-15
Trash Mound, bead blank	40	29	14
Backdirt, pendant	57	42	14
Surface, bead blank	35	13	9
Glycymeris gigantea			
Pithouse B, fill, bracelet fragment	207	74	67
Burial 2, bead	35	26	11
bead	29	14	5
Bin 1 floor, bracelet fragment	436	101	74
Kiva A, Level 2, unidentified artifact	159	55	39
Level 3, bracelet fragment	458	51	50
bracelet fragment	298	43	41
Trash Mound, bracelet fragment	198	32	25

(continued)

Table 5.3. (continued)

Provenience and Artifact Description	Length	Width	Thickness
Other Materials			
House 1, Room 7, Level 1, lignite pendant	349	403	35
Room 4, basin-shaped pit, sandstone anthropomorph	741	303	246
Room 3 fill, selenite fetish	351	189	120
Room 4, basin-shaped pit, selenite rectangle	282	122	37
Kiva A, Level 1, jet ring	177	174	35
fill, argillite tubular bead	212	72	72
argillite disc bead	76	140	134
Pithouse B, Burial 2, and Plaza Area 5, floor shale heisi beads (n = 450)	2-3		
(n = 3948)	<2		
Pithouse B, Burial 2, serpentine heishi beads (n = 8)	<2		
Pithouse B bench, sandstone pendant	633	368	366
House 2, Feature A, aragonite fetish	411	84	85
Trash Mound, Level 3, red shale fetish	188	138	21

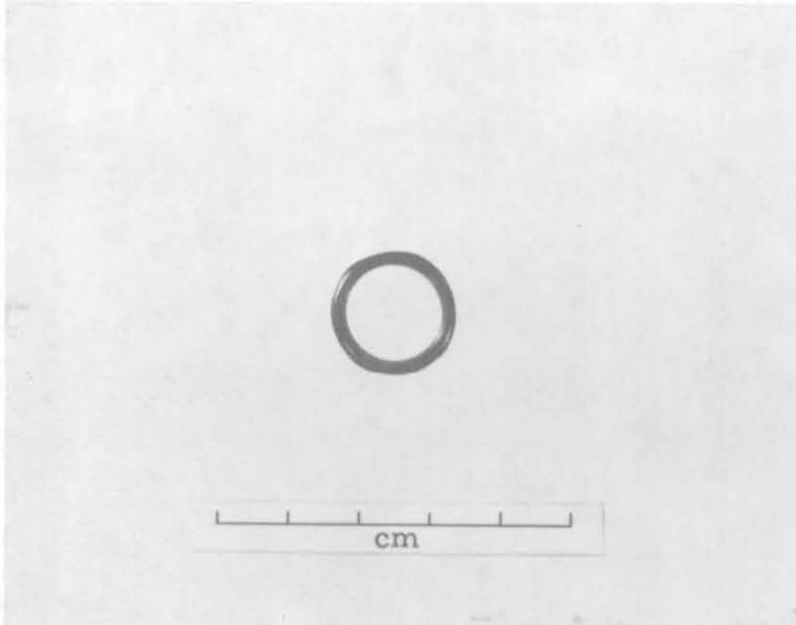


Figure 5.1. Jet ring from Kiva A, Level 1

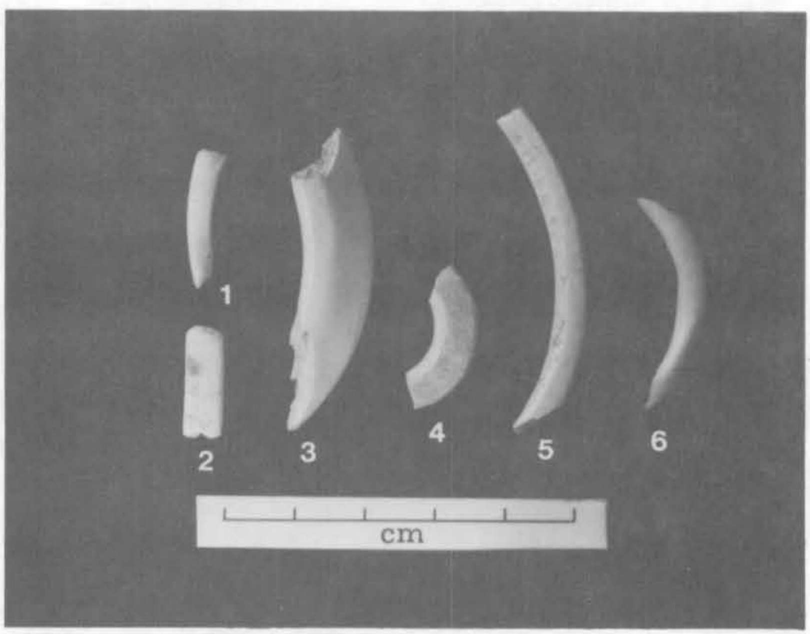


Figure 5.2. Glycymeris gigantea bracelet fragments

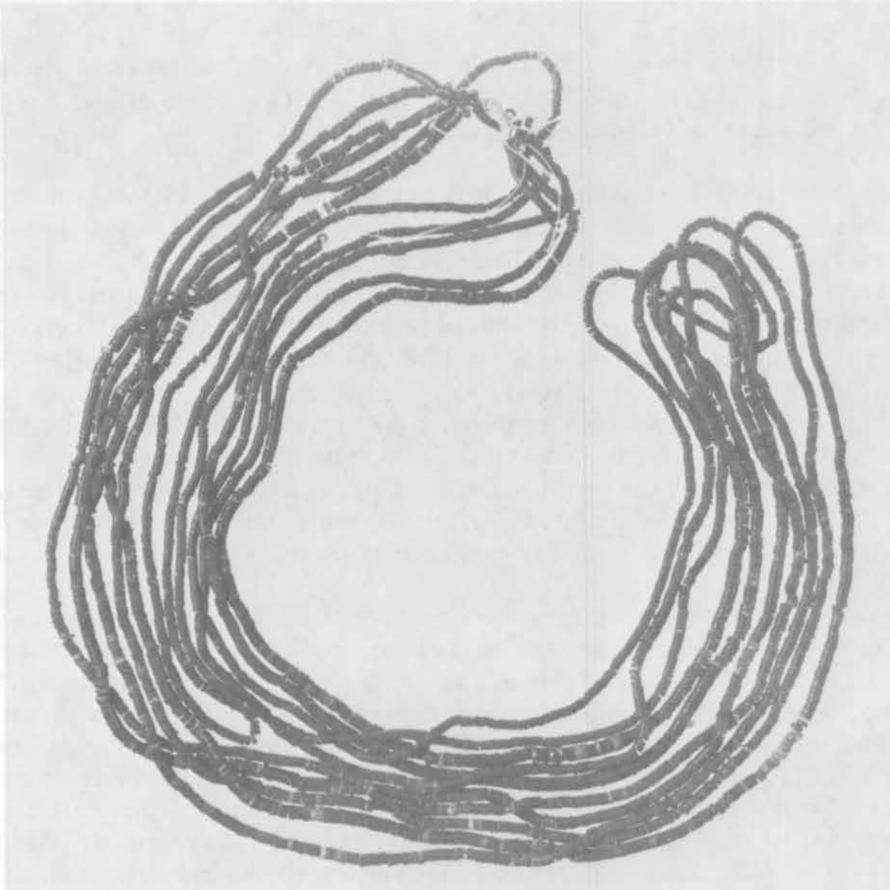


Figure 5.3. Shale heishi beads from Burial 2, Pithouse B

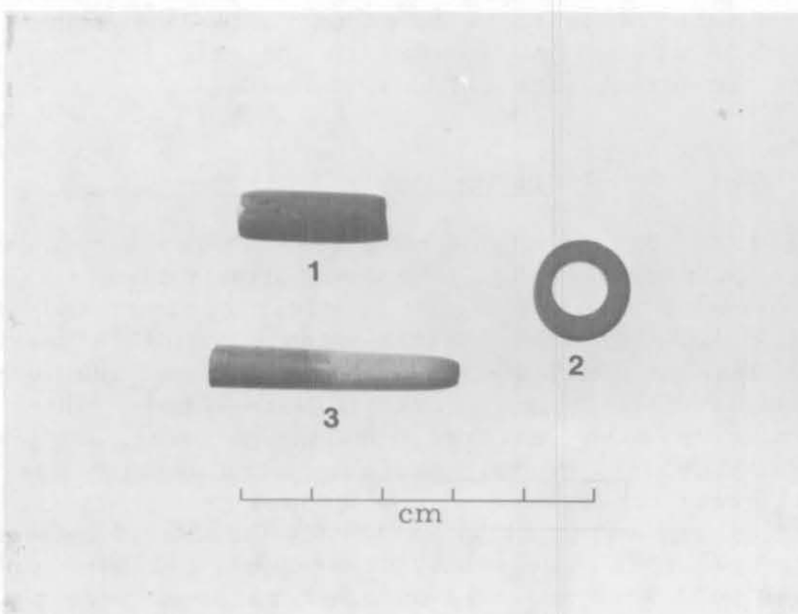


Figure 5.4. Dark red argillite beads (1-2) and red shale conical fetish (3)

pass through a 2-mm mesh. Two other bead forms, a narrow tubular bead and a large ringlike bead of dark red argillite, were found in the upper trash fill of Kiva A (Figure 5.4).

Other ornaments of mineral are pendants or possibly pendant blanks. Three worked selenite specimens--an opaque rectangle, a rounded square, and a translucent irregular piece (Figures 5.5[1], 5.6, and 5.7)--seem to fall into this latter category. A square of black lignite and one of soft hematitic sandstone both exhibit holes and may have been pendants. The presence of multiple holes in the lignite square suggests that it may have been tied to a backing, perhaps as part of a set and not necessarily as an individual ornament (Figure 5.8). The bulky sandstone "pendant" (Figure 5.9) recovered from the Pithouse B bench has two obliquely angled facets on one face, suggesting alternative use as an abrader. This item may have functioned as a pottery smoother that was used prior to slipping, decorating, and firing.

The 117 pieces of turquoise were worked into more forms than any other mineral: heishi-like beads (Figures 5.10-5.13), mosaic, inlay or pendant blanks (Figures 5.10,5.13, and 5.14), and pendants (Figures 5.11, 5.13, and 5.14). The mosaic or pendant forms may all be pendant blanks, but only one definite pendant blank was recovered. This item, specimen 674 (Figure 5.13[1]), has an incomplete, off-center hole. The larger pendant forms are the most common item of worked turquoise, occurring half again as often (n = 12) as the irregular heishi-like beads (n = 8). Incidentally ground and unground minute fragments are the most common turquoise items. These appear to be manufacturing debris. Over half of these fragments (53 percent) exhibit some grinding while more than half of the remainder are too small to examine for such wear. No raw material with veins of turquoise was recovered, which suggests that the mineral was brought to the site for final processing after most of the parent rock had been removed.

Turquoise Identification

Turquoise at 1360 may have come from at least two sources, but there is no significant change in color through time. The tables in Appendix 4 present color and matrix distributions and explain the systems used to classify them. Matrix categories follow matrix examples published in Branson (1975:30-31) and refer only to the matrix (not to the stone color). Three types of matrix were noted: white inclusions and/or lines, gold/honey-colored mosslike patterns, and black mottled with pitted inclusions. Those specimens with whitish matrix seem to form a small group of darker-colored stones that occur in the latest proveniences (Kiva A upper fill, Pithouse B bench, Plaza Area 3 fill). All other matrix types were evenly distributed between light and dark stones. Items with honey-colored or black matrices were the most frequent and may represent independent sources, since the differences in matrix color and pattern suggest different parent rock. Approximately two-thirds of the finished artifacts exhibit matrix; the proportion of matrix in the collection as a whole is much lower due to the abundance of miniscule, unmatrixed scrap items.

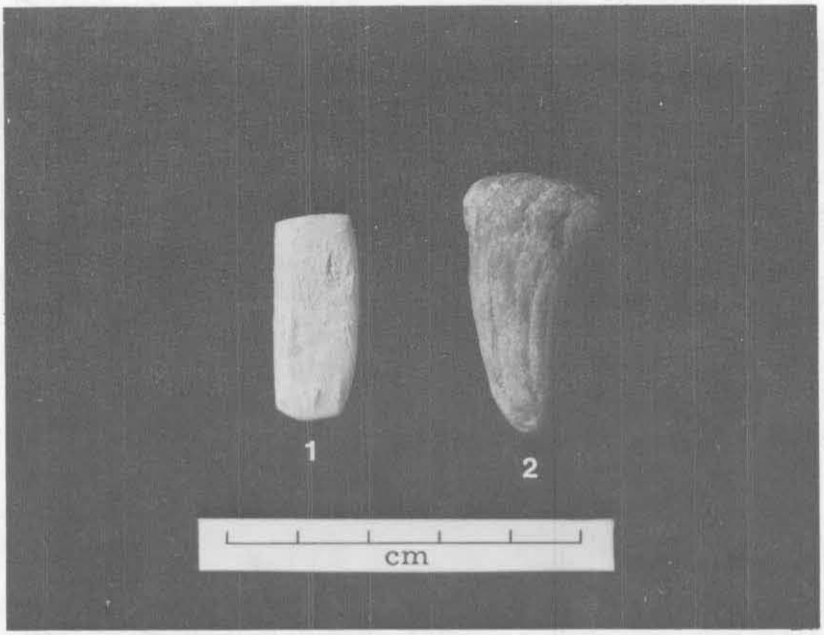


Figure 5.5. Ground selenite rectangle and slightly ground selenite fetish

Figure 5.6. Ground selenite

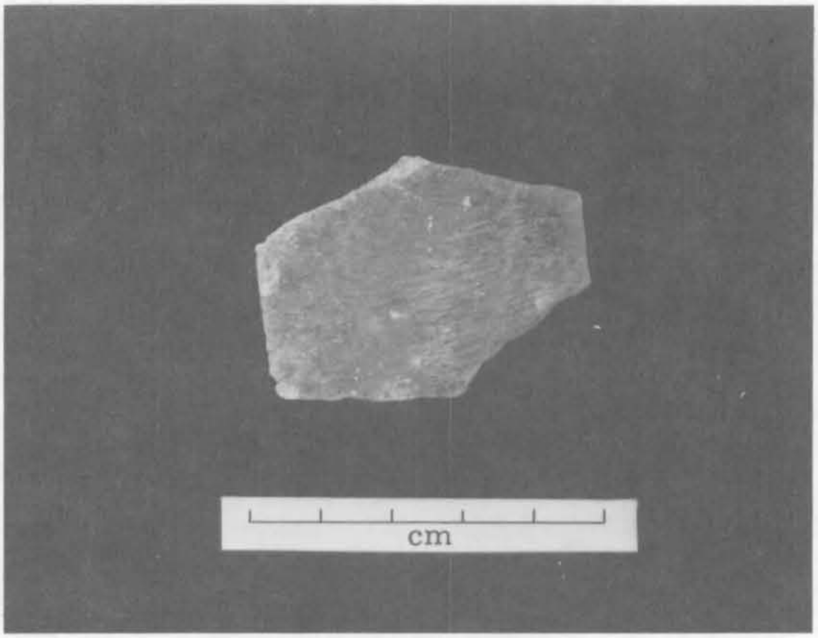


Figure 5.7. Ground selenite

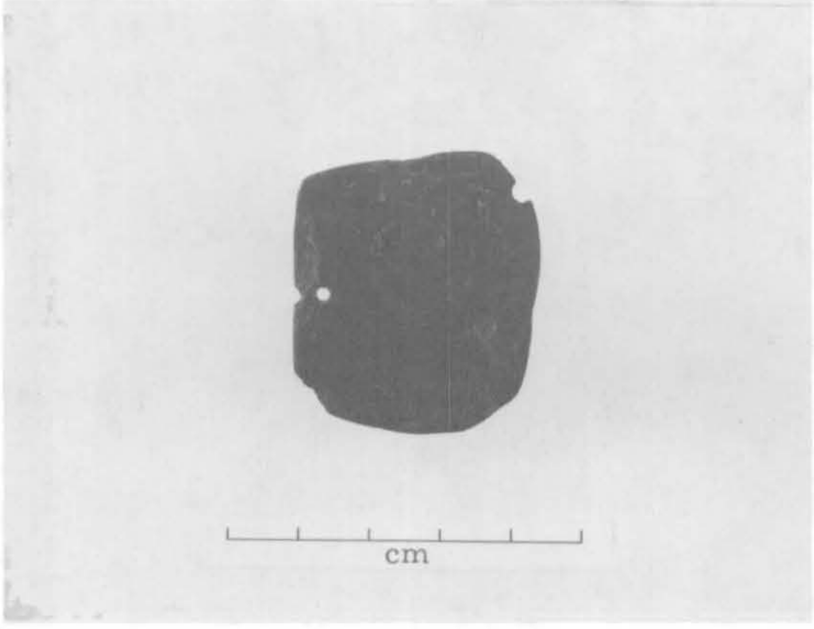


Figure 5.8. Ground and drilled lignite or Gilsonite pendant or mosaic

Figure 5.9. Sandstone pendant or small abrader

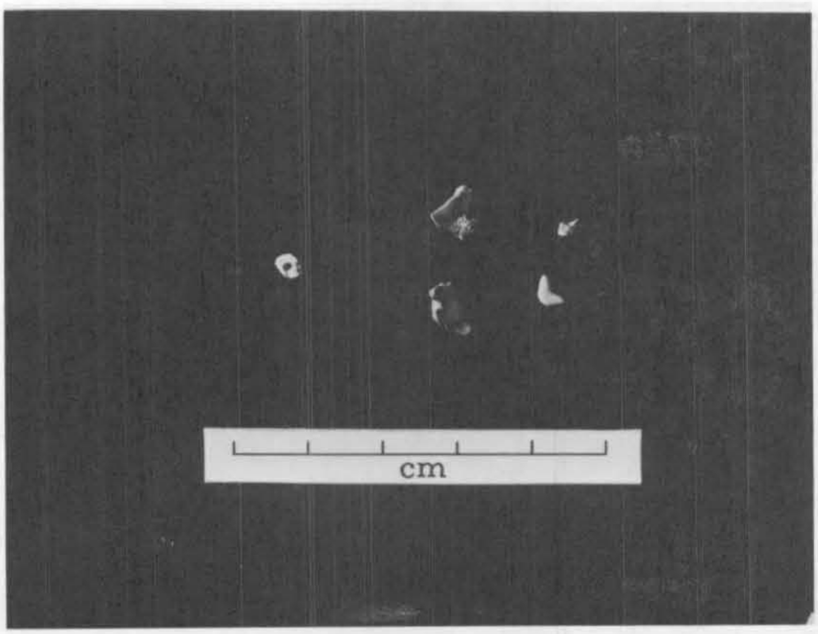


Figure 5.10. Turquoise heishi-like bead and scrap

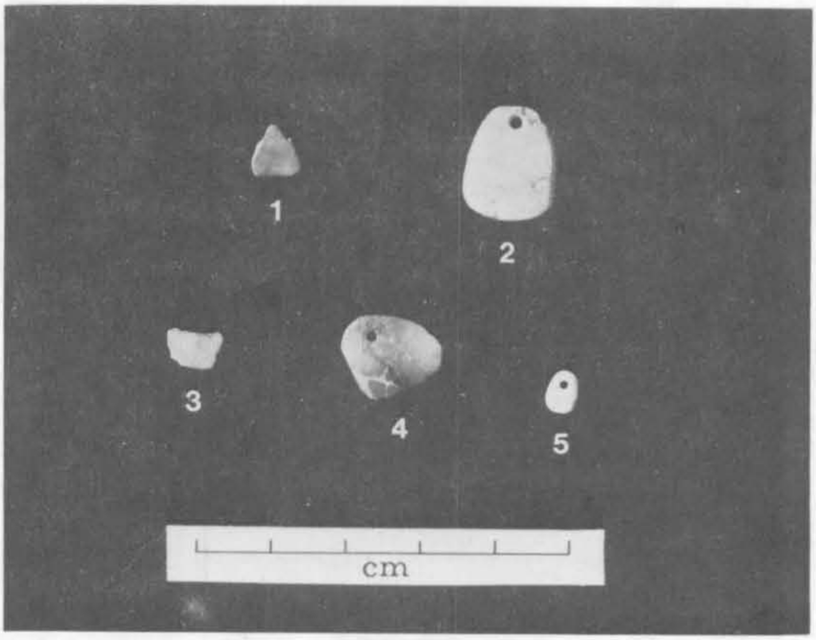


Figure 5.11. Turquoise inlay, pendants, and bead

Figure 5.12. Miscellaneous ground and unground turquoise scrap

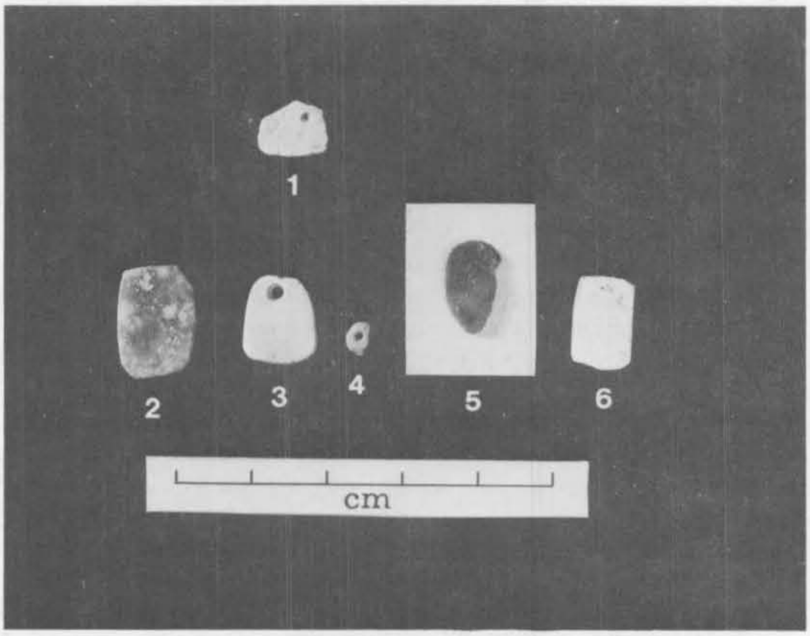


Figure 5.13. Turquoise ornaments and probable blanks

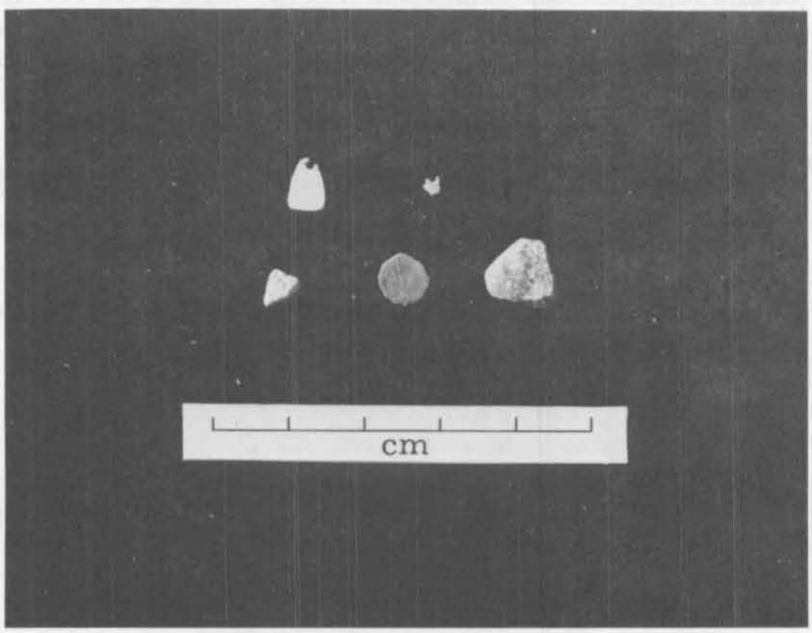


Figure 5.14. Turquoise pendants, bead blanks, and miscellaneous scrap

Two systems of organizing turquoise colors were used (Appendix 4, Table 1). System 1 organizes color according to hues, while System 2 crosscuts and subdivides hues according to values of light blue-green and basic blue-green; no hues or values of dark blue-green were recorded (Appendix 4, Table 1). Light green stones were lumped with lighter valued blue-green materials in color distribution tests. According to the System 2 classification, the bulk of the turquoise items from 1360 may be characterized as blue-green tending toward the greener hues and lighter values (Appendix 4, Table 2). The larger, finished artifacts are mostly light green stones and exhibit a honey-gold matrix. Overall, there were few light green specimens (13 percent) at the site (Appendix 4, Table 2), but of these, 33 percent occur as finished pieces. The honey-gold matrix is the most frequent ($n = 45$, 38 percent); this number includes half of the finished artifacts. The relative proportions of the various shades of turquoise in the 1360 assemblage suggest the use of the entire range of a turquoise seam with no marked color preferences being discernible either within discrete units/incidents of use (note Pithouse B bench, Appendix 4, Table 4) or through time across the site.

The System 1 classification suggests the same thing, but it indicates a more even distribution of colors between the dark and light groups. The Kiva A fill and the Pithouse B bench are the only two proveniences with potentially adequate time depth and turquoise frequency for an examination of color change. There is no significant difference between the two deposits (chi square = 0.267, df = 1, $0.75 < p < 0.5$) nor is there any significant difference between the most temporally extreme populations--the lower Kiva A fill and Pithouse B bench (chi square = 0.406, df = 1, $0.5 < p < 0.25$). The two most frequent and evenly distributed matrix types, gold and black, likewise display no significant difference in distribution patterns between the two pit structures (chi square = 0.001, df = 1, $0.95 < p < 0.9$), supporting the impression of even distribution from color tests (Appendix 4, Table 2).

The consistency of matrix type and stone color suggests stable sources of turquoise within the short time represented in the pit structure deposits. It is still possible, however, that these samples represent mining activity within different localities of a single source. Dutton (1938:71) optimistically suggests Cerrillos and the Burro Mountains near Silver City, New Mexico, as the sources for stones from Leyit Kin. Stone colors and matrix types from 1360 seem generally to conform to these two areas, but the nascent study of turquoise sources is too inconclusive and insecure to confidently pinpoint one source versus another (Mathien 1981a) at this time.

Fetishes

Several esoteric items identified in Table 5.2 as fetishes are a composite group of naturally occurring and highly worked specimens. Among the former are a vaguely anthropomorphic concretion (Figure 5.15), reminiscent of a "woman's fetish" as discussed by Jeancon (1923:66-67, Plate 56L), and a clawlike selenite crystal (Figure 5.5[2]). These two items were recovered from House 1, the former from the bell-shaped pit

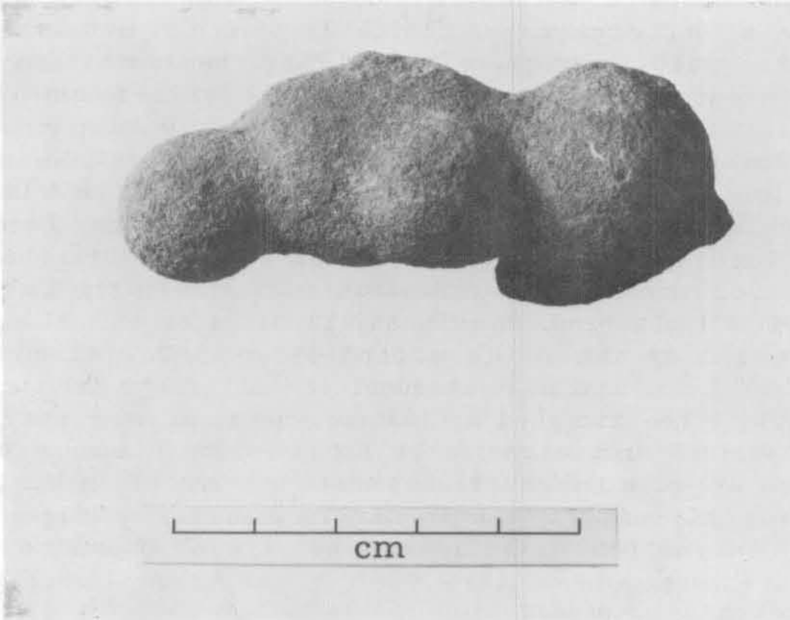


Figure 5.15. Anthropomorphic sandstone concretion

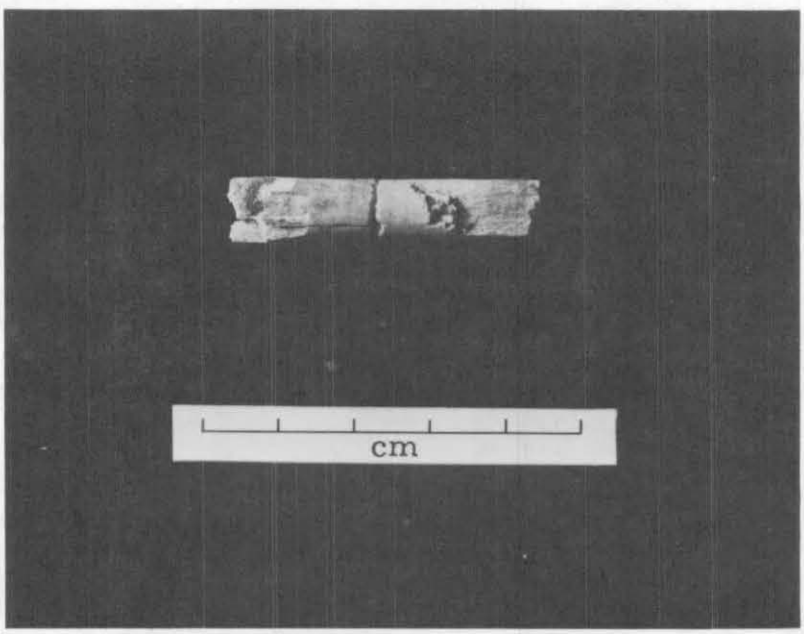


Figure 5.16. Aragonite or calcite cylindrical fetish

in Room 4,the latter from the fill of Room 3/10 (Figure 5.5[2]). Both appear to be slightly ground at the base, possibly incidental to twisting them on a gritty surface, e.g., rotating them into sand to set them upright. Three other cylindrical fetishes were found: a red shale specimen from Pueblo I levels in the trash mound (Figure 5.4[3]), a banded calcite or aragonite item from House 2 surface (Figure 5.16), and a conical limonite specimen from Kiva A. Woodbury (1954:183) discusses the distribution of such objects and suggests that they began appearing during the Pueblo II period. The use of shale and quartzitic stones seems to be more common in earlier periods and in the small sites of Chaco. Judd (1954:286-288, Figure 85) illustrates and discusses banded calcite items like the surface find from 1360. Although Gladwin (1945:Plate 31) illustrates banded calcite artifacts from the Red Mesa phase, most of the examples from Chaco seem to be restricted to the later time periods and to the Great Houses. The limonite specimen was possibly used as an ochre or paint stone, but use of hematite cylinders and cones for ritualistic purposes is suggested by Pepper's (1920:105, 176, 273ff) turquoise-inlaid specimens at Pueblo Bonito and in some ethnographic accounts (Judd 1954:286-289; Stevenson 1905:333-334).

Minerals

Raw materials were found throughout the site. The majority were probably used as pigment: selenite, malachite, azurite, limonite, hematite, and gypsite. Selenite is the most common and is also the most readily available, outcropping in numerous seams along the exposed lignite beds at the base of Fajada Butte and in similar seams throughout the canyon. Selenite may have been processed into a white powder for plastering, or its occurrence may be incidental to the use of lignite as posthole packing; its low artifact frequency, despite its high availability, indicates that selenite was not a highly valued material. The next most common minerals, limonite and hematite, are also abundant as concretion scatters in mesa-top and talus locations. Azurite and malachite, possibly associated with the turquoise traffic, are available from several areas throughout the state, but the closest and most conspicuous sources are Cerrillos and the Zuni Mountains south of Gallup (Northrop 1959:129-131, 339-342).

Only Pithouse B has evidence of any concentration of raw materials in a specific area. The area behind the wing walls contained seven of the eight raw mineral samples from the pithouse floor. The remaining minerals were scattered throughout the site and occurred mostly in trash deposits and general fill. No caches were recovered.

The 14 clay samples in Table 5.2 are discussed in Chapter 3.

Tinklers

Perforated rabbit tibias or "tinklers" were located in Kiva A and on the bench of Pithouse B. Until recently, it was felt by some that these artifacts were found only north of the San Juan River (Hayes and

Lancaster 1975:170). Tinklers are made from small mammal (most often rabbit) tibias, by grinding the proximal head until it is flat, drilling into the shaft, and perforating the shaft at some point. The specimens at 1360 differ from many of their northern counterparts in that they lack the shaft perforation (Hayes and Lancaster 1975:Figure 221; Rohn 1971:249-250; Swannack 1969:154-155). The actual function of these artifacts is unknown, but they may have been used, as the name suggests, to produce a rhythmic dry "tinkling" or rattling during ceremonies. This form of bone working seems to be restricted to, or at least most prevalent during, the AD 950-1300 period. These specimens and those from 628 and 29SJ724 (Moore n.d.; Windes 1976b) may be among the earliest recovered from Chaco.

Unworked Stone

Miscellaneous unworked stone material from the site (Table 5.4) consists of sandstone concretions, miscellaneous siliceous stones, and small, smoothed "gizzard stones." The concretions, various-sized roundish nodules of ferric sandstone, occur abundantly throughout the canyon and may represent unused sources of limonite and hematite or may simply be general alluvial material. The siliceous stone, archaeologically collected as either manuports or polishing stones, are unused material with no change in surface sheen to indicate modification or use. Specimens are insufficient in size or bulk to be efficient as either hammerstones or cores. Pebbles and gravels in this size range are occasionally referred to as "Ojo Alamo gravels," and for the residents of Chaco, they would have been locally available along the tops of South Mesa and West Mesa.

Gizzard stones are highly polished small stones (less than 3 by 3 mm) that result from the digestive action of a seed-eating bird's gizzard. At 1360 the most likely sources of such stones are turkeys (Schorger 1966:95-96), but the macaw should not be discounted. Although a few of these stones are chalcedonic, most of them are turquoise (debris on Table 5.2); this is probably due to selective collection by the excavators rather than to the behavior of the prehistoric residents or their birds. The presence of these stones indicates that birds, probably turkeys, were kept at 1360 at least long enough to ingest and process the stones through their digestive systems. These gizzard stones are similar to several dozen recovered from the body cavity of a turkey burial in the Pueblo Alto trash mound, and they suggest a practice of selectively providing birds with siliceous debris from chipped stone production to help meet their digestive requirements. The two turquoise specimens from the Pithouse B bench suggest that a bird, possibly the macaw, spent some time in the structure, most likely during cold winter months.

Summary

The ornaments, minerals, and miscellaneous materials from 1360 suggest several things. First, the most commonly available material

Table 5.4. Miscellaneous artifacts--manuports and gizzard stones

	Ojo Alamo Siliceous Gravels and Pebbles	Gizzard Stones		Concretions	
		Turquoise	Siliceous	Limonitic/ Hematitic	Unmodified Sandstone
Kiva A					
Fill	-	2	-	-	-
Level 1	3	3	-	-	-
Level 2	2	2	-	-	-
Level 3	1	-	-	-	-
Level 4	1	-	-	-	-
Pithouse B					
Level 1	1	-	-	-	1
Level 2	1	-	-	-	-
Level 3	-	-	-	-	-
Level 4	1	-	-	-	-
Bench	-	-	1	-	-
Firepit	-	-	-	1	-
Subfloor	-	1	-	-	-
House 1					
Room 1 Fill	-	-	-	-	1
Room 4 Fill	1	-	-	-	-
Room 9 Fill	1	-	-	-	-
Room 11 Fill	1	-	-	-	-
Room 11 Floor	-	1	-	-	-
Ramada Fill	2	-	-	-	-
Plaza 5 Floor	-	-	3	-	-
Trash Mound	7	1	-	6	2
Surface	-	1	-	-	-
Total	22	11	4	7	4

exhibits the least modification or use while the nonlocal materials are the most modified group. Second, ornaments seem to increase in frequency during the latest phase of site occupation, and third, there is evidence of on-site manufacturing of ornaments.

The latest proveniences contain the majority of the ornaments. The uppermost level of fill in Kiva A and the floors and floor fills from Pithouse B and Plaza Area 5 produced notable concentrations of the more elaborate ornaments discussed. The occurrence of both the aragonite fetish (which is similar to items described by Judd [1954] and Woodbury [1954] as occurring late in the sequence at Chaco) and Mesa Verde Black-on-white ceramics in Feature A of House 2 may not be totally fortuitous. This co-occurrence is suggestive of more intensive use of this end of the site by later occupants in the area, perhaps as a trail or shrine locale. The disproportionate number of ornaments found in later contexts may be a function of temporal development, but it may also be a reflection of the extent of excavation in this horizon of the site. The scanty but even distribution of raw materials indicates a relatively consistent need for and use of the more common local materials.

The four most valuable materials for ornamental forms appear to be *Glycymeris gigantea*, jet, turquoise, and shale. The first two occur only as ornamental forms: bracelet fragments and a ring. Rare but probably more accessible, turquoise and shale were used more than any other materials for ornaments, with turquoise appearing in the greatest diversity of forms. Turquoise ornaments are mostly larger, heavier items with potentially greater visibility and display value than the undifferentiated masses of shale heishi beads. The turquoise heishi-like beads that do occur exhibit pronounced irregularity, suggesting production from scrap material and underscoring the value of this stone.

Clusters of turquoise scrap and unfinished and finished artifacts from the Pithouse B bench suggest a workshop situation. Similar debris in Plaza Area 5 suggests similar activity in that area. Shale beads were only recovered as finished specimens, but methods of recovery used at the site might easily have missed minute pieces of tan and grayish debris in a similarly colored fill. On the other hand, completion of the work and subsequent cleanup might account for an absence of shale debris. Certainly the context of the intermixed, scattered turquoise specimens, both finished and scrap, on the Pithouse B bench is in sharp contrast with that of the multitude of shale beads from a finished necklace about the neck of Burial 2; it would appear that production of shale beads was not the current lapidarian activity in Pithouse B at the time of abandonment.

Most materials were located in trash fill, but the *Glycymeris* bracelet fragments on the floor of Bin 1 suggest uses of this feature beyond the storage of common materials. The workshop concentrations of Pithouse B and Plaza Area 5 have already been discussed and are likewise suggestive of special-purpose loci. Only one apparent cache of esoteric items was located. The anthropomorphic concretion, worked selenite rectangle, and a pendant of greenish turquoise were all found in the bell-shaped pit in House 1, Room 4. Pit fill was primarily fire-reddened structural rubble, suggesting intentional plugging with trash rather than caching, but the objects do form a unique group at 1360.

All in all the ornaments and raw materials from 1360 exhibit a range and constituency not unlike many other sites reported from Chaco Canyon. What should be emphasized is that this assemblage provides additional evidence of craft specialization in a small site during the late tenth and early eleventh centuries.

PERISHABLE MATERIAL

Considered under the rubric of perishable material are the decomposed fragments and impressions of cultigens, finished products such as matting or textiles, and organic architectural materials. M. Toll (1980) of the Castetter Ethnobotanical Laboratory at the University of New Mexico provided the identifications of vegetal material.

Architectural Elements

Remains of architecturally related vegetal material are few and restricted to Pithouse B. Three fragments of support beams were found: the central post on the north bench, a fragment in the upper fill, and the northern stringer pole. The western stringer fell onto the western bench, crushing and scattering artifacts on the bench. The specimen was badly decomposed and unsalvageable. It was originally thought to be juniper bark batting from above the support poles, an impression gained from its powdery appearance owing to the dissolution of supportive lignin. Matted organic material found over Burial 2 proved to be stems and leaves of a scaberulous grass, possibly a member of the genus Festuca or Muhlenbergia, both common throughout the canyon. This material probably served as a batting over the first adobe layer found directly over the secondary poles. Impressions generally similar to this grass were found on the 3 cm thick layer of adobe packing. Opposite the grass impressions were the impressions of two secondary poles, each of them 5 to 6 cm wide. One of these secondary pole impressions is of a rounded pole, the other of an apparently flat, split shake, suggesting use of both pinyon and juniper (juniper is more conducive to splitting) to fill this function in the structure. Both the northern post and the fragment from the fill were identified as pinyon during dendrochronological analysis.

Only two samples of charcoal were collected, one from House 1, Room 1 fill and the other from the trash mound. None of the specimens from these samples have been identified as to species, and none were suitable in size, provenience significance, or condition to be submitted for radiocarbon dating. Elements in the two samples appear to be similar to the local woody shrubs, such as saltbush, greasewood, and sagebrush, that have been identified among similar charcoals in other Chacoan sites.

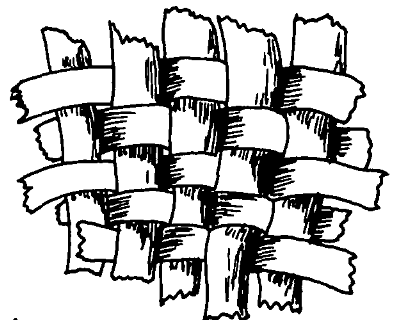
Textiles

Two fragments of matting impression and a possible blanket fragment make up the collection of finished products of vegetal material. All of this material appears to be Yucca, but only the impressions could be positively identified; these impressions are of a narrow-leaf type (Yucca angustissima) found throughout the area. The two matting impression fragments came from below Burials 2 and 4. The specimen from beneath the infant (Burial 4) was too fragmentary to reveal any structure, but the larger specimen indicates a simple over/under plaiting technique using 3-to-5-mm wide yuccalike leaves (Figure 5.17[1]). A very charred fabric fragment from the fourth level of fill in Kiva A is of exceptional quality, exhibiting three warps and 13-15 wefts per cm (Figure 5.17[2 and 3]). Warps are two-ply, two-twist strands of coarsely prepared bast fiber such as Yucca; these warp strands probably consist of entire vascular bundles. Initial examination of the single-ply weft thread suggested that a different material, possibly cotton, was used because the texture is much finer and softer than that of the warp. Examination of slides of this fiber at 400 power, however, demonstrated that the material compares more favorably with Yucca. When compared with modern Hopi cotton, the 1360 specimen proved to be distinctly different: the weft strands are thicker, characteristics of twisting differ, cell walls are thicker, and lumens are smaller. Although identification is tentative, due to the fabric's charred condition, it appears that the weft was prepared by breaking down vascular bundles of Yucca into individual fibers and respinning these finer elements into a single strand.

Corn

Among the approximately 50 specimens of Zea mays, 31 are measurable cobs (Table 5.5). Generally these cobs are small, irregular, and indistinguishable from contemporary samples recovered from 627 and 629. No cobs are complete in length, but cross sections are available from the measurable specimens. All cobs and fragments are charred and lack kernels. Glumes are eroded from most specimens. Determination of the base form can be made in only one case; a single cob has a tapered base. Elliptical and circular cob cross sections are almost even in number, but elliptical forms may have resulted from postdepositional compression. Compression and distortion of cobs likewise make row positions difficult to determine, but straight rows are more common than spiral rows.

Isolated kernels were recovered from two locations: the overburden of House 2 and the bench of Pithouse B. The specimens from House 2 (cleared to a depth of no more than 15 cm) are associated with the burned area in Room 1 and with artifacts of the Pueblo III period. Fragments of rachises and husks were incorporated with the mass of fused kernels. The kernels are large and regular, and Toll felt it unlikely that these kernels came from the corn population represented by the small, irregular cobs found elsewhere in the site. This was a tentative assessment, however, as no comparable data were available regarding the



1

2

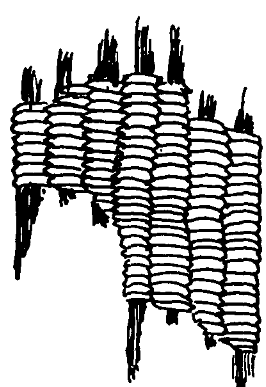


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Figure 5.17. Stylized illustration of matting and fabric samples: (1) from matting impression under Burial 2, (2) cross section and frontal view of yucca fabric from Kiva A

Table 5.5. *Zea mays* characteristics and distribution

	Kernels	Number of Rows 8	10	12	14	Measured Cobs	Unmeasurable Fragments	Total
Kiva A								
Level 1	-	--	1	1	--	2	--	2
Level 2	-	--	3	4	--	7	5	12
Level 3	-	1	5	3	1	10	4	14
Pithouse B								
Bench	x	--	2	2	--	4	5	9
Firepit	-	1	--	--	--	1	--	1
House 1								
Room 4 fill	-	--	--	--	--	--	1	1
Room 6 fill	-	--	--	--	--	--	1	1
Room 7 firepit	-	1	3	1	--	5	2	7
Ramada								
Fill	-	--	--	--	1	1	--	1
Trash mound								
Fill	-	--	--	1	--	1	--	1
House 2								
Fill	x	--	--	--	--	--	--	--
n		3	14	12	2	31		49
% of measured cobs		10	45	39	6	100		

Cross-section:			
Elliptical	16		55%
Circular	13		45%
Rows:			
Straight	15		79%
Spiral	4		21%
Mid-Cob diameter:		$\bar{x}$ = 12.2	
		cv = 19.0%	
		Range = 7.8 - 17.2 mm	
Cupule width:		$\bar{x}$ = 6.0 mm	
		cv = 20.3%	
		Range = 4.0 - 9.2 mm	

x = present

differential effects of drying and charring of cobs with and without associated kernels.

Eggshell

Finally, Windes (1977a) has discussed the significance of eggshells recovered from Chacoan Anasazi sites. Samples from 1360, tentatively identified as turkey (M. gallopavo, Windes 1977a:6), were recovered principally from the central portions of House 1 (Table 5.6). Windes suggests that prehistorically, like today, Chaco Canyon was not a favorable turkey habitat and that the Chacoan Anasazi would have had to obtain turkeys from the mountains at the basin's periphery. Windes argues, in part, that the total volume of eggshell recovered does not warrant postulating a permanent resident domestic flock. Given the diversity of locations from which turkey remains have been recovered and the coincident occurrence of turkey bones, eggshells, and gizzard stones, however, it would seem likely that turkeys were maintained at the site for an indeterminate period and not summarily consumed.

Table 5.6. Eggshell at 29SJ1360

Provenience	Number	Weight in grams
Kiva A, Level 3	48	1.2
House 1, Room 1 floor	189	4.0
Room 11 floor fill	543	11.6
Room 11 floor	27	0.7
Plaza Area 3 fill	539	13.0
Plaza Area 5 fill	31	0.2
East Ramada fill	5	0.1
Total	1382	30.8

Summary

Site 1360 produced meager vegetal remains: architectural wood and bast, two matting impressions, a textile fragment, and a handful of charred corncobs and kernels. All identifiable materials were locally available, making on-site production possible. Although two populations of corn are tentatively suggested by differences between charred kernels and cobs, the majority of specimens, as cobs, are similar to samples obtained from other nearby contemporary sites. Eggshells, also found in other Pueblo II collections, were found scattered throughout the fill. Tentatively identified as turkey, their presence attests to collection of and/or exchange for some perishable resources from areas some distance from the canyon.

CHAPTER 6

Faunal Remains

FAUNAL IDENTIFICATION

Faunal remains from 1360 include a wide range of genera, some of them unanticipated. The occurrence patterns of the species probably are not in themselves significant, as field-collection procedures seem to have emphasized larger body-sized animals. Reference may be made to Tables 6.1-6.4 for data pertinent to this discussion. All bone was identified at the Chaco Center by N. Akins, who used comparative collections from the Chaco Center and the University of New Mexico Biology Department along with appropriate literature (e.g., Lawrence 1968; Olsen 1964). Certain specimens, usually avifauna, were sent to S. Emsli at the University of Northern Arizona for identification.

Serious discrepancies in recovery procedures are apparent when major provenience collections are compared. The trash mound, which comprised 7.2 percent of the fill removed, accounts for only 3 percent of the fauna, while Kiva A, also trash-filled, accounts for 14.3 percent of the fill removed yet yielded 50 percent of the faunal specimens recovered. Pithouse B yielded 20.7 percent of the collection, but because Pithouse B was abandoned with all materials in situ, most of the specimens are bone tools; the inclusion of bone artifacts with general faunal data may be a questionable practice (see worked bone discussion below). The disparity between the two collected trash areas appears to be too great to be accounted for by differences in the nature of trash deposition or differential destruction through time. Since these tabulations were made, an additional taxon, badger (*Taxidea taxus*), was identified from a previously unexamined backdirt collection (Akins 1981). The faunal inventory (Table 6.1) suggests that the low recovery rate for small mammals was the most inconsistent aspect of faunal collection at 1360.

Large mammals are abundantly represented at 1360. Artiodactyl species are the most frequent (38 percent), with pronghorn (*Artilocapra americana*) being the most often identified species (19.3 percent of the artiodactyla). Rabbit species are next (25.2 percent), with jackrabbits (*Lepus* sp.) accounting for the majority (78.8 percent) of those. Carnivora (11.7 percent) account for the bulk of the remainder, with domestic

Table 6.1. General faunal counts and condition, 29SJ1360

			Sub-Adult		Cooking Brown		Butchering	
	n	% of Total	n	% of Species	n	% of Species	n	% of Species
ANTILOCAPRIDAE								
A. americana								
Pronghorn	52	7.3	2	3.8	--	----	10	19.2
CERVIDAE								
O. hemionus								
Mule deer	17	2.4	1	5.9	--	----	1	5.9
BOVIDAE								
O. canadensis								
Bighorn sheep	8	1.1	-	---	--	----	1	12.5
ARTIODACTYLA								
(Unidentified)	193	27.2	2	1.0	1	0.5	1	0.5
Subtotal	270	38.0	5	1.9	1	0.4	13	4.8
CANIDAE								
C. familiarus								
Dog	53	7.5	20	37.7	--	----	--	----
C. latrans								
Coyote	10	1.4	--	----	--	----	--	----
CANIDAE								
(Unidentified)	14	2.0	1	7.1	--	----	--	----
CARNIVORA								
(Unidentified)	6	0.9	--	----	--	----	--	----
Subtotal	83	11.7	21	25.3				
LEPORIDAE								
L. californicus								
Jackrabbit	141	19.9	12	8.5	11	7.8	1	0.7
S. auduboni								
Cottontail	38	5.4	9	23.7	4	10.5	--	----
Subtotal	179	25.2	21	11.7	15	8.4	1	0.6
SCIURIDAE								
C. gunnisoni								
Prairie dog	26	3.7	4	15.4	1	3.8	--	----
GEOMYIDAE								
T. bottae								
Pocket gopher	1	0.1	--	----	--	----	--	----
HETEROMYIDAE								
Dipodomys sp.								
Kangaroo rat	1	0.1	--	----	--	----	--	----
GALLIDAE								
M. gallopavo								
Wild turkey	18	2.5	--	----	1	5.9	--	----

(continued)

Table 6.1 (continued)

	n	% of Total	Sub-Adult n	Sub-Adult % of Species	Cooking Brown n	Cooking Brown % of Species	Butchering n	Butchering % of Species
FALCONIDAE								
F. mexicanus								
Prairie falcon	1	0.1	--	----	--	----	--	----
ACCIPITRIDAE								
Buteo sp.								
Hawks	3	0.4	--	----	--	----	--	----
PSITTACIDAE								
A. macao								
Macaw	4	0.6	--	----	--	----	--	----
CORVIDAE								
C. corvax								
Raven	1	0.1	--	----	--	----	--	----
Unidentified bone:								
Mammals								
Small-medium	31	4.4	--	----	1	3.2	--	----
Medium-Large	51	7.2	--	----	--	----	--	----
Bird	20	2.8	--	----	--	----	--	----
Bone, unidentified	21	3.0	2	9.5	--	----	--	----
Total	710	99.9	51	7.2	19	2.7	14	2.0

Table 6.2. Fauna: minimum number of individuals, 29SJ1360

	Within Major Provenience														Entire Site				
	Rooms								Pitstructures				Trash		subadult		adult		
	1	2	3	4	5	7	9	11	A	B	C	Ramada	Mound	N	n	%r*	n	%r*	N
A. americana		1	1					1	4	2	1	1		11	1	20	4	80	5
O. hemionus									3	1		1		5	1	25	3	75	4
O. canadensis									1	1	1			3			1	100	1
C. familiarus		1	1		1	1	1	1	5	5		4	1	21	6	60	4	40	10
C. latrans									1	1		2	1	5			2	100	2
L. californicus					2	1		3	8	5		2	1	22	4	25	12	75	16
S. audoboni			1		1			1	2	2		1	1	9	2	40	3	60	5
C. gunnisoni	1		2	1	2	1			1	3		1	1	13	1	10	9	90	10
M. gallopavo	1		1					1	2	1		1	1	8			2	100	2
Total	2	2	6	1	6	3	1	7	27	21	2	13	6	97	15	27	40	73	55

*%r = percent row n

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Table 6.3. Faunal frequency by provenience, 29SJ1360

	ARTIODACTYLA				CARNIVORA				LAGO-MORPHA	RODENTIA				AVES								TOTALS		
	A. americana	O. hemionus	O. canadensis	ARTIODACTYLA unid.	C. familiarus	C. latrans	CANIDAE unid.	CARNIVORA unid.	L. californicus	S. auduboni	C. gunnisoni	T. bottae	Dipodomys sp.	M. gallopavo	C. corvax	F. mexicanus	A. macao	Mammals, sm-med	Mammals, med-lg	Birds	Bone, general	Prov. subdivision	Maj. depositions	Prov. unit/class
Kiva A																								
Fill level 1	18	8	1	86	3	1	7	2	30	1	1	-	1	7	-	-	-	7	17	12	1	20	---	---
Fill level 2	10	4	-	13	7	-	2	2	12	2	1	-	-	2	-	1	-	2	1	2	-	60	---	---
Fill level 3	7	2	3	16	2	-	-	-	18	5	2	-	-	-	-	-	-	2	--	--	1	59	---	---
Fill level 4	4	1	-	12	1	-	-	-	12	2	-	-	-	-	-	-	-	1	--	1	-	34	---	---
General	1	--	-	1	-	-	-	-	--	-	-	-	-	-	-	-	-	-	--	--	-	2	358	
Total	40	15	4	128	13	1	9	4	72	10	4	-	1	9	-	1	-	12	18	15	2	--	---	358
Pithouse B																								
Fill general	--	--	-	--	-	-	-	-	1	2	-	-	-	1	-	-	-	-	--	--	-	5	---	---
Fill overburden	--	--	-	4	5	1	1	1	7	3	-	-	-	1	1	-	4	-	1	--	2	30	---	---
Fill level 1	--	--	-	--	-	-	-	-	2	-	1	-	-	-	-	-	-	-	--	--	3	6	---	---
Fill level 2	--	--	-	4	1	1	1	-	5	1	-	-	-	2	-	-	-	1	2	--	1	19	61	---
Level 3 floor fill	--	--	-	5	-	-	-	-	3	2	2	-	-	-	-	-	-	1	--	--	-	--	13	---
Floor 1, main chamber	--	--	-	--	1	-	-	-	5	-	-	-	-	-	-	-	-	-	--	--	-	6	---	---
Floor 1, wing wall	2	--	-	--	-	-	-	-	3	2	-	-	-	-	-	-	-	-	1	--	-	8	---	---
Floor 1, bench	2	1	1	23	-	-	-	-	15	1	-	-	-	-	-	-	-	-	--	--	2	45	---	---
Floor 1, burial 2	1	--	-	--	-	-	-	-	--	-	-	-	-	-	-	-	-	-	--	--	-	1	60	---
Subfloor floor 2 fill	--	--	-	--	-	-	1	-	2	4	4	1	-	-	-	-	-	1	--	--	-	--	13	---
Total	5	1	1	36	7	2	3	1	43	15	7	1	-	4	1	-	4	3	4	--	9	--	---	147
Pithouse C																								
Fill	1	--	2	--	-	-	-	-	--	--	-	-	-	-	-	-	-	-	--	--	-	--	3	---
Total	1	--	2	--	-	-	-	-	--	--	-	-	-	-	-	-	-	-	--	--	-	--	---	3

(continued)

Table 6.3 (continued)

	ARTIODACTYLA				CARNIVORA				LAGO-MORPHA		RODENTIA			AVES								TOTALS	
	A. americana	O. hemionus	O. canadensis	ARTIODACTYLA unid.	C. familiarus	C. latrans	CANIDAE unid.	CARNIVORA unid.	L. californicus	S. auduboni	C. gunnisoni	T. bottae	Dypodomys sp.	M. gallopavo	Buteo sp.	F. mexicanus	A. macao	Mammals, sm-med	Mammals, med-lg	Birds	Bone, general	Prov. subdivision	Provenience	Prov. unit/class
Room 1 fill	--	--	-	--	--	-	-	-	--	-	1	-	-	-	-	-	-	-	--	--	-	1	---	---
Room 1 floor 1	--	--	-	--	--	-	-	-	--	-	-	-	-	1	-	-	-	-	--	--	-	1	2	---
Room 2 floor 2	1	--	-	--	--	-	-	-	--	-	-	-	-	-	-	-	-	-	--	--	-	1	---	---
Room 2 pit 1	--	--	-	--	1	-	-	-	--	-	-	-	-	-	-	-	-	-	--	1	-	2	3	---
Room 3 fill	1	--	-	1	1	-	-	-	--	3	4	-	-	1	-	-	-	-	1	--	-	-	12	---
Room 4 fill	--	--	-	1	--	-	-	-	--	-	1	-	-	-	-	-	-	-	--	--	-	2	---	---
Room 4 floor 1	--	--	-	--	--	-	-	-	--	-	-	-	-	-	-	-	-	-	1	--	-	1	---	---
Room 4 pit 1	--	--	-	--	--	-	-	-	--	-	1	-	-	-	-	-	-	-	--	--	-	1	4	---
(Room) 5 fill	--	--	-	6	2	-	-	-	12	1	-	-	-	-	-	-	-	1	--	--	2	24	---	---
(Room) 5 floor 1	--	--	-	5	--	-	-	-	2	-	2	-	-	-	-	-	-	-	--	--	-	9	33	---
Room 6 fill	--	--	-	2	--	-	-	-	--	-	-	-	-	-	-	-	-	-	--	--	-	-	2	---
Room 7 fill	--	--	-	6	1	-	-	-	1	-	2	-	-	-	-	-	-	5	6	--	1	22	---	---
Room 7 floor 1 firepit 1	--	--	-	--	--	-	-	-	--	-	-	-	-	-	3	-	-	-	--	--	-	3	25	---
Room 9 fill	--	--	-	--	1	-	-	-	--	-	-	-	-	-	-	-	-	-	--	--	-	-	1	---
Room 11 fill	1	--	-	1	1	-	1	-	3	4	-	-	-	1	-	-	-	4	9	4	2	-	31	---
Total	3	--	-	22	7	-	1	-	18	8	11	-	-	3	3	-	-	10	17	5	5	-	---	113
Ramada																								
Area 1 overburden	--	--	-	--	6	1	-	-	2	-	-	-	-	-	-	-	-	2	--	--	-	11	---	---
Area 1 fill	3	--	1	2	19	-	-	-	1	-	-	-	-	1	-	-	-	2	2	--	-	31	42	---
Area 3 overburden	--	1	-	4	--	4	1	-	3	2	3	-	-	-	-	-	-	-	5	1	1	-	25	---
Area 4 overburden	--	--	-	--	--	-	-	-	--	1	-	-	-	-	-	-	-	-	--	--	-	-	1	---
Total	3	1	1	6	25	5	1	-	6	3	3	-	-	1	-	-	-	4	7	1	1	-	---	68

Table 6.3 (continued)

	ARTIODACTYLA				CARNIVORA				LAGO-MORPHA		RODENTIA			AVES								TOTALS		
	A. americana	*O. hemionus*	*O. canadensis*	ARTIODACTYLA unid.	*C. familiarus*	*C. latrans*	CANIDAE unid.	CARNIVORA unid.	*L. californicus*	*S. auduboni*	*C. gunnisoni*	*T. bottae*	*Dypodomys* sp.	*M. gallopavo*	*Buteo* sp.	*F. mexicanus*	*A. macao*	Mammals, sm-med	Mammals, med-lg	Birds	Bone, general	Prov. subdivision	Provenience	Prov. unit/class
Trash Mound																								
Grid E	--	--	-	1	--	-	-	-	--	-	-	-	-	-	-	-	-	-	2	--	2	5	---	---
Grid F	--	--	-	--	1	2	-	-	--	1	-	-	-	-	-	-	-	-	1	--	-	5	---	---
Grid H	--	--	-	--	--	-	-	-	2	1	1	-	-	1	-	-	-	2	2	--	-	9	---	---
Grid I	--	--	-	--	--	-	-	-	--	-	-	-	-	-	-	-	-	-	-	--	1	1	---	---
N. extension	--	--	-	--	--	-	-	1	--	-	-	-	-	-	-	-	-	-	-	--	-	1	21	---
Total				1	1	2		1	2	2	1			1				2	5		3			21

Table 6.4. Faunal elements from Kiva A, 29SJ1360

											Vertebrae																						
	Tibia	Patella (R)	Femur	Ulna	Radius	Humerus	Scapula	Innominate	Skull	Mandible	Cervical	Thoracic	Lumbar	Sacrum	Upper rib	Middle rib	Lower rib	Unknown rib/ vertebra	Talus (R)	Calcaneus	Metatarsal	Tarsal	Metacarpal	Carpal (R)	Metapodial	Phalanges	Astragalus (R)	Antler	Long bone fragment	Tibiotarsus (L)	Coracoid	Unknown	Total
A. americana	1 L 1 R	1	-	2 L 1 R	1 L 5 R	1 L 1 R	3 R	1 L 2 R	-	-	2	-	-	-	-	-	-	-	-	-	3 L 1 ? 4 R	2 L	1 ?	1	-	4 F 2 S	-	-	-	-	-	-	40
O. hemionus	-	-	-	-	3 R	-	2 L	-	-	-	-	-	-	1	-	-	-	-	1	-	1 L 1 R	-	-	-	-	2 F	1	3	-	-	-	-	15
O. canadensis	-	-	-	-	1 R	1 R	-	1 L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 S	-	-	-	-	-	-	4
ARTIODACTYLA unidentified	1 L 5 ? 1 R	1	1 ?	1 L	1 L	1 L 1 ?	2 L 3 ? 2 R	2 L 2 ? 1 R	-	-	-	1	4	1	2 L 2 R	7 R	1 R	7	-	-	2 ?	-	2 ?	-	2	-	-	-	70	-	-	2	128
C. familiaris	-	-	-	1 L	1 L	-	-	1 L	2	2 L 5 R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 T	-	-	-	-	-	-	13
C. latrans	-	-	-	-	1 L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CANIDAE unidentified	-	-	1 L	3 R	1 L 1 R	-	2 L	-	-	1 R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
CARNIVORA unidentified	-	-	1 ? 1 R	-	-	1 L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	4
L. Californicus	7 L 2 ? 8 R	-	6 L 2 ? 6 R	3 L 1 R	2 L 1 R	2 L 3 R	1 L 1 R	2 L 1 ? 5 R	2	-	2	-	-	-	-	2 L 4 R	1 L	-	-	1 L 1 R	1 R	-	-	-	-	-	-	-	5	-	-	-	72
S. auduboni	2 L	-	1 L	-	-	-	1 L 1 R	1 L 2 R	1	1 L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
C. gunnisoni	-	-	1 L	-	-	1 L	-	-	-	1 L 1 R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Dipodomys sp.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
M. gallopavo	1 R	-	-	-	1 L	1 L 1 R	1 L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1 L 1 R	-	9
F. mexicanus	-	-	-	-	-	1 L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Mammals																																	
Small-Medium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	12
Medium-Large	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	17	-	-	-	18
Bird	1 L 1?	-	-	1 ?	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	15
Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2
Subtotals	12 L 8 ? 11 R	2	9 L 4 ? 7 R	7 L 1 ? 5 R	8 L 1 ? 10 R	8 L 1 ? 6 R	9 L 3 ? 7 R	8 L 3 ? 10 R	6	4 L 7 R	5	1	4	2	2 L 2 R	2 L 11 R	1 L 1 R	8	1	1 L 1 R	4 L 3 ? 6 R	2 L	3 ?	1	2	6 F 3 S 1 T	1	3		2	1 L 1 R	2	
Total	31	2	20	13	19	15	19	21	6	11	5	1	4	2	4	13	2	8	1	2	13	2	3	1	2	10	1	3	118	2	2	2	358

L = left; R = right; ? = unknown

dogs (Canis familiarus) predominating (68.8 percent of the order). No cats were identified among the carnivores. Unidentified bone accounts for 17.3 percent of the collection, while the small species, such as prairie dogs (Cynomys gunisoni), pocket gophers (Thomomys bottae), and kangaroo rats (Dipodomys sp.) make up only 3.9 percent of the fauna. Bird remains complete the remaining 3.8 percent of species-identified fauna. (Rounding accounts for the slight discrepancies between these figures and those given on Table 6.1).

Wild turkey remains (Meleagris gallopavo) make up the bulk of the bird bone (66.7 percent). The absence of splints among the elements recovered suggests that turkeys were used for food, since splints would have been present for unbutchered individuals. Three specimens of unidentified hawk (Buteo sp.) were found in the House 1, Room 7 firepit, and prairie falcon (Falco mexicanus) was tentatively identified from Kiva A trash. A single raven (Corvus corvax) was recovered from the overburden of Pithouse B.

Certainly the most unexpected identification was that of macaw (Ara sp.). Emsli (personal communication, 1980) identified four macaw elements from 1360: ulna, carpometacarpus, scapula, and furculum (Figure 6.1). A radius was later found in the backdirt bag (Akins 1981). The bird was probably a Scarlet Macaw (Ara macao), but positive identification was not possible; the bones could be those of a Military Macaw (Ara militaris). Features of the carpometacarpus, when compared with those of modern specimens, suggest that this element is more like that of a Scarlet, but because no published discussions of the distinguishing characteristics for the two species were available, positive identification could not be made. Pathological growth on these bones suggests an older individual, fitting the pattern noted by Hargrave (1970) for individuals found at Pueblo Bonito. The presence of the furculum (wishbone) and right scapula reduces the possibility of traded, dried wings and suggests that a live bird was present at the site. All other elements come from the right wing, indicating a single individual. The macaw was recovered from the overburden of Pithouse B (surface to top of bench), which was excavated with a backhoe. There was only casual recovery of materials from this provenience so that the rest of the macaw probably remains at the site in backfill.

There are many problems with reconstructions of minimal numbers of individuals (Table 6.2), and these are even greater for a site with potentially high recovery bias; MNI distribution is presented on Table 6.3. These MNIs indicate that for the entire site adults outnumber subadults (by a ratio of 7:3); if domestic dogs are discounted, this ratio rises to 8:2. These ratios suggest another interesting aspect of life at 1360--a thriving dog population. Only rabbit and prairie dog outnumber or equal the estimated minimal number of dogs present. A maximum of 21 individual dogs were recovered from various parts of the site, but the minimum figure of 6 to 10 adults and 4 subadults probably represents a truer picture. A closer examination of ages--one very young puppy, two older puppies, one young adult, and six adults--suggests sufficient age and sex distributions for a stable intrasite breeding population. Two complete individuals were recovered from

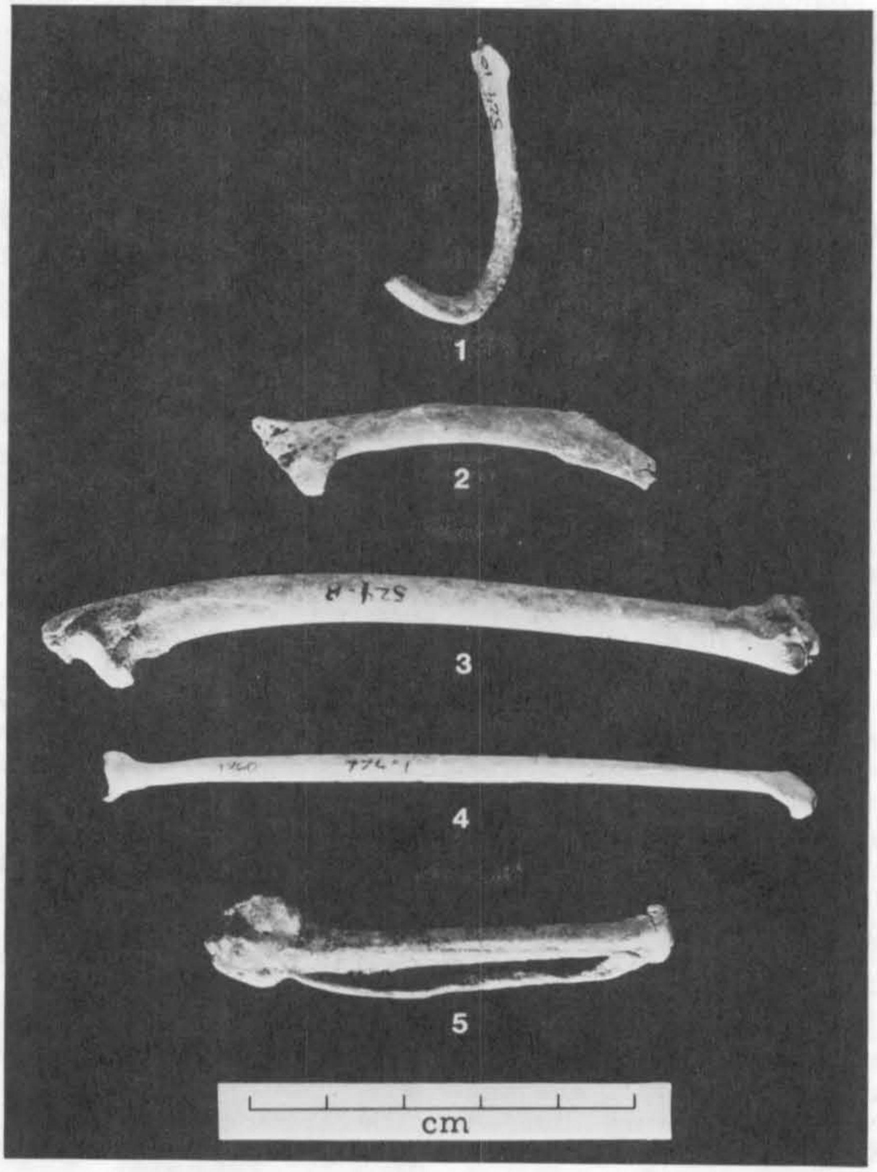


Figure 6.1. Macaw bones from fill of Pithouse B: (1) furculum, (2) scapula, (3) ulna, (4) radius, and (5) carpometacarpus

Pithouse B, one from the floor of the main chamber near the knee of Burial 2 and another from the west floor of the area behind the wing walls. Major portions of other individuals were located in the adjacent plaza and rubble areas.

Several distillations and inferences can be made from an examination of Table 6.4. This table displays elements from the principal trash deposit, Kiva A, and represents trends in element distribution. Bighorn sheep and mule deer are represented principally by lower extremities. Each has a single occurrence of a pelvic fragment. Pronghorn, however, have both axial and extremity segments represented. This species was most extensively used for tools, and it displays the greatest incidence of butchering. Thus, pronghorn, it may be suggested, was the most readily available large mammal. Because of their smaller body size and local availability, pronghorn were transported to the site for processing beyond minimal field dressing. Bighorn and mule deer may have been harder to come by, and the lack of butchering evidence on distal elements suggests that these items were retained as handles on skin bags and used to transport the meat. The unwanted, heavier portions of the skeleton were probably left in the field by the hunter(s).

Coyote remains consistently were found in surface contexts and may not be associated with the occupationally related fauna. Prairie dog remains were widely scattered over the site, but the existence, until recently, of a large prairie dog population in the area makes assessment of the prairie dog's prehistoric economic value difficult.

Raw frequencies, element counts, minimal numbers of individuals, and provenience data all suggest that pronghorn, jackrabbit, and cottontail rabbit, respectively, were the primary economic fauna at 1360.

BONE TOOLS

Bone tools were recovered from all portions of the site except the trash mound. Concentrations of bone tools were located in Kiva A and Pithouse B, and because these two concentrations represent different contextual situations (trash and in situ use), they provide excellent comparative assemblages. A generalized tool inventory is provided in Table 6.5; illustrations of the terms used in this section appear in Figure 6.2. The following discussion summarizes the salient points of a preliminary study of bone tools from Chaco (McKenna 1980b) that used 1360 as a case study.

Seventy-seven bone tools were recovered; six other bone artifacts were identified as tinklers and are discussed as ornaments (Chapter 5). Most of the bone tools fall into the general class of awls (57 percent, Table 6.5). The presence of humerus endscrapers, more elaborate forms of which have been recovered in Great House deposits from later time periods (Judd 1954:Plate 36-37; Morris 1928:36), suggests a mid- to late-Pueblo II time period.

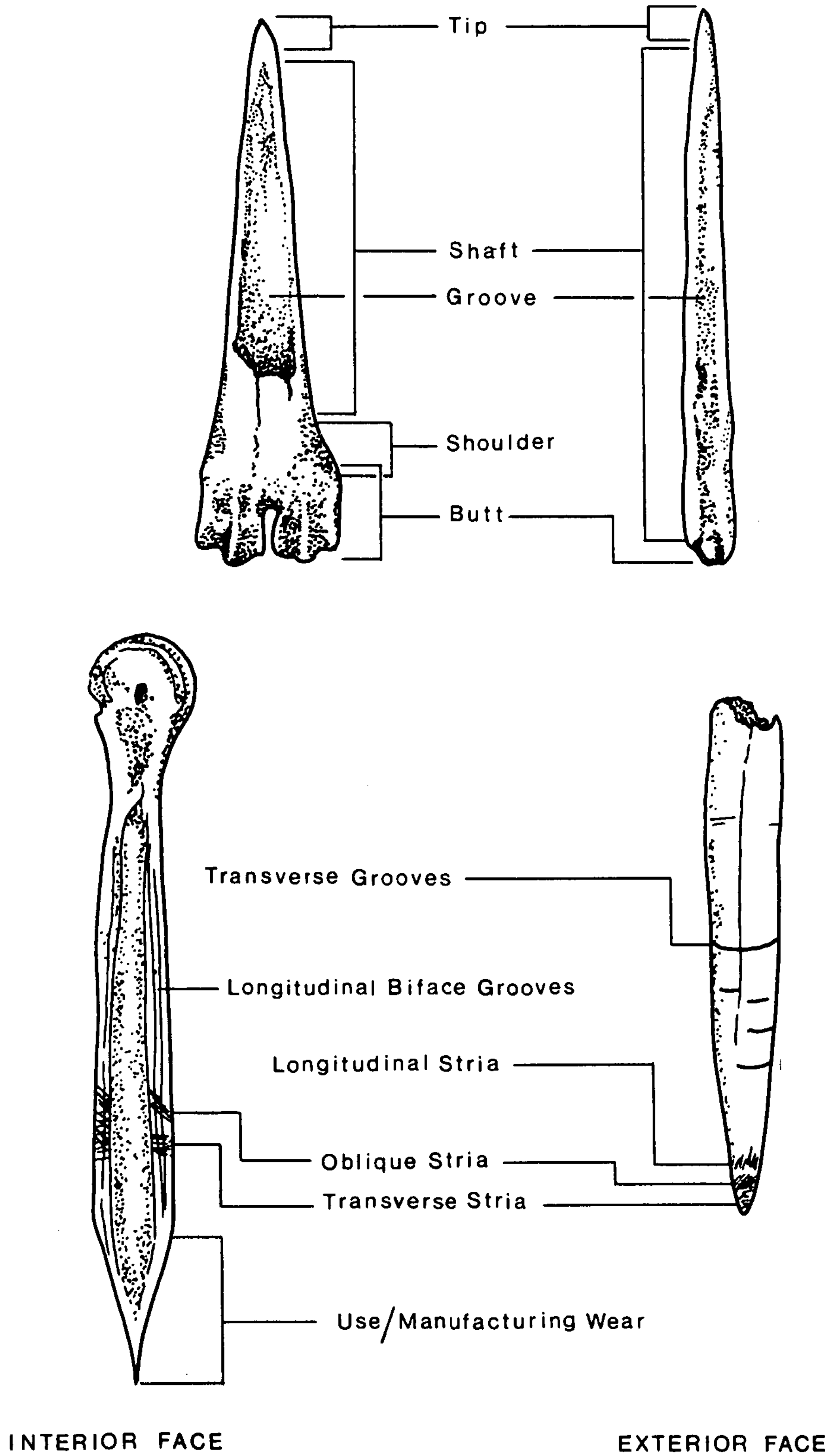


Figure 6.2. Reference terminology for bone tools

Table 6.5. Generalized bone tool classes, species, and condition.

Tool Class	Taxonomic Identification	Element	Mature	Immature	Unknown	Total	% of Total
Awl forms	O. hemionus	Ulna, proximal right	1	-	-	--	----
	A. americana	Metatarsal, distal	1	-	-	--	----
	O. canadensis	Radius, proximal left	1	-	-	--	----
	C. latrans	Ulna, proximal left	1	-	-	--	----
	ARTIODACTYL	Metapodial, distal	8	2	-	--	----
		Metatarsal, proximal	1	-	-	--	----
		Metatarsal, proximal right	1	-	-	--	----
		Metatarsal, distal	2	-	-	--	----
		Tibia, shaft, left	1	-	-	--	----
		Long bone shaft fragments	-	-	23	--	----
		Long bone unknown head	1				
		Long bone, distal	-	1	-	--	----
Subtotal			-	-	-	44	57.1
Needles	Mammal small-medium	Long bone shaft fragments	-	-	3	--	----
	Mammal-bird?	Long bone shaft fragments	-	-	2	--	----
Subtotal			-	-	-	5	6.5
Pins	ARTIODACTYL	Long bone shaft fragments	-	-	2	--	----
			-	-	-	2	2.6
Multipurpose Spatulates							
	ARTIODACTYL	Long bone shaft fragments	-	-	1	--	----
		Metapodial, distal	-	-	1	--	----
		Tibia, distal	1	-	-	--	----
Subtotal			-	-	-	3	3.9
End Scrapers	ARTIODACTYL	Humerus, distal right	1	-	-	--	----
		Humerus, distal, left	-	1	-	--	----
		Long bone shaft fragments	-	-	1	--	----
Subtotal			-	-	-	3	3.9
Flakers	O. hemionus	Antler tine	2	-	-	--	----
Subtotal			-	-	-	2	2.6
Tool fragments	A. americana	Metacarpal, distal	-	1	-	--	----
	ARTIODACTYL	Metatarsal, proximal	1	-	-	--	----
		Metacarpal, proximal	1	-	-	--	----
		Tibia, shaft	-	-	1	--	----
		Rib, shaft	-	-	1	--	----
		Long bone shaft fragments	-	-	5	--	----
Subtotal						10	13.0

(continued)

Table 6.5 (continued)

Tool Class	Taxonomic Identification	Element	Mature	Immature	Unknown	Total	% of Total
Tool Blanks	*A. americana*	Metacarpal, left	1	-	-	--	----
		Metacarpal, right	2	-	-	--	----
		Metatarsal, right	2	-	-	--	----
	O. canadensis	Metacarpal, right	2*	-	-	--	----
	ARTIODACTYL	Metapodial, right	-	1	-	--	----
Subtotal			-	-	-	8	10.4
Total			31	6	40	77	100.0

*2 blanks, single bone.

Artiodactyls are the principal source of bone selected for use as tools at 1360. Table 6.6 compares identified artiodactyls from Kiva A, which represents the bulk of the faunal trash, with tools identified to species from Pithouse B; worked bone reflects unworked faunal distributions.

Table 6.6. Fauna selected for bone tools

	Kiva A	Pithouse B	
	Number of Elements	Number of Metapodials	Number of Worked Elements
Pronghorn	40	9	7
Mule deer	15	2	3
Bighorn sheep	4	-	2

Pronghorn constitute the majority of the bulk artiodactyl and of the bone selected for use as tools. The apparently heavy reliance on this species may reflect Chaco's position in the center of the relatively flat San Juan Basin where antelope, a herd animal, would be more readily available than deer or sheep. Selection of artiodactyl bone for tool manufacture would seem to be due to the abundance of this material. Given the general availability of suitable bone, exchange of bones for tool manufacture among canyon sites is unlikely.

Generally, the tools from 1360 imply a broad spectrum of tasks, all utilitarian and all involved in the processing of raw materials. Processing of fibrous materials, e.g., corn shucking or removing fibers from pulp, is specifically suggested by the presence of humerus end-scrapers (Figure 6.3[3]) in the collection and by the numerous scraping facets on some tool blanks (Figure 6.4) and other spatulate tools (11.7 percent of all tool classes). Hide working is suggested by the single ulna awl (Figure 6.5[5]). Finishing of tailored products by sewing and/or weaving of coarser fabrics, such as turkey feather and rabbit fur for blankets, are suggested by a variety of needles and pins (9.1 percent of all tool classes; Figures 6.3[6 and 7], 6.6[2], and 6.7[8 and 9]). Pressure flaking of siliceous stone is indicated by the two antler-tine flakers (Figure 6.8). The general class of awl forms suggests that a broad range of tasks, such as punching, piercing, and enlargement and possibly plaiting of mats and coiling of basketry, were undertaken with an implement of rather standardized appearance. The remainder of the identifiable collection consists of split and unsplit unutilized tool blanks (6.5 percent of all tool classes).

The in situ assemblage in Pithouse B reveals several stages of bone tool production. The presence of split and unsplit artiodactyl metapodials and of bone preparation marks on tool shafts indicates some of the technology of production (Figure 6.9). Artiodactyl metapodial bones were selected and curated for use in tool manufacturing. The metapodials were longitudinally incised both posteriorly and anteriorly along the midline, probably with a lithic biface; subsequently they were split

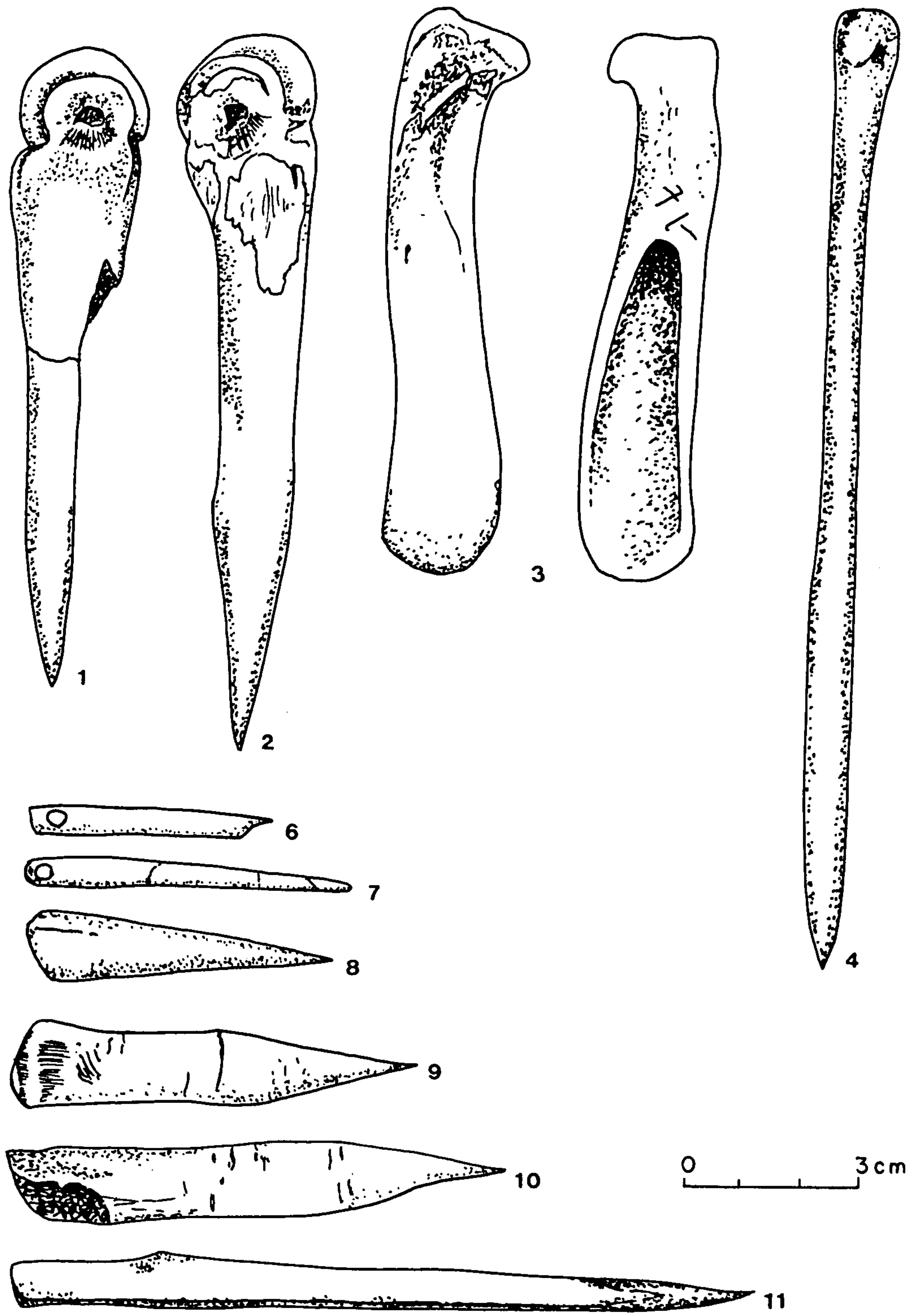


Figure 6.3. Worked bone from Pithouse B, north bench

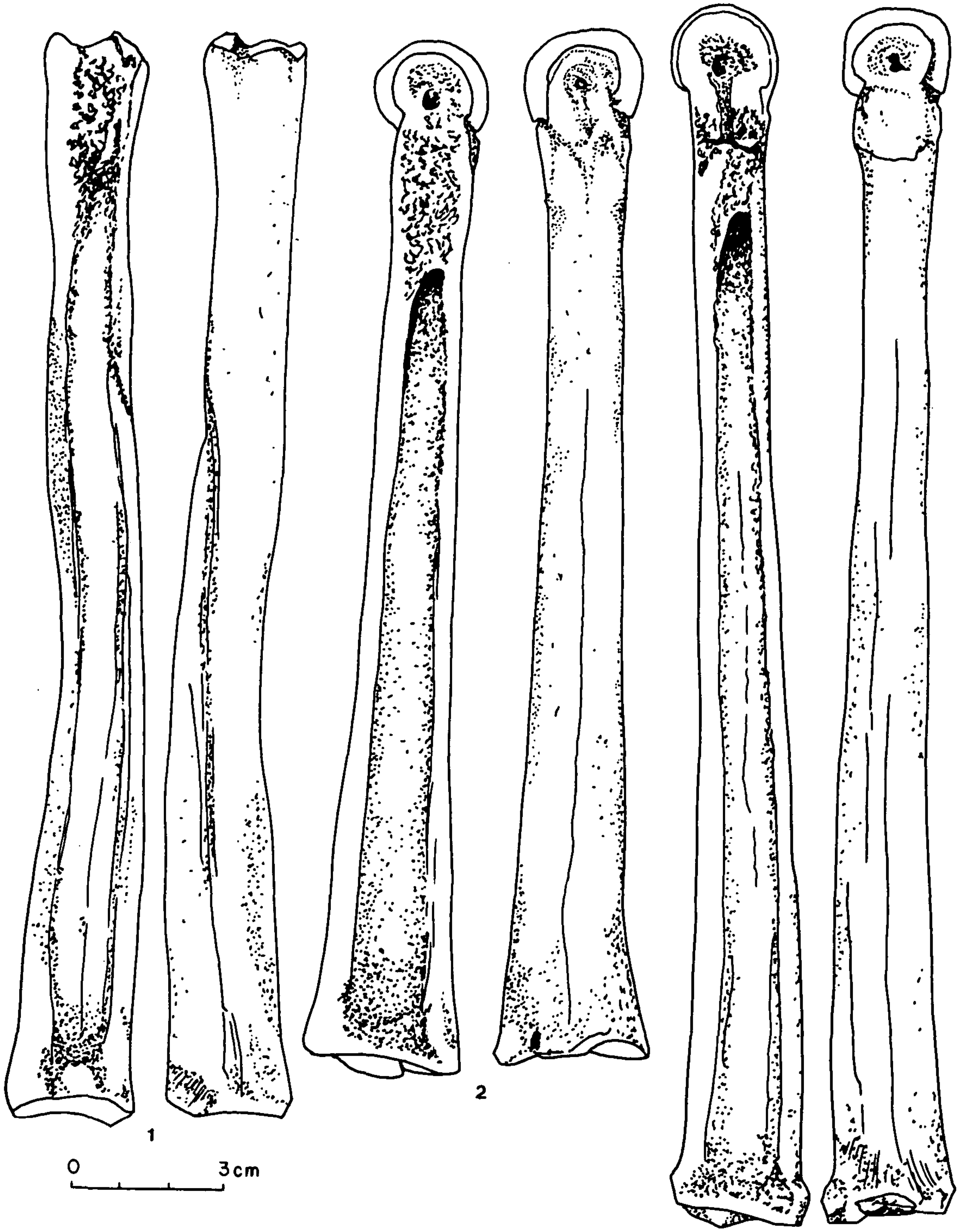


Figure 6.4. Worked bone from Pithouse B, west bench

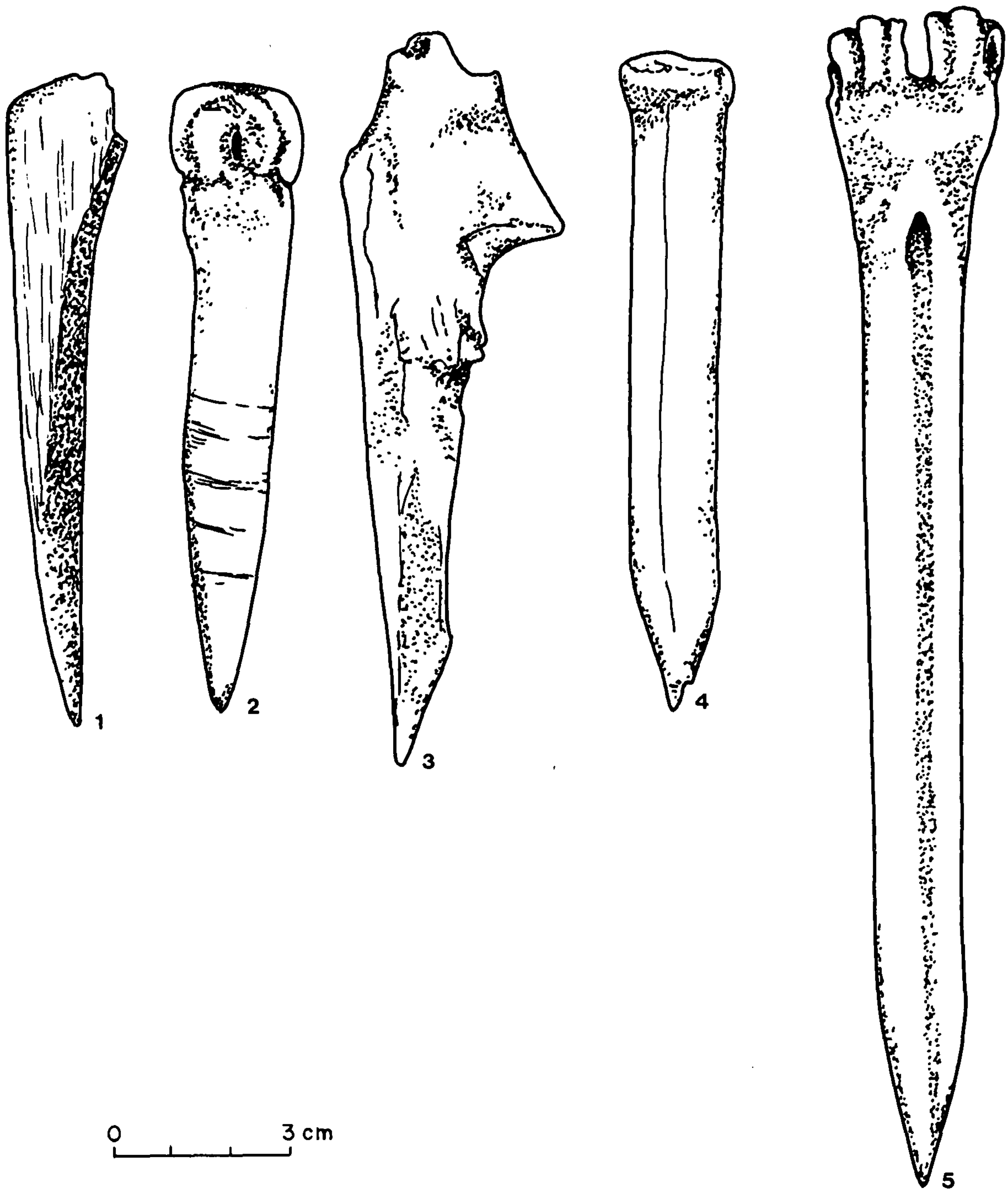


Figure 6.5. Worked bone from Kiva A trash fill

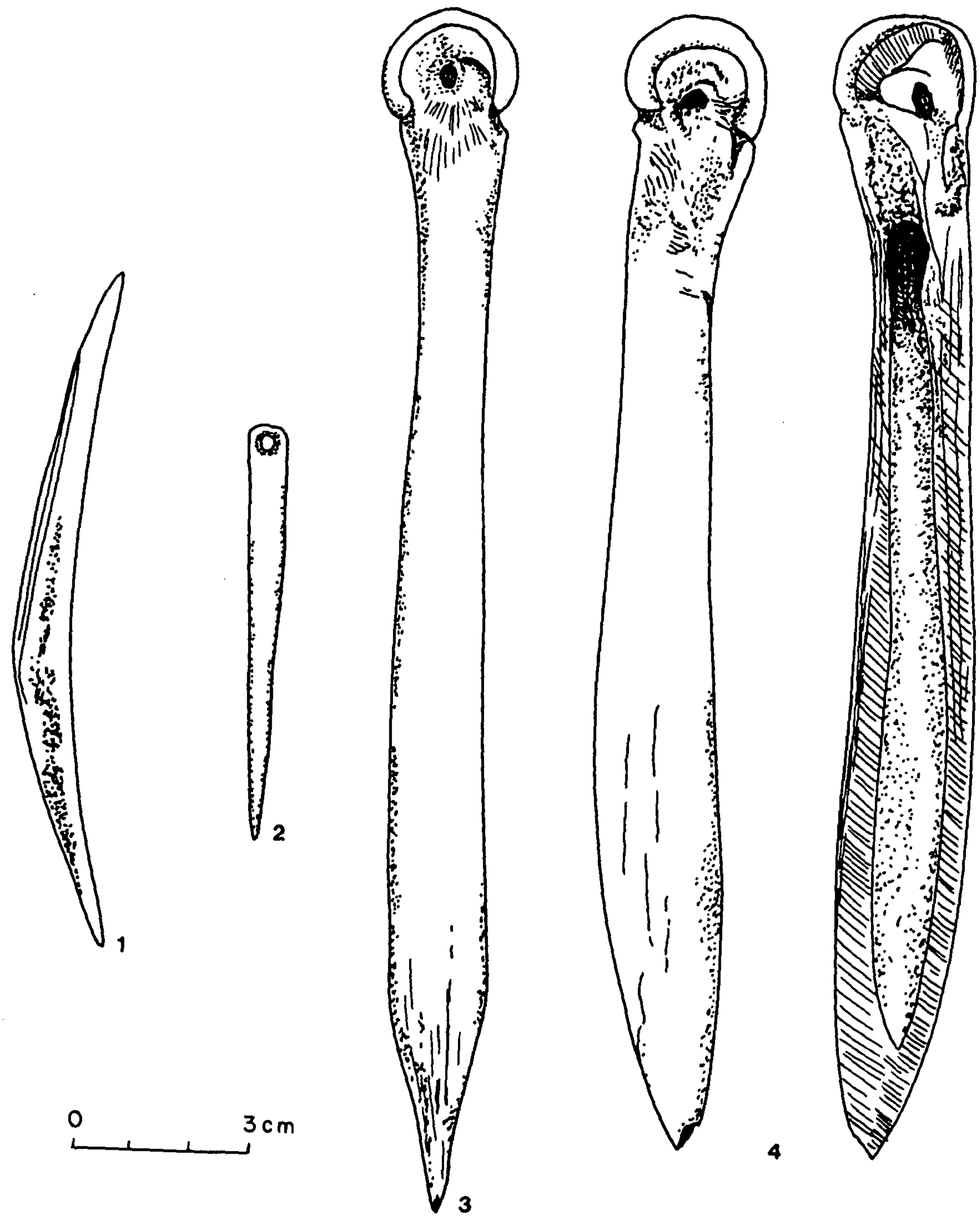


Figure 6.6. Worked bone from Pithouse B: (1-3) from floor fill, fallen from bench; (4) from unspecified bench location.

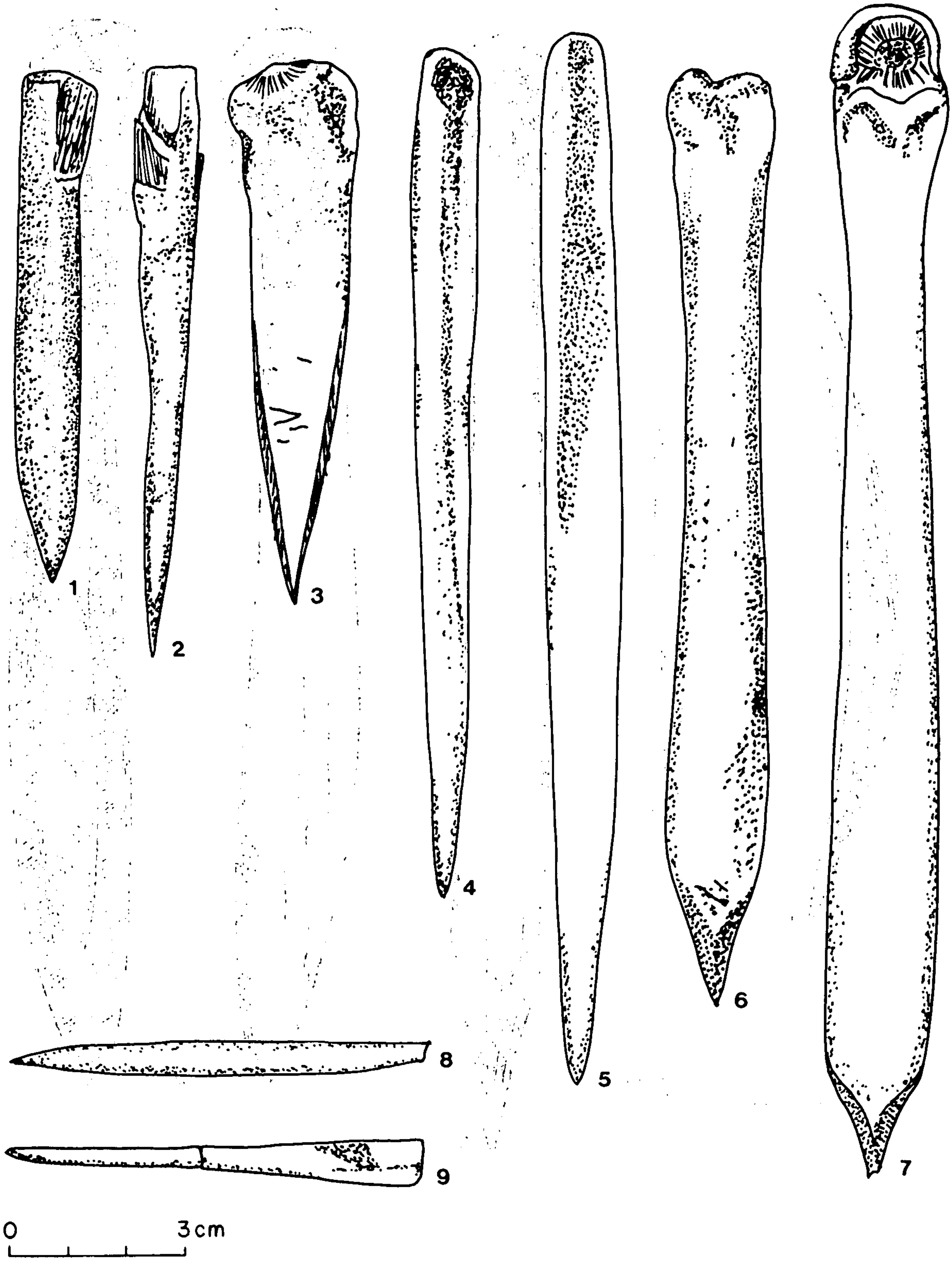


Figure 6.7. Worked bone from Pithouse B, west bench

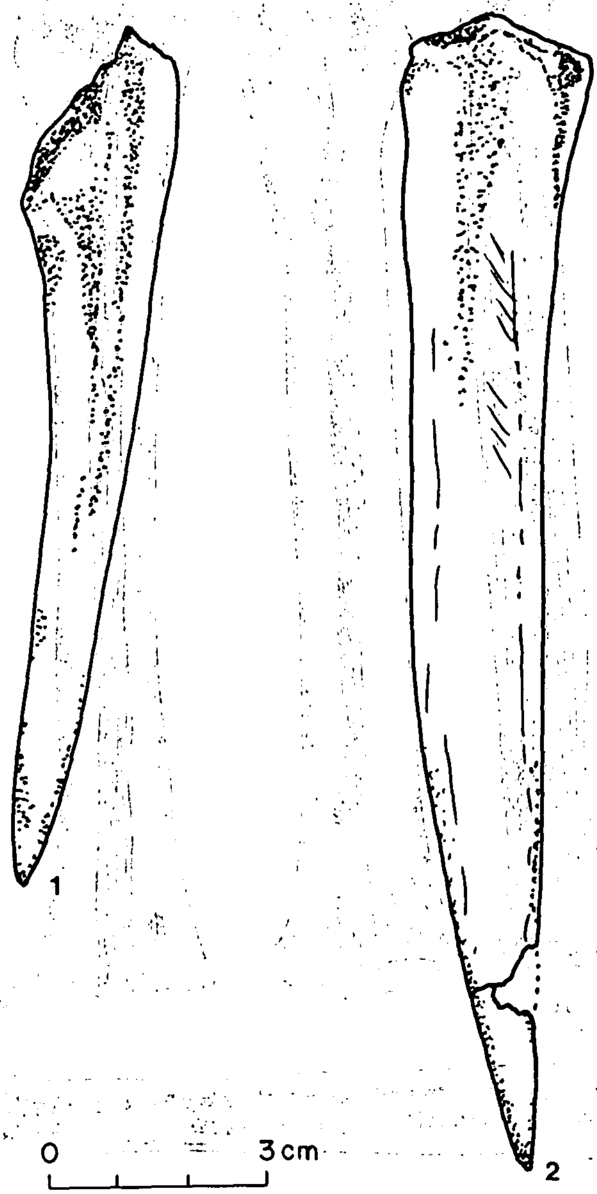


Figure 6.8. Worked bone from Pithouse B, west bench

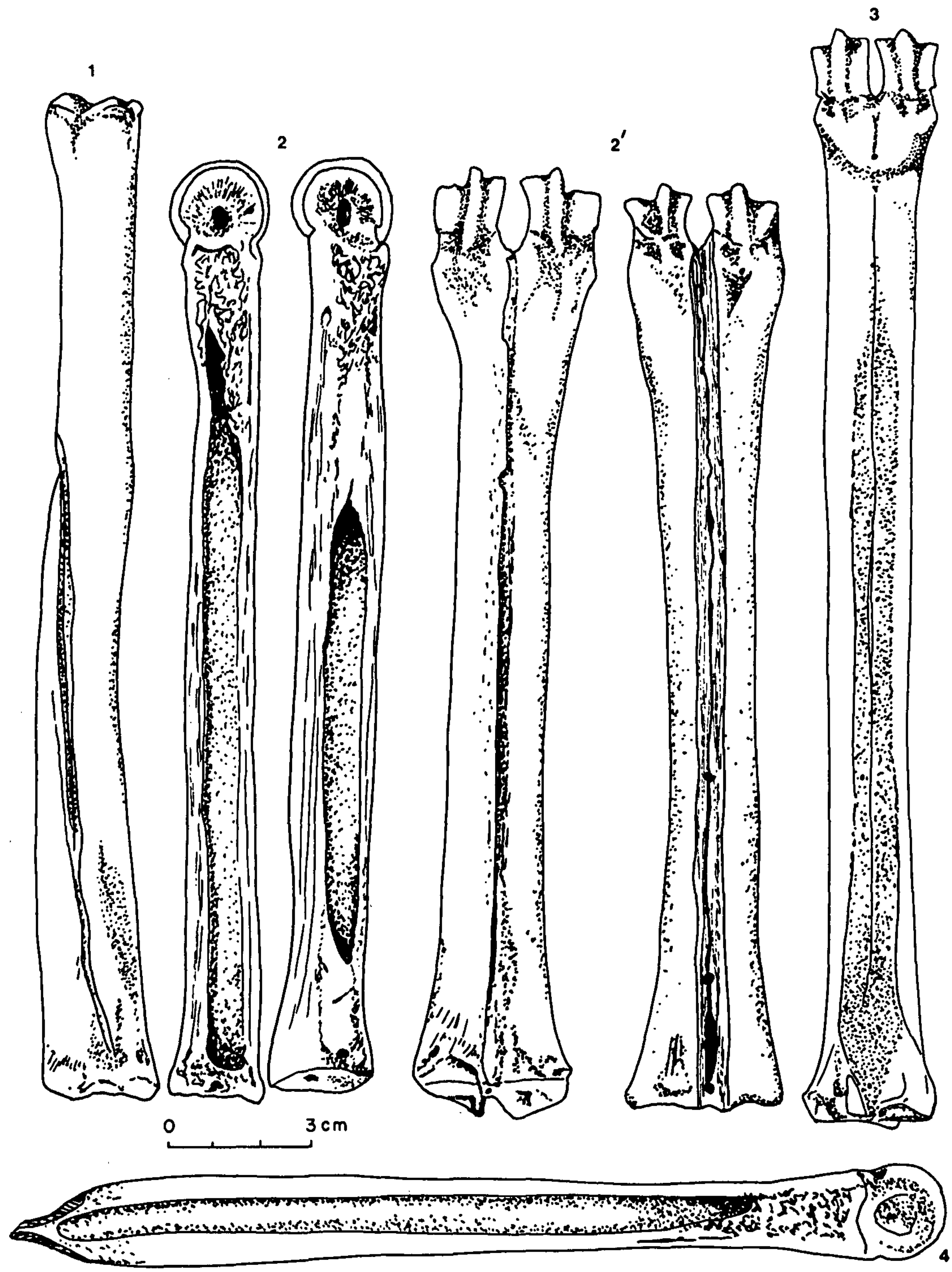


Figure 6.9. Tool blank production; a tool similar to the horizontal example (4) was probably used to split the specimens shown in the middle (2)

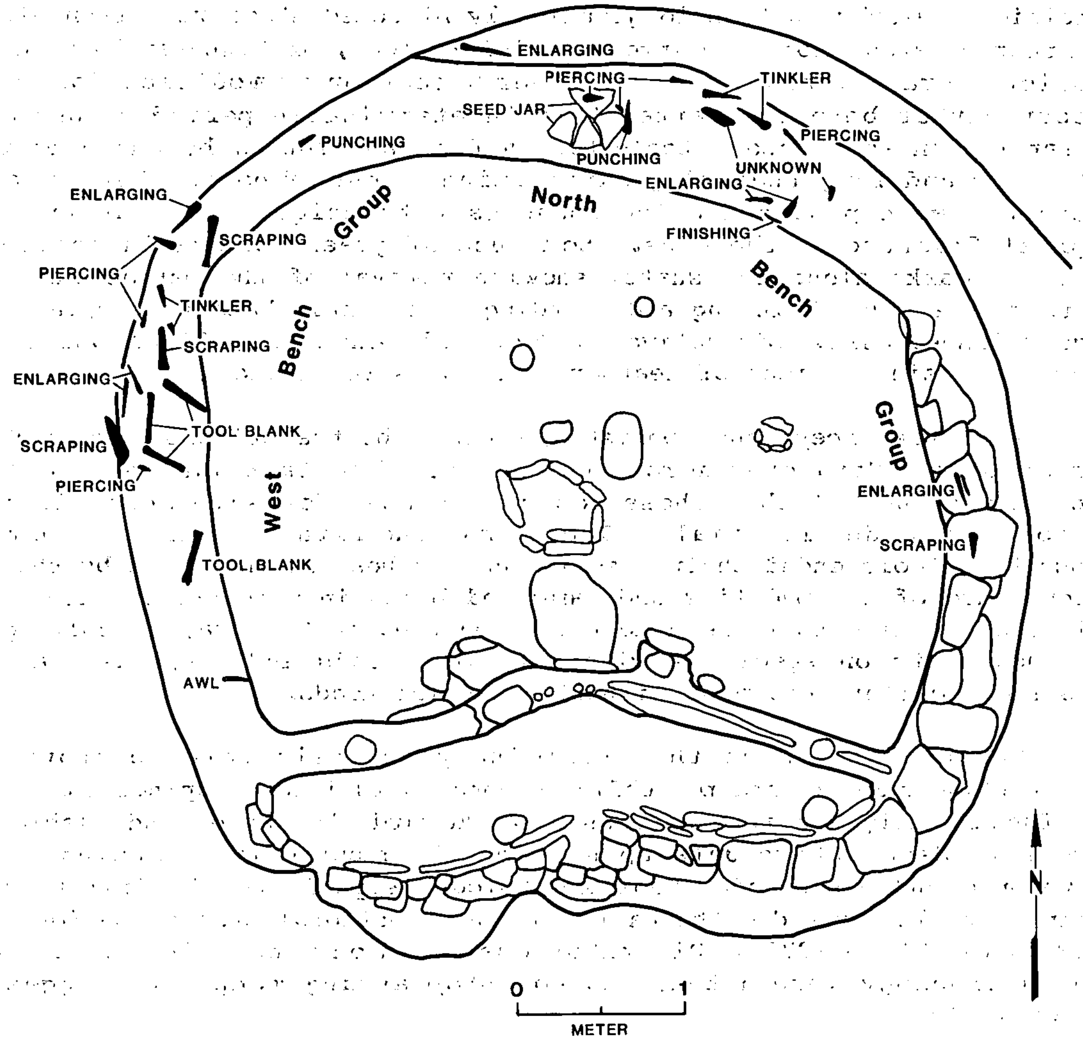
by punching with an awllike tool at critical points along this midline incision. Blanks in this longitudinally bisected stage were then either further curated, modified into an awl-form tool, or temporarily used for various scraping functions. Further bisection or modification could occur either before or after this indeterminable period of use as a scraper. In some cases, tool-shaft width was reduced by chopping into the bone and longitudinally exfoliating a spur of bone. Humerus end-scrapers were produced using these same techniques or by means of a spiral fracture on the bone. Some use of green bone is indicated by chatter marks along the shaft, showing removal of the periosteum with lithic scrapers. Pointing and rounding into final shape were apparently accomplished using soft active abraders of sandstone; final polishing was done using a piece of leather or a polishing stone.

With few exceptions, polish appears to be the principal wear characteristic. Scratches across the shafts of certain smaller, awllike specimens suggest that these tools were used for some specific task involving harder materials. Tools from the Kiva A trash suggest that most bone tools ended their use-life as punches, as indicated by the co-occurrence of chipped tips and hammered butts in this provenience. All sizes of awllike tools seem to have been used in this way, resulting in crushed butts on specimens with articular heads and steplike fracture scars on smaller specimens without articular heads.

The objectives of the preliminary analysis were to provide a descriptive summary and to subdivide bone tools into groupings that were as functionally specific as possible. Toward the latter end, Table 6.7 presents descriptive data upon which the functional groupings were developed and discussed. Tool morphology, especially tip diameters on pointed tools, provided the basis for the functional breakdowns (McKenna 1980b; cf. Olsen 1979). Distributions based on patterning of tool use and morphology were noted, and workshop arrangements are suggested accordingly.

Kiva A and Pithouse B contained most of the site collection of worked bone (84 percent) and hence are the focal points for this discussion. Pithouse B bone tools were grouped in two clusters on distinct areas of the bench. These tool clusters would appear to represent either a) two tool kits with separate and distinct compositions; b) a single tool kit duplicated in each area; or c) a single kit scattered over the bench. Generally tools of the various functional classes appear evenly in the two clusters (Figure 6.10). The north bench produced four piercing/fine-basketry awls, the west bench three. The northern and western benches each had three enlarging/coarse-basketry awls. Four punches were evenly distribution around the bench. Other tools were also evenly distributed, although this is not readily apparent.

Two instances of uneven tool distribution and two specific task areas can be noted. Evidence of scraping/husking activities and bone tool production was restricted to the west bench. Scrapers, like the majority of tools, appear as paired sets--one a set of "tool-blank" scrapers and the other a set of split artiodactyl tibias. The tool-



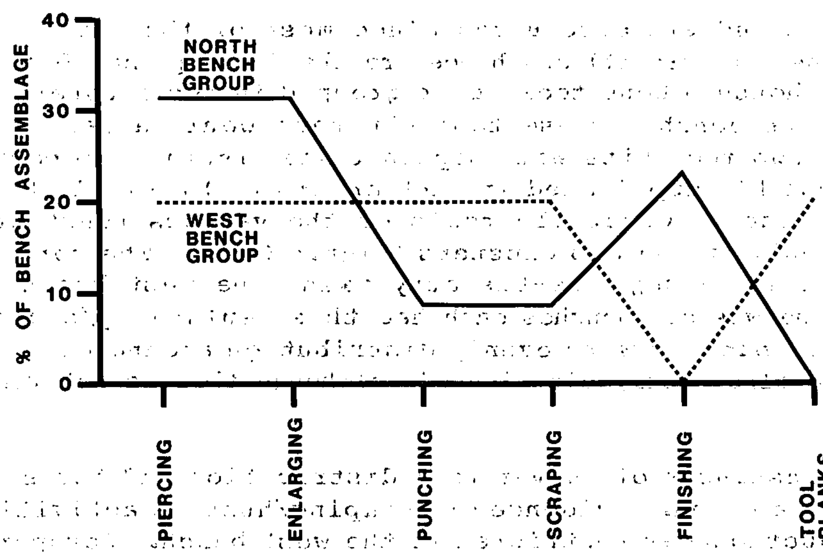


Figure 6.10. Bone tools and proposed use distribution, Pithouse B

Table 6.7. Descriptive attributes of bone tools

Provenience/ Artifact Type	Bone Alteration							Condition			Maximum Dimensions (mm)			Tip morphology: Pointed			Tip morphology							Butts				Features				
	Longitudinal bilaterally split	Longitudinal unilaterally split	Not split	Split indeterminate	Spur fragment	Diagonal cut - Spiral fracture	Unknown	Complete	Incomplete	Fragment	L	W	Tip D	Sharp	Rounded	Concave to base	Flat	Multiple bevels	Exterior bevel - concave to base	Spatulate*	Flat, bibeveled	No modification	Unknown	Articular head	Dual tips	Worked	Unknown/ not applicable	Carved	Eyed	Tool blank	Battered butt	Finger bevels
Backdirt																																
Tool fragment	-	-	-	x	-	-	-	-	-	x	33	10	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-
Plaza Areas																																
Area 1 fill																																
Awl (E CB)	x	-	-	-	-	-	-	x	-	-	108	10	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Area 2 fill																																
Humerus endscraper	-	-	-	-	-	x	-	x	-	-	90	22	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	x	-	-	-	-
Area 3 fill																																
Awl (matting)	-	-	-	-	x	-	-	x	-	-	88	10	2.1	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-
Area 5 fill																																
Awl (E Punch)	x	-	-	-	-	-	-	x	-	-	66	15	2.1	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-
House 1 Rooms																																
Room 3/10 fill																																
Awl fragment	-	-	-	x	-	-	-	-	x	-	66	12	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Humerus endscraper	-	-	-	x	-	-	-	-	x	-	53	36	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-	-	-	-	-
Room 7, Level 1																																
Needle fragment	-	-	-	x	-	-	-	-	-	x	39	9	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-
Kiva A																																
Fill																																
Humerus endscraper	-	-	-	-	-	-	x	-	-	x	26	17	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	x	-	-	-	-
Level 1																																
Awl (E Punch)	x	-	-	-	-	-	-	x	-	-	93	18	2.9	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (E Ps)	x	-	-	-	-	-	-	x	-	-	102	15	3.5	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-
Awl (E Punch)	x	-	-	-	-	-	-	x	-	-	107	15	-	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Ulna awl	-	-	x	-	-	-	-	x	-	-	121	15	1.7	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (P)	-	-	x	-	-	-	-	-	x	-	116	9	0.9	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Needle	-	-	x	-	-	-	-	x	-	-	75	3	0.8	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-
Needle	-	-	x	-	-	-	-	-	x	-	53	6	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-
Tool fragment	-	-	-	x	-	-	-	-	-	x	53	12	-	-	-	-	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Tool fragment	-	-	x	-	-	-	-	-	-	x	87	9	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Tool fragment	-	-	-	x	-	-	-	-	-	x	34	10	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-
Level 2																																
Awl (E Punch)	-	x	-	-	-	-	-	x	-	-	194	16	2.0	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-
Awl (matting)	x	-	-	-	-	-	-	x	-	-	105	11	1.8	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Pin	-	-	-	-	x	-	-	x	-	-	76	6	1.0	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Antler-tine flaker	-	-	x	-	-	-	-	-	x	-	144	21	1.6	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x
Awl fragment	-	-	x	-	-	-	-	-	-	x	58	7	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Level 3																																
Awl fragment	-	-	-	x	-	-	-	-	-	x	83	13	1.8	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Tool fragment	-	-	x	-	-	-	-	-	-	x	36	6	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-
Level 4																																
Weaving tool (?)	x	-	-	-	-	-	-	x	-	-	93	11	1.6	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (E CB)	-	-	-	-	x	-	-	-	-	x	88	13	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Tool fragment	x	-	-	-	-	-	-	-	-	x	58	13	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-
Tool fragment	-	x	-	-	-	-	-	-	-	x	89	18	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-
Pit Structure C																																
Fill																																
Punch	-	x	-	-	-	-	-	x	-	-	56	27	3.3	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-

(continued)

L = Length; W = Width; Tip D = Tip Diameter; E = enlargening; CB = coarse basketry; P = piercing; Ps = punch with transverse scratches

* Spatulate tips are blunt, exteriorally beveled

Table 6.7. (continued)

Provenience/ Artifact Type	Bone Alteration							Condition			Maximum Dimensions (mm)			Tip Morphology										Butts				Features				
	Longitudinal bilaterally split	Longitudinal unilaterally split	Not split	Split indeterminate	Spur fragment	Diagonal cut - spiral fracture	Unknown	Complete	Incomplete	Fragment	L	W	Tip D	Pointed: Sharp	Pointed: Rounded	Pointed: Concave to base	Pointed: Flat	Multiple bevels	Exterior bevel - concave to base	Spatulate*	Flat, bibeveled	No modification	Unknown	Articular head	Dual tips	Worked	Unknown/ not applicable	Carved	Eyed	Tool blank	Battered butt	Finger bevels
Pithouse B																																
Level 1																																
Tool fragment	x	-	-	-	-	-	-	-	-	x	108	16	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-	-	-	-
Level 3																																
Awl (R/P)	x	-	-	-	-	-	-	x	-	-	72	16	2.3	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (R/P)	x	-	-	-	-	-	-	x	-	-	68	20	3.0	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	x	-
Awl (P FB)	x	-	-	-	-	-	-	x	-	-	82	14	1.1	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (E Ps)	-	-	-	x	-	-	-	x	-	-	78	10	2.4	-	x	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (P)	x	-	-	-	-	-	-	x	-	-	233	12	1.0	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Level 4, floor fill																																
Awl fragment	-	-	-	x	-	-	-	-	-	x	68	13	1.7	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Awl fragment	-	-	-	x	-	-	-	-	-	x	82	17	-	-	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Needle	x	-	-	-	-	-	-	x	-	-	67	6	0.8	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-
Awl (E CB)	x	-	-	-	-	-	-	x	-	-	197	16	1.9	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Awl (E Ps)	-	-	x	-	-	-	-	x	-	-	80	11	2.2	-	x	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Tool fragment	-	-	x	-	-	-	-	-	-	x	108	9	-	-	-	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-
Floor 1 (?)																																
Tool blank	x	-	-	-	-	-	-	x	-	-	223	16	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Bench Plaster																																
Humerus endscraper	x	-	-	-	-	x	-	x	-	-	90	17	-	-	-	-	-	-	-	x	-	-	-	-	-	x	-	-	-	x	-	-
Bench																																
Tool blank	-	-	x	-	-	-	-	x	-	-	226	18	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Tool blank	-	-	x	-	-	-	-	x	-	-	231	18	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Tool blank	x	-	-	-	-	-	-	x	-	-	191	16	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Tool blank	x	-	-	-	-	-	-	x	-	-	192	15	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Longitudinal scraper	x	-	-	-	-	-	-	x	-	-	195	18	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Antler-tine flaker	-	-	x	-	-	-	-	x	-	-	114	14	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x
Longitudinal scraper	x	-	-	-	-	-	-	x	-	-	231	18	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Awl (R/P)	x	-	-	-	-	-	-	-	x	-	151	15	1.1	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (R/P)	x	-	-	-	-	-	-	x	-	-	194	18	-	-	-	x	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (E CB)	-	-	-	x	-	-	-	x	-	-	84	15	1.8	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Pin	-	-	-	-	x	-	-	x	-	-	70	5	1.8	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Needle	x	-	-	-	-	-	-	-	x	-	55	5	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	-
Needle	x	-	-	-	-	-	-	-	-	x	40	5	-	-	-	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	-	-
Awl (E Punch)	x	-	-	-	-	-	-	x	-	-	83	10	2.1	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (P)	-	-	-	x	-	-	-	-	-	x	51	11	0.9	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (E Ps)	x	-	-	-	-	-	-	x	-	-	68	12	1.0	-	-	x	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Awl (P)	-	-	-	-	x	-	-	x	-	-	124	6	0.8	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (P Ps)	x	-	-	-	-	-	-	x	-	-	82	13	1.2	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (P FB)	-	-	-	-	x	-	-	x	-	-	70	5	1.0	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (E CB)	x	-	-	-	-	-	-	x	-	-	153	19	1.1	-	-	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Lateral scraper	x	-	-	-	-	-	-	x	-	-	204	18	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	x	-	-
Weaving (?)	x	-	-	-	-	-	-	x	-	-	185	20	2.8	-	-	-	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Scraping/matting	x	-	-	-	-	-	-	x	-	-	182	27	-	-	-	-	-	-	x	-	-	-	-	-	x	-	-	-	-	-	-	-
Awl (E S)	-	-	-	x	-	-	-	x	-	-	173	12	1.7	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (E S)	-	-	-	x	-	-	-	x	-	-	157	11	-	-	-	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (E S)	-	-	-	x	-	-	-	x	-	-	138	10	1.3	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (E CB)	x	-	-	-	-	-	-	x	-	-	158	7	1.7	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (P Punch)	-	-	-	-	x	-	-	x	-	-	98	8	1.0	x	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (P FB)	x	-	-	-	-	-	-	x	-	-	88	16	1.2	-	-	-	x	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-
Awl (E CB)	x	-	-	-	-	-	-	x	-	-	105	12	2.2	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (P FB)	x	-	-	-	-	-	-	x	-	-	120	13	1.3	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Awl (matting)	x	-	-	-	-	-	-	x	-	-	131	18	2.1	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-

L = Length; W = Width; Tip D = Tip Diameter; P = Piercing; CB = coarse basketry; FB = fine basketry; R/P = intermediate reamer/punch; S = spatulate; Ps = punch with transverse scratches; E = enlarging

* Spatulate tips are blunt, exteriorally beveled

blank scrapers were on the west bench with the other unmodified tool blanks, but the tibias were split between the east and west bench. In the other specific task area, sewing is suggested by the needles on the north bench. Most of the items in these clusters are awllike tools, which are undifferentiated in spatial association or general morphology, but which seem to occur in paired sets of long and short, with dull and sharp tips. Of the three alternatives mentioned above, the composition and distribution of bone tools on the Pithouse B bench appear to favor the third--a single dispersed workshop/tool kit.

The materials from Kiva A represent trash, which means that general observations about the assemblage are more practical than an examination for individual tool kits. The makeup of the collection is distinct: 64 percent of it consists of fragments compared with 23 percent fragments in the Pithouse B assemblage (and approximately half of the Pithouse B fragments have only minor damage). The Kiva A assemblage lacks the wide range of tools noted for Pithouse B (72 percent are awl forms). The absence of multipurpose or spatulated tools may reflect actual low frequency, or it may be the result of extensive reuse and modification of these tools. A single specimen (Table 6.7) exhibits a midshaft transverse groove resembling the wear associated with weaving. Table 6.8 shows that the Kiva A bone tool assemblage does not differ from the general site collection in distribution of tip diameters. Since Kiva A fill consists wholly of trash and discarded items, this would indicate that tools, at least awl forms, were not necessarily discarded because they became dull; actual breakage seems most responsible for tool discard.

A trimodal distribution of tip diameters on the awls (measured 1 mm back from the tip) seems apparent in Table 6.8. Replication studies have indicated that leather piercing is practical only with tools no larger than 1 mm at the tip, suggesting that tools would rarely be maintained specifically for this purpose (Olsen 1979). Bone needles, often curved split small mammal or bird bone, are too fragile to withstand the thrusting pressures of leather piercing and probably were only used as fiber draws, the small tip size and diameter being necessary to maintain a fine seam. The remainder of the tools indicate a variety of possible uses.

Combinations of features provide information about the uses of bone tools beyond the fine or coarse work implied by tip diameters. Crushing on butts and damaged tips indicate use as a hammered punch (Figures 6.7[1], 6.11[2 and 3], and 6.12[1-3]), while smooth butts with damaged tips suggest use as hand punches (Figures 6.7[7] and 6.9[4]). As an example of awls used as punches, the tip of the punch shown in Figure 6.9(4) was found imbedded in the anterior incision of a tool blank made from a bighorn sheep metacarpal. Fine tips suggest fine basketry work or, when combined with articular heads as butts, some possible piercing (Figures 6.3[2] and 6.12[5]). Blunt tips suggest a range of functions from manufacture of coarse basketry to use as matting plaiters, in the case of chisellike and spatulated tips (Figures 6.3[1 and 5], 6.7[4 and 5], and 6.12[1 and 2]). Combinations of these attributes on one tool hint at use for multiple tasks (Figures 6.13[1] and 6.14[1]).

Table 6.8. Tip diameters on pointed bone tools

Kiva A Collection	Tip Diameter (mm)	Total Collection
X	3.5	X
	3.4	
	3.3	X
	3.2	
	3.1	
	3.0	X
	2.9	X
	2.8	X
	2.7	
	2.6	
	2.5	
	2.4	X
	2.3	X
	2.2	XX
	2.1	XXXX
X	2.0	X
	1.9	X
XX	1.8	XXXX
X	1.7	XXXX
XX	1.6	XX
	1.5	
	1.4	
	1.3	XX
	1.2	XX
	1.1	XXX
X	1.0	XXXXX
X	0.9	XX
X	0.8	XXX
total 11 tools		total 42 tools
mean 1.781 mm		mean 1.705 mm
s.d. 0.817		0.705

Refer to Table 6.7 for complete listing of pointed bone tools

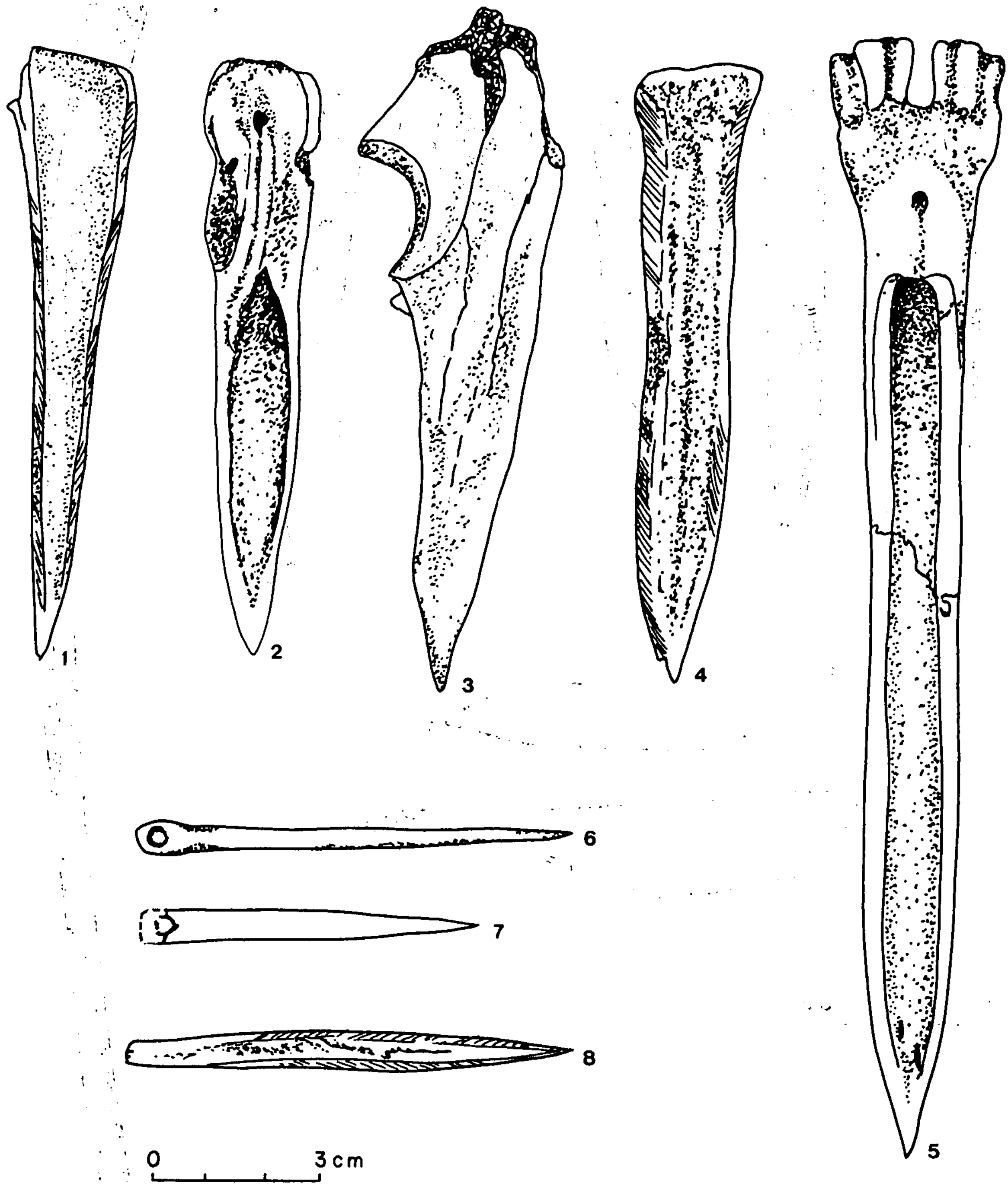


Figure 6.11. Worked bone from trash fill of Kiva A

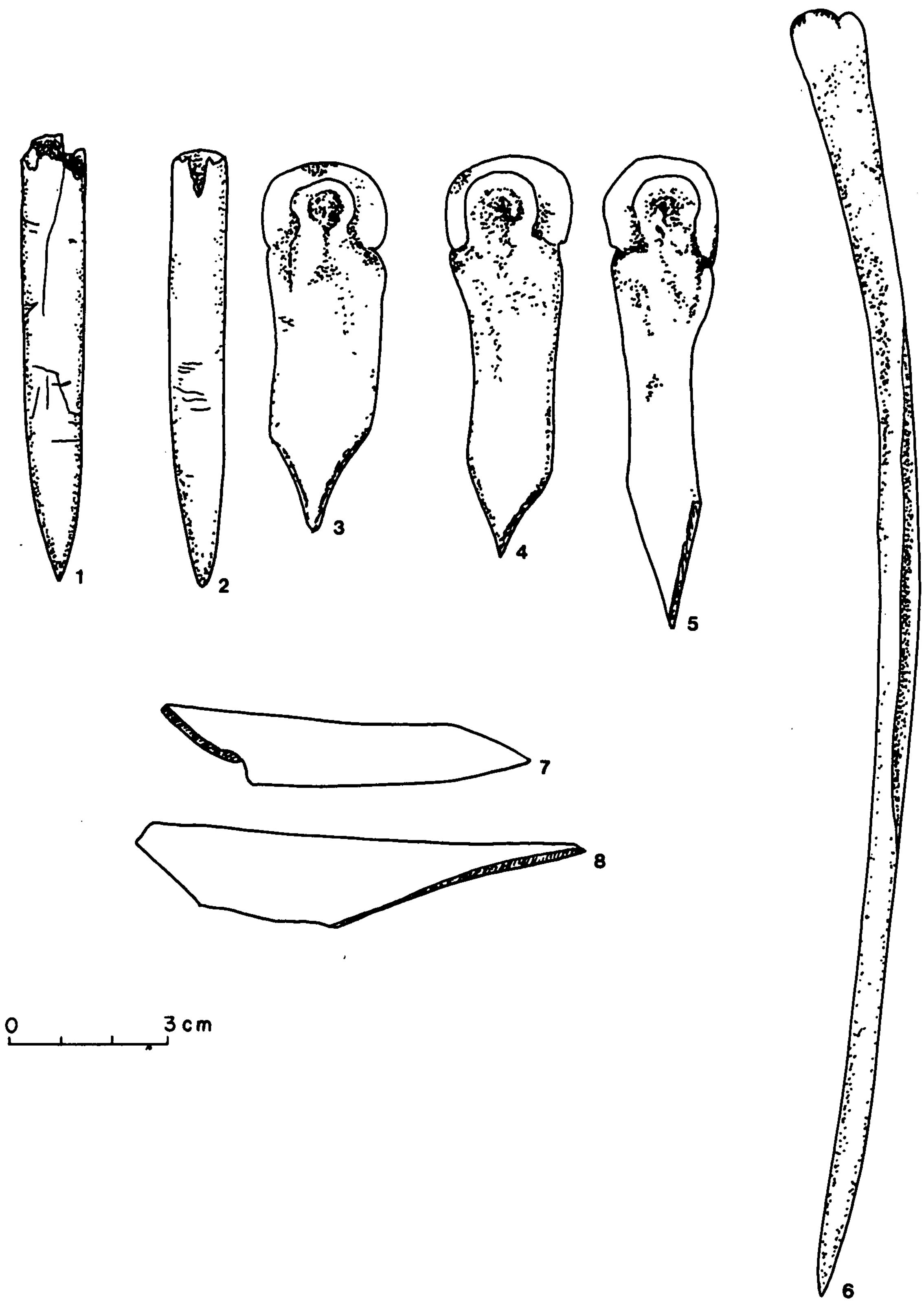


Figure 6.12. Worked bone from Pithouse B, Level 3, above roof fall

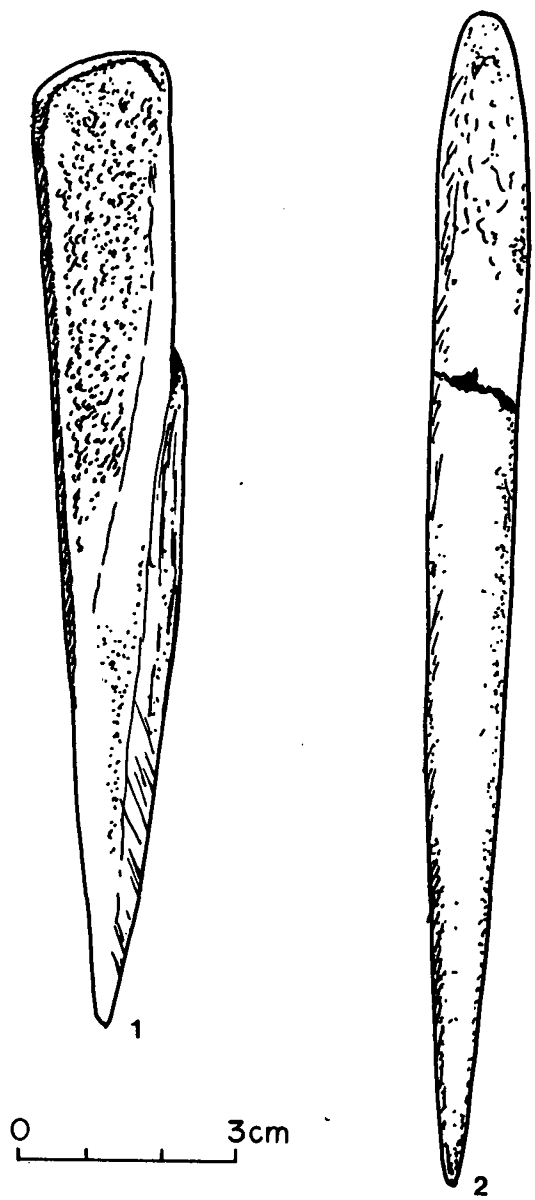


Figure 6.13. Worked bone from Pithouse B, east bench

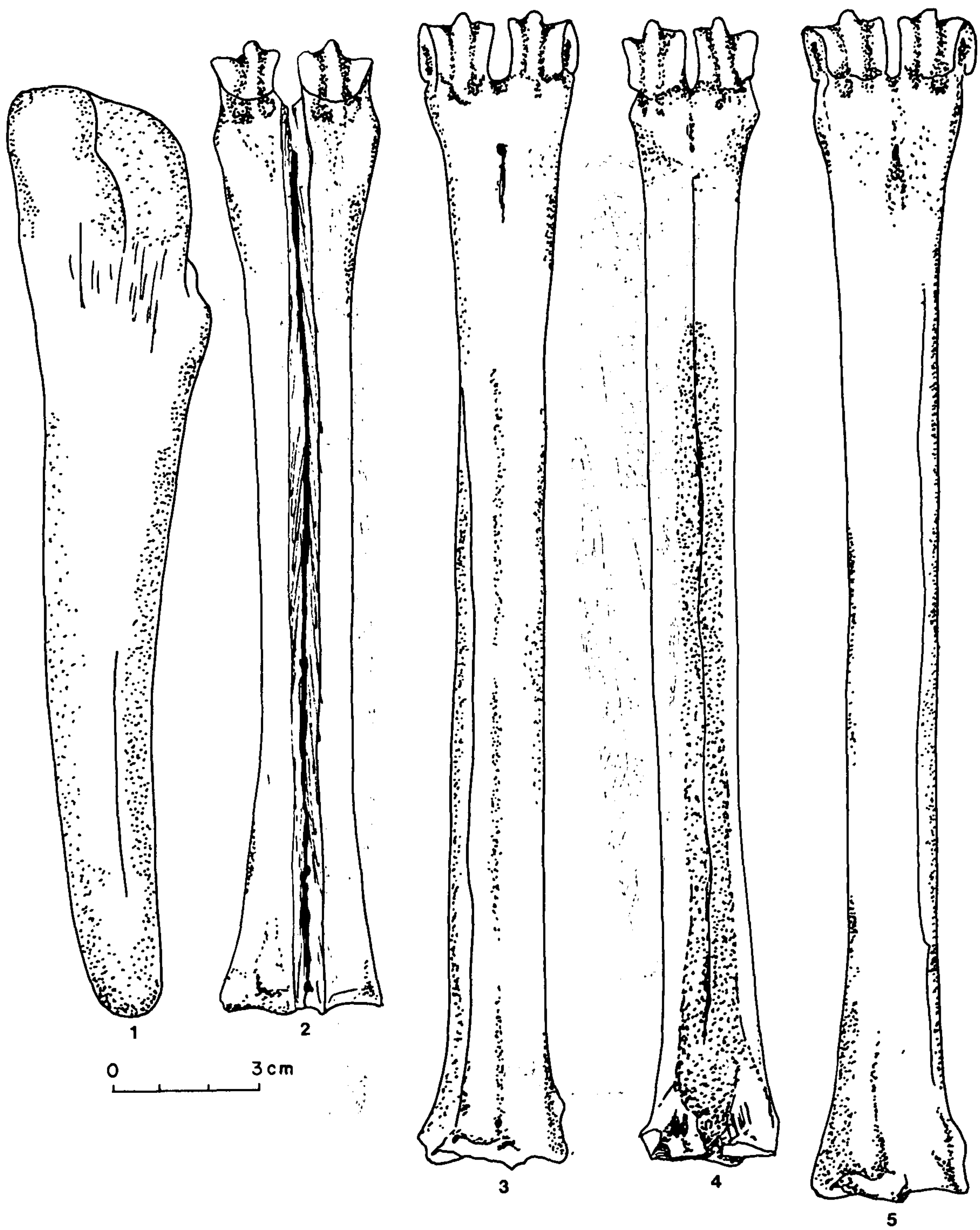


Figure 6.14. Worked bone from Pithouse B, west bench

Splinter awls (Figures 6.3[11] and 6.7[2 and 8]) tend to have the most evenly rounded and the sharpest tips. The sharpest awls (Figure 6.3[8]) may have been used exclusively for leather piercing. Spatulate awls form a cohesive group and could easily have been multipurpose tools (Figures 6.3[4 and 5] and 6.13[2]). Tools with transverse scratches are consistently short, forming a recognizable tool type of undetermined use. Evidence of pounding, transverse scratches, weaving grooves, and the widest variety of point shapes all crosscut the fine (less than 1.3 mm) and the coarse-tipped awls, strongly suggesting that awl-form tools generally served the widest range of purpose among the bone tools.

The 77 bone tools from 1360 exhibit a wide range of uses, reveal characteristics of use and discard assemblages, exhibit all phases of bone tool use life from production through discard, and suggest some social patterning in Pithouse B.

The range of tasks implied by the bone tool collection includes scraping (e.g., yucca-fiber processing and corn shucking), leather piercing, sewing of tailored goods, fine and coarse basketry weaving, and mat plaiting. Punching of tougher materials, such as bone tool blank splitting, is indicated, and the presence of hammered specimens suggests the use of indirect percussion. Antler-tine flakers imply pressure flaking of siliceous stone, but the unprepared nature of core platforms in the lithic assemblage from the site and the mild degree of tip damage on the bone tools strongly argue against direct percussion reduction of cores. Weaving, as indicated by grooves on awllike tools, is weakly represented and may not have been practiced to the degree indicated for later periods; alternatively, most weaving tools may have been of wood, which would not have been preserved. An undetermined specialized task is indicated by the consistent presence of transverse scratches on smaller awl forms. Awllike tools, followed by spatulates, constitute the bulk of the collection.

Inhabitants of 1360 were apparently self-sufficient in the production of their bone tools. Several curated, unmodified artiodactyl metapodials had been retained, apparently as material for future tools. The similarity in species proportions in the bulk fauna and in the fauna represented as tools suggests intrasite acquisition of tool blanks, although acquisition of bone tool material through trade should not be discounted. Tool blanks, both modified and unmodified, were concentrated along the western bench of Pithouse B. Other tools on the Pithouse B bench were essentially in good repair with few broken specimens. Trash contexts (i.e., Kiva A) suggest that tool discard was due to hard use and eventual breakage rather than to tool attrition through resharpening and modification.

A wide range of tool functions is represented within the in situ Pithouse B collection. It was found that these tools were essentially evenly distributed over the bench, which argues against specialized tool kits or task-group activity within the structure. The number of tools and the duplication of generally paired tool forms suggest that at least two groups were present but that both shared a common kit of tools designed to handle a broad range of tasks.

CHAPTER 7

Human Remains

The remains of six individuals and scattered elements of another six were recovered at 1360. The sandy soils at the site provide good drainage, contributing to the excellent preservation of all individuals, especially those on the floor of Pithouse B. The individuals in Pithouse B were surrounded by a sandy matrix immediately overlain by organic roofing material; none of these individuals constitutes an intentional burial. Of the six identifiable individuals from 1360, only one (Burial 6) may have been a true interment. All complete individuals for whom sex could be determined are female; two are adults, another is a very young child, and the remaining individuals are infants no more than a year and a half old. The stature of the two adults is estimated to be just over 5 feet. Scattered elements suggest another infant, a young adult whose sex cannot be determined, a young adult female, possibly three adult males, one or two additional females, and a few other individuals of unknown sex (Tables 7.1 and 7.2). These individuals, in conjunction with those on the floor of Pithouse B, suggest the expected age and sex range for a domestic habitation site (see Figures 7.1 and 7.2).

Looting in the south side "burial mounds" of Chacoan sites was a common and popular pastime of early excavators in the canyon (Pepper 1920:339-351). Pepper and Wetherill actively encouraged local Navajos to bring in pottery to augment their collections (some of these items are recorded in the American Museum Catalogs, NPS Account No. 2130-G, Chaco Center, Albuquerque), and some of this material came from the Fajada Butte area. F.H.H. Roberts also actively engaged in this pursuit, removing many burials from the Pueblo II refuse heaps of the Fajada Butte sites (see U.S. National Museum [Smithsonian] Catalog Card Nos. 340897-340913 for records of these items). Given this evidence for concentrated burial removals, the presence of fragmented remains scattered throughout the Fajada Butte sites and trash mounds is not unexpected. They indicate that a more complete range of interred individuals was formerly present, supporting an interpretation of extensive domestic habitations in the area.

Standard references for identification of remains and pathologies were Bass (1971) and Steinbock (1976). Anthropometric measurements may be found in Table 7.3; Bass (1971) and Brothwell (1972) served as reference keys for the abbreviations on the most common measurements of the skull.

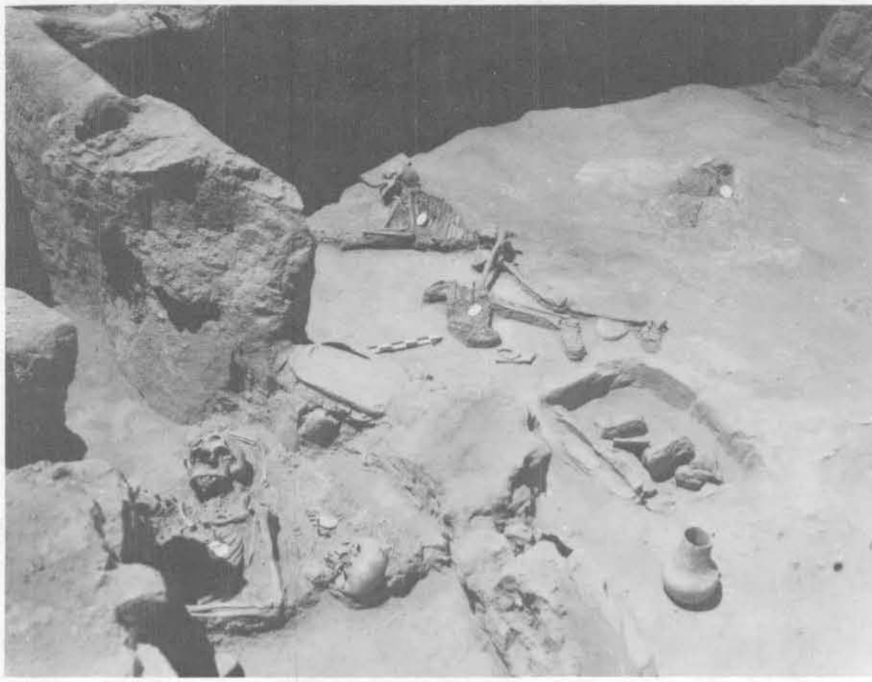


Figure 7.1. Burials on Pithouse B floor; view to northwest

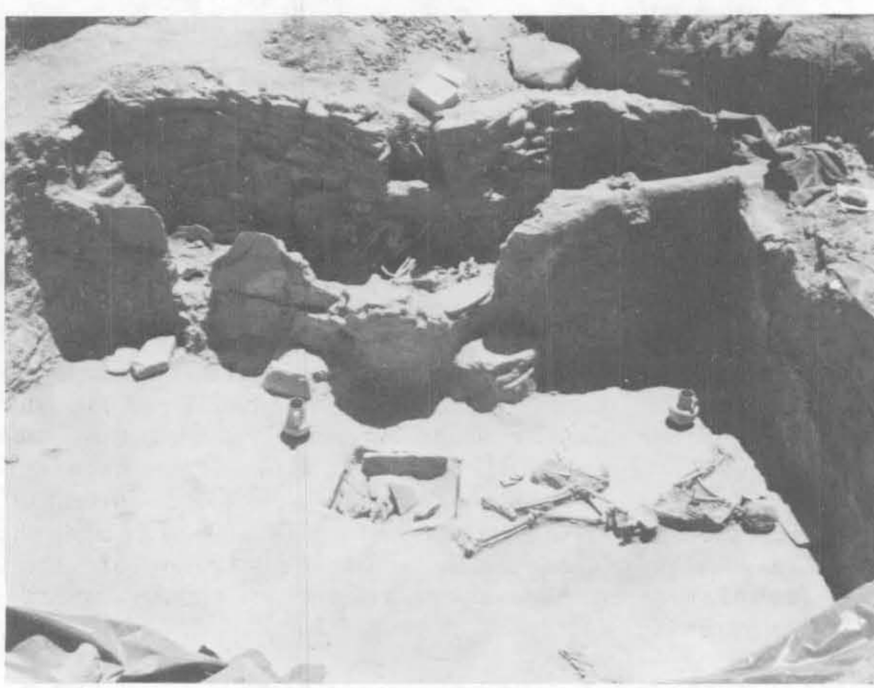


Figure 7.2. Burials on Pithouse B floor; view to south

Table 7.1. Conditions, associations and proveniences of complete individuals, 29SJ1360

	Sex	Age	Stature (inches)	Associations	CO&PO	Trauma	Arthritis	Hypo-plasia	Harris Lines
Pithouse B floor main chamber									
Burial 2	F	35-39	61	dog Burial 4 heshi necklace twilled mat 2 points headstones		L-hand R-ulna	spine phalanges	mild	4-5 on distal tibias
5	?	ca.1		twill mat headstone	mild				
South end									
Burial 1	F	39-45	63				spine phalanges	extreme	1 on tibia
3	?	2			none				
7	?	ca.1			mild				
Vent X									
Burial 6	?	ca.1-2			slight				

CO&PO = cribra orbitalia and porotic hyperostosis

Other Pathologies: Burial 1—ruptured thorasic discs, 3 button osteomas, and carnivore gnawing of right extremities

Caries: Burial 1 Left--$C^2 1$, PM^1-2, M^1, M_1-2, with M^2 missing
Right--PM^1-2, M^1, PM_1, M_1-2, with M^1-2 missing
Burial 2 Left--M^2, with M^1m M^3 M_1 M_3 missing
Right--M^1-2, with M_1-2 missing
Infants exhibit no caries

Table 7.2. Scattered human remains, 29SJ1360

	skull		humerus	radius		tibia		fibula	pelvis	clavicle	phalanx	rib	subtotal	N	MNI
	R	?	R	R	L	R	L	L	L			L			
Kiva A Level 1	1a			1y*				1am*					1		
Level 3	1a		1yf*			1a*							3		
Level 4			1am*										3	7	2
Pithouse B Level 1						1af								1	
Room 4											1a			1	
Room 9									1i					1	1
Trash Grid GR1							1af*						1		
Trash Grid FX								1a					1		
Trash Grid EX				1af								1a	2		
Trash Grid DX								1a					1		
Trash Grid CX									1a				1	6	2
Plaza Area 3					1a*									1	1
Backdirt		1a								1a				2	
Totals	3		2	3		3		3	2		1	1		19	6

Minimum Number of Individuals for Site

2 adults, undetermined
1 adult, female
1 adult, male
1 young adult, female
1 infant
6 scattered individuals

R = right
L = left
y = young adult
a = adult
i = infant
f = female
m = male
* = carnivore gnawing

Table 7.3. Anthropomorphic measurements of individuals, 29SJ1360

	Burial 1 cm	Burial 2 cm	Burial 3 cm	Burial 5 cm	Burial 6 cm	Burial 7 cm
Skull[a]					na	na
L	16.9	15.9				
B	14.4	13.6				
Ba-B	13.4	-				
Ba-ids	9.8	9.6				
Ba-subn	8.4	8.3				
U. Face ids-n	9.6	6.4				
T. Face gn-n	13.9	12.6				
GB	4.9	4.6				
Bizygo	2.6	2.4				
NH'	4.9	4.6				
NB	2.6	2.4				
O_1 L	3.5	3.4				
R	3.4	3.6				
O_2 L	3.3	3.3				
R	3.2	3.2				
Pal. Lgt.						
interior	3.3	3.0				
exterior	5.2	5.1				
LB	9.8	9.5				
S_1	11.5	11.5				
S_2	12.0	-				
S_3	11.0	10.0				
FL	2.1	-				
FB	1.8	-				
Mandible[a]					na	na
W_1	12.0	9.5				
GoGo	9.0	8.3				
RB'	2.3	2.4				
H_1	3.5	3.3				
ML	9.0	9.1				
CrH	6.3	4.2				
Long Bones						
Humerus L	-	26.8	11.6	7.0	na	na
R	28.2	27.0	11.5	6.9		
Radius L	-	22.0	8.8	5.5		
R	22.2	20.0	8.9	5.4		
Ulna L	-	20.4	9.7	6.2		
R	23.3	20.6	9.9	6.2		
Femur L	-	37.4	14.7	8.1		
R	38.7	38.2	14.8	8.2		
Tibia L	-	31.4	11.9	6.8		
R	-	31.7	12.0	6.8		
Fibula L	-	30.8	12.0	6.4		
R	-	-	12.1	6.3		
Clavicle L	14.0	13.7	6.8	4.7		
R	14.2	13.4	7.0	4.8		

[a] Abbreviations for measurements from Bass (1971) and Brothwell (1972)

Before proceeding to the descriptions of individuals, a description of the situation encountered on the floor of Pithouse B is probably in order. The presence of five individuals, two on the main floor (Burials 2 and 5), two in the area behind the wing walls (Burials 1 and 3), and another in the vent shaft (Burial 7), all of whom apparently died in situ, has created much speculation. Both individuals in the main chamber were in positions of repose; there was even a dog curled on its back by the knee of Burial 2. This adult had her feet near the firepit, while an infant (Burial 5), oriented in the same direction, was placed a safer distance from the fire. Both individuals lay on twilled mats and had stone rests under or near their heads. Two other individuals in the elevated area behind the wing walls showed evidence of a less peaceful death. A child (Burial 3) about 2 years old lay on its back in front of the ventilator opening near the lip of the elevated wing-wall flooring with the head of an adult woman resting between its knees. The adult (Burial 1) showed every indication of having been squatting in front of the ventilator opening--possibly to place an infant (Burial 7) into the shaft--and then having collapsed backwards onto the legs of the child. An adult dog lay in the western wing area near Burials 3 and 1. None of these individuals was arranged so as to indicate any severe postmortem disturbance in these final positions.

The complete, undisturbed composure of those on the main floor and the apparently feeble final efforts by those clustered around the ventilator opening suggest asphyxiation. S. Rhine, forensic anthropologist at the University of New Mexico, generally concurs with this assessment. Although the deaths of these individuals could have been aided and abetted by parties outside the pithouse, the mechanism for self-destruction was inherent in the architecture of the pithouse itself.

Ventilator openings, firepits, and main flooring areas in pit structures of the Anasazi are all normally on the same level. Air passing around the deflector rises to exit through the roof entrance by heat convection. The relatively flat surface of the floor and the presence of the deflector would ensure that all air in the pit structure would be involved. The unusual split-level profile of Pithouse B, however, would have produced perfect conditions for air stagnation and unintentional asphyxiation in the lower section of the structure. The raised southern flooring and ventilator opening would have actively circulated air around the deflector some 30 cm <u>above</u> the floor of the main chamber. Convection would be most active above this point, so that carbon dioxide and carbon monoxide could have been trapped along the lower floor due to an inversion of vented air. Cold, clear, still winter evenings, which are common at Chaco, would have ensured that sleepers would be sheltering in the pit structure. Such a situation would also have reduced incidental air currents throughout the structure, enhancing a hothouse effect. Too late, it would seem, one of the women awoke and, either too weak or confused to mount the ladder to safety, attempted to revive the children at the opening of the ventilator. The final exertion seems to have proved too costly and, with her small oxygen reserves exhausted, she slumped backward and died.

While the architecture of Pithouse B and the local atmospheric conditions could have combined to produce the fatal scenario outlined above, there are certain facts that seem incongruent with the tragic accident described above. Burial 2, the adult female in the main chamber of the pithouse, exhibits ample evidence of having been the victim of violence: two lithic projectile points were found within her torso. These injuries, and a third trauma resulting in the presence of a wooden shaft in her right arm, were all apparently survived, but they obviously suggest violent conflict. An alternative scenario suggesting that the Burial 2 individual was shot in her sleep by attackers at the smokehole above who then covered the smokehole and ventilator openings and suffocated the remaining occupants of the pithouse is also possible. There is no general evidence of serious conflict in Chaco, especially in this early period; however, if the women and children in Pithouse B were indeed the victims of a violent attack, this could have important implications for our understanding of sociopolitical events in Chaco.

BURIAL 1

Burial 1 (Figure 7.3) is a female, 39-45 years old and approximately 5 feet 3 inches tall. She was found immediately in front of the ventilator opening inside Pithouse B, on the raised portion of the floor behind the wing walls (Figure 7.1). The woman was lying face up, flat on her back with her legs flexed in the air and seemingly wedged against the top of the ventilator tunnel. The impression is that she had collapsed backward from a squatting position. Her head rested between the legs of a child, Burial 3.

Recorded pathologies are generally those expected in Anasazi populations. Both antemortem pathologies and postmortem deformations or disturbance were noted. Rodengenograms of available long bones show a single distinct Harris Line medio-distally on the left tibia. This is suggestive of a severe stress earlier in life, possibly caused by malnutrition although disease may not be ruled out. An extreme hypoplasia line on the anterior teeth is corroborative, suggesting a severe isolated incidence of malnutrition before 8 years of age. The lack of other Harris Lines suggests that nothing so severe occurred during the remaining years of development. Evidence of arthritis is generally mild, being mostly restricted to the thoracics and lower lumbars, with some ossification of the rib cartilage. The occipital condyles exhibit some lipping. Terminal phalanges of the fourth and fifth toes are united but evidence of arthritis is very slight among the other digits. Finally, it was noted that sacral vertebrae 4 and 5 had failed to unite.

Caries (Table 7.1) are extensive, and three maxillary molars are missing. Abscesses, often related to tooth loss, had occurred on the upper right maxilla in association with two of the three missing molars. The mandible exhibits periodontal disease on the right side but has fewer caries and no tooth loss.

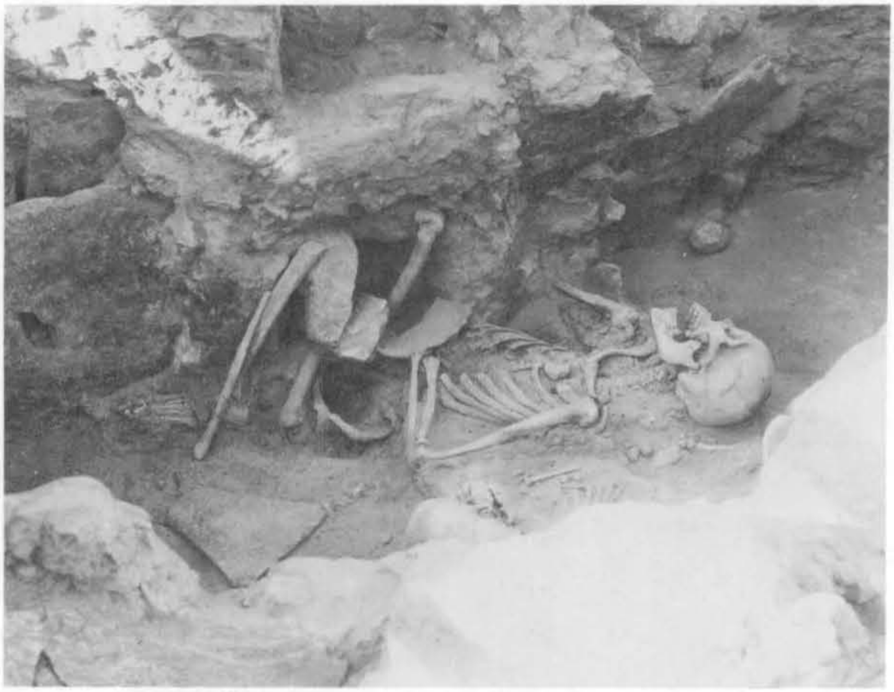


Figure 7.3. Burial 1 in wing wall area; knees flexed in ventilator shaft

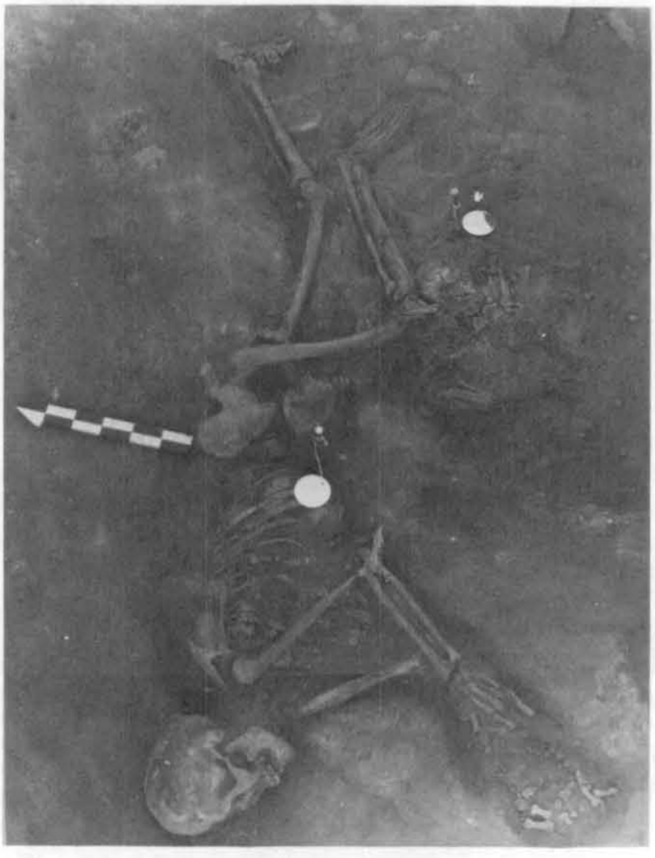


Figure 7.4. Burial 2 on western main chamber floor; dog (Burial 4) at left knee of Burial 2 (30-cm scale)

Burial 1 exhibits lambdoidal deformation slightly skewed to the right side of the head.

The right distal humerus and the articular heads of the available femurs, tibias, and fibulas exhibit carnivore gnawing at the knees. The body's position and the occurrence of the gnawing (dog or coyote) suggest partial filling of the pithouse before disturbance of the remains by carnivores. Only Burial 1, the individual who would have been highest in the fill and who had the greatest body mass, had indications of carnivore disturbance. The right tibia of an adult was located in the Pithouse B overburden and may belong to this individual (Figure 7.3).

No cultural remains were associated with Burial 1. A large corrugated sherd found in the abdominal area is associated with corrugated vessels from the eastern wing of the storage area (Figure 7.3).

BURIAL 2

This individual (Figures 7.4 and 7.5) is slightly younger than Burial 1, being 35-39 years of age. Stature is estimated at approximately 5 feet 1 inch. She was located on the west side of Pithouse B with her head to the west and her feet near the firepit; she faced south with bent, overlapped arms and a leg extending in the same direction--a typical sleeping position (Figure 7.2).

Evidence of pathology in this individual is more marked than in Burial 1, and the pathologies are both systemic and traumatic. Two projectile points were located within this individual (Figures 4.1 and 4.3), one in the abdomen and one in the chest cavity. A lateral-medial hole in the right proximal ulna below the articular facet also appears to be from an arrowshaft--possibly a wooden-tipped arrow. The ulna had been slightly longitudinally split, but bone regrowth surrounding the hole and edge rounding of the split indicate that the healing process had begun. If the shaft were left in place, arm bending at the elbow would have been impaired. These instances of violent trauma may not have caused immediate death, but partial involvement should not be discounted. As outlined above, these projectile points suggest alternative scenarios involving intentional asphyxiation and conflict as the primary factors in the deaths of the Pithouse B occupants.

The less spectacular pathologies range from the relatively benign to those of a more crippling nature. Like Burial 1, this individual suffered from acute dental caries, oral abscesses, periodontal disease, tooth loss, and subsequent alveolar reabsorption. The most affected areas are the maxillary molars, where tooth loss and caries are most severe on the left side. The lower right third molar is impacted against the second molar. Mandibular teeth are not as affected by active caries due to wide spacing. Three pea-sized button osteomas were noted on the superior left frontal; no other pathologies were observed on the skull.

Figure 7.5. Detail of Burial 2 with passive lapidary abraders along the western wall (30-cm scale)

Figure 7.6. Detail of dog (Burial 4) at knee of Burial 2 (30-cm scale to north)

More severe pathologies were noted for the spinal column and the left hand. On the left hand a healed fracture is indicated by a spur on the distal second metacarpal, with possibly related osteophytes at the juncture of phalanges 1 and 2 of the third finger. An examination of Table 7.3 reveals that the right leg is 1.1 cm (0.4 inches) longer than the left. This differential may account for some compensatory axial realignments, but not for the severity of the arthritic distortion observed in the spinal column. Sacral vertebra 5 had failed to unite with the sacral body. The first sacral body had not fused with the sacrum and was acting as an extra lumbar vertebra. The patterning of arthritic osteophytes is asymmetrical. Arthritic atrophy of the left sacral body is pronounced, due to severe osteophytes at the left sacro-iliac suture, left lumbars 4 and 5, and the left side of the lumbar vertebrae. Arthritic lipping switches in preponderance from the right side in the thoracic to the left in the cervical vertebrae. Arthritic osteophytes and lipping may be characterized as moderate with increasing severity in the lower back and sacrum. Additional spinal problems are indicated on the centrums of thoracics 11-12, where evidence of ruptured discs was noted. R. Ted Steinbock (personal communication, 1980) has noted that the position of the heart in relation to the spine often creates the appearance of asymmetrical arthritis by providing more nutrition and respiration to the left side, thereby impeding the arthritic growth. He discounts the influence of a slight differential in leg lengths in producing this pattern.

A mild hypoplasia line on the anterior teeth was counterbalanced by multiple (4-5) Harris Lines on the distal tibias, suggesting several extended periods of malnutrition stress. None of these malnutrition episodes was as severe as the incident indicated for Burial 1.

Common Anasazi skeletal modifications due to cultural behaviors were noted. There is a very distinct (compared with Burial 1) lamb-doidal deformation oriented to the left side of the skull. Deltoid tuberosities are enlarged, probably from corn grinding, and squatting facets are also present on the tibias.

Burial 2 was associated with several material items, none of which may be properly classified as grave furniture. A twilled mat lay under the body, the head was resting near shaped and ground stones (possibly head rests), and one or more strands consisting of approximately 3890 heishi beads were about the neck (Figure 5.3). A Red Mesa/early Gallup Black-on-white transitional pitcher lay between Burial 2 and the wing wall. A dog, a male puppy that was originally identified as Burial 4 (Figure 7.6), lay on its back near the angled left knee of Burial 2.

BURIAL 3

A 2- to 3.5-year-old child (Figure 7.7) was the other individual located in front of the ventilator behind the wing walls. The child lay prone on its back, head to the east facing upward and slightly rotated to the south. Both legs and the left arm were pinned under the head of Burial 1. The right arm was bent with the hand behind the head.

Burial 3 has no apparent pathologies. All deciduous dentition present is free of caries, evidence of tooth loss, abscesses, or periodontal disease. No cribra orbitalia or spongy hyperostosis indicative of anemia is present. A slight lambdoidal depression is evident. No material goods were associated with Burial 3, but as noted, a mature dog was found in the area behind the west wing wall with Burials 1 and 3.

BURIAL 5

An infant in the center of the northwest quad of the main chamber of Pithouse B (Figure 7.8) is probably no more than 12 months of age. The metopic suture is not fused and the individual was compressed by postmortem soil pressure. Burial 5 has marginal evidence of porotic hyperostosis and cribra orbitalia.

The infant lay on a twilled mat, and its head rested flat against a small rectangular ground and pecked stone; this stone is a smaller version of the worked stones beside the head of adult Burial 2. The head was to the north, face up. The right arm was extended beside the body, the left forearm and hand lay across the chest. Both legs were fully extended.

BURIAL 6

Partial excavation of Vent X recovered the skull, a cervical vertebra, and a lumbar vertebra of another child 1 to 2 years of age. This crude estimation of age was made by comparing orbital sizes with Burials 3 and 5. A slight porotic hyperostosis of the temporals and sphenoids is present in this individual.

The vent was capped by sandstone slabs and a metate fragment, either slumped vent masonry or an intentional plug. This was probably a complete interment, as opposed to a secondary burial, but incomplete excavation of the feature and rapid decay of immature bone close to the surface resulted in only a partial recovery of the individual.

BURIAL 7

This infant is represented only by a cranium minus the lower portions of the maxilla. It was located on the floor of the ventilator shaft of Pithouse B, beyond the interior opening. The shaft was not

Figure 7.7. Detail of Burials 1 (left) and 3 (right) in wing wall area

Figure 7.8. Infant (Burial 5) on main chamber floor (30-cm scale to north)

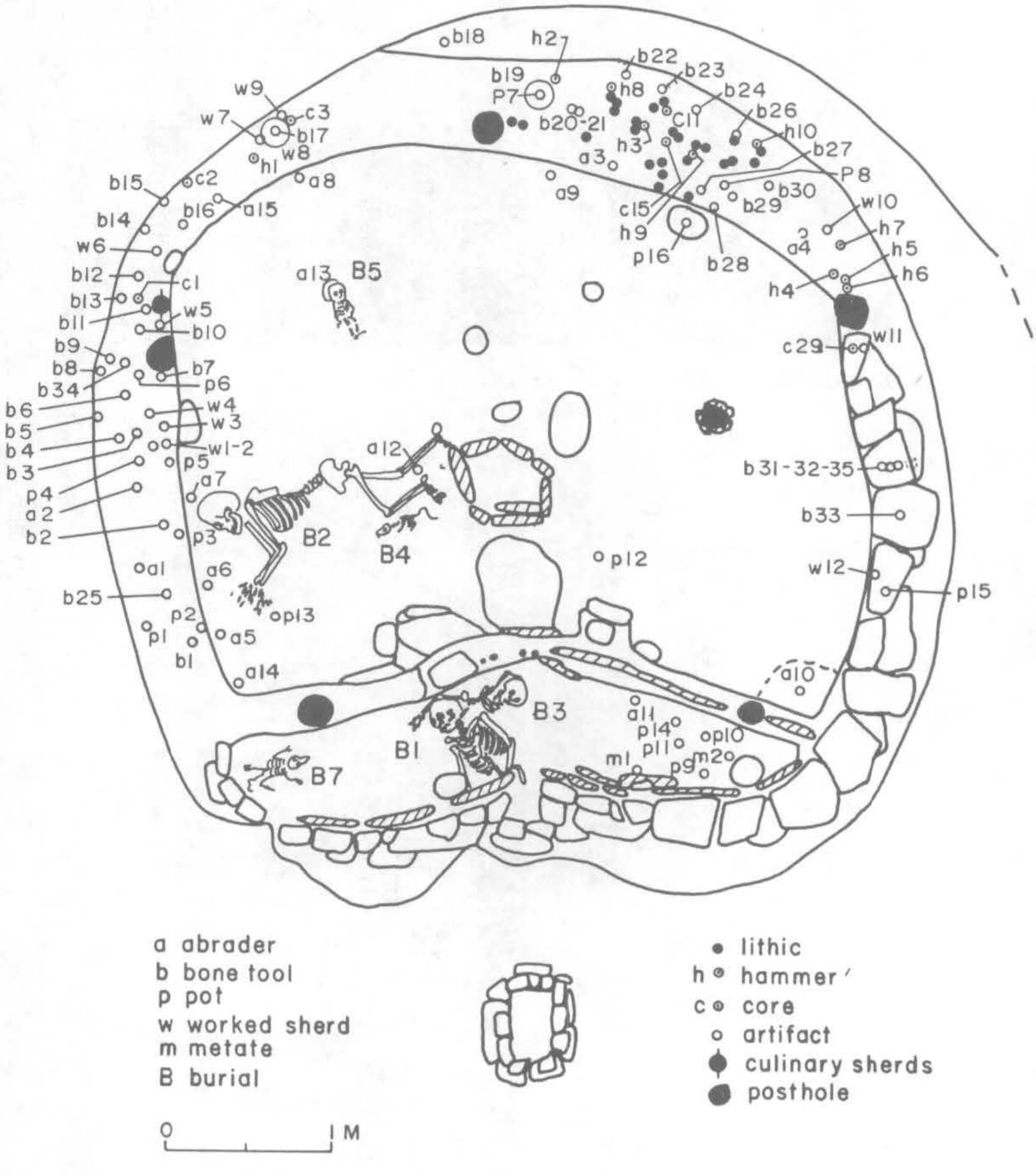


Figure 7.9. Pithouse B floor-associated artifacts and burials

KEY TO FIGURE 7.9

Pots

p-1 Red Mesa bowl
-2 bowl
-3 Captain Tom pitcher
-4 Pueblo II culinary jar
-5 Mancos bowl
-6 Red Mesa bowl
-7 Red Mesa seed jar
-8 Red Mesa bowl
-9 Blue Shale Corrugated
-10 pitcher
-11 Blue Shale Corrugated
-12 early Gallup pitcher
-13 early Gallup pitcher
-14 unidentified pot
-15 unidentified jar bottom
-16 unidentified covered pot in cist

Worked Sherds

w-1 Red Mesa bowl*
-2 Red Mesa bowl
-3 Red Mesa bowl
-4 Red Mesa bowl (scoop)*
-5 Escavada jar
-6 Red Mesa bowl
-7 Red Mesa bowl
-8 Red Mesa bowl (?)
-9 Red Mesa bowl
-10 early Gallup jar
-11 olla handle
-12 early Gallup bowl

Hammerstones/Polishers

h-1 quartzite polisher
-2 quartzite hammerstone
-3 quartzite polisher
-4 quartzite hammerstone
-5 quartzite hammerstone
-6 petrified wood hammerstone
-7 pebble chopper
-8 petrified wood hammerstone
-9 petrified wood hammerstone
-10 petrified wood hammerstone

Chipped Stone

c-1 graver
-2 core
-3 core
-11 flesher (?)
-15 core
-19 core
-29 core (Washington Pass chert)

Bone Tools

b-1 rabbit ulna awl
-2 blank
-3 blank
-4 pin
-5 scraper
-6 blank
-7 blank
-8 spatulate awl - blunt point
-9 spatulate awl - blunt point
-10 blank/scraper
-11 tinkler
-12 tinkler
-13 awl - sharp point
-14 flaker
-15 awl - blunt point
-16 blank/scraper
-17 punch
-18 awl - blunt point
-19 awl - sharp point
-20 awl - sharp point
-21 awl - sharp point
-22 awl - sharp point
-23 tinkler
-24 tinkler
-25 pin
-26 awl - sharp point
-27 awl - blunt point
-28 needles
-29 awl - blunt point
-30 unidentified
-31 spatulate awl - blunt point
-32 tinkler
-33 spatulate awl - blunt point
-34 blank/scraper
-35 ulna awl (?)

Abraders

a-1 passive
-2 passive
-3 passive lapidary
-4 active lapidary
-5 passive
-6 passive
-7 passive
-8 pestle form
-9 passive
-10 passive
-11 biscuit mano
-12 "pot lid"
-13 headrest
-14 pestle form
-15 pot lid

completely excavated. Eye orbit size and the presence of an unfused metopic suture suggest that this individual, like Burial 6, is about 1 year old. As with the other infants recovered, cribra orbitalia and porotic hyperostosis of the frontals are present. Stratigraphy of Pithouse B suggests that Burial 7 is a contemporary of the four individuals on the pithouse floor.

SUMMARY

Among the minimum of 12 individuals found at 1360, at least one household of 5-7 persons can be postulated. Two nuclear families were apparently occupying Pithouse B. Two adult females, similar in age and stature, were located on the floor of Pithouse B with three very young children. Spatial associations of the individuals and the presence of duplicate ceramic assemblages on either side of the firepit suggest two nuclear groups, with relationships between Adult 2 and Infant 5 and between Adult 1, Infant 7, and Child 3 (Figure 7.9). Given the absence of adult males, it is possible that only one of the women lived in the structure and that the women had temporarily congregated in one residence for mutual support while the men were away. The presence of dual ceramic assemblages, however, would seem to argue against this interpretation.

The adults exhibit evidence of oral pathologies, arthritis, and lambdoidal deformations, common features among Anasazi individuals. The adults also show evidence of malnutrition stress during early life. Among the infants cribra orbitalia and porotic hyperostosis are present in the orbits and frontals, but this is probably to be expected in rapidly growing infants; it is not necessarily indicative of anemic conditions. Judging by the close spacing of the infants' ages, the mothers were healthy enough to maintain their fecundity. [Note: Given the ages of the women, it is debatable whether these individuals were the mothers of the infants in Pithouse B, but this assumption has been made throughout this discussion.]

While it is possible that these individuals were accidentally asphyxiated, the implications of violent trauma in Adult 2 should be underscored. The presence of the projectile points and the degree of healing on the ulna clearly indicate that at least one of the occupants of 1360 had been embroiled in a conflict shortly before her death. The extent to which this event influenced the immediate or long-term lives of the occupants at the site is unknown, but it is clear the human remains from 1360 do not constitute burials in the normal sense.

1360 in Chacoan Context

The following discussion summarizes the main aspects of the archaeology of site 1360 with respect to Chacoan prehistory and the Chaco Phenomenon. Because each chapter of the preceding descriptive text includes an independent summary, those sections are recommended to readers seeking greater detail. In this discussion, previous Chaco-related research is reviewed, and archaeological evidence from site 1360 is compared with some expectations derived from other Chacoan studies. The architectural data, which have thus far been treated in only a very descriptive manner, are used to make functional comparisons with contemporary small sites. Information on material culture from 1360 is used to support the functional arguments developed on the basis of the architectural comparisons in order to examine the place of small sites (and 1360 in particular) within Chacoan culture.

The main purpose of this book is to present as comprehensive a report as possible on the architectural and artifactual data from 1360. Judge (1975) has identified such presentations as the primary obligation of the Chaco Project; indeed, the dearth of such information has frequently been lamented as a major failing of Chacoan archaeology (Martin and Plog 1973; Vivian 1970a). It is, however, important that any report dealing with Chaco research attempt to integrate the particular subject of the report--in this case the architecture and material culture of 1360--with the general body of knowledge concerning Chaco.

In the considerable literature that exists on Chaco, three topics are of particular concern; environmental relationships, small-site-related studies, and general statements of Chacoan organization and operation. These subjects form the main emphases in recent research on what has been described as the "Chaco Phenomenon" (Hayes 1981; Irwin-Williams 1980a, 1980b; Judge 1975). Although this report is most applicable to discussions of the configuration of the Chacoan system as revealed in small sites, at least some discussion of all three of these research areas is important in order to put the information gained from the excavation of 1360 into perspective.

PAST ENVIRONMENT

The recent positions outlined by Judge (1977, 1979; Judge et al. 1981) concerning prehistoric responses to the environment in the San Juan Basin and Chaco Canyon are some of the most synthetic efforts in a long history of attempting to postulate past man/environment relationships in the region. The synthetic aspect of these models owes much to the ecological perspective (Odum 1959; Pianka 1974) that focuses on behavioral patterns or relationships with respect to environmental and social contexts and on the maintenance and transformation of energy levels within those contexts. Continued research has refined and reoriented the original suggested cause-and-effect correlations in which environmental changes were offered as explanations of cultural development. Consideration of environmental relationships has almost always been an integral part of Chacoan studies (see Vivian and Mathews 1965:1-16; Vivian 1970a) because the environment has often been invoked to explain the developments at Chaco. One of the reasons for the repeated reexaminations of this topic is that it is becoming increasingly apparent that Chaco was probably never self-sustaining in terms of subsistence (Schelberg 1982a, 1982b) and that much of the Anasazi adaptation in Chaco was possibly in response to a "continuous population-environmental disequilibrium" (Irwin-Williams 1980a).

Early researchers inferred that the Anasazi occupation of Chaco Canyon, or at least the early portion of that occupation, occurred during a period of greater precipitation and more luxuriant vegetation than occur today. These environmental features purportedly acted as a stimulus to further settlement. Such inferences were based on the presence of remnant pines, on the abundant timbers used in construction, on expectations concerning necessary supplies of fuel woods, and on assumptions about fluvial mechanics as interpreted from profiles in the Chaco Wash (Bryan 1954; Hawley 1934; Judd 1954). Excessive tree harvesting, general environmental deterioration leading to arroyo cutting, or a combination of these factors have previously been suggested as features of Chacoan life that ultimately led to the abandonment of the canyon. Vivian and Mathews (1965:111-112) provide the most recent statement of this position.

Palynological analysis from the basin's periphery (Schoenwetter 1967; Schoenwetter and Eddy 1964), studies of the dendroclimatological record (Dean and Robinson 1977), and multidisciplinary studies (Euler et al. 1979) have suggested that the environment varied considerably, with cyclical fluctuations occurring across the Colorado Plateau. Euler et al. (1979) correlate climatic fluctuations with demographic changes, i.e., more precipitation, more population. Palynological studies by Hall (1977) suggest that Chaco's environment during the Anasazi occupation was, in fact, drier than at present. Hall feels that conditions were too dry to support the suggested conifer forests; he suggests that a lower stream-flow velocity permitted runoff to spread over a flat, bare, alluvial Chaco Valley, thereby facilitating agriculture and occupation. Hall proposes that a rise in precipitation in the early twelfth century caused entrenchment of the arroyo; this in turn lowered the water table and ultimately led to abandonment of the canyon.

Other researchers have suggested changes in or refinements of Hall's and Euler et al.'s work in a variety of studies focusing on different aspects of the past environment. The underlying criticism of Hall and Euler et al. is that either such reconstructions and explanations of past events depend on indicators that are insufficiently sensitive to monitor local variations or they obscure those portions of the environmental record that are most important to horticulturalists. Betancourt and Van Devender (1981) studied macrofloral remains from packrat middens at Chaco and suggest, on the basis of this work, that vegetational patterns may have been marginal pinyon-juniper woodland with desert scrub at the inception of Anasazi building, but that years of intense occupation probably altered the vegetative community far more than did climatic fluctuations. Love (1977, 1979) argues that a channeled watercourse was necessary to prevent the deposition of impermeable sodium montmorillinite (Judd's "black alkali") from headwaters in fields and to avoid flooding of habitations. The drought of the late twelfth century, he argues, could have filled the channel, producing an undesirable overflow. Lateral drainages in Chaco contribute more new sediments and retained moisture than does the main channel, and as Vivian (1972, 1974) has shown, lateral drainages, and not the main wash, were tapped for agricultural production. Although arroyo cutting affects water tables, Love's contention that the water table in Chaco is related to the confluence elevation of the Chaco and Escavada washes suggests that groundwater levels upstream from this junction would always have been too low to be available to crops.

A. Cully (1979) has shown that the palynological record of a room (or site) is extremely variable, and she suggests that basing interpretations on limited numbers of samples from limited numbers of rooms may also contribute to an inaccurate picture of local conditions. Extensive palynological and flotation studies from Chaco, however, have generally supported the xeric climatic picture suggested by others (A. Cully 1981; M. Toll 1981). One unifying theme in these recent reevaluations of San Juan Basin paleoclimatic studies is a caution against simplistic correlations of cultural and environmental changes. Betancourt and Van Devender (1981:658), for example, note the "self-limiting consequences of human impact in heavily populated areas." Others (e.g., Schelberg 1982a) note the implications of the scarcity of many basic resources at Chaco.

Vivian and Mathews (1965) frequently cite Hack's (1942) study of the Hopi environment, historical accounts concerning the rarity of Navajo fields, and Navajo oral histories recounting better times to suggest that Chaco would still be habitable if precipitation were a little better. What is of more interest in Hack's work is his discussion of differentiation in planting areas, a strategy designed to utilize the diverse moisture sources of the Hopi territory, and of the changes in planting-area emphasis caused by fluctuations in precipitation. Vivian (1970a) has discussed the implications of this for Chaco. The differentiated planting strategy employed by the Hopi guards against complete crop failure. In addition, because each of the Hopi mesas possesses slightly different proportions of the various planting area types, primarily sand dunes vs arroyo "akchin" plots, the three mesas are differentially affected by variations in rainfall, and they can serve as alternative food sources for each other. Because of the similarity between Chaco and the Hopi area, Hack's model would seem to be applicable to interpretations of the Chacoan adaptation.

Snow (1977) and Loose (1976) have pointed out a correlation between Anasazi communities and specific soils, notably the fine-grained, high-clay content soils of the southern and western San Juan Basin, including the Chaco bottomland. In its location relative to these "preferred" soils, Chaco is, as Snow points out, not an agricultural "central place" in the basin; rather it is centered on the northeastern periphery. While other Chacoan communities border on and have access to more varied upland resources (Marshall et al. 1979), Chaco Canyon borders on the relatively unoccupied (by the Anasazi) northeastern third of the San Juan Basin extending from the Escavada to the Largo-Gallina country. The physiography and hydrological convergences in Chaco Canyon are unique relative to the rest of the San Juan Basin; the canyon offers clayey bottomlands, talus plots, sandy intake soils of the mesa tops, and the possibility of high-risk planting in the main wash. Seeps may have been more active during the Anasazi occupation, not necessarily because of more rainfall but because sources were nursed and because the local ground cover may have been stripped, greatly reducing vegetative water absorption and transpiration.

Euler et al. (1979) note that, with increasing precipitation, temperature usually declines and growing seasons are shortened. Therefore, an increase in rainfall can adversely affect upland plantings. The rise in lowland population often seen during periods of higher moisture suggests that population movement correlates with rainfall fluctuations. Annual measures of rainfall are not the critical index for crop raising, however; information on seasonal precipitation is imperative. Summer-dominant patterns are important to agriculturalists who are not dependent on stream sources for irrigation, and it is the pattern of summer rainfall, which may vary independently from annual figures, that is most important to assessing the success of prehistoric subsistence (Gillespie in Powers et al. 1983:Figures 145 and 146). Experimental plots have shown that the critical period for corn fruition is during the tasseling period (Downing 1974; Mackey n.d.), and they have also demonstrated that, no matter how sophisticated the water-collection, diversion, and distribution systems are, if it doesn't rain such systems won't work (H. Toll et al. 1979).

Both Gillespie (in Powers et al. 1983) and Schelberg (1982b) have calculated standard deviations using 10- and 100-year means of summer precipitation from Rose's (1979) preliminary seasonal dendroclimatic data for the San Juan Basin, which start at AD 900. Their findings suggest that no shift from winter to summer dominance occurred at AD 1000 as has traditionally been suggested (Schoenwetter and Dittert 1968; Vivian 1970a); rather, precipitation continued to display the usual pattern of a semiarid ecosystem with unpredictable fluctuations from year to year. During the time of interest here, AD 900-1050, periods of good years occurred mostly in the tenth century, with a major shift in periodicity after AD 1000 (Jorde 1977). Assuming that an average harvest may be expected within one standard deviation from the mean precipitation, those periods during which variability from the mean exceeded this range might be expected to have produced surpluses or deficits accordingly. Runs of greater than normal summer precipitation occurred between AD 910-920, 928-931, 948-953, and 973-980, with extensive summer deficits between 953 and 971; other major periods of summer deficit occurred between 1006-1053 and 1081-1103 (Powers et al. 1983; Schelberg 1982b). These data suggest that agriculture at Chaco would have been productive, although not consistently so, during the tenth century, with markedly reduced productivity in the eleventh century--an interpretation counter to Schoenwetter's palynological evidence as projected by Vivian (1970a:83-115). Even given these intermittently favorable conditions, various productivity estimates have suggested that productive capacity within the canyon fell short of projected population (Drager 1976; Loose and Lyons 1976). This would support arguments favoring a broad, closely affiliated web of regional subsistence interaction to ensure survival.

SMALL SITES

Presently, there is some reluctance to use the term "villages" for the smaller sites at Chaco, because the term evokes unwarranted associations with larger, more complex sites, as discussed by Sanders (1956), Flannery (1976:163-165), and Truell (1981a:I 2-3). Accordingly the traditional nomenclature for discussing Chacoan settlements has been modified in this book so that terms descriptive of relative size are used for the site types. Small sites have a long history of research in Chaco, although little of this material has been published. Most of these sites do not have tenth or early eleventh century components, and those that have been reported reflect the general archaeological concerns at the time of their excavation--relic hunting, descriptive studies, and culture history--rather than being concerned with explanation or examination of the Chacoan adaptation. Histories and partial summaries of small-site work at Chaco are presented by Vivian and Mathews (1965:25-31) and Vivian (1970a); the only complete synthesis to date of excavations and of architectural changes and trends is Truell (1981a).

Many of the characteristics attributed to Chacoan small sites are based on work done outside Chaco and, often, outside the San Juan Basin. Gladwin (1945) developed descriptive systematics for sites in the Red Mesa Valley that he felt were also applicable to sites in Chaco. His Red Mesa and Wingate phases were differentiated primarily on the basis of architecture and ceramics. The major features of Red Mesa architecture were foundations of "capping" stones with main walls of jacal, generally featureless rooms, and pit structures subdivided by substantial wing walls; primary ceramics were Red Mesa Black-on-white and a narrow-coiled, neck-decorated grayware. In contrast, Wingate phase architecture involved the use of coursed masonry, the presence of features within rooms (notably firepits), and construction of true kivas with a southern recess ("altar"), wall niches, and no wing walls. Associated ceramics were Gallup Black-on-white, corrugated grayware, and the phase diagnostic, Wingate Black-on-red.

Based on salvage excavations in the Red Mesa Valley, on Lobo Mesa, and along the southwestern periphery of the Chaco Basin, Wendorf and Lehmer (1956:190-195) postulate an occupation intermediate to the Red Mesa and Wingate phases and correlate Wingate with a "Hosta Butte" phase after 1050-1060. Physical attributes of their intermediate period (ca. 1000-1050) include a Gallup/Red Mesa ceramic mix without Wingate Black-on-red, use of coursed masonry, tiered rectilinear roomblocks, and pit structures with masonry but lacking a southern recess. A little farther east of Wendorf's sites, near Prewitt, Smith (1964) found supportive evidence for Wendorf and Lehmer's suggested intervening period when he excavated a group of small sites forming a very tight temporal sequence. Smith's work, however, revealed greater variability in site organization and components than had been discussed by Wendorf and Lehmer. The Prewitt-area sites are arranged as multiple, single, or double, circular or rectilinear isolated rooms, with single architectural rows, tiered double rows with and without evidence of paired functional units, and L-shaped or double-wing oriented roomblocks; ceramic assemblages on Smith's sites correspond to Wendorf and Lehmer's expectations.

Because of the nature of these studies (i.e., salvage of an unsystematically drawn population) no concept or discussion of community emerges, and most variation is attributed to temporal change. That some differences may be functional is suggested by the variation of sites near LA 6383, Prairie Dog Pueblo, the largest and most formalized site in Smith's study area (Salzer and Lane in Smith 1964:113-159). The artifactual similarity and tree-ring-dated overlap of these sites precludes confident separation into serial units evidencing trends toward "degeneration" and/or "borrowing" from adjacent areas. The above studies mention the lack of apparent planning, the low level of regional interaction as measured by typologically identified trade wares (no greater than 5 percent), and the provincial nature of the architecture to suggest the relative isolation and self-sufficiency of each site.

With few exceptions (e.g., Adams 1951; Bradley 1971; Judd 1954; Roberts 1929; Vivian 1965), small-site excavations in Chaco have concentrated on the most recent and impressive "Bc" mounds in the vicinity of South Gap. Reports on these sites (including, among many, Brand et al. 1937; Dutton 1938; Kluckhohn and Reiter 1939; Voll 1964) have provided most of the "data" and arguments for theories about and reconstructions of Chacoan small-site occupation despite the admittedly preliminary nature of these reports. More recent reports on the small sites excavated by the Chaco Center are also of a preliminary, descriptive nature and provide only minor and incomplete syntheses and summaries (McKenna 1981a; Truell 1981a). Among the 71 small sites excavated in Chaco, Truell (1981a:Table I-1) found only nine that include tenth and early eleventh century components: Bc 50-51 (Brand et al. 1937; Kluckhohn and Reiter 1939); Leyit Kin (Dutton 1938); the Three-C site (Vivian 1965); 627 (Truell 1980); 629 (Windes 1978b); an isolated kiva at a Basketmaker site (Loose 1978); Bc 59 (Vivian and Mathews 1965:107); and 1360. A tenth site with a component dating to this period, 626, has recently been excavated (Bradford et al. 1983).

The earliest excavations at Bc 50-51 (Brand et al. 1937; Kluckhohn and Reiter 1939) and Leyit Kin (Dutton 1938) encountered components contemporary with 1360, but there was no clear-cut recognition or description of those components because interest was focused on the later occupations at those sites. Vivian's (1965) monograph on the Three-C site represents the only published work on a Pueblo II site in Chaco, and it is concerned mainly with Kluckhohn's (Kluckhohn and Reiter 1939) separate lineage concept as a possible explanation for the existence of small sites and large sites at Chaco and with typological classification of the site components. Further investigation at this site (Windes and Neller n.d.) revealed additional floors and an earlier pit structure under the "San Juan" Kiva A, making the Three-C site less anomalous than Vivian's presentation implies. The isolated kiva at 299 was not a major concern in Loose's (1978) interpretations of this Basketmaker site, and it did not receive special consideration. Bc 59 underwent piecemeal excavation without summary over a number of years. Even without the complications raised by Gladwin's (1945) discussion of Kluckhohn's (Kluckhohn and Reiter 1939) interpretations of Bc 50-51, much of the information concerning the Pueblo II period in Chaco Canyon has been obscured or lost.

The current descriptive site reports from the Chaco Center also make no attempt to integrate models of Chacoan adaptation with evidence from the sites. The regular distribution of features and the repetitive, patterned nature of site construction through time is, however, a recurrent theme throughout these site reports. Although it is not explicitly stated, there is general agreement in the Chaco Center reports that small-site developments in Chaco are comparable to those elsewhere in the Anasazi area (Hayes 1981:14; Vivian and Mathews 1965:110). This agreement has been tempered by a reluctance to attribute every change to external influences or to accept totally autonomous, self-sufficient small-site occupation (Vivian 1970a:141-143) as a rule. The emergent concept of a diversified community with planned, patterned, and repetitive site construction runs counter to the usual interpretations of simple, unstructured accretion by independent lineage units (Dutton 1938; Vivian 1965; Vivian 1970a).

A very brief review of Chacoan small-site culture history shows that here, as elsewhere in the Anasazi area, later pithouses are consistently rounder and deeper than the early ones, and through time surface storage cists become formalized in shape, placement, and arrangement. These formerly scattered cists are subsequently arranged to the west or northwest of a pit structure in the form of contiguous shallow and deep tub-shaped storage rooms (Truell 1980, 1981a; Windes 1976a, 1976b). These rooms are fronted by a ramada in which storage and heating features cluster. Often certain clusters are delineated by low, narrow walls made of either adobe turtle-backs or (later) simple masonry set in ample mortar. These areas of domestic activity form the basis of later construction units or suites. In these suites, "living rooms" are usually backed by two storage rooms that, together, equal about two-thirds of the floor space of the associated living area. Contiguous sets of such living/storage suites along with some open ramadas make up the roomblock. Through time, the distance between pit structures and roomblocks decreases, and the pit structures begin to exhibit fewer habitation features--e.g., mealing bins, storage pits, wall niches, ancillary heating pits, and distinctive wing-walled sections--and to become more uniform in size (McKenna 1981a; Truell 1981a).

Room suites of differently sized rooms are no longer the dominant pattern in small sites occupied past AD 975-1000. After this time most rooms are small, squarish structures with about 6 sq m of floor area, although there is marked variability in room form and site organization at the turn of the tenth century. Pit structures gradually lose almost all floor features except those for heating and ventilation, and their increasing proximity to the roomblock culminates in actual incorporation. Truell (1981b) has addressed the internal diversity of small sites after AD 1075, but these are temporally outside the scope of this report.

It is partially the similarity of such architectural changes between small sites and Great Houses that has promoted a more unified view of the Chacoan occupation. Although there are slight differences in timing and there is certainly a quantum change in scale, the general morphology of these architectural changes is mirrored in Great House layouts. Some researchers (Vivian and Mathews 1965) have interpreted the later "McElmo" Great Houses as site unit intrusions, but the change in architecture between early Pueblo Bonito and late Kin Kletso, for example, is no greater than contemporary and parallel changes in architecture between the first and third construction episodes at 627 (Truell 1980). In other words, viewed from the perspective of small-site architectural patterns, Great Houses are large-scale versions of contemporary small sites and are not anomalous other than in scale (Lekson 1981, 1984; McKenna 1981a; Truell 1981b).

It can be argued that small-site development was a practical, functional response to changes in social organization. The recently reiterated neo-Durkheimian proposition that differentiation facilitates integration (C. Breternitz 1982; Gillespie 1976; F. Plog 1974) in increasingly complex organization can be applied to the study of the relationship between floor area and firepits to examine trends in differentiation of use-space associated with a primary feature through time (McKenna 1981a). Using these attributes, functional differentiation of small-site use-space and architecture can be suggested to have begun early (ca. AD 700) and to have been a strong factor of small-site organization before the post-AD 1075 period when the physical diversity of small sites becomes evident in the actual arrangement and shape of suite components, as discussed by Truell (1981b). There appears to have been considerable variability among small sites during the early Bonito phase, and this variability may well have been a significant part of the Chacoan adaptive strategy during this period. The failure of archaeologists to recognize this variability as meaningful probably stems as much from a lack of work in this period as from a rigid adherence to the traditional phase sequence, which does not provide a mechanism for discussing components beyond those described in the sequence. The suggestion that a functional diversity of Pueblo II sites existed as part of an adaptive strategy is supported to an extent by Martin and Plog (1973:209-212), who use a grosser scale and attributes of settlement system and environment but who also suggest that the Pueblo II period was the most culturally diverse in the Anasazi sequence.

In sum, studies of small sites in Chaco have largely been limited to description and empirical generalizations from site to site. Studies from outside Chaco Canyon have been used to delineate the basic characteristics of sites in Chaco, but these have largely used historical processes to account for variation, changes, and adaptation. There has been some recognition of formal diversity in small sites during the Classic Bonito phase and even some awareness that this diversity may have begun during the Pueblo II period of the tenth and early eleventh centuries. But very little information is available for the Pueblo II period at Chaco, and on the basis of recent work, it would appear that much of what has been published (Vivian 1965) is misleading. Few studies have specifically examined any Chacoan small site(s) within the broader context of a regional or even an intracanyon system, and those that have done so accept as valid a dichotomy in culture based on differences in site size and, to some extent, artifact inventory. Thus, while one is informed as to the particulars of small sites from studying site reports, the broader question of their role in the cultural system has not been addressed.

REGIONAL ADAPTATION MODELS

Several descriptions and explanations of the Chaco Phenomenon have been offered (including Hayes 1981; Irwin-Williams 1980a, 1980b; Judge 1979). These explanations and their supporting rationalizations are briefly reviewed here. These are separated, as much as possible, from the descriptive systematics that are occasionally and inconsistently applied to Chaco (Gladwin 1945; Vivian and Mathews 1965). Previously suggested time/space systematics as well as periods of occupation for sites excavated by the Chaco Center and discussed herein are presented on Figure 8.1. The terms "Pueblo II" and "early Bonito phase" are here used interchangeably but do not completely follow their traditional definitions. Their use here encompasses all "manifestations" from AD 920-1020 (Judge et al. 1981; Toll et al. 1980) and serves to relate a localized event to a broader, generally accepted developmental scheme. Currently there are two main schools of explanation of the Chaco Phenomenon, internal and external development.

The significant differences in site size and organization within the Chacoan occupation have elicited discussion and explanation in terms of dichotomies. Vivian (1970a) supplies a synthesis of the history of research and descriptive systematics and a review and examination of the most widely accepted explanations for Chaco to that date. Vivian's test of seven propositions (1970a:207-281) rejected several possible explana-

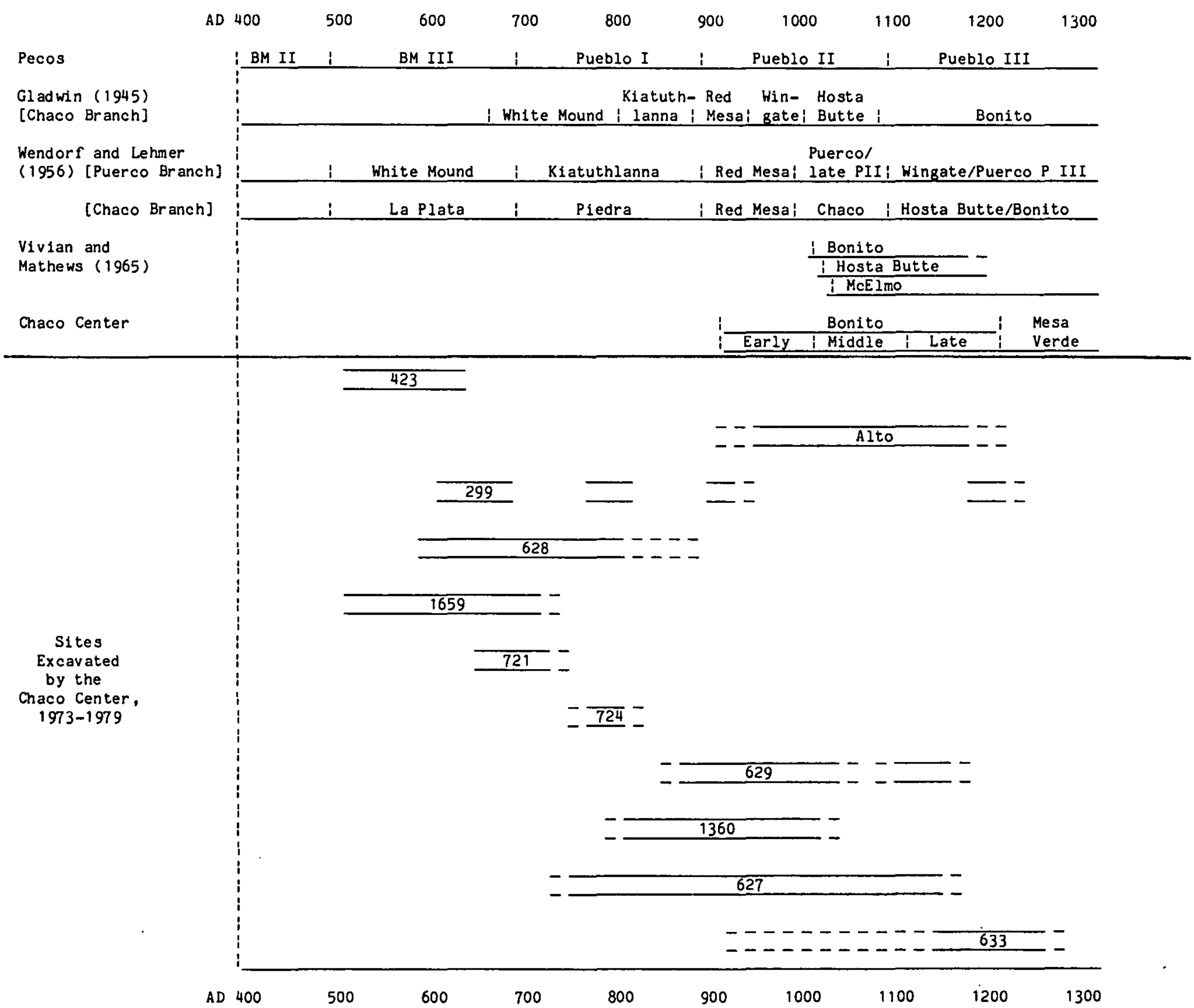


Figure 8.1. Phase classifications and site duration

tions for Chacoan adaptation that depended on the conservative vs progressive dichotomy (e.g., Dutton 1938; Hawley in Brand et al. 1937:115-119; Judd 1954:29-38, 1959:172-176) or on Mexican influence via pochteca contact (e.g., Di Peso 1968; Ferdon 1955) as being either untestable, invalidated by research subsequent to their formulation, or in the case of Mexican influence, unsupported by affirmative data. Apologists for the primacy of an influential Mexican connection still persist (e.g., Di Peso 1974; Frisbie 1980; Hayes 1981; Kelley and Kelley 1975), although their arguments are largely rhetorical and repetitive with no additional substantive contributions to "affirmative data" as discussed by Vivian.

Vivian favored the explanation that the development of different social organizations and the evolution of the town/village settlement pattern were localized responses to ecological--mainly topographic--conditions. He further discussed the possibility of cultural variation stemming from a single society organized by ranking or from the development of separate but contemporaneous social systems. He found some support for these propositions, initially concluding that the data were insufficient to permit any confident interpretations (Vivian 1970a:287-288) but later expressing support for models of separate social systems as accounting for site differences (Vivian 1970b). Grebinger (1973) later argued, again on a localized basis, for a more unified social adaptation through ranking than that originally favored by Vivian. The question of a single, complex system or two divergent systems is still a viable issue (compare Judge 1979 or Judge et al. 1981 with Irwin-Williams 1980b:62-63 or Stuart and Gauthier 1981).

Vivian's (1970a, 1970b) and Grebinger's (1973) works were the first in a long line of systems/ecology-oriented papers describing increased complexity in social organization and economic responses as an indigenous, regional adaptation to resource scarcity and unpredictability of precipitation in the San Juan Basin (e.g., Altschul 1978; Cordell 1980; Irwin-Williams 1977, 1980a, 1980b; Judge 1977, 1979; Judge et al. 1981; Schelberg 1980, 1982a, 1982b; Tainter and Gillio 1980; H. Toll 1978). These authors do not deny the existence of items of Mesoamerican origin in Chacoan sites. Rather, they view these items as having functioned within a framework of "cultural readiness resulting from internally developed complexity" (H. Toll 1978:7); cultural systems are held to be nonadditive and diffusion is viewed as nonexplanation (F. Plog 1977:25). Lister's (1978) review of the Mesoamerican evidence likewise favors an indigenous development with subsequent Mesoamerican "exploitation," apparent in an extractive rather than a causal sense. These papers, however, have primarily focused on towns or Great Houses as one product representative of the system's growth and change rather than discussing the functioning of the entire system.

These most recent works have emphasized the regional implications of their research. They ultimately suggest some hierarchical organization of society, though often without ascribing specified classes of social organization as discussed by Service (1962) or Fried (1967). Redistribution in some form has been discussed as the highest level of goods exchange within the Chaco system (Judge et al. 1981:79). Schelberg (1980, 1981, 1982a, 1982b) has addressed the argument for a hierarchical society in Chaco, using Peebles and Kus's (1977) model and its correlates. Although most of these studies have a heavy economic emphasis in attempting to explain events in the San Juan Basin, those by H. Toll (1978) and Schelberg (1982a) are the most comprehensive.

It would be impossible to recapitulate all of the recent, regionally oriented work here, but the implications of these studies are pertinent to small sites in Chaco, and they therefore deserve some attention. In general, these models hold that the success of Basketmaker and Puebloan adaptations permitted normal growth and eventual maturation of the system (Judge 1979). This maturation reduced the "mobility option" (Loose and Lyons 1976:50-51; Vivian 1981) as a potentially significant means of coping with unfavorable local conditions, which led to the development of alternative "energy subsidies" (Athens 1977) and "buffering mechanisms" (Jorde 1977), such as agricultural intensification, craft specialization, and the shift from a reciprocal to a redistributive level of exchange. These processes ultimately become visible as the archaeological epiphenomena of water-control systems (Vivian 1970b, 1974), highly visible hierarchical settlement systems ("towns" and "villages"; Schelberg 1981; Tainter and Gillio 1980), formalized transport and communication systems ("roads" and "shrines"; Hayes and Windes 1974; Obenauf 1980), and an increase in exotic and luxury items during the Bonito phase.

These models depend on a number of different heuristic systems: Judge's social speciation into new "trophic levels" (Judge 1979), for example, or Stuart's "divergent trajectories" of power and efficiency (Stuart and Gauthier 1981). The net effect of the events outlined in each of the models, however, is enhanced cultural diversity in the environmentally most homogeneous areas of the basin, e.g., Chaco Canyon (Cordell 1980). Ultimately, the development of the Great Houses is seen as the result of "production intensification" and "specialization"; these sites are interpreted as loci of regional information processing/coordination and localized redistribution by an "administrative entity" (Cordell 1980; Judge et al. 1981). In the regional hierarchy then, Great House occupants are seen as information specialists who efficiently facilitate the mobilization of resources to counter the unpredictable variability of the basin and, more specifically, the basic resource scarcity in Chaco.

Clearly, if such a hierarchical system existed during the Bonito phase, certain predictable states or conditions should be recognizable at the different levels within the system. Generally, two trends seem to characterize archaeological research in the San Juan Basin: a) descriptive and particularistic studies, usually in the form of site reports; and b) general, systems-oriented models that focus their verification on the smallest segment of the system and then project, without examination, the function and form of other system components. In some respects, the fixation on examining the apical portion of the Chacoan adaptation has frustrated satisfactory assessment of the postulated system.

Empirically verifiable characteristics of small sites within these hierarchical or systemic models are largely unstated (see Irwin-Williams 1980b:47-55). They are usually taken as being the opposite of those conditions cited for the Great Houses. Those characteristics most commonly mentioned for small sites include a lack of status burials (except those of the "subordinate dimension" [Akins and Schelberg 1981; Peebles and Kus 1977]), a lack of site planning and organization, the absence of exotic and status goods (such as macaws, copper bells, abundant shell and turquoise, and specialized pottery), relatively fewer storage facilities, and no evidence of craft specialization (see Grebinger 1973). These general characteristics are associated with lower social levels of information processing and/or energy control. In light of Windes's (1978b) identification of turquoise manufacturing at a small site (also see Mathien 1981b), Cordell (1980) justifiably hedges on the question of craft specialization. At the very least, if local scarcities are being ameliorated by any regional redistribution system, distribution patterns of basic goods should reflect some circumvention of Renfrew's (1975) "law of monotonic decrement"; that is, levels of abundance and diversity should exceed those attributable to direct procurement, even though the exact mechanism of acquisition is not known (Pires-Ferreira and Flannery 1976; also Judge et al. 1981).

EVIDENCE FROM 1360

The following sections of this chapter use information gained from the excavation of 1360, especially the particulars of architecture and material culture, to address the general archaeological questions raised in the previous section. For example, it has been shown that environmental degradation and unpredictability are frequently mentioned as causal elements in explanations of cultural change in Chaco, but the limited environmental data from 1360 suggest parallels between the present and past environments of the canyon. Studies at 1360 did not include pollen and flotation analyses, but species represented in the faunal and macrobotanical remains are similar to those found in the canyon today. This suggests that no significant environmental changes have taken place, and indeed, more detailed studies from contemporary sites (629 and 627) support arguments for relatively similar past and present environments (A. Cully 1981; Cully and Potter 1976; Struever 1977; M. Toll 1981). Successful adaptations to similar environments (e.g., the Hopi mesas) have combined a diversified subsistence strategy with intense regional economic interaction.

Much of the socioeconomic and cultural change that resulted in site configurations such as 1360 may be traced to the increasingly important role of agriculture, with its attendant predictable labor requirements, relative occupational stability, and concentration of population in optimal production areas. It has been suggested that population packing in relatively optimal areas (such as Chaco Canyon) may have resulted eventually in the consolidation of single-family habitation units into multifamily dwellings (Glassow 1972; McKenna 1981a). These larger kin or social groups overtaxed traditional processing and storage facilities in pithouses, and this led to greater investment in surface architecture and to diversification and specialization of surface features. Similar stresses of normal growth caused by a successful adaptation have been invoked to account for intensification of agricultural practices and, ultimately, development of Great Houses in Chaco (Judge et al. 1981). Because of insufficient temporal depth, specific evidence of diachronic developments is not evident at 1360.

Architectural and Site Structural Comparisons

The architectural details of Site 1360 are presented in Chapter 2. The purpose of this discussion is to offer functional interpretations based on the site architecture, to make comparisons with other excavated Chacoan small sites, and to explain the applicability of these data to the general concerns of Chacoan archaeology.

The architecture of site 1360 indicates a habitation site, probably occupied year-round. The classification of rooms into functional categories based on features alone is risky at best, especially in view of some fairly strong arguments that structure functions are best determined through a variety of criteria focusing on activity-area analysis (C. Breternitz 1982; Flannery and Winter 1976; Gillespie 1976; Hill 1970). Since 1360 lacks sufficient floor materials and control to permit multivariate assessment of all major features based on associated artifacts and biofacts, only rudimentary functional interpretations can be made.

The site architecture appears, at first glance, to be rather unpatterned and unintegrated, failing even to conform to expected orientations and relationships between room and pit structure positions, especially in relation to House 1. Patterning is present, however, and the full development of special-function rooms is suggested. Domestic work areas, including cooking and mealing loci, can be found adjacent to Pithouse B, with special-purpose rooms in back of these domestic areas. A similar pattern is reported at the Three-C site (Vivian 1965), 724 (Windes 1976a), 629 (Windes 1976b), and 627 (Truell 1980).

A common architectural pattern in Chacoan sites involves a shift to uniform room sizes from an earlier pattern of a big room backed by two smaller rooms. Such "early" units do exist at 1360 (Rooms 2-4), but they have not been obscured by later building of uniform rooms, as happened at 627 (Truell 1980) or Bc 50-51 (Kluckhohn and Reiter 1939). Uniform rooms have been interpreted as architectural evidence of a San Juan cultural intrusion (Judd 1954; Vivian and Mathews 1965), but at 1360 these two different patterns of rooms exist side by side, with no clear San Juan traits to argue for an intrusion. Not only was the earlier unit in House 1 not superimposed by uniformly sized rooms, there are no significant differences in the ceramic assemblage between that part of the site and other site areas, which suggests that this unit may still have been in use up to or nearly until abandonment. As far as I am aware, this is the only instance of two different patterns of room architecture being in apparently contemporary use at a small site. Such side-by-side occurrences of different architectural patterns are more readily visible in Pueblo Bonito (Lekson 1981). Building over or extensive remodeling of older units is less difficult in small sites and was the usual practice. That this did not occur at 1360 suggests that some functional requirements existed for both room types.

The two excavated pit structures at 1360 have been discussed as a kiva and a pithouse (A and B, respectively). These terms generally carry different social connotations, but the validity of the differentiation is somewhat obscured by the abandonment of the kiva prior to the abandonment of the pithouse. The two structures differ in several important aspects of construction and in the types of features recorded. Several lines of evidence have been used in this book to demonstrate that Pithouse B was a domestic habitation. In contrast, the exact function of Kiva A is not clear, but some differences in function from Pithouse B can be suggested. Studies of the pithouse/kiva evolutionary transition (Gillespie 1976; Lancaster and Pinkley 1954) have suggested functional and/or multivariate causes for this transition. These two structures were in use during a time generally characterized by transition to specialized surface and subsurface site components. Possibly because 1360's pit structures were built during this period of rapid change, there is less clear differentiation between the two subsurface structures in construction and function than might be expected in pit structures built during earlier or later periods. The main types of architectural evidence for designating Kiva A as a kiva are the lack of clear demarcation of work or storage space and the dearth of features. The lack of evidence for discrete activity areas is a weakness in this argument, but the identification of this pit structure as a kiva seems to be the most likely possibility, given the available evidence.

Pithouse B, in contrast, has clear evidence of both male and female activity sets, an obviously demarcated storage/processing area behind the wing walls, an abundance of domestic-related floor pits, and, of course, the deceased occupants on the floor. Pithouse B, however, has a small wall niche that falls into the "special feature" class, which is illustrative of the ambiguity in pit structure features that may occur in this transitional period. In light of architectural data from other contemporary sites, it would appear that activities at 1360 were becoming less pithouse-centered because of the development of special processing rooms and other relatively stable surface components. The evidence from 1360 alone, however, does not suggest this change as clearly.

Although one unit of rooms in House 1 (Rooms 2-4) has been tentatively identified as a suite and as possibly being the earliest structural component, only Room 2 (the semisubterranean room) is architecturally distinct from the remainder of House 1. The basic wall construction for all rooms, regardless of period, is apparently adobe foundations with simple, unshaped to roughly edge-chipped tabular sandstone slabs set in abundant mortar with a sandstone spall and clay veneer. Puddled adobe is found in Room 2 and Bin 1. Room 2's unique construction may have served a special storage-related function; it is unclear whether Room 2 was still in use at abandonment.

Rooms sizes at 1360 are unimodal in distribution, but for the purposes of this report the rooms have been classified into two basic groups: storage and living/processing. Storage rooms are those without features or with unburned storage pits of various shapes (Rooms 1, 2, 3, and 9). Living/processing rooms are distinguished by firepits, mealing bins, and storage pits (Rooms 4, 6, 7, and 11, and conceivably the L-shaped wall area). The determinant variable is the presence or absence of a firepit, a feature that has been used to assign room function in ethnoarchaeological contexts (Adams 1983:49). Rooms 8 and 10 could not be placed in this dichotomy for a variety of reasons discussed in Chapter 2, although their lack of floor features might suggest storage. Excavated rooms in House 2 also appear to be storage-related but are, like Rooms 8 and 10, too enigmatic to categorize definitely.

If the basic room functions suggested above are accepted, the spatial arrangement of House 1 rooms correlates with expected intensity of use. North of Pithouse B are structural units containing firepits of normal cooking size and mealing areas (L-shaped wall area, Room 4, Room 6), backed by storage structures (Rooms 2 and 3) associated with a living room, followed by paired special processing rooms (Rooms 7 and 11) noteworthy for oversized firepits suggesting bulk drying, cooking, or smoking, and finally, farthest north of Pithouse B, a featureless storage room or rooms (Room 9 and possibly Room 8). An alternative reason for this organization, a possible structural relationship with site 1278, will be discussed later.

The difference in support features between Kiva A and Pithouse B is more striking than the difference in architectural structure. Pithouse B's subdivision of space may be as much related to buttressing of unconsolidated fill and wall support as to its function as a domiciliary structure, but the dearth of features in Kiva A suggests that Kiva A may have served a more specialized, if not strictly ceremonial, function than Pithouse B. The possibility of functionally paired pit structures at 1360 should not be overlooked, although here the A/B combination may be fortuitous; it is equally possible that Kiva A and the structure represented by Vent Y and Pithouse B and the structure associated with Vent X are pairs.

Comparisons with Other Small Sites

The following comparison of 1360's architecture with other Chacoan sites of approximately the same age concentrates on a limited number of attributes, such as basic features, pit structure composition and construction, modal room distributions, amounts of room space devoted to storage vs processing, and special features. As previously mentioned, those excavated sites with components in the same period as 1360 include the Three-C site, 629, 627, 299, and 626. With the chronic problems of absolute dating in Chaco, these sites cannot be shown to be completely contemporaneous in construction, but their occupations overlap. Perhaps the earliest components at these sites are represented by Kiva B at 299 and the early floor of Pithouse 2 at 629, with the latest components being found at 627 and 626, but all construction and occupation at these sites took place between the early 900s and the early to middle 1000s (Figure 8.2).

Basic construction techniques are similar from site to site. Pit structures are generally circular, with plaster over native earth, and feature central slab-lined firepits with an above-floor ventilation system. House construction in all sites involves a variety of construction techniques, including simple horizontal masonry, adobe turtlebacks, puddled adobe, and upright slab-fronted walls, but these construction techniques do not seem to have been used in any precise serial order. Domestic features and postholes indicative of various extramural screens or ramadas are usually clustered between pit structures and roomblocks, and the abundance and variety of room or activity-area features decline with distance from pit structures. Variation in basic construction techniques has been noted at contemporary sites outside the canyon, such as those around Cebolleta Mesa and in the slightly later Chacoan scion community of Bis sa'ani (Breternitz et al. 1982; Franklin 1982; Tainter and Gillio 1980).

The relative frequency and consistency of location for processing and storage features among the Chaco Canyon small sites are notable, as not all areas of Anasazi occupation seem to exhibit regular feature organization even at this general level. Mesa-top sites at Mesa Verde, for example, have markedly fewer firepits or storage pits associated with surface structures, suggesting at least a different use of work space than is evident in Chacoan small sites of this time if not a partially seasonal settlement pattern (cf. Hayes and Lancaster 1975:73-82; Lancaster and Pinkley 1954:23-53; Lister 1966; Swannack 1969).

Table 8.1 compares several formal attributes of the pit structures from the canyon small sites. Differences in pit structures seem to be partly temporal and partly functional. The main temporal trends are a reduction in the number of floor pits; a change from post-supported to surface-level, flat-laid roofs; a change from subfloor to above-floor vents; and a decline in the number of large, deep wall niches. Although the number of sites and their areal distribution is limited, the occurrence of two items seems to be related to spatial proximity of the sites: formal mealing bins occur at 627 (Pit Structure F) and 629 (Pit Structure 2), and square pit structures occur at 626 (Pit Structure 2) and 629 (Pit Structure 3). All of these sites are located in Marcia's Rincon west of the Fajada/Chaco confluence. The most noteworthy functional pattern in small-site pit structures is the trend toward paired structures at each site, one structure with abundant domestic features and another smaller, shallower structure with an absence or much lower density of floor features.

The main differences in surface architecture seem to be correlated with site size. Modal room distributions suggest different room-size emphasis at each site, but the sample is too small to permit confident claims of functional differentiation. Except for the Three-C site,

```
Structure
Number    Site           AD   875     900     925     950     975     1000    1025    1050

  A       1360                                 |-------------------|
  B       1360                      |------------------|
  B       299                                |-----------------|
  2       629                                  |---------------|
  3       629                                  |---------------|
  F       627                                          |-------|
  D       627                                                  |------------------|
  G       627                                                  |------------------|
  1       626                                                              |---------------|
  2       626                                                              |---------------|
```

Figure 8.2. Probable construction periods of pit structures

Table 8.1. Summary of early Bonito phase small-site pit structure attributes

	Site and Structure									
	1360		299	629		627			626	
	A	B	B	2	3	F	D	G	1	2
Orientation (degrees)	198	192	171	162	180	160	175	165	98	93
Shape: rectangular	–	–	–	–	x	–	–	–	–	x
D-shaped	–	x	–	x	–	–	–	–	–	–
circular	x	–	x	–	–	x	x	x	x	–
Floor area (without bench) (sq m)	12.8	12.6	12.6	16.2	8.4	12.7	9.8	10.4	8.9	11.2
Depth (m)	1.8	2.0	2.0	2.0	1.7	2.3	1.8	2.2	1.6	2.3
Roof supports (all in bench)	6	5	8	4	0	4	0	0	0	0
Masonry	–	x	–	–	–	–	–	–	–	x
Bench: three-quarter height	–	x	–	–	–	–	–	–	–	–
full height	x	–	–	–	–	–	–	–	–	–
height (cm)	140	110	–	–	–	–	–	–	–	–
width (cm)	35	20–45	–	–	–	–	–	–	–	–
South partition	–	x	–	–	x	–	–	–	–	–
Wall niches: small, above floor	–	x	–	x	–	–	–	–	–	x
large, at floor level	–	–	x	–	x	–	–	–	–	–
Storage pits: small, shallow	–	x	x	x	x	x	x	?	–	–
large, deep	x	–	–	x	–	–	–	–	–	x
Firepits, slab-lined	x	x	x	x	x	x	x	x	x	x
Ashpits	x	x	–	–	x	–	–	–	–	–
Heating pits	–	x	–	x	–	–	–	–	–	–
Metates/bins	–	x	–	x	–	–	x	–	–	–
Sipapu	x	x	–	x	x	–	–	–	–	–
Vent (all masonry): subfloor	–	–	x	x	–	x	–	–	–	–
above floor	x	x	x	x	x	x	x	x	x	x

these sites show a unimodal pattern of room sizes with the modal group of 61 percent at 627 making it the site with the least dispersion in room sizes (Table 8.2). Truell (1980, 1981a) has shown that storage area increases through time, but a comparison of these sites shows that much more surface space was devoted to processing at 627 than at its contemporaries (Table 8.2). The physical organization of rooms is variable and suggestive of different use-emphases, but this pattern, like room-size distributions, is based on few observations. Site 627 has the most complex room arrangement in this small sample; it features a linear, three-tiered roomblock. In contrast, living/processing rooms are situated at the margins of the roomblock at 629, so that there is access to all rooms.

Functional diversity between sites is suggested not only by different modal room-size groupings and varying emphases on basic storage/ processing components, but by the presence of special-function rooms at a site, which may be viewed as an architectural correlate of differentiated subsistence, social, or craft organization. Only the Three-C site does not have a room for which a special purpose or function may be inferred. Sites 629 and 627 have special rooms that complement the basic orientation of use-space. At 627, a circular, centralized, plaza-oriented mealing room (20) and a larger-than-normal, multipurpose workroom (17/18) behind the mealing room seem to reflect (as well as contribute to) the emphasis on processing activities at this site. At 629 three large, bell-shaped pits in the plaza are similar in size and form to granaries excavated near Kiatuthlanna (Roberts 1931:41), although the packed, charred corn of the Kiatuthlanna features was not present at 629 because these pits were last used as trash receptacles. These pits meet the criteria of unique features (for this time period in Chaco) and underscore the importance of the storage component at 629, an emphasis that has already been suggested on the basis of the site's modal room-size group and relatively high ratio of storage to processing space. Although room excavations are incomplete at 626, the main pattern appears to be one of living/processing areas fronting a western tier of essentially featureless storage rooms. Centered in this western tier is a circular, flagstone-floored room whose function is uncertain, but which is unique within the Chacoan small-site sample. Finally, 1360 has a feature previously discussed as a parrot bin, the special implications of which are readily apparent. Two other rooms (7 and 11) at 1360 also have unusual features, namely the extremely large central firepits. These features suggest that special, possibly bulk processing occurred in these two rooms.

Community Organization

The concept of community has been extensively employed throughout this book, but it would be impossible to present any specific discussion of such organizations in the canyon based on current knowledge. The hierarchical community structure as an integrative mechanism for the Chacoan Anasazi is an idea that appears frequently in recent research reports (Breternitz et al. 1982; Doyel et al. 1983; Marshall et al. 1979; Powers et al. 1983; Schelberg 1981). The majority of such studies

Table 8.2. Summary of early Bonito phase small-site space-use in surface architecture

Site Number (Period of Construction)	Storage Rooms: Feature Numbers	Storage Rooms: Floor area (sq m)	Storage Rooms: Percent of Total Room Area	Processing Rooms: Feature Numbers	Processing Rooms: Floor area (sq m)	Processing Rooms: Percent of Total Room Area
629	5,6,7,8	19.6	48.4	9,3,2	20.9	51.6
Three-C	I,H,G,F	22.3	37.2	A,D,B,C,E	37.7	62.8
1360	1,2,3,9	13.2	33.4	4,6,7,11	26.3	66.7
627 (2nd)	1,2,4,9,16,22	28.3	22.7	remainder	96.6	77.3
(3rd)	same as above	30.3	25.2	remainder	90.6	74.8

	n	Range: sq m	$\bar{x}$	s.d.	cv	Modal Group: sq m	Modal Group: Percent of rooms
629	7	4.2 - 9.1	6.0	1.947	32.5	3 - 5	57.1
Three-C*	8	4.4 -10.9	7.5	2.670	35.6	3 - 5	33.3
						7 - 9	44.4
1360	8	2.3 - 8.7	4.9	2.164	44.2	5 - 7	44.4
627 (2nd)	7	3.8 - 5.5	4.4	.706	16.0	3 - 5	71.4
(3rd)	18	4.7 -14.3	6.6	2.224	33.7	5 - 7	61.1

* omitting the late wall that creates Rooms B-D

are based on surface observations and the readily observable variation in Great House size and associated small-site density and frequency. The variation discussed by Powers et al. (1983) for the region and particularly by Doyel and Breternitz for the Bis sa'ani community suggests that differing organizations of site interaction may have existed from community to community. Part of this variability may be accounted for by time, or perhaps more correctly by the reasons for establishing new communities, since these reasons may change through time. Chaco Canyon is one area of lengthy sociocultural development, and if the canyon was in any sense truly ancestral to Chacoan settlements elsewhere (Doyel et al. 1983), the complexity of community structure(s) in the canyon could be expected to be among the greatest in the basin.

The current sample of excavated small sites in the canyon is far too small and dispersed to form the basis of a reasonable, empirical reconstruction of small-site community structure or of the integration/interactive association of small sites with even the nearest Great Houses. It could be that community constellations of small sites may have replicated the structure of the more visible Great House/small sites constellations. If such groups of six- to eight-room small sites linked to somewhat larger sites exist, these larger small sites may have served as very localized centers, but not necessarily as intermediate links between the smallest sites and a Great House. In other words, the presence of intermediate centers does not necessarily imply a three-level hierarchical system; relations between the smallest sites and their associated Great Houses could have been unaffected by the presence of a localized center. Such a constellation of small sites is suggested by the pattern of sites in Marcia's Rincon, where numerous sites of eight or fewer rooms might be viewed as being associated with the larger (but still relatively small) site 627. Potential community patterning along Fajada Ridge has not been sufficiently investigated, but the size of house mounds in this area suggests some differentiation.

Flannery and Winter (1976) focus on activity-area analysis and material culture and suggest that the organization of sites into behavioral components, such as subsistence activities and household, regional, or unique specializations, provides a common base for evaluating community structure and variation. If this concept is applied to architectural attributes of this very small sample of early Bonito phase small sites it would appear that, although household or site architecture and space-use are similar, there is a differential emphasis on components of storage vs living/processing from site to site, with smaller sites exhibiting a slightly greater emphasis on storage space. Specialized architecture was noted at these sites, and although the socioeconomic connotations of these specialized structures are not clear, these rooms seem to complement the particular storage or processing emphasis of the site. Recognition of a functionally diversified community solely on the basis of architecture is not possible within such a small sample, but clearly some basic differences exist.

The diversity of small sites is less apparent in architectural form than in features and material items (see discussion below), which suggests that emphases on activity sets differed somewhat. Evidence of subsistence activity is present at every site, but the scale of processing and other functions is not as consistent as would be expected if each site were a self-sufficient community. Small-site diversity increases through time (Truell 1981b), and the period between AD 900-1050 (Pueblo II) was marked by an early trend in that direction.

Because of the potential for functionally differentiated communities, some consideration should be given to the possibility that 1360 was part of a large site complex: 1278/1360 or Pierson's original site Bc 240. This perception of 1360 would require some significant reorderings in the organization of site layout. Site 1360 would be but one isolated segment of a much larger site, possibly involving a partially enclosed plaza; the duration of occupation would be much longer, and the probability of functionally specific components would be greater. The traditional interpretation of 1360 is that of the layout recorded during survey and excavation, but the development of alternative site definitions is possible and should not be ignored--especially since rectangular house mounds and enclosed plazas are a recognized pattern in Pueblo II Great Houses and later Pueblo IV architecture. The proximity of 1278, the occupation of which coincides in part with that of 1360, argues strongly for close interaction.

The particular case of 1360/1278 is belabored here because of the possibility of a structural relationship, but the entire ridge was densely occupied and arguments for a community can be easily extended. Such speculations could continue _ad infinitum_; as Powers et al. (1983) point out, recognizable community clusters are not readily apparent in Chaco, but they are undoubtedly present. The delineation of such community clusters is extremely important. Despite the problems of recognition, research designs for the canyon should use potential clusters as basic sampling units rather than relying on chronologically oriented samples of single sites as was done for the Chaco Project.

While it is possible to suggest alternative views of 1360's architectural or communal affiliations, 1360 itself does follow tenth-century small-site patterns in Chaco. Irregularities in architecture, demographics, and the occurrence of material remains can be circumscribed by general covering statements concerning a pattern for tenth-century occupation, but there is ample diversity in small sites of this period, and it is this diversity that may be important as an adaptive mechanism. This diversity suggests a much broader community organization that we are just beginning to appreciate. The difficulty of typifying small sites into a repetitive pattern suggests the operation of differentiated parts in a larger entity or community. Although one may hold up odd-looking elements of 1360 for critique, 1360 is not anomalous among small sites. Site 1360 contributes to an emerging pattern of diversity in the small sites from the inception of the Chaco Phenomenon.

Patterns in Material Culture

The inventory of artifacts at 1360 comprises the expected array of tools and materials needed to sustain the broad range of daily household activities, but there is some meaningful variation. Basic processing tools and subsistence goods are all present: manos and metates; flaked stone with casual tools commonly being made of local material; a hammerstone assemblage that suggests maintenance of mealing equipment; a variety of miscellaneous ground stone and abrading implements; bone tools indicative of various piercing, scraping, and sewing activities; and evidence of maize subsistence. These materials are the common denominator in almost all Anasazi occupations.

The three main items that differ from patterns at other sites are the flaked stone assemblage, hammerstones, and faunal remains. Although the diversity of flaked stone material types suggests a regional basis for acquisition and controlled distribution, it appears that exotic material was acquired for on-site use and not as a reworkable resource for exchange; specialized knapping does not appear to have been part of the 1360 production activities. The very small weight range of the hammerstones may reflect a curtailment in skilled knapping, but this explanation is not completely satisfactory if these tools were used as dressers for mealing equipment, since heavier stones would have been more efficient for this purpose. Perhaps the poor quality of these hammers led to their rapid reduction, and most of the recovered items were expended. Finally, the faunal assemblage constitutes an unusually high proportion of artiodactyls, particularly pronghorn. Akins's (1982) discussion of faunal exploitation in Chaco is not necessarily informative in this regard, because she uses the debatable technique of estimated meat weights as a comparative measure. Not only do data from 1360 contribute heavily to this particular measure, but Akins does not use available data from 629 (Gillespie 1981) that suggests considerable variability in faunal exploitation. The abundance of artiodactyl remains at 1360 may be due to several factors: a) the relative status of the site residents within a communal hunting network, b) the acquisition of appropriate raw material for bone tool production, and c) the differential preservation exacerbated by biased recovery techniques.

Two kinds of possible part-time craft specialization at the household level seem to be indicated in the material culture from 1360. Chapter 3 reviews the evidence for ceramic production at 1360. The amount of ceramic production that took place in the canyon is currently a point of some debate, but amounts of import are substantial and increase through time. Until very recently, 1360 was the only site of its time period from which potters' tools (scrapers and polishing stones) had been recovered in good condition and quantity from contexts that clearly suggest ceramic production. Subsequently, a lump of coarse-tempered potters' clay with polishing stones embedded in it was recovered from 626; this supports the contention that pottery production took place during the period of occupation of these two sites, but such production could have been very limited.

The other potential craft specialization is in the production of bone tools. Definite evidence of bone tool production was found in Pithouse B; the material present ranged from unused metapodials to finished tools. No other site in the present sample exhibited such evidence, which makes it difficult to determine how much of the bone tool production was for on-site consumption vs actual production for circulation in the community. Given the abundance of raw material at the site, however, the evidence of manufacture suggests production in excess of need. If these materials do represent craft specialization, it probably was part-time and possibly was seasonal. It would appear, however, that 1360 may have been one of a limited number of sites producing utilitarian goods for local exchange or distribution.

In addition to the household and site levels of specialization, there is evidence at 1360 in the flaked stone, abrader, mineral, and ornament assemblages for what Flannery and Winter (1976) term regional specialization. At 629 and 1360 a case for at least part-time lapidary specialization can be made (Mathien 1981b). At 629 this was demonstrated by abundant turquoise manufacturing debris associated with workshop tools. Although the association of tools, debris, and finished products is not as extensive at 1360, all are present and indicate on-site production. Minute drills, lapidary abraders, and turquoise may be associated with commodity production that is definitely not single-site oriented. Other small sites have been identified as loci of turquoise processing, e.g., 629 and the late horizons at Bc 50 (Mathien 1981b), but the abundance and ubiquity of turquoise in the small sites at Chaco Canyon suggest that this phenomenon was more widespread than the limited number of identified workshops indicate.

Finally, Flannery and Winter (1976) mention what they term unique specializations. The macaw bones and parrot cage (Bin 1) at 1360 could be viewed as implying the presence of such a specialist in the Fajada Butte community. The orientation of Bin 1 toward a large open area containing a trash/burial mound that lies between the roomblocks of 1278 and 1360 may suggest that 1360 was part of a larger site that served the surrounding area in a variety of ways not completely apparent in the small sample recovered from 1360.

The material culture assemblage from 1360 conforms to the patterns associated with a variety of interaction modes, and similar patterns are evident at other small sites in Chaco. Although this sample is very small, it does provide evidence for a variety of economic and social factors that served to integrate the small sites into a community or communities that, in turn, articulated with the regional system.

The contrary presumptions of small-site autonomy and uniform household production of material goods is neither completely rejected nor supported by the evidence. There is some evidence of differential production, but it is difficult or impossible to extract from the current body of literature because data and observations are often biased by the tacit and unlikely assumptions that individuals possess equal abilities, and that each site represented an independent, self-sufficient unit. What is not clear is the extent to which other small sites contributed to the production of utilitarian or exotic goods. The differences between 629 and 1360 are informative in this regard because one site (629) appears to have been a locus of intense production of a single item, while production at the other (1360) may have been more diversified.

Because of differences in the quality and quantity of some goods and in the size and organization of sites, specialists and specialization are frequently suggested to have been aspects of Bonito phase life in Chaco. Judge et al. (1981) and Cordell (1980) postulate managerial specialists in the Great Houses, while others (Mathien 1981a; Washburn 1980) suggest craft specialization for various commodities; this report likewise has used the term "specialist" noncritically. At 1360, the almost completely multifunctional character of the tools and the lack of confidently identifiable stored raw materials or commodity inventories suggest that the term craft specialization needs some qualification. Akins's (Akins and Schelberg 1981) and Palkovich's (1981) examinations of the trauma and pathologies evident among the Pueblo Bonito status burials suggest that no physical benefits were enjoyed by these putative socioeconomic specialists. Certainly part of the problem is the lack of any developmentally sensitive vocabulary on the subject of specialization; the only qualifier currently in use is the cumbersome and inconsistently applied term "part-time." Future research in the San Juan Basin might profit from a refinement of the concept and identification of the role(s) that specialization played in the Chacoan expression of the Anasazi adaptation.

At the beginning of the 1360 project, the role of specialization was not an overriding concern; an insight into the potential extent and significance of craft specialization as an adaptive mechanism for small-site populations is one by-product of this study. Specialists and specialization are frequently treated as givens in discussions of Great Houses (witness Judge et al. 1981; Shelley 1980; Terrel and Durand 1979; H. Toll 1978), but discussions of small sites are much less likely to deal with these topics. Progress has been made in the study of craft specialization, and recognition of specialization as part of the adaptive process is growing (Kent 1973; Rice 1981; Shelley 1983). But interest in this topic has hardly reached the point where it is one of the core features of Anasazi research. Rice's (1981:219) remark that "It is clear that some operational definition of craft specialization needs to be developed for and by archaeologists," makes the infancy of the subject apparent. The obvious suggestion here is that future research on the subject of specialists and their products in the San Juan Basin or in Anasazi research in general should not be limited by considerations of site size alone.

1360 AND THE CHACO SYSTEM

Is 1360 an "important" site in Chaco? Is it typical? This level of inquiry is frequently found in earlier site reports; here such concerns are neither paramount nor especially appropriate. There are some aspects of 1360 that could be used to argue either for egalitarian society or for the existence of a secondary village center at the site. Two versions of the traditional just-so story can be offered. For arguments in favor of some status differentiation, the most notable features of 1360 are the relative abundance of turquoise and other ornamental items and the presence of a macaw and a cylinder jar fragment (which suggests the use of special ceramic forms). Differential access to status items and significant differences in material inventories are often used as evidence of ranking (Cordell 1980:27-28; Grebinger 1973; Lister 1978; Schelberg 1980). The location of 1360 at the base of Fajada Butte, atop which a solstice marking station has been located (Sofaer et al. 1979), might be found provocative by some. Such a station could have required the presence of a nearby attendant specialist to monitor access to the station and to perform whatever esoteric support functions might be required. The potential "status" elements in the 1360 material culture noted above could easily be interpreted as indicative of the presence of such a specialist.

On the other hand, if one wishes to argue for egalitarian society in Chaco, the presence of a macaw and a cylinder jar at 1360, a small site, could be used to bring into serious question the assumed high status of these items and, consequently, the arguments for status differentiation in Chaco. Naturally, interpretations of 1360 depend on who is reading the archaeological record of the site. It is more useful to view 1360 simply as one more small sample of variation in Chacoan technical and social development rather than treating it as an archetype of a class of sites.

Site 1360 was occupied during the tenth and early eleventh centuries. Although the time depth of 1360 is insufficient for extensive diachronic study, information from this period is of interest because it marks the beginning of the Bonito phase in the San Juan Basin (Judge et al. 1981). Some chronological change is apparent at 1360, particularly in architecture and ceramics, but this change is neither as extensive nor as demonstrably continuous as in some other sites (Truell 1980, 1981a). This raises the question of comparisons and observations concerning 1360 as a product of its time. Recent systems or ecologically based reconstructions (such as Altschul 1978; Grebinger 1973; Irwin-Williams 1977, 1980a, 1980b; Judge 1979; Schelberg 1982a, 1982b; Vivian 1970a) have concentrated on internal cultural development as opposed to the imposed cultural change suggested by Mexican diffusion proponents (such as Di Peso 1974; Ferdon 1955; Frisbie 1980; Hayes 1981:46-63; Kelley and Kelley 1975; Schroeder 1981). It would seem that an understanding of local and regional cultural developments and coping strategies would be necessary before any attempt could be made to determine the contribution, if any, of external cultural influence.

Even excluding the debate on extraregional influences, there is not a consensus on the operation of the Chacoan system. Marshall et al. (1979) suggest that Great Houses represent public architecture and were used largely as granaries by surrounding small sites in an unorchestrated pooling of resources for the communal good. I would agree with Tainter and Gillio (1980:99-114) that this suggestion describes an incongruous and improbable relationship between nonelites and elites (given that there are true elites). On the other hand, a fairly strong case can be made for the operation and authority of Great House elites having been supported on a broad base of smaller sites. It is possible that the prehistoric sociopolitical situation in Chaco was quite flexible (especially in the early Bonito phase), and that the domains of authority were not as crystallized as the rhetoric under which they are discussed. The suggestion that social coercion by elites from Great Houses made the system work (Tainter and Gillio 1980:107) places some burden on its supporters to identify the archaeological correlates of the sanction and power that enabled elites to both concentrate Hosta Butte phase peoples throughout the San Juan Basin and then systematically extract and redistribute goods against the parochial interests of that nonelite population. That religious persuasion may have been involved (Irwin-Williams 1977) is highly probable, but until the mechanisms of power are delineated and identified, coercion provides no more concrete a mechanism for explaining the operation of the Chacoan system than the cooperative pooling suggested by Marshall et al. (1979).

Several researchers have suggested measures of and material correlates for different levels of participation in egalitarian and ranked societies. Although a full review of background literature is inappropriate here (see Fried 1967; Peebles and Kus 1977), some preliminary observations can be based on these and similar models. Pires-Ferreira and Flannery (1976) discuss some general patterns for artifact group or commodity distributions as related to differing social structures. As mentioned in the ceramics section (Chapter 3), they postulate that egalitarian or household-based exchanges produce greater variability in sources and proportions of a commodity, while redistribution through pooling may be viewed as lowering variation in sources and proportions. Different commodities circulate at different levels in a ranked society, but only in a highly developed rank order can distinctions be made between regionally derived goods in the nonelite households and long-distance exotica in elite residences. Imbalances from trading activity are mitigated by the circulation of higher value objects as insurance ("regulators") for the continued flow of subsistence goods. Distribution centers should be recognizable because they process exotic raw materials into higher-value finished goods that then serve in a variety of roles, including status markers and items of exchange. As a hedge against shortages in subsistence goods, values banked in status objects may serve to restore balance to the system through exchange (Bronitsky 1977; Pires-Ferreira and Flannery 1976; Sahlins 1972:229-230).

Different commodity levels are evident at 1360. While locally available materials and production seem to predominate, the abundance and diversity of <u>regionally</u> derived items strongly suggests the operation of a redistributive system within the canyon at least. Inspection of chipped stone sources (Cameron 1981) and observations on 1360's pottery sources (Chapter 3; also see H. Toll 1981, 1983; Toll and McKenna 1981) indicate that the diversity of sources exceeds the probable bounds of kin-based reciprocity. The other commodity level is the manipulation of exotic or raw materials not regionally available; evidence does exist for processing of raw turquoise to finished goods. At 1360 turquoise was present mostly as scrap, but those few finished items recovered suggest production of objects for display or status value, e.g., pendant forms. Other ornaments suggest the two commodity levels: lower value items (primarily of local material) used on-site (by contextual inference), and higher value turquoise work as an product to be exported.

Although there may be hierarchical site organization, the assumption that Great Houses are _prima facie_ evidence of a highly developed ranked society may both frustrate consideration of the development of the Chacoan system and mask the presence of interstitial components not necessarily affiliated with the Great Houses. Such an interpretation would constitute an á priori presumption concerning the strength and directionality of sanction and power in the Chacoan system. Discussions of adaptation or response to stress often seem teleological, and the suggestion that the Chaco Phenomenon represents such an adaptational response does not seem supportable, given the uneven expression of cultural development in the canyon and throughout the San Juan Basin. The archaeological events that are perceived as marking the Bonito phase appeared unevenly and were apparently very short lived; such differential responses to localized and temporary situations run counter to the frequent, though inadvertent, impression of some predestined evolutionary cultural culmination.

During its occupation, 1360 seems to have been an integral component of a much larger system. This system may have been on a trajectory that led to a more developed, ranked society, but it cannot be demonstrated to have been such by the middle of the eleventh century. This study would suggest that, during the tenth and early eleventh centuries, small sites were an important, differentiated, and internally complex sphere in the economic and social operation of the canyon and the regional system. It is in the small sites, such as 1360, that the economic basis of the Chacoan Anasazi can be found. In such sites one finds evidence for daily and bulk food processing, manufacturing of utilitarian and status goods, and biological reproduction. The pace of interaction and change in small sites such as 1360 foreshadowed many developments found later in the Great Houses. The strength of Chaco's adaptation may be related more to the diversification of components at the small-site level than to the consolidation of authority by elites associated with Great Houses. Great House elites were, in fact, operating in a highly diversified community of small sites, some of which include some aspects generally assumed to indicate elite residences. The mutual involvement of both small and large sites in a common exchange and social system seems certain.

Great Houses may captivate and stimulate the imagination because of their size and complexity, but observations concerning the small-site contributions are necessary to a complete analysis and understanding of the system. Certainly the perspective from 1360 does not support the suggested existence of two separate cultural systems--imposed or evolved--as a useful explanation of Chacoan variability; rather it suggests a system that developed through time and possibly only briefly attained the level of a relatively formalized ranked society.

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Appendix 1

Appendix 1. Feature Dimensions

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
HOUSE 1						
Room 1						
Bell-shaped pit	21-26	16-10	25	Sand	5.22	Unlined
Room 2						
Bell-shaped pit	--	20 top 40 bell 30 base	32	Sand and Trash[a]	16.33	Sealed, unlined
Room 3						
Pit 1 (Cist)	--	50-48	31	----	49.70	Unlined
Room 4						
Bell-shaped pit	--	20-23 top 53 bell 27 base	41	Trash, rubble, sand	45.90	Unlined
Room 6						
Floor 1						
Firepit 1	--	45	20	Ash-charcoal	30.58	Slab-lined
Posthole 1	--	16	--	----	-----	N. post
Posthole 2	--	16	--	----	-----	N. center
Posthole 3	--	11	--	----	-----	S. center
Posthole 4	--	12	--	----	-----	E. post
Posthole 5	--	9	--	----	-----	W. post cut by pit 2

(continued)

[a]Occupational fill.

Appendix 1 (continued)

	Dimensions (Centimeters)					
Provenience/Feature	Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Floor 2						
Pit 1	--	27	15	----	8.18	S. pit, unlined
Pit 2	--	27.5	9	----	5.12	S. pit, unlined
Room 7						
Floor 1						
Firepit 1	71	73	53	Ash-charcoal	194.46 141.52[b]	Slab-lined Remodeled[b]
Storage Pit 1	69	68	23	Sand, adobe	75.41	Unlined
Pit 1	--	28 top 22 base	30	----	-----	Unlined
Floor 2						
Heating pit 1	54	45	--	----	-----	Unlined slab on E.
Floor 3						
Heating pit 2	--	20	--	----	-----	Unlined slab on E.
Posthole 1	--	15	--	----	-----	Exterior of E. wall
Room 10						
Floor 1						
Posthole 1	--	13	20	----	2.90	N. post
Posthole 2	--	15	17	----	2.40	S. post
Slot 1	18	5	6	Adobe	-----	Set into E. wall

(continued)

[b] Main chamber.

Appendix 1 (continued)

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Room 11						
Floor 1						
Firepit 1	60	55	32	Ash-charcoal[a]	70.26	Slab-lined
Heating pit 1	--	35	11	Adobe	9.33	Adobe-lined
Posthole 1	--	12	--	Lignite[a]	-----	NE. post
Posthole 2	--	12	--	Shims[a]	-----	SE. post
Posthole 3	--	12	--	Shims[a]	-----	SW. post
Posthole 4	--	12	--	Lignite[a]	-----	NW. post
Kiva A						
Floor 1						
Firepit 1	58	49	35	Ash-charcoal Trash	86.51	Slab-lined
Ashpit 1	55	38	--	Trash	36.68	Adobe-lined
Posthole 1	--	20	ca. 140	Adobe[a]	-----	NE. post
Posthole 2	--	21	ca. 140	Adobe[a]	-----	E. post
Posthole 3	--	23	ca. 140	Adobe[a]	-----	SE. post
Posthole 4	--	21	ca. 140	Adobe[a]	-----	SW. post
Posthole 5	--	23	ca. 140	Adobe[a]	-----	W. post
Sipapu	--	15	--	Trash	-----	-----

(continued)

[a]Occupation fill.

Appendix 1 (continued)

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Pithouse B						
Floor 1						
Firepit	60	50	--	Ash-charcoal[a]	-----	Slab-lined
Ashpit 1	--	50	--	Ash[a]	-----	Adobe-lined
Heating pit 1	40	25	--	----	-----	NE. of firepit 1
Storage pit 1	--	--	--	----	-----	W. wing
Storage pit 2	42	28	--	Sand	-----	E. wing
Pit 2	20	13	--	----	-----	N. wall cist[b]
Pit 3	--	15	--	----	-----	N. center cist[b]
Pit 4	--	13	--	----	-----	NE. center[b]
Pit 5	--	--	--	----	-----	See heating pit 1
Pit 6	--	13	--	----	-----	E. step cist
Pit 7	20	12	--	----	-----	W. step cist
Pit 8	20	10	--	Adobe	-----	Cist N. of firepit
Pit 9	18	10	--	----	-----	W. wall cist[b]
Posthole 1	--	18	255	Adobe[a], lignite post	-----	N. bench

(continued)

[a]Occupational fill.

[b]Main chamber.

Appendix 1 (continued)

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Pithouse B						
Floor 1 (continued)						
Posthole 2	--	15	125+	Adobe[a], lignite	-----	NE. bench
Posthole 3	--	19	--	Adobe[a]	-----	E. wing wall
Posthole 4	--	18	--	Adobe[a]	-----	W. wing wall
Posthole 5	--	18	125+	Adobe[a], lignite	-----	NW. bench
Posthole 6	--	12	--	Sand[a]	-----	Stone-lined, NE. center[b]
Wall niche 1	8	5	5	Sand[a], sherds	-----	NW. wall by Posthole 5; lined
Firepit 1	38	30	--	Ash-charcoal[a]	-----	-----
Plaza - Area 1						
Firepit 1	60	42	15	Ash-charcoal[a]	46.31	Slab-lined, sealed by plaza
Pit 1	--	30	--	----	-----	Lined, SE. retaining wall
Posthole 1	--	13	--	3 shims[a], lignite, wood	-----	SW. exterior of Room 1
Posthole 2	--	13.5	--	Lignite[a]	-----	NW. of retaining wall

(continued)

[a]Occupational fill.

[b]Main chamber.

Appendix 1 (continued)

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Plaza - Area 3						
Storage bin 1 (formerly Firepit A)	60	42	15	Adobe[a], ground stone	-----	Intentional fill, slab-lined w/reused burned stone; L-wall complex 2nd floor
Pit 1 (Basin B)	--	35-37	10	Adobe	9.07	L-wall complex 2nd floor
Pit 2 (Basin C)	--	40	11	Adobe	13.31	L-wall complex 2nd floor
Pit 3 (Basin D)	--	45	10	Adobe, 2 manos	-----	L-wall complex 2nd floor; pit 1-3 probable metate bin catchments
Pit 4 (Basin E)	32	32	6-8	Adobe, sand	7.82	L-wall complex 2nd floor; N. side pit formed by L-wall. Slab-lined base and sides. Storage or heating?
Pit 5 (Basin F)	38	32	25	Charcoal, sand	29.52	N. side of L-wall. Bisected at 15 cm depth by horizontal slab. Slab-lined base and sides
Adobe mixing	--	40-45	--	Adobe[a]	-----	-----
Plaza Area 5						
Heating pit 1	40	28	7	Trash, sand	9.39	Slabs on E. and SE.

(continued)

[a]Occupational fill.

Appendix 1 (continued)

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Ramada						
Heating pit 1	--	60x40	--	----	-----	E. most hearth
Heating pit 2	--	60x40	--	----	-----	Slab-lined on S.
Heating pit 3	--	50	--	----	-----	Slab-lined, round
Heating pit 4	--	55	--	----	-----	N. of backrow of posts
Pit 1	--	50	--	----	-----	Central pit in post-quad front of Rooms 2 and 4
Adobe mixing (Basin 1)	--	78	--	Adobe[a]	-----	Too small for functional use
Adobe mixing (Basin 2)	--	65x55	--	Adobe[a]	-----	-----
Adobe mixing (Basin 3)	--	40x25	--	Adobe[a]	-----	-----
Postholes 2,6-12	--	15	--	Lignite[a]	-----	-----
Postholes 4,26-28	--	18	--	Lignite[a]	-----	-----
Postholes 1,3,5,15, 18,20-21,23-25,29-30	--	20	--	Lignite[a]	-----	Posthole 15 has 2 shims
Posthole 14	--	21	--	Lignite[a]	-----	-----

[a]Occupational fill.

(continued)

Appendix 1 (continued)

Provenience/Feature	Dimensions (Centimeters) Length	Diameter /Width	Depth	Fill	Volume (Liters)	Comment
Ramada continued						
Posthole 31	--	22	--	Lignite[a]	-----	-----
Postholes 16-17,19, 22,32	--	25	--	Lignite[a]	-----	Postholes 16 and 17 are lignite only
Posthole 13	--	20x15	--	Lignite[a]	-----	-----
Trash Mound						
Adobe mixing basin	--	290	78	Adobe[a]	-----	Grid GX
Firepit 1	--	ca. 50	--	Ash-charcoal[a]	-----	Grid AX

[a]Occupational fill.

Appendix 2

Appendix 2, Table 1. Ceramics from House 1

	Lino Gray	Lino Fugitive Red	Plain gray	Wide neckbanded	Narrow neckbanded	Neck corrugated	Pueblo II Corrugated	Unidentified corrugated	Basketmaker III-Pueblo I mineral black-on-white	Early Red Mesa B/w	Red Mesa B/w	Puerco B/w	Gallup B/w	Exotic mineral b/w	Unidentified whiteware	Pueblo II-Pueblo III mineral black-on-white	Tunicha (Kana-a*) B/w	Burnham B/w	Newcomb B/w	Chuskan carbon b/w	Chaco-McElmo B/w	McElmo B/w	San Juan carbon b/w	Lino Smudged	Forestdale Smudged	Puerco B/r	White Mountain Redware	Sanostee R/o	Deadman's B/r	San Juan Redware	Total
ROOM 1																															
Fill	-	-	8	-	1	1	-	-	-	-	1	-	-	-	4	4	-	-	-	-	-	-	-	1	1	-	-	-	-	-	21
Floor	-	-	5	-	-	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Total	-	-	13	-	1	1	-	2	-	-	3	-	-	-	4	4	-	-	-	-	-	-	-	1	1	-	-	-	-	-	30
Percent of total	-	-	43	-	3	3	-	7	-	-	10	-	-	-	13	13	-	-	-	-	-	-	-	3	3	-	-	-	-	-	98
Bowls (54%**)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	2	-	-	-	-	-	-	-	1	1	-	-	-	-	-	7
Jars (38%)	-	-	13	-	1	1	-	2	-	-	2	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Other (8%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
ROOM 2																															
Adobe, Level 1	-	-	10	1	5	1	-	8	1	1	5	-	1	-	7	5	-	-	1	-	-	1	-	-	-	-	-	-	-	-	47
Level 2	-	-	4	1	-	1	-	-	-	1	6	-	-	-	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
Bell-shaped pit	-	-	1	-	1	-	-	-	-	2	4	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Total	-	-	15	2	6	2	-	8	1	4	15	-	1	1	10	9	-	-	1	-	-	1	-	-	-	-	-	-	-	-	78
Percent of total	-	-	20	3	8	3	-	11	1	5	20	-	1	1	13	12	-	-	1	-	-	1	-	-	-	-	-	-	-	-	100
Bowls (56%)	-	-	-	-	-	-	-	-	1	4	9	-	1	1	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24
Jars (44%)	-	-	15	2	6	2	-	8	-	-	6	-	-	-	6	5	-	-	1	-	-	1	-	-	-	-	-	-	-	-	19
ROOM 3																															
Level 1	1	-	33	6	20	4	1	1	-	2	29	-	-	-	15	9	-	-	-	-	-	-	-	-	-	-	-	-	6	-	127
Fill	-	-	5	2	6	-	-	-	-	2	6	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Floor 1	-	-	42	9	12	4	-	-	3	1	21	1	-	-	17	17	1*	-	-	-	-	1	-	-	-	1	-	2	-	1	133
Total	1	-	80	17	38	8	1	1	3	5	56	1	-	-	33	29	1*	-	-	-	-	1	-	-	-	1	-	2	6	1	285
Percent of total	<1	-	28	6	13	3	<1	<1	1	2	20	<1	-	-	12	10	<1*	-	-	-	-	<1	-	-	-	<1	-	1	2	<1	98
Bowls (37%)	-	-	-	-	-	-	-	-	2	2	18	-	-	-	11	10	-	-	-	-	-	-	-	-	-	1	-	2	6	-	52
Jars (62%)	1	-	80	17	38	8	1	1	1	3	37	1	-	-	22	19	1	-	-	-	-	1	-	-	-	-	-	-	-	1	86
Other (<1%)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
ROOM 4																															
Fill	-	-	12	1	3	-	-	1	-	-	3	-	-	-	6	4	-	-	-	-	1	1	-	-	-	-	-	-	-	-	32
Floor plaster	-	-	2	-	-	1	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Bell-shaped pit	-	-	26	-	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29
Total	-	-	40	1	4	1	-	3	-	-	5	-	-	-	6	5	-	-	-	-	1	1	-	-	-	-	-	-	-	-	67
Percent of total	-	-	60	1	6	1	-	4	-	-	7	-	-	-	9	7	-	-	-	-	1	1	-	-	-	-	-	-	-	-	97
Bowls (33%)	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Jars (61%)	-	-	40	1	4	1	-	3	-	-	1	-	-	-	4	4	-	-	-	-	1	1	-	-	-	-	-	-	-	-	11
Other (6%)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

(continued)

Appendix 2, Table 1. (continued)

	Lino Gray	Lino Fugitive Red	Plain gray	Wide neckbanded	Narrow neckbanded	Neck corrugated	Pueblo II Corrugated	Unidentified corrugated	Basketmaker III-Pueblo I mineral black-on-white	Early Red Mesa B/w	Red Mesa B/w	Puerco B/w	Gallup B/w	Exotic mineral b/w	Unidentified whiteware	Pueblo II-Pueblo III mineral black-on-white	Tunicha (Kana-a*) B/w	Burnham B/w	Newcomb B/w	Chuskan carbon b/w	Chaco-McElmo B/w	McElmo B/w	San Juan carbon b/w	Lino Smudged	Forestdale Smudged	Puerco B/r	White Mountain Redware	Sanostee R/o	Deadmans' B/r	San Juan Redware	Total
ROOM 6																															
Fill	-	-	4	-	3	-	-	-	-	-	2	-	-	-	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17
Level 2	-	-	4	5	1	-	-	-	-	-	11	-	-	-	-	5	-	1	-	-	-	-	-	-	-	-	-	-	-	-	27
Total	-	-	8	5	4	-	-	-	-	-	13	-	-	-	3	10	-	1	-	-	-	-	-	-	-	-	-	-	-	-	44
Percent of total	-	-	18	11	9	-	-	-	-	-	30	-	-	-	7	23	-	2	-	-	-	-	-	-	-	-	-	-	-	-	100
Bowls (30%)	-	-	-	-	-	-	-	-	-	-	5	-	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	8
Jars (63%)	-	-	8	5	4	-	-	-	-	-	6	-	-	-	2	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17
Other (7%)	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
ROOM 7																															
Level 1	-	-	50	2	30	3	-	3	1	1	12	-	2	-	16	20	-	-	1	-	-	-	-	-	1	-	1	-	-	1	144
Fill	-	-	23	-	6	-	-	1	3	-	15	-	2	-	29	25	-	-	-	-	-	-	-	-	1	-	-	-	-	1	106
Floor	-	-	1	-	3	-	-	-	-	1	5	1	1	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17
Firepit	-	-	3	4	1	1	-	-	-	-	7	1	-	-	2	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	22
Total	-	-	77	6	40	4	-	4	4	2	39	2	5	-	52	47	-	-	2	-	-	-	-	-	2	-	1	-	-	2	289
Percent of total	-	-	27	2	14	1	-	1	1	<1	13	<1	2	-	18	16	-	-	<1	-	-	-	-	-	<1	-	<1	-	-	<1	100
Bowls (40%)	-	-	-	-	-	-	-	-	3	2	18	-	3	-	18	15	-	-	-	-	-	-	-	-	2	-	1	-	-	1	63
Jars (59%)	-	-	77	6	40	4	-	4	1	-	20	1	2	-	35	32	-	-	2	-	-	-	-	-	-	-	-	-	-	1	94
Other (1%)	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
ROOM 9																															
Fill	-	-	17	3	-	-	1	1	1	-	1	-	-	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Floor	-	-	23	2	7	3	-	1	-	1	7	3	3	-	10	12	-	-	-	-	-	-	-	-	-	-	-	-	1	-	73
Total	-	-	40	5	7	3	1	2	1	1	8	3	3	-	12	17	-	-	-	-	-	-	-	-	-	-	-	-	1	-	104
Percent of total	-	-	38	5	7	3	1	2	1	1	8	3	3	-	12	16	-	-	-	-	-	-	-	-	-	-	-	-	1	-	101
Bowls (30%)	-	-	-	-	-	-	-	-	-	1	4	1	-	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	1	-	14
Jars (67%)	-	-	40	5	7	3	1	2	1	-	4	2	3	-	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
Other (2%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
ROOM 11																															
Level 1	-	-	25	3	8	2	-	-	-	-	8	1	7	2	15	18	3	-	-	-	-	-	-	-	1	-	-	-	3	-	96
Level 2	-	-	55	2	5	1	-	1	2	4	18	-	-	-	23	13	1	-	-	-	-	-	1	-	2	-	-	-	-	-	128
Fill	5	-	52	2	1	-	-	1	-	-	8	3	1	1	13	10	2	-	2	2	-	-	-	-	-	-	-	-	-	2	105
Floor	-	-	1	1	-	1	-	-	-	-	3	-	-	-	3	-	3*	-	-	-	-	-	-	-	-	-	-	-	-	-	12
Total	5	-	133	8	14	4	-	2	2	4	17	4	8	3	54	41	9	-	2	2	-	-	1	-	3	-	-	-	3	2	341
Percent of total	1	-	39	2	4	1	-	<1	<1	1	11	1	2	1	16	12	3	-	<1	<1	-	-	<1	-	1	-	-	-	1	1	101
Bowls (29%)	-	-	-	-	-	-	-	-	2	2	16	2	-	1	10	9	2	-	1	1	-	-	-	-	3	-	-	-	2	-	51
Jars (70%)	5	-	133	8	14	4	-	2	-	2	20	2	6	2	44	31	7	-	1	1	-	-	1	-	-	-	-	-	1	2	122
Others (1%)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
BIN 1 FILL	-	-	6	-	1	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
Bowls (25%)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Jars (75%)	-	-	6	-	1	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3

*Kana-a B/w

** Percent of forms refers only to decorated assemblage

Appendix 2, Table 2. Ceramics from Kiva A

	Lino Gray	Lino Fugitive Red	Plain gray	Wide neckbanded	Narrow neckbanded	Neck corrugated	Pueblo II corrugated	Unidentified corrugated	Basketmaker III-Pueblo I mineral black-on-white	Early Red Mesa B/w	Red Mesa B/w	Puerco-Escavada B/w	Gallup B/w	Chaco B/w	Exotic mineral b/w	Unidentified whiteware	Pueblo II-Pueblo III mineral black-on-white	Kana-a B/w	Tunicha B/w	Burnham B/w	Newcomb B/w	Toadlena B/w	Chuskan carbon b/w	Shato B/w	Tusayan carbon b/w	McElmo B/w	San Juan carbon b/w	Forestdale Smudged	Abajo R/o	Deadmans' B/r	San Juan Redware	Total
General fill	-	-	2	1	2	2	-	-	-	1	10	-	1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	1	-	-	-	29
Level 1 and Test Trench 1	1	-	659	64	296	56	4	63	21	67	760	18	6	3	17	413	538	2	10	4	23	2	11	1	-	1	3	14	-	11	6	3074
Level 2	-	5	179	7	92	14	-	8	6	29	224	3	1	-	13	102	148	-	-	-	10	-	2	-	-	-	-	11	1	4	1	860
Level 3	1	-	178	18	62	22	1	18	4	37	248	1	-	-	19	120	145	1	-	-	-	-	-	-	-	-	-	3	-	-	-	878
Level 4	-	-	137	10	68	11	-	9	-	7	156	-	-	-	1	50	75	-	1	-	2	-	1	-	1	1	1	6	-	-	4	541
Floor	-	-	-	-	-	1	1	-	2	-	8	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Ventilator fill	-	-	8	-	-	-	-	-	-	-	5	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17
Total	2	5	1163	100	520	106	6	98	33	141	1411	22	8	3	53	692	910	3	11	4	35	2	14	1	1	2	4	35	1	15	11	5412
Percent of total	<1	<1	21	2	10	2	<1	2	1	3	26	<1	<1	<1	1	13	17	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	100
Bowls (40%)*	-	-	-	-	-	-	-	-	28	84	598	8	5	-	30	249	270	1	3	1	23	1	9	1	-	1	3	35	1	13	6	1370
Jars (57%)	2	5	1163	100	520	106	6	98	4	53	770	13	3	3	23	433	615	2	8	3	11	1	5	-	1	1	1	-	-	1	5	1956
Other (3%)	-	-	-	-	-	-	-	-	1	4	43	1	-	-	-	10	25	-	-	-	1	-	-	-	-	-	-	-	-	1	-	86

* Percent of forms refers only to decorated assemblage

Appendix 2, Table 3. Ceramics from Pithouse B and Pit Structure C

	Lino Gray	Lino Fugitive Red	Plain gray	Wide neckbanded	Narrow neckbanded	Neck corrugated	Pueblo II corrugated	Unidentified corrugated	Basketmaker III-Pueblo I mineral black-on-white	Early Red Mesa B/w	Red Mesa B/w	Puerco-Escavada B/w	Gallup B/w	Chaco B/w	Exotic mineral b/w	Unidentified whiteware	Pueblo II-Pueblo III mineral black-on-white	Lino B/g	Kana-a B/w	Burnham B/w	Newcomb B/w	Chuskan carbon b/w	Chaco-McElmo B/w	McElmo B/w	San Juan carbon b/w	Little Colorado unidentified	Forestdale Smudged	Deadmans' B/r	San Juan Redware	Total
PITHOUSE B																														
Level 1																														
Test Trench 1	-	-	11	2	7	-	1	12	-	-	4	3	-	-	-	7	5	-	-	-	-	-	-	1	-	-	-	-	-	53
Overburden	-	-	177	10	99	7	7	85	5	13	93	8	10	1	6	111	84	-	1	2	-	3	1	-	-	-	-	1	-	724
Level 2	-	-	120	4	79	12	3	55	8	17	55	6	14	1	2	49	71	1	-	1	1	1	-	-	1	1	-	2	1	505
Level 3	-	-	3	1	1	2	1	1	-	2	7	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	4	-	-	26
Wing wall fill	-	-	7	-	3	2	-	1	-	1	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	23
General fill	-	-	14	1	6	2	-	3	-	-	5	-	-	-	-	6	6	-	-	-	2	-	-	-	-	-	-	-	-	45
Subtotal																														1376
Floors																														
Wing wall	-	-	20	-	6	4	2	37	-	3	12	3	1	-	-	5	7	-	-	-	-	-	-	-	-	-	-	-	-	100
Bench	1	-	53	3	22	5	1	23	2	5	52	-	4	-	1	16	22	-	-	-	-	-	-	-	-	-	-	-	1	211
Main chamber	-	-	11	-	4	-	-	38	-	-	7	1	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	67
Firepit	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Storage Cist 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Subtotal																														380
Fill, Floor 2	-	-	20	3	4	-	-	4	-	-	10	-	2	-	-	6	4	-	-	-	-	-	-	-	-	-	-	-	-	53
Total	1	-	436	24	231	34	15	266	15	41	246	21	32	2	9	205	206	1	1	3	3	4	1	1	1	1	4	3	2	1809
Percent of total	<1	-	24	1	13	2	1	15	1	2	14	1	2	<1	<1	11	11	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	98
Bowls (39%)*	-	-	-	-	-	-	-	-	14	25	98	2	11	1	6	60	73	-	1	2	2	3	1	1	1	-	4	2	2	309
Jars (59%)	1	-	436	24	231	34	15	266	1	16	137	19	21	1	3	142	127	1	-	1	1	1	-	-	-	1	-	1	-	473
Other (2%)	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	3	6	-	-	-	-	-	-	-	-	-	-	-	-	20
PIT STRUCTURE C																														
Level 1	-	1	37	2	4	-	-	-	2	4	13	-	-	-	-	7	6	-	-	-	-	-	-	-	-	-	-	-	-	76
Level 2	-	-	7	1	1	-	-	-	-	2	7	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	1	24
Total	-	1	44	3	5	-	-	-	2	6	20	-	-	-	-	9	9	-	-	-	-	-	-	-	-	-	-	-	1	100
Bowls (34%)	-	-	-	-	-	-	-	-	-	1	7	-	-	-	-	5	2	-	-	-	-	-	-	-	-	-	-	-	1	16
Jars (62%)	-	1	44	3	5	-	-	-	2	5	12	-	-	-	-	4	6	-	-	-	-	-	-	-	-	-	-	-	-	29
Other (4%)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2

* Percent of forms refers only to decorated assemblage

Appendix 2, Table 4. Ceramics from Plaza Areas, the Ramada, and House 2

	Lino Gray	Plain gray	Wide neckbanded	Narrow neckbanded	Neck corrugated	Pueblo II corrugated	Unidentified corrugated	Basketmaker III-Pueblo mineral black-on-white	Early Red Mesa B/w	Red Mesa B/w	Puerco B/w	Gallup B/w	Exotic mineral b/w	Unidentified whiteware	Pueblo II-Pueblo III mineral black-on-white	Lino B/g	Tunicha B/w	Newcomb B/w	Toadlena B/w	Chuska B/w	Chuskan carbon b/w	Chaco-McElmo B/w	McElmo B/w	Mesa Verde B/w	San Juan carbon b/w	Tusayan carbon b/w	Little Colorado carbon	Forestdale Smudged	Puerco B/r	Sanostee R/o	Deadmans' B/r	San Juan Redware	Total
HOUSE 1 PLAZA AREA (n=118)																																	
Overburden	-	26	-	8	1	2	8	-	11	9	2	2	1	11	11	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	83
Test Trench 1	-	7	1	-	-	-	19	-	-	2	-	1	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35
PLAZA AREA 2 (n=329)																																	
Overburden	-	68	1	33	5	1	20	2	3	45	-	6	-	53	47	-	2	-	1	-	-	-	-	-	-	-	-	1	-	1	1	1	291
Fill	-	7	1	7	-	-	-	-	-	9	-	1	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38
PLAZA AREA 3 (n=562)																																	
Level 1	-	5	-	3	1	-	1	-	-	4	-	-	-	5	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26
Fill	1	164	6	85	8	-	31	2	10	55	3	11	2	71	86	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	536
PLAZA AREA 4 (n=27)																																	
Fill	-	7	-	6	-	-	3	1	1	5	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27
PLAZA AREA 5 (n = 509)																																	
Level 1	-	22	-	10	-	1	4	1	1	22	-	3	-	12	12	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	89
Fill	-	82	4	24	6	4	29	3	11	53	-	6	2	30	43	-	1	-	-	2	-	-	-	-	-	1	-	1	-	-	3	-	302
Floor	-	21	1	9	4	3	46	-	2	9	3	3	-	6	4	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	116
Cist	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Total, Plaza Areas	1	409	14	185	25	11	161	9	29	214	9	33	6	198	220	1	4	-	1	3	2	-	1	-	-	1	-	2	-	1	4	1	1545
Percent of total	<1	26	1	12	2	1	10	1	2	14	1	2	<1	13	14	<1	<1	-	<1	<1	<1	-	<1	-	-	<1	-	<1	-	<1	<1	<1	99
Bowls (39%)*	-	-	-	-	-	-	-	8	18	84	2	19	3	63	77	1	-	-	-	3	2	-	-	-	-	-	-	2	-	1	4	1	288
Jars (60%)	1	409	14	185	25	11	161	1	11	128	7	14	2	134	138	-	4	-	1	-	-	-	1	-	-	1	-	-	-	-	-	-	442
Other (1%)	-	-	-	-	-	-	-	-	-	2	-	-	1	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
HOUSE 2																																	
Overburden	-	75	5	24	2	-	7	1	3	18	3	4	1	22	29	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	197
Test Trench 1	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Total, House 2	-	75	6	25	2	-	8	1	3	18	3	4	1	22	29	-	1	2	-	-	-	-	-	1	-	-	-	-	-	-	-	1	202
Percent of total	-	37	3	12	1	-	4	<1	1	9	1	2	<1	11	14	-	<1	1	-	-	-	-	-	<1	-	-	-	-	-	-	-	<1	96
Bowls (29%)*	-	-	-	-	-	-	-	1	1	4	-	-	-	9	7	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	24
Jars (69%)	-	75	6	25	2	-	8	-	2	14	3	4	1	12	21	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	58
Other (2%)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
RAMADA (Area 1)																																	
Level 1 Overburden	1	117	-	70	-	3	54	2	8	35	2	1	-	60	91	-	1	-	-	-	-	2	-	-	-	-	1	-	1	-	1	-	458
Level 2	-	58	7	61	2	5	57	-	12	37	1	9	1	42	30	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	324
Ventilator X	-	11	-	2	1	-	6	-	-	7	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	30
Feature B	-	11	-	1	10	-	3	-	1	2	-	1	-	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41
Firepit 1	-	3	1	-	-	1	12	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
Total, Ramada	1	200	8	134	13	9	132	2	21	81	3	11	1	123	125	-	1	-	-	-	1	2	-	-	1	-	1	1	1	-	1	-	873
Percent of total	<1	23	1	15	1	1	15	<1	2	9	<1	1	<1	14	14	-	<1	-	-	-	<1	<1	-	-	<1	-	<1	<1	<1	-	<1	-	96
Bowls (38%)	-	-	-	-	-	-	-	2	11	26	-	4	-	39	54	-	-	-	-	-	-	2	-	-	1	-	1	1	1	-	1	-	143
Jars (60%)	1	200	8	134	13	9	132	-	9	53	3	7	1	83	69	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	227
Others (2%)	-	-	-	-	-	-	-	-	1	2	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6

* Percent of forms refers only to decorated assemblage

Appendix 2, Table 5. Ceramics from the trash mound

	Lino Gray	Lino Fugitive Red	Plain gray	Wide neckbanded	Narrow neckbanded	Neck corrugated	Pueblo II corrugated	Unidentified corrugated	Basketmaker III-Pueblo I mineral black-on-white	Early Red Mesa B/w	Red Mesa B/w	Puerco B/w	Gallup B/w	Exotic mineral black-on-white	Unidentified whiteware	Pueblo II-Pueblo III mineral black-on-white	Lino B/g	Tunicha (Kana-a*) B/w	Newcomb B/w	Toadlena B/w	Chuskan carbon b/w	San Juan carbon b/w	Forestdale (Lino**) Smudged	Abajo R/o	Deadmans' B/r	San Juan Redware	Total
TEST TRENCH 1																											
Grid AX fill	2	-	42	3	28	6	-	10	1	2	21	-	-	-	28	35	-	-	1	-	1	1	-	-	-	-	181
Grid BX fill	2	-	56	12	48	10	1	7	2	1	29	-	-	5	45	31	-	1	1	-	1	-	1	-	-	-	253
Grid CX fill	-	-	68	9	21	5	-	3	6	2	18	-	-	2	31	18	-	-	-	-	1	-	-	-	1	-	185
Grid DX fill	-	2	98	4	13	1	-	-	14	2	29	-	-	1	39	13	1	-	-	-	-	-	-	-	-	-	217
Grid EX (n=99)																											
Level 1	1	1	35	-	-	-	-	1	4	-	8	-	-	2	2	7	-	1	-	-	1	-	1	-	-	1	65
Level 2	1	1	18	2	1	-	-	-	5	2	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	34
Grid FX (n=123)																											
Level 1	4	9	33	-	3	-	-	1	5	-	1	-	-	-	5	3	-	-	-	-	-	-	3	1	-	-	68
Level 2	1	4	37	-	-	-	-	-	6	-	-	-	-	-	4	-	-	1*	-	2	-	-	-	-	-	-	55
Grid GX (adobe basin)	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Grid HX fill	16	8	131	-	6	-	-	2	10	-	3	-	1	-	7	12	1	-	-	-	-	-	1**	-	-	-	198
Grid IX fill	1	1	14	2	11	-	-	1	3	1	3	-	-	1	9	5	1	-	-	-	-	-	1	-	-	-	54
Grid I (n=109)																											
Level 1	7	2	40	-	4	-	-	3	5	-	1	-	-	-	8	5	-	-	-	-	-	-	-	-	-	-	75
Level 2	-	-	15	-	-	-	-	-	4	-	2	-	-	-	2	6	-	-	-	-	-	-	1	-	-	-	30
Level 3	-	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Test Trench 1 (n=66)																											
Level 1	-	1	11	-	2	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	17
Fill	1	2	17	-	4	-	-	-	7	-	1	1	1	-	9	5	-	-	-	-	-	-	1	-	-	-	49
Retaining Wall	3	-	33	7	14	-	-	3	8	4	5	-	1	1	18	11	-	-	-	-	-	-	1	-	-	-	109
Feature I	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Total	39	32	655	39	155	22	1	31	86	14	123	1	3	12	208	155	3	3	2	2	4	1	10	1	1	1	1604
Percent of total	2	2	41	2	10	1	<1	2	5	1	8	<1	<1	1	13	10	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	99
Bowls (37%)***	-	-	-	-	-	-	-	-	58	8	42	-	1	6	51	49	2	2	2	-	1	-	10	1	-	1	234
Jars (62%)	39	32	655	39	155	22	1	31	27	6	79	1	2	6	156	106	1	1	-	2	3	1	-	-	1	-	392
Other (<1%)	-	-	-	-	-	-	-	-	1	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	4

* Kana'a Black-on-white; ** Lino Black-on-gray; *** Percent of forms refers only to decorated assemblage

Appendix 2, Table 6. Description of 29SJ1360 BMIII-PI mineral-on-white ceramics

A. SURFACE TREATMENT

1. Decoration[a]

Code	Designs	Most Common Motif* 1st	2nd	3rd	n	%
---	Isolated single elements	-	1	-	1	0.8
002	Hooks, flags	2	-	-	2	1.5
003	Nested isolates	-	1	-	1	0.8
010	Parallel lines	10	2	-	12	9.2
011	Cribbed parallel lines	1	-	-	1	0.8
013	Pendant parallel lines	1	-	-	1	0.8
014	Framers w/unticked solids	18	1	-	19	14.5
015	Framers w/ticked solids	1	-	-	1	0.8
017	Ticking	1	3	2	6	4.6
018	Corner triangles	1	7	1	9	6.9
020	Scrolls	6	1	-	7	5.3
---	Framed slashes	-	-	1	1	0.8
022	Dots	-	1	-	1	0.8
024	Framing dots	-	1	1	2	1.5
026	Dotted lines	3	2	1	6	4.6
032	Checkerboard	3	1	-	4	3.1
034	Sawteeth	6	1	1	8	6.1
035	Barbs	2	3	-	5	3.8
038	Heavy dotted lines	1	-	-	1	0.8
---	Solid band design	1	-	-	1	0.8
042	Isolated triangles	1	-	-	1	0.8
---	General solids	4	1	1	6	4.6
050	Hatchure A-1	9	2	-	11	8.4
054	Hatchure B-2	1	-	-	1	0.8
070	Squiggle lines	3	2	1	6	4.6
072	Anthro- and zoomorphs	1	-	-	1	0.8
073	Solid ticked triangles	1	2	-	3	2.3
081	Ext. bowl motif	-	-	1	1	0.8
082	Jar neck motif	1	-	-	1	0.8
085	Narrow Sosi style	3	-	-	3	2.3
086	Narrow curvilinear lines	1	-	-	1	0.8
---	Plain, whiteware paste	1	-	-	1	0.8
---	Polished plain	6	-	-	6	4.2
	N	89	32	10	131	100.3
	n w/ 1st, 2nd, 3rd most common designs	57	22	10	89	
	% w/ 1st, 2nd, 3rd most common designs	64.0	24.7	11.2		99.9

Type Design Diversity H' = 3.052
s = 33 J = 0.873
Design Distribution Diversity H' = 0.876
s = 3 J = 0.800

[a]See key at end of Table

* Refers to the most prevalent motif on each sherd; see p. 143

Appendix 2, Table 6 (continued)

2. Paint

Paint	n	%	Rim Decoration	n	%
Unpainted	7	7.6	Unpainted	29	31.5
Mineral: red	11	12.0	Solid line	50	54.3
Mineral: brown	36	39.1	Use-ground	3	3.3
Mineral: black	37	40.2	Unknown	10	10.9
Glaze	1	1.1	n	92	100.0
n	92	100.0			

3. Polish

	Open Forms		Closed Forms		Total	
Polish	n	%	n	%	N	%
Unknown	2	2.5	-	----	2	2.2
None	22	27.2	7	63.6	29	31.5
One side						
Streaky	1	1.2	2	18.2	3	3.3
Moderate	15	18.5	-	----	15	16.3
Total	11	13.6	2	18.2	13	14.1
Both sides						
Streaky	2	2.5	-	----	2	2.2
Moderate	7	8.6	-	----	7	7.6
Total	14	17.3	-	----	14	15.2
Differential	7	8.6	-	----	7	7.6
n	81	88.0	11	12.0	92	100.0

4. Slip

	Open Forms		Closed Forms		Total	
Slip	n	%	n	%	N	%
Absent	53	65.4	9	81.8	62	67.4
Interior	6	7.4	-	----	6	6.5
Exterior	--	----	2	18.2	2	2.2
Slip-slop	--	----	-	----	--	----
Both sides	18	22.2	-	----	18	19.6
Unknown	4	4.9	-	----	4	4.3
n	81	88.0	11	12.0	92	100.0

5. Form

			Orifice Diameter (mm)				
Form	n	%	n	Range	$\bar{x}$	s.d.	cv
Bowl	78	84.8	69	65-350	169.1	53.792	31.8
Ladle	3	3.3	3	110-170	136.7	30.551	22.4
Tecomate	1	1.1	1	130	-----	------	----
Duckpot	1	1.1	--	--------	-----	------	----
Jar	9	9.8	4	45-150	95.0	46.726	49.2
N	92	99.9					

Diversity of Forms

H' = 0.577 s = 5 J = 0.459

6. Handles: None recorded

$\bar{x}$ = mean, s.d. = standard deviation, cv = coefficient of variation, s = number of forms.

Appendix 2, Table 6 (continued)

B. PASTE

1. Temper Composition

Temper Composition	n	%
Undifferentiated sandstone	70	77.8
Pink chalcedonic sandstone	2	2.2
White chalcedonic standstone	5	5.6
Sandstone w/ rounded iron	2	2.2
Magnetitic sandstone	3	3.3
San Juan igneous w/hornblende + sandstone	4	4.4
San Juan igneous w/out hornblende + sandstone	1	1.1
Sandstone + San Juan igneous w/out hornblende	3	3.3
Total	90	99.9

2. Texture Attributes

Grain Size	n	%	Density	n	%	Sherd Temper	n	%
Fine	15	16.7	1-2%	3	3.3	None	61	67.8
Medium	35	38.9	5%	29	32.2	0-50%	12	13.3
Coarse	24	26.7	10%	38	42.2	50%+	17	18.9
Very coarse	16	17.7	20%	18	20.0	Total	90	100.0
Total	90	100.0	30%	1	1.1			
			40% +	1	1.1			
			Total	90	99.9			

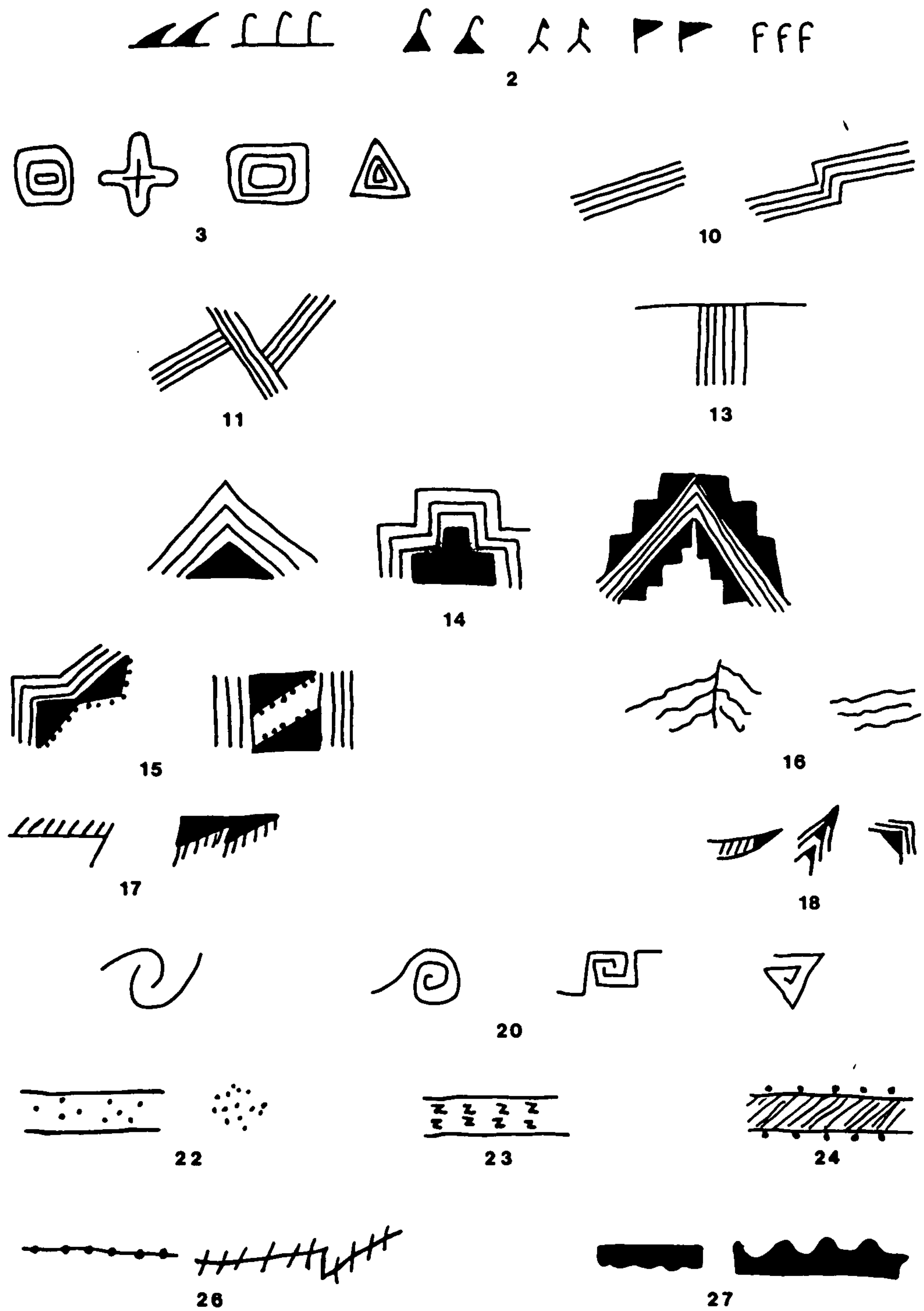
Grain Size	n[c]	%	Texture Index	n	%
Fine	11	15.5	Very fine (0-2)	14	15.6
Medium	26	37.1	Fine (2.1-4)	14	15.6
Coarse	20	28.6	Fine-Medium (4.1-7)	12	13.3
Very coarse	13	18.6	Medium (7.1-10)	11	12.2
Total	70	100.0	Medium-Coarse (10.1-13)	14	15.6
			Coarse (13.1-16)	11	12.2
			Very coarse (16.1+)	14	15.6
			Total	90	100.1

3. Clay Attributes

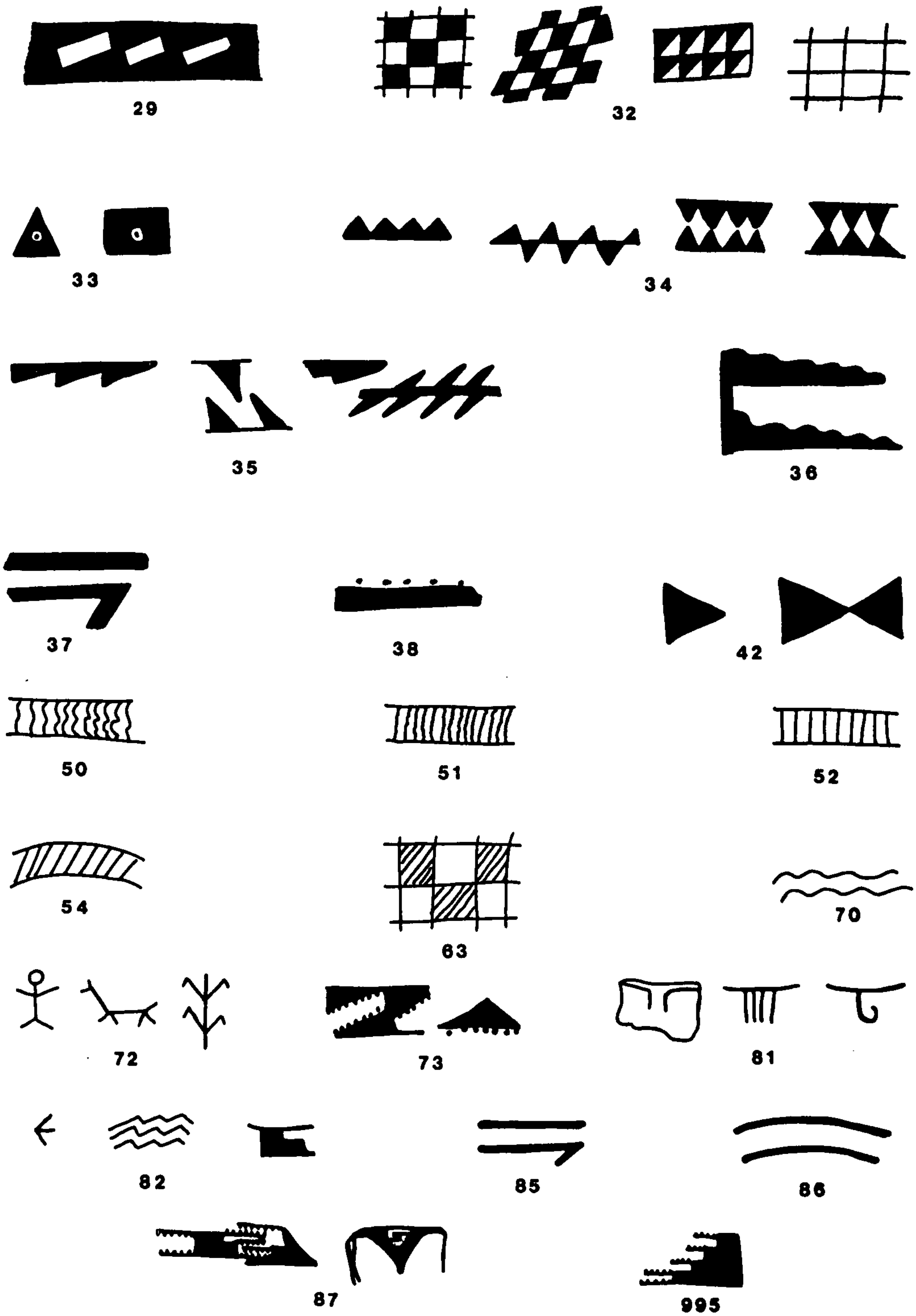
Clay-Temper Types	n	%	Vitrification	n	%
No type assigned	38	42.2	Absent	32	35.6
Black clay, white sherd	6	6.7	Present	55	61.1
Gray clay, black sherd	1	1.1	Marked	3	3.3
Black and white sherd	2	2.2	Total	90	100.0
Chuska gray, homogeneous	1	1.1			
Gray clay, white sherd	13	14.4			
Tan to brown clay	7	7.8			
Black	3	3.3			
White	19	21.1			
Total	90	99.9			

[c] Undifferentiated sandstone only

Appendix 2, Table 6 (continued)



Appendix 2, Table 6 (continued)



Appendix 2, Table 7. Description of 29SJ1360 Early Red Mesa Black-on-white ceramics

A. SURFACE TREATMENT

1. Decoration [a]

Code	Designs	Most Common Motif 1st	2nd	3rd	N	%
010	Parallel lines	23	5	1	29	16.7
011	Cribbed parallel lines	3	1	-	4	2.3
013	Pendant parallel lines	5	2	-	7	4.0
014	Framers w/unticked solids	16	-	-	16	9.2
015	Framers w/ticked solids	30	4	-	34	19.5
017	Ticking	--	-	1	1	0.6
018	Corner triangles	--	1	3	4	2.3
020	Scrolls	2	3	2	7	4.0
022	Dots	1	-	2	3	1.7
026	Dotted lines	3	5	-	8	4.6
034	Sawteeth	4	4	-	8	4.6
037	Wide Sosi style	1	-	-	1	0.6
---	Solid band design	3	2	-	5	2.9
---	Banded hachured motif	1	-	-	1	0.6
---	General solids	1	4	-	5	2.9
050	Hatchure A-1	8	6	-	14	8.0
052	Hatchure A-2	--	1	-	1	0.6
070	Squiggle lines	5	-	-	5	2.9
073	Solid ticked triangles	2	5	2	9	5.2
081	Ext. bowl motif	-	2	-	2	1.1
085	Narrow Sosi style	5	-	1	6	3.4
087	Interlocked ticking	3	-	-	3	1.7
995	Others, solid	-	1	-	1	0.6
	N	116	46	12	174	100.0
	n w/ 1st, 2nd, 3rd most common designs	70	34	12	116	
	% w/ 1st, 2nd, 3rd most common designs	60.3	29.3	10.3		99.9

Type Design Diversity H' = 2.670[b]
s = 23 J = 0.852
Design Distribution Diversity H' = 0.899
s = 3 J = 0.818

[a]See key at end of Appendix 2, Table 6

[b]Shannon-Weaver Indices: Diversity=H', Evenness=J, Number of Motifs=s

Appendix 2, Table 7 (continued)

2. Paint

Paint	n	%	Rim Decoration	n	%
Mineral: red	3	2.6	Unpainted	10	8.6
Mineral: brown	36	31.0	Solid line	74	63.8
Mineral: black	76	65.5	Eroded, solid	6	5.2
Mineral: green	1	0.9	Use-ground	6	5.2
n	116	100.0	Unknown	20	17.2
			n	116	100.0

3. Polish

	Open Forms		Closed Forms		Total	
Polish	n	%	n	%	N	%
Unknown	4	4.3	-	---	4	3.4
None	1	1.1	1	4.3	2	1.7
One side						
Streaky	2	2.1	2	8.7	4	3.4
Moderate	7	7.5	-	---	7	6.0
Total	26	28.0	20	87.0	46	39.7
Both sides						
Streaky	-	---	-	---	-	---
Moderate	1	1.1	-	---	1	0.9
Total	30	32.3	-	---	30	25.9
Differential	22	23.7	-	---	22	19.0
n	93	80.2	23	19.8	116	100.0

4. Slip

	Open Forms		Closed Forms		Total	
Slip	n	%	n	%	N	%
Absent	9	9.7	3	13.0	12	10.3
Interior	22	23.7	-	----	22	19.0
Exterior	-	----	17	73.9	17	14.7
Slip-slop	1	1.1	3	13.0	4	3.4
Both sides	52	55.9	-	----	52	44.8
Unknown	9	9.7	-	----	9	7.8
n	93	80.2	23	19.8	116	100.0

5. Form

			Orifice Diameter (mm)				
Form	n	%	n	Range	$\bar{x}$	s.d.	cv
Bowl	85	73.3	72	80-280	187.9	49.545	26.4
Ladle	8	6.9	6	65-115	95.0	19.235	20.2
Pitcher	4	3.4	2	65-705	67.5	------	----
Olla	3	2.6	2	75-80	77.5	------	----
Duckpot	1	0.9	1	50	----	------	----
Jar	15	12.9	4	50-105	73.8	24.281	32.9
N	116	100.0					

Diversity of Forms

H' = 0.928 s = 6 J = 0.518

(continued)

Appendix 2, Table 7 (continued)

6. Handles

Handles	n	%
Multiple coil	1	11.1
Strap	3	33.3
Trough	3	33.3
Effigy	1	11.1
Perf. tit lug	1	11.1
n	9	99.9

Handles:Items = 1:18
(excluding ladles from forms and handles)

B. PASTE

1. Temper Composition

Temper	n	% of Total
Undifferentiated sandstone	69	65.1
Pink chalcedonic sandstone	1	0.9
White chalcedonic sandstone	12	11.3
Trachyte only	1	0.9
Trachyte w/sandstone	6	5.7
San Juan igneous w/hornblende + sandstone	2	1.9
San Juan igneous w/out hornblende	1	0.9
San Juan igneous w/out hornblende w/sandstone	6	5.7
Unidentified igneous + sandstone	8	7.5
Total	106	99.9

2. Texture Attributes

Grain Size	n	%	Density	n	%	Sherd Temper	n	%
Fine	37	34.9	1-2%	2	1.9	None	39	37.1
Medium	59	55.7	5%	31	29.2	0-50%	29	27.6
Coarse	8	7.5	10%	46	43.4	50%+	37	35.2
Very Coarse	2	1.9	20%	24	22.6	Total	106	99.9
Total	106	100.0	30%+	3	2.8			
			Total	106	99.9			

Grain Size	n[c]	%	Texture Index	n	%
Fine	25	36.2	Very fine (0-2)	29	27.4
Medium	38	55.1	Fine (2.1-4)	32	30.2
Coarse	5	7.5	Fine-Medium (4.1-7)	29	27.4
Very Coarse	1	1.5	Medium (7.1-10)	14	13.2
Total	69	100.0	Medium-Coarse (10.1-13)	1	0.9
			Coarse (13.1-16)	1	0.9
				106	100.0

$\bar{x}$ = mean, s.d. = standard deviation, cv = coefficient of variation, s = number of forms

[c] Undifferentiated sandstone only

Appendix 2, Table 7 (continued)

3. Clay Attributes

Clay-Temper Types	n	%	Vitrification	n	%
No type assigned	35	33.0	Absent	14	13.3
Black clay, white sherd	10	9.4	Present	75	71.4
Gray clay, black sherd	4	3.8	Marked	16	15.2
Black and white sherd	7	6.6	Total	105	99.9
Chuska gray, homogeneous	3	2.8			
Gray clay, white sherd	28	26.4			
Tan to brown clay	4	3.8			
Black	3	2.8			
White	12	11.3			
Total	106	99.9			

Appendix 2, Table 8. Description of 29SJ1360 Red Mesa Black-on-white

A. SURFACE TREATMENT

1. Decoration[a]

Code	Designs	Most Common Motif 1st	2nd	3rd	N	%
002	Hooks, flags	--	2	--	2	0.2
003	Nested isolates	3	4	--	7	0.6
010	Parallel lines	37	23	8	68	6.2
011	Cribbed parallel lines	10	--	--	10	0.9
013	Pendant parallel lines	20	14	1	35	3.2
014	Framers w/unticked solids	12	1	--	13	1.2
015	Framers w/ticked solids	32	1	1	34	3.1
017	Ticking	--	1	--	1	0.1
018	Corner triangles	1	7	3	11	1.0
020	Scrolls	21	92	18	131	11.9
022	Dots	--	1	--	1	0.1
023	Other framed isolates	1	--	--	1	0.1
024	Framing dots	--	4	2	6	0.5
026	Dotted lines	9	23	6	38	3.5
027	Thick wavy lines	--	1	1	2	0.2
029	Parallelograms	1	--	--	1	0.1
032	Checkerboard	58	4	--	62	5.6
033	Eyed solids	1	4	--	5	0.5
034	Sawteeth	27	13	8	48	4.4
035	Barbs	4	2	2	8	0.7
036	Elongated scallop triangles	2	3	--	5	0.5
037	Wide Sosi style	--	--	2	2	0.2
038	Heavy dotted lines	1	2	1	4	0.4
---	Solid band design	253	4	3	260	23.6
---	Banded hachured motif	1	1	--	2	0.2
042	Isolated triangles	1	--	1	2	0.2
---	General solids	13	15	4	32	2.9
050	Hatchure A-1	63	4	1	68	6.2
052	Hatchure A-2	2	--	--	2	0.2
051	Hatchure B/C	6	--	--	6	0.5
063	Hatched checkerboard	2	1	--	3	0.3
070	Squiggle lines	26	15	9	50	4.5
073	Solid ticked triangles	100	27	3	130	11.8
081	Ext. bowl motif	2	7	1	10	0.9
082	Jar neck motif	1	2	--	3	0.3
085	Narrow Sosi style	4	1	--	5	0.5
087	Interlocked ticking	10	14	3	27	2.5
995	Others, solid	--	--	2	2	0.2
---	Others, hachured	--	1	--	1	0.1
---	Narrow banded	--	1	--	1	0.1
---	Wide banded	1	--	--	1	0.1
	N	725	295	80	1100	100.3
	n w/ 1st, 2nd, 3rd most common designs	430	215	80	725	----
	% w/ 1st, 2nd, 3rd most common designs	59.3	29.7	11.0		100.0

Type Design Diversity H' = 2.717 s = 41 J = 0.732
Design Distribution Diversity H' = 0.914 s = 3 J = 0.832

[a]See key at end of Appendix 2, Table 6

Appendix 2, Table 8 (continued)

2. Paint

Paint	n	%	Rim Decoration	n	%
Mineral: red	4	0.6	Unpainted	45	6.2
Mineral: brown	139	19.1	Solid line	468	64.5
Mineral: black	565	77.8	Dotted	2	0.3
Mineral: green	4	0.6	Eroded, solid	12	1.7
Carbon	1	0.1	Use-ground	35	4.8
Glaze	11	1.5	Unknown	164	22.6
Unknown	2	0.3	n	726	100.1
n	726	100.0			

3. Polish

	Open Forms		Closed Forms		Total	
Polish	n	%	n	%	N	%
Unknown	26	4.8	13	6.9	39	5.4
None	15	2.8	3	1.6	18	2.5
One side						
Streaky	6	1.1	4	2.1	10	1.4
Moderate	26	4.8	13	6.9	39	5.4
Total	180	33.5	153	81.4	333	45.9
Both sides						
Streaky	3	0.6	--	---	3	0.4
Moderate	15	2.8	--	---	15	2.1
Total	108	20.1	2	1.1	110	15.1
Differential	159	29.6	--	---	159	21.9
n	538	74.1	188	25.9	726	100.1

4. Slip

	Open Forms		Closed Forms		Total	
Slip	n	%	n	%	N	%
Absent	40	7.4	12	6.4	52	7.2
Interior	94	17.5	--	---	94	12.9
Exterior	--	---	152	80.9	152	20.9
Slip-slop	23	4.3	17	9.0	40	5.5
Both sides	359	66.7	2	1.1	361	49.7
Unknown	22	4.1	5	2.7	27	3.7
n	538	74.1	188	25.9	726	99.9

(continued)

Appendix 2, Table 8 (continued)

5. Form

Form	n	%	n Measured	Orifice Diameter (mm) Range	$\bar{x}$	s.d.	cv
Bowl	454	62.5	368	60-350	190.1	49.601	26.1
Ladle	84	11.6	31	45-200	119.0	39.124	32.9
Canteen	5	0.7	4	25-35	31.3	4.787	15.3
Duckpot	1	0.1	--	-----	-----	------	----
Effigy	3	0.4	2	20-60	40.0	------	----
Miniature	5	0.7	3	25-35	30.0	5.000	16.7
Pitcher	22	3.0	18	40-115	69.2	19.945	28.8
Seed jar	5	0.7	5	60-110	84.0	24.083	28.7
Tecomate	2	0.3	2	100-120	110.0	------	----
Gourd jar	4	0.6	2	25-35	30.0	------	----
Olla	25	3.4	13	70-115	83.8	12.609	15.0
Jar	113	15.6	20	40-125	75.3	22.681	30.1
Unknown	3	0.4					
	726	99.9					

Diversity of Forms H' = 1.235
s = 12 J = 0.497

6. Handles

Handles	n	%
Solid coil	1	1.4
Strap	13	17.8
Tubular	1	1.4
Trough	51	69.9
Tit lug	1	1.4
Dual tits	1	1.4
Strap lug	3	4.1
Cupule lug	1	1.4
Perf. tit lug	1	1.4
n	73	100.2

Handles:Items = 1:29
(excluding ladles from forms and handles)

$\bar{x}$ = mean
s.d. = standard deviation
cv = coefficient of variation
s = number of forms

Appendix 2, Table 8 (continued)

B. PASTE

1. Temper Composition

Temper	n	%
Undifferentiated sandstone	389	65.1
Pink chalcedonic sandstone	21	3.5
White chalcedonic sandstone	101	16.9
Magnetitic sandstone	3	0.5
Trachyte only	3	0.5
Trachyte w/sandstone	17	2.8
San Juan igneous w/hornblende	2	0.3
San Juan igneous w/hornblende + sandstone	1	0.2
San Juan igneous w/out hornblende	4	0.7
San Juan igneous w/out hornblende w/sandstone	31	5.2
Gray andesite with sandstone	1	0.2
Unidentified igneous	3	0.5
Unidentified igneous w/sandstone	22	3.5
Total	598	100.1

2. Texture Attributes

Grain Size	n	%	Density	n	%	Sherd Temper	n	%
Fine	192	32.1	1-2%	17	2.8	None	184	30.8
Medium	369	61.7	5%	143	23.9	0-50%	158	26.5
Coarse	36	6.0	10%	285	47.7	50%+	255	42.7
Very Coarse	1	0.2	20%	148	24.7	Total	597	100.0
Total	598	100.0	30%+	5	0.8			
			Total	598	99.9			

Grain Size	n[b]	%	Texture Index	n	%
Fine	135	34.7	Very fine (0-2)	177	29.6
Medium	225	57.8	Fine (2.1-4)	222	37.1
Coarse	29	7.5	Fine-Medium (4.1-7)	109	18.2
Total	389	100.0	Medium (7.1-10)	54	9.0
			Medium-Coarse (10.1-13)	28	4.7
			Coarse (13.1-16)	7	1.2
			Very Coarse (16.1+)	1	0.2
			Total	598	100.0

(continued)

[b] Undifferentiated sandstone only

Appendix 2, Table 8 (continued)

3. Clay Attributes

Clay-Temper Types	n	%	Vitrification	n	%
No type assigned	138	23.1	Absent	80	13.4
Black clay, white sherd	50	8.4	Present	425	71.1
Gray clay, black sherd	17	2.8	Marked	93	15.6
Black and white sherd	35	5.9	Total	598	100.1
Little Colorado paste	1	0.2			
Chuska gray, homogeneous	11	1.8			
Gray clay, white sherd	244	40.8			
Tan to brown clay	21	3.5			
Black	8	1.3			
White	73	12.2			
Total	598	100.0			

Appendix 2, Table 9. Description of 29SJ1360 Wide Neckbanded

A. SURFACE ATTRIBUTES

1. Decoration

Designs	Most Common Motif 1st	2nd	n	%
Undifferentiated neckbanding	9	-	9	11.0
Narrow neckbanding 2-5 mm	2	-	2	2.4
Wide neckbanding >5 mm	15	-	15	18.3
Wide clapboard >5 mm	55	-	55	67.3
Fingernail punctate	--	1	1	1.2
N	81	1	82	100.0
n w/ 1st, 2nd most common design	80	1	81	
% w/ 1st, 2nd most common design	98.8	1.2	--	100.0

Type Design Diversity H' = 0.965[a]
s = 5 J = 0.600
Design Distribution Diversity H' = 0.067
s = 2 J = 0.100

2. Sooting

Sooting	n	%
Sooted	23	30.3
Unsooted	53	69.7
n	76	100.0

3. Handles

Handles	n	%
Solid coil	1	4.5
Multiple coil	1	4.5
Strap	1	4.5
Extended lip	1	4.5
Tit lug	14	63.6
Dual tit	2	9.1
Cupule lug	1	4.5
Multi-coil strap lug	1	4.5
n	22	99.7

Handles:Items = 1:3.5

4. Form and Metrics

Form	n	%		n	Range	$\bar{x}$	s.d.	cv
Jars	78	100.0	Orifice diameter (mm)	57	70-305	167.7	42.700	25.5
			Rim fillet (mm)	59	10-27	16.3	3.342	20.5
			Rim flare (degrees)	37	3-29°	15.6	6.193	39.6

[a]Shannon-Weaver Indices: Diversity=H', Evenness=J, Number of Motifs=s
$\bar{x}$ = mean
s.d. = standard deviation
cv = coefficient of variation

Appendix 2, Table 9 (continued)

B. PASTE

1. Temper Composition

Temper	n	%
Undifferentiated sandstone	44	65.7
Pink chalcedonic sandstone	11	16.4
White chalcedonic sandstone	8	11.9
Trachyte only	4	6.0
Total	67	100.2

2. Texture Attributes

Grain Size	n	%
Medium	11	16.0
Coarse	32	51.3
Very Coarse	24	32.0
Total	67	99.3

Density	n	%
1-2%	2	3.0
5%	9	13.4
10%	44	65.7
20%	11	16.4
30%+	1	1.5
Total	67	100.0

Sherd Temper	n	%
None	65	97.0
<50%	2	3.0
Total	67	100.0

Grain Size	n[b]	%
Medium	5	11.4
Coarse	17	38.6
Very Coarse	22	50.0
Total	44	100.0

Texture Index	n	%
Fine-Medium (4.1-7)	6	9.0
Medium (7.1-10)	6	9.0
Medium-Coarse (10.1-13)	7	10.4
Coarse (13.1-16)	24	35.8
Very Coarse (16.1+)	24	35.8
Total	67	100.0

3. Clay Attributes

Clay-Temper Types	n	%
No type assigned	45	67.2
Black with white sherd	1	1.5
Chuska gray homogeneous	1	1.5
Gray with white sherd	1	1.5
Tan to brown clay	4	6.0
Black clay	8	11.9
White clay	7	10.4
Total	67	100.0

Vitrification	n	%
Absent	9	13.4
Present	55	82.1
Marked	3	4.5
Total	67	100.0

[b] Undifferentiated sandstone only

Appendix 2, Table 10. Description of 29SJ1360 Narrow Neckbanded

A. SURFACE ATTRIBUTES

1. Decoration

Designs	Most Common Motifs 1st	2nd	Total	%
Undifferentiated neckbanding	36	-	36	22.4
Narrow neckbanding 2-5 mm	17	-	17	10.6
Wide neckbanding >5 mm	11	-	11	6.8
Narrow clapboard 2-5 mm	31	-	31	19.3
Wide clapboard >5 mm	44	-	44	27.3
Festoon indented	1	-	1	0.6
Patterned, narrow	6	-	6	3.7
Patterned, wide	5	-	5	3.1
Unknown corrugated	1	-	1	0.6
Vertical incisions	-	2	2	1.2
Horizontal incisions	-	2	2	1.2
Punctate	-	1	1	0.6
Fingernail punctate	-	4	4	2.5
Total	152	9	161	99.9
n w/ 1st, 2nd most common designs	143	9	152	
% w/ 1st, 2nd most common designs	94.1	5.9		100.0

Type Design Diversity H' = 1.953[a]
s = 13 J = 0.762
Design Distribution Diversity H' = 0.225
s = 2 J = 0.324

2. Sooting

Sooting	n	%
Sooted	36	23.5
Unsooted	117	76.5
n	153	100.0

3. Handles

Handles	n	%
Solid coil	1	5.9
Multiple coil	1	5.9
Strap	1	5.9
Extended lip	1	5.9
Tit lug	9	52.9
Tabular lug	2	11.8
Cupule lug	1	5.9
Bent tit	1	5.9
n	17	100.1

Handles:Items = 1:9

[a]Shannon-Weaver Indices: Diversity=H', Evenness=J, Number of Motifs=s

Appendix 2, Table 10 (continued)

4. Form and Metrics

Form	n	%
Jar	150	98.0
Pitcher	2	1.3
Miniature	1	0.7
Total	153	100.0

Metrics	n	Range	$\bar{x}$	s.d.	cv
Jars					
Orifice diameter (mm)	135	50-330	178.6	49.636	27.8
Rim fillet (mm)	144	10-22	15.5	3.017	19.5
Rim flare (degrees)	57	6-48°	14.6	5.297	36.2
Pitchers					
Orifice diameter (mm)	1	60	----	-----	----
Rim fillet (mm)	1	10	----	-----	----
Rim flare (degrees)	-	--	----	-----	----
Miniature					
Orifice diameter (mm)	1	115	----	-----	----
Rim fillet (mm)	1	15	----	-----	----
Rim flare (degrees)	1	9°			

Form Diversity H' = 0.109
s = 3 J = 0.099

$\bar{x}$ = mean
s.d. = standard deviation
cv = coefficient of variation
s = number of forms

Appendix 2, Table 10 (continued)

B. PASTE

1. Temper Composition

Temper	n	%
Undifferentiated sandstone	96	62.8
Pink chalcedonic sandstone	12	7.8
White chalcedonic sandstone	16	10.5
Magnetitic sandstone	3	2.0
Trachyte only	22	14.4
San Juan igneous + sandstone	1	0.6
Sandstone + San Juan igneous	2	1.3
Sandstone + unidentified igneous	1	0.6
Total	153	100.2

2. Texture Attributes

Grain Size	n	%
Medium	28	18.3
Coarse	87	56.9
Very Coarse	38	24.8
Total	153	100.0

Density	n	%
1-2%	2	1.3
5%	21	13.7
10%	88	57.5
20%	36	23.5
30%+	6	3.9
Total	153	99.9

Sherd Temper	n	%
None	150	98.0
<50%	3	2.0
Total	153	100.0

Grain Size	n[b]	%
Medium	12	12.5
Coarse	50	52.1
Very Coarse	34	35.4
Total	96	100.0

Texture Index	n	%
Fine (2.1-4)	2	1.3
Fine-Medium (4.1-7)	2	1.3
Medium (7.1-10)	19	12.4
Medium-Coarse (10.1-13)	22	14.4
Coarse (13.1-16)	58	37.9
Very Coarse (16.1+)	50	32.7
Total	153	100.0

3. Clay Attributes

Clay-Temper Types	n	%
No type assigned	85	55.6
Black with white sherd	1	0.6
Gray with shale plates	19	12.4
Chuska gray homogeneous	2	1.3
Tan to brown clay	15	9.8
Black clay	18	11.8
White clay	13	8.5
Total	153	100.0

Vitrification	n	%
Absent	39	25.5
Present	111	72.5
Marked	3	2.0
Total	153	99.0

[b] Undifferentiated sandstone only

Appendix 2, Table 11. Description of 29SJ1360 Neck Corrugated

A. SURFACE ATTRIBUTES

1. Decoration

Designs	1st	2nd	Total	%
Undifferentiated neckbanding	1	-	1	1.7
Narrow neckbanding <5 mm	1	1	2	3.4
Narrow clapboard <5 mm	5	-	5	8.5
Wide clapboard >5 mm	2	-	2	3.4
Indented corrugated 2-5 mm	6	3	9	15.3
Indented corrugated >5 mm	13	1	14	23.7
Undifferentiated corrugated	2	-	2	3.4
Festoon indented	10	-	10	16.9
Indented corrugated, oblique	1	-	1	1.7
Patterned, narrow	3	-	3	5.1
Patterned, wide	2	-	2	3.4
Unknown corrugated	4	-	4	6.8
Punctate	-	1	1	1.7
Fingernail punctate	-	3	3	5.1
Total	50	9	59	100.1
n w/ 1st, 2nd most common designs	41	9	50	
% w/ 1st, 2nd most common designs	82.0	18.0		100.0

Type Design Diversity H' = 2.290[a]
s = 14 J = 0.868
Design Distribution Diversity H' = 0.471
s = 2 J = 0.680

2. Sooting

Sooting	n	%
Sooted	21	42.0
Unsooted	29	58.0
n	50	100.0

3. Handles

Handles	n	%
Strap	2	25.0
Tit lug	3	37.5
Strap lug	1	12.5
Tabular lug	1	12.5
Bent tit	1	12.5
n	8	100.0

Handles:Items = 1:6

[a] Shannon-Weaver Indices: Diversity=H', Evenness=J, Number of Motifs=s

Appendix 2, Table 11 (continued)

4. Forms and Metrics

Form	n	%
Jars	48	96.0
Pitchers	2	4.0
Total	50	100.0

Metrics	n	Range	$\bar{x}$	s.d.	cv
Jars					
Orifice diameter (mm)	35	110-330	191.3	51.369	26.9
Rim fillet (mm)	37	8-23	15.0	3.632	24.3
Rim flare (degrees)	22	5-28°	15.6	5.900	37.5
Pitchers					
Orifice diameter (mm)	2	110-170	14.0	42.426	30.3
Rim fillet (mm)	2	14-15	14.5	0.707	4.9
Rim flare (degrees)	1	9°	----	-----	---

Form Diversity H' = 0.168
s = 2 J = 0.242

B. PASTE

1. Temper Composition

Temper	n	%
Undifferentiated sandstone	31	64.6
Pink chalcedonic sandstone	3	6.3
White chalcedonic sandstone	3	6.3
Sandstone w/rounded iron	1	2.1
Magnetitic sandstone	1	2.1
Trachyte only	7	14.6
Trachyte + sandstone	1	2.1
Sandstone + trachyte	1	2.1
Total	48	100.2

2. Texture Attributes

Grain Size	n	%	Density	n	%	Sherd Temper	n	%
Fine	2	4.2	5%	7	14.6	None	46	95.8
Medium	7	14.6	10%	35	72.9	<50%	2	4.2
Coarse	22	45.8	20%	5	10.4	Total	48	100.0
Very Coarse	17	35.4	30%+	1	2.1			
Total	48	100.0	Total	48	100.0			

$\bar{x}$ = mean
s.d. = standard deviation
cv = coefficient of variation

Appendix 2, Table 11 (continued)

Grain Size	n[b]	%
Medium	3	9.7
Coarse	13	41.9
Very Coarse	15	48.4
Total	31	100.0

Texture Index	n	%
Fine (2.1-4)	2	4.2
Fine-Medium (4.1-7)	1	2.1
Medium (7.1-10)	7	14.6
Coarse-Medium (10.1-13)	6	12.5
Coarse (13.1-16)	16	33.3
Very Coarse (16.1+)	16	33.3
Total	48	100.0

3. Clay Attributes

Clay-Temper Types	n	%
No type assigned	26	54.2
Black with white sherd	2	4.2
Chuska gray homogeneous	7	14.6
Tan to brown clay	4	8.3
Black clay	2	4.2
White clay	7	14.6
Total	48	100.1

Vitrification	n	%
Absent	10	20.8
Present	37	77.1
Marked	1	2.1
Total	48	100.0

[b] Undifferentiated sandstone only

Appendix 2, Table 12. Description of 29SJ1360 Pueblo II Corrugated

A. SURFACE ATTRIBUTES

1. Decoration

Designs	Most Common Motif 1st	2nd	n	%
Narrow neckbanding 2-5 mm	1	2	3	6.1
Narrow clapboard 2-5 mm	7	-	7	14.3
Narrow corrugated 2-5 mm	24	-	24	49.0
Wide corrugated >5 mm	5	-	5	10.2
Undifferentiated corrugated	3	-	3	6.1
Corrugated, festoon	2	-	2	4.1
Patterned, narrow	3	-	3	6.1
Corrugated, unknown	1	-	1	2.0
Vertical incisions	2	3	5	1.1
N	48	5	53	100.0
n w/ 1st, 2nd most common designs	43	5	48	
% w/ 1st, 2nd most common designs	89.6	10.4		100.0

Type Design Diversity H' = 1.663[a]
s = 9 J = 0.757
Design Distribution Diversity H' = 0.230
s = 2 J = 0.332

2. Sooting

Sooting	n	%
Sooted	18	39.1
Unsooted	28	60.9
n	46	100.0

3. Handles

Handles	n	%
Multiple coil	1	25.0
Strap	1	25.0
Tit lug	1	25.0
Tabular lug	1	25.0
n	4	100.0

Handles:Items = 1:11.5

4. Form and Metrics

Form	n	%
Jars	44	95.7
Pitchers	2	4.3
Total	46	100.0

[a]Shannon-Weaver Indices: Diversity=H', Evenness=J, Number of Designs=s

Appendix 2, Table 12 (continued)

Metrics	n	Range	$\bar{x}$	s.d.	cv
Jars					
Orifice diameter (mm)	41	105-350	200.1	55.300	27.6
Rim fillet (mm)	44	9-28	17.6	4.116	23.4
Rim flare (degrees)	26	5-35°	14.6	6.268	43.0
Pitchers					
Orifice diameter (mm)	2	120	----	-----	----
Rim fillet (mm)	2	10	----	-----	----
Rim flare (degrees)	-	---	----	-----	----

Form Diversity H' = 0.179
s = 2 J = 0.258

B. PASTE

1. Temper Composition

Temper	n	%
Undifferentiated sandstone	13	28.9
Pink chalcedonic sandstone	4	8.9
White chalcedonic sandstone	1	2.2
Magnetitic sandstone	1	2.2
Trachyte only	23	51.1
Trachyte w/sandstone	2	4.4
Sandstone w/trachyte	1	2.2
Total	45	100.0

2. Texture Attributes

Grain Size	n	%	Density	n	%	Sherd Temper	n	%
Fine	2	4.4	1-2%	1	2.2	None	43	95.6
Medium	10	22.2	5%	9	20.0	>50%	2	4.4
Coarse	15	33.3	10%	25	55.6	Total	45	100.0
Very Coarse	18	40.0	20%	8	17.8			
Total	45	99.9	30%	1	2.2			
			40%+	1	2.2			
			Total	45	100.0			

Grain Size	n[b]	%	Texture Index	n	%
Medium	1	7.7	Very fine (0-2)	1	2.2
Coarse	5	38.5	Fine (2.1-4)	2	4.4
Very Coarse	7	53.8	Fine-Medium (4.1-7)	2	4.4
Total	13	100.0	Medium (7.1-10)	6	13.3
			Medium-Coarse (10.1-13)	9	20.0
			Coarse (13.1-16)	9	20.0
			Very Coarse (16.1+)	16	35.6
			Total	45	99.9

$\bar{x}$ = mean, s.d. = standard deviation, cv = coefficient of variation

[b] Undifferentiated sandstone only

Appendix 2, Table 12 (continued)

3. Clay Attributes

Clay-Temper Types	n	%	Vitrification	n	%
No type assigned	12	26.7	Absent	9	20.0
Gray w/shale plates	1	2.2	Present	34	75.6
Chuska gray homogeneous	22	48.9	Marked	2	4.4
Tan to brown clay	5	11.1	Total	45	100.0
Black clay	4	8.9			
White clay	1	2.2			
Total	45	100.0			

Appendix 2, Table 13. Refiring Results, 29SJ1360

A. TEMPER PASTE GROUP

Group/Rough Sort Type

FS Number	Provenience	Refired Color	Color (Group)[a]
Sandstone and Trachyte/Red Mesa B/w			
891-1	Kiva A	7.5YR8/4-6	Reddish yellow (2-4)
464-1	Room 9 floor	7.5YR7/4	Pink (2)
283-70	Kiva A	10YR8/3	Very pale brown (1)
486-22	Pithouse B	7.5YR7/4	Pink (2)
295-2	Kiva A	7.5YR8/2	Pinkish white (2)
Trachyte and Sandstone/Red Mesa B/w[b]			
395-85	Kiva A	7.5YR8/4	Pink (2)
395-81	Kiva A	7.5YR8/6	Reddish yellow (4)
113-1	Plaza 3	7.5YR7/6	Reddish yellow (4)
215-19	Kiva A	7.5YR7/6	Reddish yellow (4)
552-1	Pithouse B	7.5YR7/6	Reddish yellow (4)
88-24	Plaza 1	7.5YR7/6	Reddish yellow (4)
Trachyte and Sandstone/PII-PIII m/w Cylinder Jar			
1000-9	Surface	10YR8/4	Very pale brown (1)
Pink Chalcedonic Sandstone/Red Mesa B/w			
68-23	Plaza 5	7.5YR8/4	Pink (2)
250-143	Kiva A	10YR8/3	Very pale brown (1)
242-9	Plaza 3	7.5YR8/2	Pinkish white (2)
295-90	Kiva A	5YR8/4	Pink (3)
351-28	Kiva A	5YR7/4	Pink (3)
250-156	Kiva A	7.5YR8/4	Pink (2)
Pink Chalcedonic Sandstone/Narrow Neckbanded			
6-15[c]	Trash Mound	7.5YR-N6	Gray
68-11	Plaza 5	7.5YR8/4	Pink (2)
250-36	Kiva A	5YR7/6	Reddish yellow (5)
250-48	Kiva A	7.5YR8/4	Pink (2)
295-15	Kiva A	5YR6/6	Reddish yellow (5)
349-1	Room 6	5YR7/6	Reddish yellow (5)
420-11	Kiva A	7.5YR8/4	Pink (2)
6-19	Trash Mound	7.5YR7/4-6	Reddish yellow (2-4)

Note: When a sherd exhibited different core and wall colors, the color used for analysis is indicated by underlining. All sherds were fired twice, once to 900° C and again to 950° C.

[a] Color groups are defined in Windes 1977b

[b] Tabulated as Naschitti B/w

[c] Vitrified core

(continued)

Appendix 2, Table 13. (continued)

Group/Rough Sort Type

FS Number	Provenience	Refired Color	Color Group
White Chalcedonic Sandstone/Red Mesa B/w			
260-53	Kiva A	7.5YR7/6	Reddish yellow (5)
215-11[d]	Kiva A	7.5YR8/2	Pinkish white (2)
420-65	Kiva A	5YR7/4	Pink (3)
349-6	Room 6	10YR8/2	White (1)
333-6	Kiva A	7.5YR8/4	Pink (2)
439-4	Room 11 floor	10YR8/3	Very pale brown (1)
395-74	Kiva A	7.5YR8/4	Pink (2)
326-37	Kiva A	10YR8/3	Very pale brown (1)
441-6	Kiva A	7.5YR8/4	Pink (2)
57-17	Room 3	7.5YR7-8/4	Pink (2)
White Chalcedonic Sandstone/Narrow Neckbanded			
250-39	Kiva A	7.5YR8/4	Pink (2)
250-41	Kiva A	10YR8/3	Very pale brown (1)
250-50	Kiva A	7.5YR8/6	Reddish yellow (4)
283-22	Kiva A	7.5YR8/4	Pink (2)
88-6	Plaza 1	7.5YR8/4	Pink (2)
283-23	Kiva A	7.5YR8/6	Reddish yellow (4)
68-6	Plaza 5	7.5YR8/4	Pink (2)
Trachyte/Naschitti B/w			
242-15	Plaza 3	7.5YR8/4	Pink (2)
295-4	Kiva A	10YR7/2	Light gray (1)
439-8	Room 11 floor	5YR8/4	Pink (3)
120-3	Kiva A	5YR5/6	Yellowish red (5)
16-1	Trash Mound	7.5YR8/2	Pinkish white (2)
249-9	Kiva A	10YR8/2	White (1)
Trachyte/Narrow Neckbanded			
88-19	Plaza 1	10YR8/4	Very pale brown (1)
6-7	Trash Mound	7.5YR7/6	Reddish yellow (4)
6-4	Trash Mound	7.5YR8/6	Reddish yellow (4)
283-16	Kiva A	5YR6/6	Reddish yellow (5)
441-3	Kiva A	7.5YR8/6	Reddish yellow (4)
486-15	Kiva A	7.5YR8/4	Pink (2)
Undifferentiated Sandstone, Tan Paste/Red Mesa B/w			
326-41	Kiva A	10YR8/3	Very pale brown (1)
395-116	Kiva A	10YR8/2	White (1)
395-84	Kiva A	10YR8/3	Very pale brown (1)
395-125	Kiva A	5YR8/4	Pink (3)
441-12	Kiva A	10YR8/4	Very pale brown (1)
250-168	Kiva A	10YR8/4	Very pale brown (1)
215-10	Kiva A	10YR8/3	Very pale brown (1)

[d] silty slip

(continued)

Appendix 2, Table 13. (continued)

Group/Rough Sort Type

FS Number	Provenience	Refired Color	Color Group
Undifferentiated Sandstone, Tan Paste/Narrow Neckbanded			
68-13	Plaza 5	10YR8/4	Very pale brown (1)
283-15	Kiva A	5YR7/6	Reddish yellow (5)
25-13	Plaza 2	10YR8/4	Very pale brown (1)
420-6	Kiva A	10YR8/2	White (1)
486-14	Pithouse B	10YR8/4	Very pale brown (1)
351-9	Kiva A	5YR8/4	Pink (3)
Undifferentiated Sandstone with Black Sherd, Gray Paste/Red Mesa B/w			
16-3	Trash Mound	10YR8/2	White (1)
621-7	Pithouse B	7.5YR8/4	Pink (2)
622-1 [e]	Pithouse B	5YR7/6	Reddish yellow (5)
202-27	Plaza 1	10YR8/2	White (1)
1-18 [f]	Trash Mound	10YR8/2	White (1)
486-21	Pithouse B	7.5YR8/4	Pink (2)
395-101	Kiva A	7.5YR8/6	Reddish yellow (4)
420-63	Kiva A	5YR7/6	Reddish yellow (5)
Fine Undifferentiated Sandstone with <50% White Sherd, Gray Paste/ Red Mesa B/w			
57-8	Room 3	5YR7/4	Pink (3)
113-20	Plaza 3	7.5YR8/4	Pink (2)
134-11	Surface	7.5YR8/4	Pink (2)
333-5	Kiva A	7.5YR7/6	Reddish yellow (4)
395-95	Kiva A	7.5YR7/6	Reddish yellow (4)
Fine Undifferentiated Sandstone with >50% White Sherd, Gray Paste/ Red Mesa B/w			
575-1	Pithouse B	7.5YR7/4	Pink (2)
326-47	Kiva A	7.5YR7/4	Pink (2)
420-40	Kiva A	5YR8/4	Pink (3)
395-128 [g]	Kiva A	7.5YR8/4	Pink (2)
333-11	Kiva A	7.5YR7/4	Pink (2)
Coarse Undifferentiated Sandstone with >50% White Sherd, Gray Paste/ Red Mesa B/w			
6-21	Trash Mound	5YR7/4	Pink (3)
250-186	Kiva A	7.5YR8/4	Pink (2)
215-14	Kiva A	7.5-5YR8/4	Pink (2)
250-80 [e]	Kiva A	10YR7/4	Very pale brown (1)
250-140	Kiva A	10YR8/2	White (1)
283-64 [h]	Kiva A	7.5YR N7	Light gray (2)
333-24	Kiva A	10YR8/2	White (1)

[e] olla

[f] core color 7/2

[g] silty slip

[h] also black paste

(continued)

Appendix 2, Table 13. (continued)

Group/Rough Sort Type FS Number	Provenience	Refired Color	Color Group
Fine Undifferentiated Sandstone with >50% Black and White Sherd, Gray Paste/Red Mesa B/w			
260-57	Kiva A	10YR8/2	White (1)
266-63	Kiva A	5YR8/4	Pink (3)
395-131[i]	Kiva A	7.5YR7/6	Reddish yellow (4)
395-149[j]	Kiva A	5YR8/3	Pink (3)
545-9[j]	Pithouse B	7.5YR7/4	Pink (2)
250-196[k]	Kiva A	10YR8/3	Very pale brown (1)
250-198[l]	Kiva A	10YR8/1	White (1)
Undifferentiated Sandstone, No Sherd, Black Paste/Red Mesa B/w			
88-22[m]	Plaza 1	7.5YR8/4	Pink (2)
333-17[n]	Kiva A	10YR8/2	White (1)
736-4[o]	Pithouse B	7.5YR N7	Light gray (2)
395-117[p]	Kiva A	7.5YR N4	Dark gray (-)
283-119[q]	Kiva A	7.5YR8/4	Pink (2)
395-104	Kiva A	10YR8/2	White (1)
Undifferentiated Sandstone, No Sherd, Black Paste/Culinary			
351-7	Kiva A	10YR8/3	Very pale brown (1)
223-5[q]	Kiva A	7.5YR8/4	Pink (2)
223-27[q]	Kiva A	7.5YR8/4	Pink (2)
395-15	Kiva A	7.5YR8/4	Pink (2)
283-21[o]	Kiva A	10YR8/3	Very pale brown (1)
260-7	Kiva A	7.5YR8/4	Pink (2)
250-52[q]	Kiva A	7.5YR8/4	Pink (2)
223-3	Kiva A	10YR8/3	Very pale brown (1)
Undifferentiated Sandstone with <50% White Sherd, Black Paste/ Red Mesa B/w			
68-28	Trash Mound	10YR8/1	White (1)
8-7[q]	Trash Mound	7.5YR8/2	Pinkish white (2)
534-3[r]	Pithouse B	7.5YR7/6	Reddish yellow (4)
250-170[o]	Kiva A	7.5YR8/2	Pinkish white (2)
420-39[s]	Kiva A	7.5YR7/6	Reddish yellow (4)
629-1[t]	Pithouse B	7.5YR8/4	Pink (2)
653-1	Pithouse B	10YR8/1	White (1)

[i] core color N5; silty slip

[j] olla

[k] silty slip

[l] also black paste

[m] core color N6

[n] core color 6/1

[o] core color N7

[p] glaze paint; vitrified core

[q] core color N5

[r] core color 7/4

[s] core color 10YR6/2

[t] core color N4

(continued)

Appendix 2, Table 13. (continued)

Group/Rough Sort Type

FS Number	Provenience	Refired Color	Color Group
Undifferentiated Sandstone with >50% White Sherd, Black Paste/ Red Mesa B/w			
442-2[u]	Kiva A	7.5YR8/4	Pink (2)
30-4[u]	Plaza 2	7.5YR8/4	Pink (2)
250-89[v]	Kiva A	7.5YR8/4	Pink (2)
42-4	Plaza 4	10YR8/1	White (1)
52-1	Plaza 3	7.5YR8/4	White (1)
250-119[v]	Kiva A	7.5YR8/4	Pink (2)
395-108[w]	Kiva A	7.5YR7/6	Reddish yellow (4)
295-60[v]	Kiva A	7.5YR8/4	Pink (2)
295-77[x]	Kiva A	7.5YR8/4	Pink (2)
Chalcedonic Sandstone with White Sherd, Black Paste/Red Mesa B/w			
388-4[v]	Plaza 5	7.5YR8/4	Pink (2)
395-136[y]	Kiva A	7.5YR8/4	Pink (2)
420-68	Kiva A	7.5YR8/4	Pink (2)
546-1	Pithouse B	7.5YR8/4	Pink (2)
720-4[y]	Kiva A	7.5YR8/4	Pink (2)
283-92[z]	Kiva A	7.5YR8/4	Pink (2)

[u] core color N5

[v] core color N4

[w] core color 5/2

[x] core color N6

[y] core color 10YR5/1

[z] core color 10YR6/1

(continued)

Appendix 2, Table 13 (continued)

B. IMPORTS

FS Number	Provenience	Rough Sort Type	Temper	Refired Color	Color (and Group)
Black-on-whites					
388-8	Plaza 5	Kiatuthlanna B/w	Medium sandstone	7.5YR8/4	Pink (2)
295-75[a]	Kiva A	Piedra B/w	San Juan igneous and sandstone	10YR7/2	White (1)
486-44	Pithouse B	Cortez B/w	Medium sandstone	7.5YR8/4	Pink (2)
492-2	Room 2 floor	Cortez B/w	Sandstone and San Juan igneous	10YR8/3	Very pale brown (1)
220-5	Trash Mound	Cortez B/w	Sandstone and San Juan igneous	5YR8/4	Pink (3)
250-135	Kiva A	Cortez B/w	Medium sandstone	7.5YR8/4	Pink (2)
395-114	Kiva A	Cortez B/w	Medium sandstone	10YR7/2	Light gray (1)
299-1	Kiva A	Cortez B/w	Not anayzed	10YR8/2	White (1)
295-57	Kiva A	Mancos B/w	Fine sandstone	10YR8/3	Very pale brown (1)
395-87	Kiva A	Mancos B/w	Medium sandstone	7.5YR8/2	Pink (2)
395-58	Kiva A	Mancos B/w	Sandstone and San Juan igneous	7.5YR8/4	Pink (2)
395-132	Kiva A	Mancos B/w	San Juan igneous and sandstone	10YR7/1	Light gray (1)
958-1	Kiva A	Mancos B/w	San Juan igneous and sandstone	7/5YR8/4	Pink (2)
295-102	Kiva A	Snowflake B/w(?)	Sandstone and San Juan igneous	7.5YR N8	White (1)
68-27	Trash Mound	Red Mesa B/w	White chalcedonic sandstone	7.5YR8/4	Pink (2)
266-38	Kiva A	Naschitti B/w	Trachyte and sandstone	10YR8/1	White (1)
395-64[b]	Kiva A	Naschitti B/w	Trachyte and sandstone	10YR8/2	White (1)

[a] glaze paint, vitrified greenish gray core (5YR8/4); [b] exterior motif

(continued)

Appendix 2, Table 13 (continued)

FS Number	Provenience	Rough Sort Type	Temper	Refired Color	Color (and Group)
Smudged Wares					
47-1	Trash Mound	Lino Smudged	Coarse sandstone, black paste	10YR8/3	Very pale brown (1)
122-1[c]	Room 1	Lino Smudged	Very coarse sandstone	10YR8/3	Very pale brown (1)
245-3	Trash Mound	Lino Smudged	White chalcedonic sandstone, black paste	10YR8/2	White (1)
4-2	Trash Mound	Forestdale	Fine sandstone, gray paste,>50% white sherd	5YR6/6	Reddish yellow (5)
25-26	Plaza 2	Forestdale	Medium sandstone, black paste,<50% white sherd	2.5YR6/6	Light red (6)
215-13	Kiva A	Forestdale	Medium sandstone, gray paste,>50% white sherd	5YR6/6	Reddish yellow (5)
250-173	Kiva A	Forestdale	Not analyzed	5YR6/6	Reddish yellow (5)
250-174	Kiva A	Forestdale	Medium sandstone, gray paste,>50% white sherd	5YR7/6	Reddish yellow (5)
283-56	Kiva A	Forestdale	Medium sandstone, tan paste, >50% sherd	2.5YR6/8	Light red (6)
295-57	Kiva A	Forestdale	Fine sandstone, tan paste, >50% sherd	5YR6/8	Reddish yellow (5)
319-4	Room 7	Forestdale	Fine sandstone, gray paste,<50% white sherd	2.5YR5/6	Red (6)
333-26	Kiva A	Forestdale	Medium sandstone, tan paste, <50% sherd	2.5YR5/6	Red (6)
333-27	Kiva A	Forestdale	Medium sandstone, tan paste, >50% sherd	5YR6/6	Reddish yellow (5)
333-28	Kiva A	Forestdale	Medium sandstone, tan paste, <50% sherd	2.5YR5/8	Red (6)
351-56	Kiva A	Forestdale	Medium sandstone, gray paste,<50% white sherd	2.5YR6/6	Red (6)
420-59	Kiva A	Forestdale	Fine sandstone, tan paste, >50% sherd	5YR6/6	Reddish yellow (5)
441-59	Kiva A	Forestdale	Fine sandstone, tan paste, >50% sherd	5YR6/6	Reddish yellow (5)
570-1	Pithouse B	Forestdale	Medium sandstone, tan paste, <50% sherd	2.5YR5/8	Red (6)

[c] smudged La Plata B/w

(continued)

Appendix 2, Table 13 (continued)

C. SURFACE TREATMENTS (Red Mesa B/w)

FS Number	Provenience	Temper	Refired Color	Color (and Group)
Glaze Paint				
571-3	Pithouse B	Medium sandstone	10YR7/4	Very pale brown (1)
750-1[d]	Plaza 5	Fine sandstone	10YR7/3	Very pale brown (1)
250-106	Kiva A	Not analyzed	10YR8/2	White (1)
333-41	Kiva A	Medium sandstone, gray paste, >50% white sherd	7.5YR6/6	Reddish yellow (4)
283-105[d]	Kiva A	Fine sandstone, gray paste, >50% white sherd	10YR8/4	Very pale brown (1)
250-93[d]	Kiva A	White chalcedonic sandstone	10YR6/2	Light brownish gray (-)
420-37[d]	Kiva A	Trachyte and sandstone	10YR6/3	Pale brown (-)
420-34	Kiva A	Fine sandstone	10YR8/2	White (1)
420-69[d]	Kiva A	White chalcedonic sandstone, gray paste, >50% white sherd	10YR7/4	Very pale brown (1)
283-76[d]	Kiva A	San Juan igneous and sandstone	10YR7/3	Very pale brown (1)
395-129	Kiva A	Sandstone and San Juan igneous	10YR8/3	Very pale brown (1)
260-48	Kiva A	San Juan igneous and sandstone	7.5YR7/4	Pink (2)
Silty Slips (Red Mesa B/w)				
333-15[e]	Kiva A	Fine sandstone	7.5YR8/4	Pink (2)
295-54[e]	Kiva A	Sandstone and San Juan igneous	7.5YR7/4	Pink (2)
236-2[e]	Surface	Medium sandstone	10YR8/2	White (1)
395-111	Kiva A	Medium sandstone, gray paste, >50% white sherd	10YR8/3	Very pale brown (1)
283-96	Kiva A	San Juan igenous and sandstone	7.5YR7/6	Reddish yellow (4)
283-58	Kiva A	Fine sandstone, gray paste, >50% white sherd	10YR8/4	Very pale brown (1)
202-20	Plaza 1	Medium sandstone, gray paste, >50% white sherd	7.5YR8/2	Pink (2)
250-132	Kiva A	Fine sandstone, gray paste, <50% white sherd	7.5YR8/4	Pink (3)
395-133	Kiva A	Fine sandstone, gray paste, >50% white sherd	5YR7/6	Reddish yellow (5)
647-2	Pithouse B	Fine sandstone, gray paste, >50% white sherd	5YR7/3	Pink (3)

[d] Vitrified 5Y greenish gray core; [e] Early Red Mesa B/w

(continued)

Appendix 2, Table 13 (continued)

FS Number	Provenience	Temper	Refired Color	Color (and Group)
Bowls with Exterior Motifs (Red Mesa B/w)				
351-43[e]	Kiva A	Medium sandstone	7.5YR8/2	Pink (2)
351-49[e]	Kiva A	Fine sandstone	7.5YR8/4	Pink (2)
395-90	Kiva A	White chalcedonic sandstone, black paste with white sherd	5YR6/6	Reddish yellow (5)
420-62	Kiva A	San Juan igneous and sandstone	7.5YR7/6	Reddish yellow (4)
202-36	Plaza 1	Medium sandstone, black paste, >50% white sherd	5YR8/4	Pink (3)
57-9	Room 3	San Juan igneous	7.5YR8/4	Pink (2)
496-2	Plaza 5	Medium sandstone, black paste, >50% white sherd	10YR8/2	White (1)
—	Surface	Not analyzed	5YR7/6	Reddish yellow (5)
344-11[f]	Room 11	Andesite	10YR8/2	White (1)
260-55[f]	Kiva A	Medium sandstone	7.5YR8/2	Pink (2)
D. VESSEL FORM (Red Mesa B/w)				
Ollas				
250-83[e]	Kiva A	Medium sandstone	5YR7/6	Reddish yellow (5)
57-15	Room 3	Medium sandstone	10YR7/2	Light gray (1)
599-3	Pithouse B	White chalcedonic sandstone, black paste with white sherd	7.5YR8/2	Pink (2)
250-82	Kiva A	Medium sandstone, gray paste, >50% white sherd	7.5YR8/4	Pink (2)
250-113	Kiva A	Not analyzed	10YR7/2	Light gray (1)
575-2[g]	Pithouse B	Fine sandstone	10YR8/3	Very pale brown (1)
88-37	Plaza 1	Sandstone and San Juan igneous	5YR7/4	Pink (3)
395-158	Kiva A	San Juan igneous and sandstone	10YR7/3	Very pale brown (1)
554-1	Pithouse B	San Juan igneous and sandstone	10YR7/2	Very pale brown (1)
351-?	Kiva A	Not analyzed	5YR8/4	Pink (3)
68-28	Trash Mound	San Juan igneous and sandstone, black paste, white sherd	10YR8/3	Very pale brown (1)
68-30	Trash Mound	Sandstone and San Juan igneous	10YR8/3	Very pale brown (1)
420-69[h]	Kiva A	White chalcedonic sandstone	10YR8/3	Very pale brown (1)
486-72[i]	Kiva A	Medium sandstone	7.5YR7/6	Reddish yellow (4)

[e] Early Red Mesa B/w; [f] Cortez B/w; [g] core color 7.5YR8/4; [h] early Gallup B/w; [i] Gallup B/w

Appendix 2, Table 13 (continued)

FS Number	Provenience	Temper	Refired Color	Color (and Group)
Pitchers				
956-14	Kiva A	San Juan igneous and sandstone, >50% sherd	5YR7/6	Reddish yellow (5)
326-2	Kiva A	Trachyte and sandstone, gray paste, no sherd	10YR8/4	Very pale brown (1)
Duck Pots				
333-15	Kiva A	Fine sandstone, gray paste, >50% white sherd	5YR6/6	Reddish yellow (5)
957-1	Kiva A	Fine sandstone	10YR8/6	Yellow (2)
Seed Jar (Duck Pot?)				
540-1	Pithouse B	Trachyte and sandstone, gray paste, <50% sherd	7.5YR8/6	Reddish yellow (4)
Ladle				
295-104	Kiva A	Fine sandstone, gray paste, >50% white sherd	7.5YR7/5	Reddish yellow (4)

Appendix 2, Table 14. Tabulation of Red Mesa temper/paint color according to vessel form, diameter, texture, sherd temper, clay combinations, and design motifs, and slipped and polished bowls

Temper and Paint Color

	Chalcedonic Sandstone						Undifferentiated Sandstone				San Juan Igneous and Sandstone	
	Pink		White									
	Black		Brown		Black		Brown		Black		Black	
	n	%	n	%	n	%	n	%	n	%	n	%
Vessel Form												
Bowl	14	87.5	13	65.0	58	74.4	56	70.9	206	68.2	11	64.7
Ladle	–	–	2	10.0	11	14.1	10	12.7	44	14.6	2	11.8
Pitcher	1	6.3	–	–	1	1.3	3	3.8	12	4.0	–	–
Canteen	–	–	1	5.0	–	–	–	–	2	0.7	–	–
Seed jar	–	–	–	–	1	1.3	–	–	3	1.0	–	–
Tecomate	–	–	–	–	–	–	–	–	1	0.3	–	–
Gourd jar	–	–	–	–	–	–	2	2.5	–	–	–	–
Olla	–	–	1	5.0	1	1.3	4	5.1	8	2.6	2	11.8
General jar	1	6.3	3	15.0	6	7.7	1	1.3	24	7.9	2	11.8
Duck pot	–	–	–	–	–	–	–	–	1	0.3	–	–
Effigy	–	–	–	–	–	–	1	1.3	1	0.3	–	–
Miniature	–	–	–	–	–	–	2	2.5	–	–	–	–
Total (n = 512)	16		20		78		79		302		17	
diversity (H')	.463		1.094		.861		1.078		1.103		1.037	
evenness (J)	.422		.680		.481		.518		.479		.748	
number of forms (s)	3		5		6		8		10		4	
Bowl Diameter												
mean	178.1		179.5		186.2		190.3		190.5		152.5	
s.d.	47.4		56.8		41.2		53.2		48.5		59.9	
mean + standard error	191.2		197.4		192.0		198.0		194.1		173.7	
cv	26.6		31.7		22.1		28.0		25.4		39.3	
n	13		10		51		48		183		8	

(continued)

Appendix 2, Table 14. (continued)

	Temper and Paint Color						
	Chalcedonic Sandstone			Undifferentiated Sandstone		San Juan Igneous and Sandstone	
	Pink	White					
	Black	Brown	Black	Brown	Black	Black	
	n	n	n	n	n	n	Total
Design Motifs							
Solid band	9	7	32	30	112	8	198
Scrolls	2	7	15	15	56	5	100
Ticked triangles	4	3	11	12	52	3	85
Checkerboards	1	-	8	8	34	1	52
Hatchure A-1	-	1	9	8	30	1	49
Sawteeth	1	3	4	7	23	-	38
Squiggles	2	4	8	3	16	3	36
Parallel lines	-	1	3	5	23	3	35
Framers with ticked solids	1	1	4	4	9	2	21
Ticked lines	-	2	3	3	12	-	20
Total	20	29	97	95	367	26	634
H'	1.591	1.962	2.012	2.032	2.038	1.875	
J	.818	.893	.874	.883	.885	.908	
s	7	9	10	10	10	8	

Chi-square test of five most abundant motifs:

	n	table	x^2	df	p	C	Cells with <5
White chalcedonic sandstone, brown vs black	93	5x2	4.758	4	.313	.221	4
White chalcedonic sandstone vs pink chalcedonic sandstone	110	5x2	4.150	4	.386	.191	4
Chalcedonic vs undifferentiated sandstone	466	5x2	1.767	4	.779	.061	-
Undifferentiated sandstone, brown vs black	357	5x2	.232	4	.994	.026	-
San Juan igneous and sandstone vs chalcedonic sandstone	127	5x2	.602	4	.963	.069	4
All five most abundant motifs	484	5x6	12.028	20	.915	.156	12

Appendix 2, Table 14. (continued)

Slipped Bowls	None	Interior	Slip-Slop	Both	Total
Pink chalcedonic sandstone, black paint	-	4	-	10	14
White chalcedonic sandstone, brown paint	-	-	-	13	13
White chalcedonic sandstone, black paint	2	13	1	41	57
Undifferentiated sandstone, brown paint	9	15	2	27	53
Undifferentiated sandstone, black paint	15	37	12	133	197
San Juan igneous and sandstone, black paint	1	1	-	9	11
Total	27	70	15	233	345

Chi-square tests (combining slip-slop with interior, less none):

	n	x^2	df	p	C	Cells with <5
All	318	9.430	5	.093	.170	3
Chalcedonic vs undifferentiated sandstone	308	1.560	1	.207	.072	
Chalcedonic sandstone, brown vs black	82	4.345	1	.037	-	1
Chalcedonic sandstone with brown paint vs undifferentiated sandstone with black	195	4.675	1	.031	-	1
Chalcedonic sandstone with brown paint vs undifferentiated sandstone with brown	57	7.157	1	.007	-	1
Undifferentiated sandstone, brown vs black	226	2.351	1	.125	-	-
White chalcedonic sandstone, brown vs black	68	4.167	1	.041	-	1
Pink vs white chalcedonic sandstone (black) (White chalcedonic and undifferentiated sandstone with brown greater than expected in both sides)	69	.056	1	.813	-	-
Undifferentiated sandstone, brown vs black with none (black greater than expected in both sides; brown greater than expected in one and one side)	250	6.429	2	.040	.158	1

Appendix 2, Table 14. (continued)

Polished Bowls

		One Side		Two Sides			
	None	Incomplete	Complete	Incomplete	Complete	Different	Total
Pink chalcedonic sandstone, black paint	–	1	6	1	3	3	14
White chalcedonic sandstone, brown paint	–	1	1	1	4	6	13
White chalcedonic sandstone, black paint	1	4	23	–	11	16	55
Undifferentiated sandstone, brown paint	2	7	21	1	7	15	53
Undifferentiated sandstone, black paint	5	9	75	8	30	70	197
San Juan igneous and sandstone, black paint	1	–	6	1	1	2	11
Total	9	22	132	12	56	112	343

Chi-square comparisons:

	n	x^2	df	p	C	Cells with <5
All one-side vs two-sides	334	8.146	5	.148	.154	1
Combining polish regardless of sides:						
sandstone, brown vs black	243	2.401	2	.301	.099	–
white chalcedonic sandstone, brown vs black	67	2.696	2	.260	.197	3
pink vs white chalcedonic sandstone, black	68	.867	2	.648	.112	3
white chalcedonic vs undifferentiated sandstone	310	.278	2	.810	.030	–

(continued)

Appendix 2, Table 14. (continued)

Temper and Paint Color

	Chalcedonic Sandstone						Undifferentiated Sandstone				San Juan Igneous and Sandstone	
	Pink		White									
	Black		Brown		Black		Brown		Black		Black	
	n	%	n	%	n	%	n	%	n	%	n	%
Texture												
Very fine	4	25.0	4	20.0	15	19.2	19	24.1	112	37.2	2	11.8
Fine	7	43.8	8	40.0	32	41.0	36	45.6	112	37.2	5	29.4
Fine to medium	3	18.8	4	20.0	23	29.5	17	21.5	39	13.0	8	47.0
Medium	1	6.2	2	10.0	4	5.1	4	5.1	19	6.3	2	11.8
Medium to coarse	1	6.2	2	10.0	3	3.8	3	3.8	12	4.0	-	-
Coarse	-	-	-	-	1	1.3	-	-	6	2.0	-	-
Very coarse	-	-	-	-	-	-	-	-	1	0.3	-	-
Total	16		20		78		79		301		17	
Sherd Temper												
None	7	43.8	7	35.0	19	24.4	16	20.3	80	26.7	13	76.5
Less than half	3	18.7	7	35.0	31	39.7	19	24.0	63	21.0	3	17.6
More than half	6	37.5	6	30.0	28	35.9	44	55.7	157	52.3	1	5.9
Total	16		20		78		79		300		17	
Clay Combinations												
No type	5	31.3	2	10.5	16	20.5	14	17.7	61	20.3	8	47.1
Black with												
white sherd	1	6.2	2	10.5	4	5.1	12	15.2	25	8.3	-	-
Gray with												
black sherd	1	6.2	1	5.3	1	1.3	4	5.1	10	3.3	-	-
white sherd	6	37.5	8	42.1	49	62.8	33	41.8	117	38.9	3	17.7
black and white	-	-	2	10.5	3	3.8	6	7.6	23	7.6	-	-
Chuska Gray	-	-	2	10.5	1	1.3	1	1.3	1	0.3	-	-
Black	-	-	1	5.3	1	1.3	1	1.3	3	1.0	-	-
White	3	18.8	1	5.3	2	2.6	8	10.1	44	14.6	6	35.3
Tan	-	-	-	-	1	1.3	-	-	16	5.3	-	-
Little Colorado	-	-	-	-	-	-	-	-	1	0.3	-	-
Total	16		19		78		79		301		17	

(continued)

Appendix 2, Table 14. (continued)

Red Mesa Groups

	n	Chi-square	Table	df	p	C	Number of cells <5
		TEXTURE					
Four Textures Combined*							
white chalcedonic sandstone vs undifferentiated sandstone	478	13.097	4x2	3	0.004	0.163	
undifferentiated sandstone brown vs black paint	380	8.128	4x2	3	0.043	0.145	
white chalcedonic sandstone brown vs black paint	98	1.763	4x2	3	0.623	0.133	2
Two Textures Combined**							
San Juan igneous vs undifferentiated sandstone	318	7.353	2x2	1	0.007		
San Juan igneous vs white chalcedonic sandstone	95	1.367	2x2	1	0.242		
		SHERD TEMPER					
Values Combined***							
all chalcedonic sandstone vs all undifferentiated sandstone	493	13.425	3x2	2	0.001	0.163	
all undifferentiated sandstone, brown vs black	379	1.418	3x2	2	0.492	0.061	
all chalcedonic sandstone brown vs black paint	98	0.931	3x2	2	0.628	0.097	
Presence/Absence							
San Juan igneous vs white chalcedonic sandstone, black paint	95	17.000	2x2	1	0.000		
San Juan igneous vs undifferentiated sandstone, black	317	19.250	2x2	1	0.000		
		CLAY COMBINATIONS****					
chalcedonic vs undifferentiated sandstone	389	14.712	5x2	4	0.005	0.191	1
undifferentiated sandstone, brown vs black paint	302	6.576	5x2	4	0.160	0.146	1

* combining the following textures: very fine, fine, fine-to-medium, and medium or coarser

** combining the following textures: very fine and fine vs fine-medium, medium, and coarse

*** combining the following sherd temper values: 0 and <50% vs >50%

**** testing the following pastes: gray with white sherd, gray with black sherd, black with white sherd, white and tan and black paste

Appendix 2, Table 15. Occurrence of most common motifs in Red Mesa temper/paint groups, 29SJ1360

	Solids in Band	Scrolls	Ticked Triangle	Checker-board	Parallel Lines	Squiggle Lines	Hatchure A-1	Saw-teeth	Framers w/Ticked Lines	Ticked Lines	Total Designs
Pink chalcedonic sandstone-black paint	9	2	4	1	0	2	0	1	1	0	20
% of group	45.0	10.0	20.0	5.0	0.0	10.0	0.0	5.0	5.0	0.0	
White chalcedonic sandstone-brown paint	7	7	3	0	1	4	1	3	1	2	29
% of group	24.1	24.1	10.3	0.0	3.4	13.8	3.4	10.3	3.4	6.9	
White chalcedonic sandstone-black paint	32	15	11	8	3	8	9	4	4	3	97
% of group	33.0	15.5	11.3	8.2	3.1	8.2	9.3	4.1	4.1	3.1	
Undifferentiated sandstone-brown paint	30	15	12	8	5	3	8	7	4	3	95
% of group	31.6	15.8	12.6	8.4	5.3	3.2	8.4	7.4	4.2	3.2	
Undifferentiated sandstone-black paint	112	56	52	34	23	16	30	23	9	12	367
% of group	30.5	15.3	14.2	9.3	6.3	4.4	8.2	6.3	2.5	3.3	
San Juan+sandstone-black paint	8	5	3	1	3	3	1	0	2	0	26
% of group	30.8	19.2	11.5	3.8	11.5	11.5	3.8	0.0	7.7	0.0	

Appendix 2, Table 16. Comparison of surface manipulation by other attributes for sandstone-tempered, narrow-neckbanded sherds

	Clapboard Width			
	2-5 mm		> 5 mm	
Surface Manipulation	n	%	n	%
<u>Grain size</u>				
Fine	Not present			
Medium	1	5.6	3	10.3
Coarse	10	55.6	18	62.1
Very coarse	7	38.9	8	27.6
Total	18		29	
<u>Vitrification</u>				
None	4	22.2	12	41.4
Present	13	72.2	16	55.2
Marked	1	5.6	1	3.4
Total	18		29	
<u>Texture</u>				
Very fine	Not present			
Fine	Not present			
Fine-medium	--	----	1	3.4
Medium	1	5.6	5	17.2
Medium-coarse	4	22.2	3	10.3
Coarse	4	22.2	12	41.4
Very coarse	9	50.0	8	27.6
Total	18		29	
<u>Clay combinations</u>				
No type	13	(72.2)	17	(58.6)
Tan	2	11.1	3	10.3
Black	2	11.1	5	17.2
White	1	5.6	4	13.8
Total	18		29	
<u>Metrics</u>				
Jar diameter (mm)	181.2		172.9	
Standard deviation (mm)	63.01		35.42	
Jar n	17		28	
Jar rim fillet (mm)	15.5		25.3	
Standard deviation (mm)	2.90		3.28	
Jar n	17		28	
Jar rim flare (°)	13.6		13.7	
Standard deviation (°)	5.94		3.33	
Jar n	5		12	

Appendix 2, Table 17. Intersite comparison of Red Mesa Black-on-white and neck-decorated culinary

Red Mesa Black-on-white	Pueblo Alto	29SJ627	29SJ629	29SJ1360
Motifs which occur on more than 2% of the sample:				
Parallel lines	39	298	50	68
Pendant parallels	19	124	17	35
Framers with ticked solids	-	84	21	34
Framers without ticked solids	-	66	-	-
Scrolls	30	281	70	131
Dotted lines	22	147	22	38
Checkerboards	11	154	39	62
Sawteeth	22	119	34	48
Barbs	-	64	-	-
Solid band design	101	657	176	260
General solids	22	228	16	32
Hatchure A-J	27	177	32	68
Squiggle lines	14	187	38	50
Ticked triangles	56	262	46	130
Interlocked ticking	13	74	19	27
Cribbed lines	-	-	15	-
Narrow Sosi style	23	-	-	-

All Motifs

	Alto	627	629	1360
H'	2.901	2.862	2.670	2.717
J	.786	.711	.751	.732
s	40	56	35	41
n	314	2286	416	725

Motifs occuring on more than 2% of sample:

Jaccard Coefficient of Similarity

	Alto	627	629
627	.750	-	-
maximum [a]	.800		
629	.800	.813	-
maximum	.857	.867	
1360	.857	.867	.929
maximum	1.000	.867	.929

Brainerd-Robinson Coefficient

	627	1360	629	Alto
627	-	170	168	165
1360	170	-	180	157
629	168	180	-	173
Alto	165	157	173	-

Attribute Groups

	Number in Sample	Group Membership 1	2-10	11-20	21-39	>40	Number of Groups	Modal Group Number	Modal Group % of total
Alto	223	5	9	-	1	1	16	146	65.3
627	2299	11	16	2	4	4	37	1466	63.8
629	404	8	7	-	2	2	19	278	68.8
1360	599	12	15	4	-	3	34	302	50.4

[a] Maximum possible S_J value given sample sizes

(continued)

Appendix 2, Table 17. (continued)

Red Mesa B/w Vessel Forms	Pueblo Alto	627	629	1360
Bowl	244	1738	235	454
Canteen	-	5	4	5
Ladle	36	239	47	84
Pitcher	5	49	12	22
Seed jar	1	23	3	5
Tecomate	-	7	3	2
Olla	1	35	13	25
Miniature	-	2	3	5
Jar	25	175	95	113
Effigy	-	5	2	3
Duck Pot	1	7	-	1
Pipe	-	1	-	-
Gourd jar	-	1	-	4

Jaccard Coefficient of Similarity

	Alto	629	627
629	.545	-	-
maximum	.700		
627	.538	.769	-
maximum	.538	.769	
1360	.583	.833	.923
maximum	.583	.833	.923

Brainerd-Robinson Coefficient

	Alto	627	1360	629
Alto	-	191	170	156
627	191	-	175	162
1360	170	175	-	184
629	156	162	184	-

Diversity Indices:		Number in Sample	Number of Attributes (s)	Diversity (H')	Evenness (J)
Forms	Alto	313	7	.766	.394
	627	2307	13	.913	.356
	629	417	10	1.293	.562
	1360	723	12	1.235	.497
Tempers	Alto	222	5	.641	.398
	627	2283	10	.569	.247
	629	400	4	.400	.289
	1360	573	10	.986	.428
Bowl Polish	Alto	244	8	1.344	.646
	627	1732	8	1.707	.821
	629	235	7	1.401	.720
	1360	454	8	1.499	.721

(continued)

Appendix 2, Table 17. (continued)

Agreement Coefficients for Selected Red Mesa Black-on-white Attributes:

Attribute Groups (Raw Frequencies)

	Sandstone			Chalcedonic Sandstone		Trachyte	San Juan Igneous	Trachyte and Sandstone	San Juan Igneous and Sandstone	
	Black	Brown	Red	Black	Brown	Black	Black	Black	Black	Total
Alto	146	29	2	13	2	1	-	3	-	196
627	1454	418	32	127	24	16	2	64	10	2147
629	275	66	5	25	4	1	-	2	2	375
1360	302	79	4	94	20	3	9	10	17	538

Paste Textures (Raw Frequencies)

	Alto		627		629		1360	
	Brown	Black	Brown	Black	Brown	Black	Brown	Black
Very fine	4	46	64	274	15	50	19	112
Fine	17	66	154	525	34	142	36	112
Fine to medium	3	30	79	272	20	71	17	39
Medium	5	2	17	46	-	11	4	19
Medium to coarse	-	2	2	10	-	3	3	12
Coarse to very coarse	-	-	5	8	-	-	-	7

Designs (Raw Frequencies)

Solid band	11	49	108	441	28	123	30	112
Parallel lines	3	20	56	198	10	34	5	23
Scrolls	5	13	55	183	12	54	15	56
Ticked triangles	5	21	61	153	7	32	12	52
Squiggles	3	7	36	120	6	23	3	16
Hatchure A-1	2	16	32	99	6	22	8	30
Checkerboards	-	7	20	100	3	28	8	34
Dotted lines	3	6	34	96	2	15	3	12
Sawteeth	1	9	26	73	4	26	7	23
Interlocked ticking	2	7	12	49	6	8	3	16

(continued)

Appendix 2, Table 17. (continued)

Brainerd-Robinson Agreement Coefficients

Groups

	627	Alto	629	1360
627	–	185	189	164
Alto	185	–	194	162
629	189	194	–	160
1360	164	162	160	–

Lumped Texture

	Alto	627	629	1360
Alto	–	187	182	174
627	187	–	187	166
629	182	187	–	155
1360	174	166	155	–

Lumped Design

	Alto	627	629	1360
Alto	–	179	175	176
627	179	–	179	171
629	175	179	–	179
1360	176	171	179	–

Black/Brown Intrasite Index

	Texture	Design
Alto	142	168
627	190	185
629	186	180
1360	166	190

Brown Design

	629	627	Alto	1360
629	–	170	173	168
627	170	–	177	164
Alto	173	177	–	164
1360	168	164	164	–

Black Design

	1360	629	627	Alto
1360	–	178	172	176
629	178	–	179	170
627	172	179	–	176
Alto	176	170	176	–

Brown Texture

	Alto	627	629	1360
Alto	–	155	147	150
627	155	–	185	185
629	147	185	–	178
1360	150	185	178	–

Black Texture

	Alto	627	629	1360
Alto	–	184	172	169
627	184	–	186	160
629	172	186	–	147
1360	169	160	147	–

(continued)

Appendix 2, Table 17. (continued)

Neck-Decorated Culinary Ware:

Diversity Indices (narrow neck)

		n	s	H'	J	Grain Size Mode		% of Sample Exotic
Temper	627	245	5	.999	.621			
	629	62	5	1.147	.713			
	1360	152	5	1.036	.644			
Texture	627	239	7	1.497	.758	coarse	47.4	32.8
	629	62	4	1.322	.954	coarse	56.5	32.3
	1360	153	6	1.385	.773	coarse	56.9	33.3

Surface Manipulation and Texture Similarity Coefficients (narrow neck)

		629		627		1360	
		n	%	n	%	n	%
Texture	Very fine to fine-medium	–	–	18	7.5	4	2.6
	Medium	10	16.1	33	13.9	19	12.4
	Medium to coarse	10	16.1	25	10.5	22	14.4
	Coarse	21	33.9	71	30.0	58	37.9
	Very coarse	21	33.9	90	38.0	50	32.7
	Total	62		237		153	
Motifs	Narrow banded	5	8.6	24	10.6	17	14.0
	Wide banded	6	10.3	13	5.8	11	9.1
	Narrow clapboard	19	32.8	88	38.9	31	25.6
	Wide clapboard	15	25.9	81	35.8	44	36.4
	Narrow patterned	5	8.6	6	2.7	6	5.0
	Wide patterned	–	–	6	2.7	5	4.1
	Fingernail punctate	1	1.7	4	1.8	4	3.3
	Horizontal incisions	5	8.6	3	1.3	2	1.7
	Punctate	2	3.4	1	0.4	1	0.8
	Total	58		226		121	

(continued)

Appendix 2, Table 17. (continued)

Brainerd-Robinson Agreement Coefficients

	Texture		
	1360	629	627
1360	–	187	177
629	187	–	177
627	177	177	–

	Motifs		
	1360	627	629
1360	–	173	157
627	173	–	159
629	157	159	–

Chi-square tests	n	x^2	df	p
Texture (combining very fine to medium)	452	6.700	6	.350
Surface (combining patterned, punctate, and incisions)	405	19.321	10	.036

Attribute Groups

	Number in	Group Membership					Number of	Modal Group	
	Sample	1	2-10	11-20	21-39	>40	Groups	Number	% of total
Wide Neckbanded									
627	150	7	3	1	2	1	14	66	44.0
1360	67	3	7	–	1	–	11	27	40.3
Narrow Neckbanded									
629	62	14	10	–	–	–	24	9	14.5
627	244	7	11	5	–	2	26	57	23.4
1360	153	11	17	1	2	–	31	29	19.0
Neck Corrugated									
629	45	9	9	1	–	–	19	12	26.7
1360	48	13	11	–	–	–	24	9	18.8
Pueblo II Corrugated									
Alto	204	10	11	2	–	2	25	64	31.4
627	396	15	16	4	2	2	39	113	28.5
1360	45	10	7	1	–	–	18	12	26.7

Appendix 2, Table 18. 1360 whole vessels

A. Culinary	vessel form	sandstones: undiff. medium	sandstones: undiff. very coarse	sandstones: iron oxide coarse	sandstones: iron oxide very coarse	chalced. coarse	trachyte medium	trachyte coarse	trachyte very coarse	soot x*	orifice dia. mm	vol. cc
Wide neckbanded												
(Kana'a Gray)												
Pithouse B Level 4												
floor fill	jar		x							x	200	14580
Kiva A Level 1	jar		x							x	215	
Ramada Area 1 fill	jar		x							x	190	
Narrow neckbanded												
(Tohatchi Banded)												
Pithouse B												
wing wall floor	jar	x								x	220	16000
House 2 fill	jar			x							180	
Kiva A Level 2	jar		x							x	160	
(Gray Hills Gray)												
Level 3	jar							x		x	190	8820
Neck corrugated												
(Newcomb Corrugated)												
Room 11 floor	jar							x		x		
Pithouse B bench	pitcher						x			x	170	3520
(Coolidge Corrugated)												
Pithouse B bench	jar	x								x	145	3120
wing wall floor	jar				x						240	17250
House 2 floor	jar	x								x	230	
Plaza Area 5 floor	jar					x					240	17720
Ramada Area 1 floor	jar	x									160	
Kiva A floor	jar		x								195	

* present

(continued)

Appendix 2, Table 18. (continued)

A. Culinary (continued)		sandstones undiff. medium	sandstones undiff. very coarse	sandstones iron oxide coarse	sandstones iron oxide very coarse	chalced. coarse	trachyte medium	trachyte coarse	trachyte very coarse	soot x*	orifice dia. mm	vol. cc
Pueblo II corrugated												
(Blue Shale Corrugated)												
Pithouse B												
wing wall floor	pitcher						x			x	120	1330
wing wall floor	jar						x			x	235	10500
floor	jar								x	x	220	8870
wing wall floor	jar							x		x	300	
Level 4 floor fill	jar						x			x		
Ramada Area 1 fill	jar						x				230	14940
(Capt. Tom Corrugated)												
Pithouse B bench	pitcher						x			x	120	1330

N = 22 vessels

volumes (cc)	N	$\bar{x}$	s.d.	cv	s.d. <1	range >1
all	12	9832	6294	64.0%	3538	16125
jars	9	12422	4886	39.3%	7536	17308
pitchers	3	2060	1264	61.4%	796	3324
Pithouse B	5	13440	3602	26.8%		
Other Areas	4	11250	6354	56.5%		

$\bar{x}$ = mean
s.d. = standard deviation
cv = coefficient of variation

(continued)

Appendix 2, Table 18. (continued)

B. Decorated (continued)	texture: percent sherd:	sandstones: undifferentiated: fine to medium <50	>50	coarse to very coarse <50	>50	chalcedonic: fine to medium <50	>50	coarse to very coarse <50	>50	San Juan igneous + mix <50	>50	trachyte + mix <50	>50	orifice dia. mm	volume cc
Polished BMIII-PI mineral															
(White Mound B/w)															
trash mound	ladle*			x										150	893
(Piedra B/w)															
Kiva A Level 1	ladle*													100	172
(Kiatuthlanna B/W)															
Plaza Area 5 fill	bowl*		x											200	1525
Early Red Mesa B/w															
trash mound	bowl*					x								200	1180
Kiva A Level 1	ladle*		x											110	238
Level 3	bowl	x												210	3189
Plaza Area 1	ladle*													80	167
Pithouse B Level 1	bowl*	x												120	430
floor	bowl*		x											260	2732
Red Mesa B/w															
Kiva A vent	seed jar		x											70	1000
fill	ladle*	x												150	601
Level 1	bowl*										x			230	2088
Level 1	ladle*		x											90	191
Level 1	bowl*													200	1500
Level 2	ladle*		x											80	120
Level 2	bowl*		x											130	397
Level 2	duck pot	x												50	70
Level 3	ladle*		x											110	312
Level 3	ladle*									x				150	332
Level 3	bowl*	x												110	270

* calculation from bowl depth and orifice diameter

(continued)

Appendix 2, Table 18. (continued)

B. Decorated (continued)	texture: percent sherd:	sandstones undifferentiated fine to medium <50	>50	sandstones undifferentiated coarse to very coarse <50	>50	sandstones chalcedonic fine to medium <50	>50	sandstones chalcedonic coarse to very coarse <50	>50	San Juan igneous + mix <50	>50	trachyte + mix <50	>50	orifice dia. mm	volume cc
Red Mesa B/w (continued)															
Kiva A Level 3	bowl*									x				110	538
Level 3	bowl	x												120	329
Level 3	bowl	x												170	1198
Level 3	bowl*													180	1502
Level 3	bowl		x											180	1741
Level 3	bowl*			x										120	348
Level 3	bowl*		x											250	2408
Level 3	bowl*		x											200	1657
Level 3	bowl*		x											250	2153
Level 4	bowl*						x							200	1280
Level 4	bowl*	x												170	1264
Level 4	bowl						x							200	1280
Level 4	bowl									x				100	212
Level 4	bowl*		x											160	975
Pithouse B Level 3	bowl					x								115	373
Level 3	ladle	x												110	189
floor fill Level 4	bowl									x				210	2257
wing wall floor	bowl	x												210	2570
wing wall floor	bowl*		x											230	2602
floor	olla		x											75	6260
floor	bowl	x												195	2000
bench	effigy bowl	x												60	310
bench	seed jar	x												70	1040
bench	jar	x													
bench	bowl*	x												180	
bench	bowl*	x												210	1709
bench	bowl*		x											260	2248

(continued)

* calculation from bowl depth and orifice diameter

Appendix 2, Table 18. (continued)

B. Decorated (continued)	texture: percent sherd:	sandstones undifferentiated fine to medium <50	>50	sandstones undifferentiated coarse to very coarse <50	>50	sandstones chalcedonic fine to medium <50	>50	sandstones chalcedonic coarse to very coarse <50	>50	San Juan igneous + mix <50	>50	trachyte + mix <50	>50	orifice dia. mm	volume cc
Red Mesa B/w (continued)															
Pithouse B (continued)															
bench	bowl*					x								190	
bench	bowl*	x												240	3186
bench	bowl*						x							150	673
bench	bowl*						x							220	2270
bench	bowl*	x												220	2531
Plaza Area 3 fill	seed jar						x							110	
Area 5 fill	bowl	x												200	1657
floor	pitcher	x													
Mancost and Cortez B/w															
Kiva A Level 2	bowl									x				180	2098
Level 2	bowl*									x				230	1993
Level 2	bowl*†									x				190	1658
Level 2	bowl*									x				210	2256
Level 3	bowl*†		x											180	1380
Pithouse B bench	ladle			x										85	100
bench	ladle*	x												95	110
bench	ladle									x				120	420
bench	canteen	x													1410
Naschitti B/w															
Kiva A Level 1	gourd jar											x		30	ca. 700
Pithouse B Level 3	olla											x		75	

* calculation from bowl depth and orifice diameter
† includes 3 gray pitchers for part C. Form (this table)

(continued)

Appendix 2, Table 18. (continued)

B. Decorated (continued)	texture: percent sherd:	sandstones: undifferentiated, fine to medium <50	sandstones: undifferentiated, fine to medium >50	sandstones: undifferentiated, coarse to very coarse <50	sandstones: undifferentiated, coarse to very coarse >50	sandstones: chalcedonic, fine to medium <50	sandstones: chalcedonic, fine to medium >50	sandstones: chalcedonic, coarse to very coarse <50	sandstones: chalcedonic, coarse to very coarse >50	San Juan igneous + mix <50	San Juan igneous + mix >50	trachyte + mix <50	trachyte + mix >50	orifice dia. mm	volume cc
Puerco/Escavada B/w															
Pithouse B															
Level 4 floor fill	bowl							x						170	882
wing wall floor	pitcher		x												4500+
floor	olla		x											80	6260
Room 9 Level 1	ladle	x												75	50
Chuska B/w															
Kiva A Level 1	ladle											x		80	50
Gallup B/w															
Pithouse B floor	pitcher	x												75	1520
floor	pitcher											x		80	1910
Whiteware															
Kiva 4 Level 4	effigy bowl												x	70	65
Newcomb B/w															
Kiva A Level 1	bowl*											x		190	1285
Tunicha B/w															
trash mound Level 1	ladle*											x		100	106
Deadmans B/r															
Kiva A Level 2	bowl*									x				250	2979
Forestdale Smudged															
Room 3-10 Level 1	bowl*					x								140	1035

*calculation from bowl depth and orifice diameter

(continued)

Appendix 2, Table 18. (continued)

Summary of whiteware volumes.

volumes (cc)	N	$\bar{x}$	s.d.	cv	s.d. range <1	s.d. range >1
all:						
bowls	44	1587	832	52.4	755	2419
ladles	14	252	240	95.2	12	492
ollas	2	6260	0			
pitchers	3	2643	1620	61.3	1023	4263
duck pots	1					
effigy bowls	2	188	173	92.0		
seed jars	see Red Mesa					
Red Mesa:						
bowls	30	1507	840	55.7	667	2347
ladles	5	311	184	59.1	127	495
seed jars	3	1777	1312	73.8	465	3089
Early Red Mesa:						
bowls	4	1817	1396	76.8	421	3213
ladles	2	334	136	40.7		
Gallup:						
pitchers	2	1715	276	16.1		
Mancos/Cortez:						
bowls	5	1877	354	18.9	1523	2231
ladles	3	210	182	86.7	28	392
Pithouse B M/w bowls	13	1841	945	51.3		
Other Area bowls	27	1362	775	56.9		

$\bar{x}$ = mean
s.d. = standard deviation
cv = coefficient of variation

(continued)

Appendix 2, Table 18. (continued)

Summary of Form Distribution

C. Form	Kiva	Pithouse	Living Room	Storage Room	Extra-mural	Trash Mound
Bowl	27	17 (16)		1	2	1
Ladle	8	4 (4)		1	1	2
Seed Jar	1	1 (1)			1	
Canteen		1 (1)			1	
Pitcher		3 (3)			1 (1)	
Duckpot	1					
Gourd jar	1					
Olla		3 (3)				
White jar		1 (1)				
Gray jar	4	11† (11)		3 (2)	4 (2)	
Total	42	41 (40)		5 (2)	10 (3)	3

Total=101, 45 in primary context

() indicates number of vessels from non-fill context
* calculation from bowl depth and orifice diameter
† includes 3 gray pitchers for Part C. Form in part B.. Decoration (this table)

Appendix 3

Appendix 3, Table 1. Chipped stone artifacts from Kiva A

	Utilized		Retouched		Whole Flakes		Debitage		Cores		Corner-Notched Points	Side-Notched Points	Other Points	End-scrapers	Knife	
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Non-C	Non-C	C	Non-C	Total
Fill																
Conchoidal petrified wood	3	2	-	-	1	-	1	-	2	-	-	-	-	-	-	9
Fossiliferous chert	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total	4	2	-	-	1	-	1	-	2	-	-	-	-	-	-	10
Level 1																
Petrified Wood																
Conchoidal	19	14	2	-	3	4	11	9	-	3	-	-	-	-	-	65
Nonconchoidal	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	3
Chalcedony	2	-	-	-	1	2	-	2	-	-	1	-	-	-	-	8
San Juan fossiliferous chert	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Quartzite	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Nacimiento quartzite	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Obsidian																
Polvadero	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	3
Jemez	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Grants	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Total	23	14	2	-	4	6	13	13	-	3	4	-	-	1	1	84
Level 2																
Petrified Wood																
Conchoidal	3	2	-	-	2	-	-	1	-	-	-	-	-	-	-	8
Nonconchoidal	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
Chalcedony	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Chert (general)	-	-	-	1	-	-	1	1	-	1	-	-	-	-	-	4
High-surface	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Obsidian																
Polvadero	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Jemez	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	2
Total	3	3	-	1	2	-	1	4	-	1	2	1	1	-	-	19

(continued)

Appendix 3, Table 1. (continued)

	Utilized		Retouched		Whole Flakes		Debitage		Cores		Corner-Notched Points	Side-Notched Points	Other Points	End-scrapers	Knife	
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Non-C	Non-C	C	Non-C	Total
Level 3																
Petrified Wood																
Conchoidal	5	9	1	–	2	3	5	6	–	–	–	–	–	1	–	32
Nonconchoidal	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Chalcedony	–	2	–	–	–	1	–	1	–	–	–	–	–	–	–	4
Chert																
High-surface	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Brushy Basin	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
Quartzite	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	2
High-surface	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Polvadero obsidian	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Total	5	12	2	–	2	7	5	8	–	–	1	–	–	1	–	43
Level 4																
Petrified Wood																
Conchoidal	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	2
Nonconchoidal	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Chert	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Total	–	1	–	–	–	–	1	2	–	–	–	–	–	–	–	4
SUBTOTAL	35	32	4	1	9	13	21	27	2	4	7	1	1	2	1	160
TOTAL	67		5		22		48		6		7	1	1	2	1	160

Non-C = noncortical; C = cortical

Appendix 3, Table 2. Chipped stone artifacts from Pithouse B

	Utilized		Retouched		Whole Flakes		Debitage		Cores		Side-Notched Points	
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Total
Fill												
Conchoidal petrified wood	3	1	-	-	-	1	1	-	-	-	-	6
Level 1												
Conchoidal petrified wood	3	1	1	-	-	-	4	-	-	-	-	9
Chalcedony	-	-	-	-	-	1	-	1	-	-	-	2
Quartzite	1	-	-	-	-	-	-	-	-	-	-	1
Level 2												
Petrified Wood												
Conchoidal	1	1	-	-	1	-	2	-	-	-	-	5
Chinle	1	-	-	-	-	-	-	-	-	-	-	1
High-surface quartzite	1	-	-	-	-	-	-	-	-	-	-	1
Level 3												
Conchoidal petrified wood	1	7	-	-	-	-	1	4	-	-	-	13
Chalcedony	-	-	-	-	-	-	1	1	-	-	-	2
Nacimiento chert	-	1	-	-	-	-	-	-	-	-	-	1
Jemez obsidian	1	-	-	-	-	-	-	-	-	-	-	1
Subtotal, fill	12	11	1	-	1	2	9	6	-	-	-	42
Level 4, floor fill												
Petrified Wood												
Conchoidal	2	1	-	-	2	-	1	-	-	-	-	6
Nonconchoidal	-	-	-	-	-	-	-	1	-	-	-	1
Chalcedony	1	-	-	-	-	1	-	-	-	-	-	2
Washington Pass Chert	1	-	-	-	-	-	-	-	-	-	-	1
Nacimiento quartzite	-	-	-	-	1	-	-	-	-	-	-	1
Subtotal, floor fill	4	1	-	-	3	1	1	1	-	-	-	11
Floor												
Main Chamber												
Chinle chert	-	-	-	-	-	-	-	1	-	-	-	1
Burial 2												
Chert	-	-	-	-	-	-	-	-	-	-	1	1
Chalcedony	-	-	-	-	-	-	-	-	-	-	1	1
Bench												
Petrified Wood												
Conchoidal	16	36	1	1	10	5	25	18	-	4	-	116
Nonconchoidal	-	3	-	-	-	-	2	8	-	-	-	13
Chalcedony	2	1	-	-	1	2	1	1	-	-	-	8
Chert (general)	-	3	-	-	1	-	-	-	-	-	-	4
Fossiliferous	4	-	-	-	-	-	1	-	-	-	-	5
Brushy Basin	-	-	-	-	-	-	-	-	1	-	-	1
Washington Pass	1	2	-	-	-	-	-	1	-	-	-	4
Quartzite	1	1	-	-	2	1	-	-	-	-	-	5
Subtotal, floor	24	46	1	1	14	8	29	28	1	4	2	159
Floor 2 Fill												
Petrified Wood												
Conchoidal	-	-	-	-	1	-	-	2	-	-	-	3
Nonconchoidal	-	-	-	-	-	1	-	1	-	-	-	2
Washington Pass chert	1	-	-	-	-	-	-	-	-	-	-	1
Nacimiento quartzite	1	-	-	-	-	-	-	-	-	-	-	1
Subtotal, Floor 2 fill	2	-	-	-	1	1	-	3	-	-	-	7
North Wall Repair												
Conchoidal petrified wood	1	-	-	-	-	-	-	-	-	-	-	1
Nacimiento quartzite	-	-	-	-	1	-	-	-	-	-	-	1
Subtotal, wall	1	-	-	-	1	-	-	-	-	-	-	2
SUBTOTAL	43	58	2	1	20	12	39	38	1	5	2	221
TOTAL	101		3		32		77		6		2	221

Non-C = noncortical; C = cortical

Appendix 3, Table 3. Chipped stone artifacts from House 1 rooms

	Utilized		Retouched		Whole Flakes		Debitage		Cores		
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Total
Room 1 fill											
Conchoidal petrified wood	-	-	1	-	-	-	-	-	-	-	1
Chalcedony	1	-	-	-	-	-	-	1	-	-	2
Subtotal	1	-	1	-	-	-	-	1	-	-	3
Room 2 fill											
Petrified Wood											
Conchoidal	1	1	-	-	1	3	-	2	1	-	9
Nonconchoidal	-	-	-	-	-	-	1	2	-	-	3
Room 2 floor											
Conchoidal petrified wood	-	1	-	-	-	-	-	-	-	-	1
Washington Pass chert	-	1	-	-	-	-	-	-	-	-	1
Subtotal, Room 2	1	3	-	-	1	3	1	4	1	-	14
Room 3/10 fill											
Conchoidal petrified wood	-	-	-	-	-	-	1	-	-	-	1
Chalcedony	-	-	-	-	-	-	1	-	-	-	1
San Juan fossiliferous chert	-	1	-	-	-	-	-	-	-	-	1
Subtotal	-	1	-	-	-	-	2	-	-	-	3
Room 4 fill											
Petrified Wood											
Conchoidal	1	-	-	-	-	-	-	4	1	-	6
Nonconchoidal	-	-	-	-	-	-	1	-	-	-	1
Chalcedony	-	-	-	-	-	-	1	-	-	-	1
Subtotal, Room 4	1	-	-	-	-	-	2	4	1	-	8
Room 7 fill											
Conchoidal petrified wood	2	3	-	-	-	-	-	-	-	-	5
Washington Pass chert	-	-	-	1	-	-	-	-	-	-	1
Room 7 floor firepit											
Petrified Wood											
Conchoidal	1	-	1	-	-	1	2	-	-	-	5
Nonconchoidal	-	-	-	-	-	-	-	1	-	-	1
Chalcedony	1	-	-	-	-	-	-	-	-	-	1
Subtotal, Room 7	2	3	1	1	-	1	2	1	-	-	13
Room 9 fill											
Petrified Wood											
Conchoidal	-	2	-	-	-	-	-	-	-	1	3
Nonconchoidal	-	-	-	-	-	-	-	-	-	1	1
Chalcedony	-	-	-	-	-	-	-	1	-	-	1
Room 9 floor											
Conchoidal petrified wood	-	-	-	-	-	-	2	-	-	-	2
Subtotal, Room 9	-	2	-	-	-	-	2	1	-	2	7
Room 11 floor fill											
Conchoidal petrified wood	2	2	1	-	2	4	-	1	-	-	12
SUBTOTAL	9	11	3	1	3	8	9	12	2	2	60
TOTAL	20		4		11		21		4		60

Non-C = noncortical; C = cortical

Appendix 3, Table 4. Chipped stone artifacts from extramural areas and House 2

	Utilized		Retouched		Whole Flakes		Debitage		Cores		Corner-Notched Points	Side-Notched Points	
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Non-C	Total
Ramada Surface													
Conchoidal petrified wood	4	2	1	2	1	-	1	4	-	-	-	-	15
Chalcedony	1	-	-	-	2	-	-	-	-	-	1	-	4
Washington Pass chert	1	-	-	-	-	-	-	-	-	-	-	-	1
Ramada Fill													
Petrified Wood													
Conchoidal	6	9	-	-	-	3	7	5	-	-	-	-	30
Nonconchoidal	-	-	-	-	-	-	1	-	-	-	-	-	1
Chert (general)	1	-	-	-	-	-	1	1	-	-	-	-	3
Chinle	-	-	-	-	1	-	-	-	-	-	-	-	1
Fossiliferous	-	-	-	-	-	-	-	1	-	-	-	-	1
Ventilator X													
Conchoidal petrified wood	1	-	-	-	-	-	-	1	-	-	-	-	2
Chalcedony	1	-	-	-	-	-	-	-	-	-	-	-	1
Firepit 1, Surface 2													
Conchoidal petrified wood	-	1	-	-	-	-	-	-	-	-	-	-	1
Subtotal, ramada area	15	12	1	2	4	3	10	12	-	-	1	-	59
Total, ramada area	27		3		7		22		-	-	1	-	59
Plaza Area 2 fill													
Petrified Wood													
Conchoidal	1	-	-	-	1	-	1	1	-	-	-	-	4
Nonconchoidal	-	-	-	-	-	1	1	-	-	-	-	-	2
Plaza Area 3 fill													
Petrified Wood													
Conchoidal	-	-	-	-	-	-	2	1	-	-	-	-	3
Nonconchoidal	-	-	-	-	-	-	1	1	-	-	-	-	2
Nacimiento quartzite	-	-	-	-	1	-	-	-	-	-	-	-	1
Plaza Area 2/3 fill													
Petrified Wood													
Conchoidal	2	5	-	-	2	-	2	6	-	-	-	-	17
Nonconchoidal	-	1	-	-	-	-	-	-	-	-	-	-	1
Chalcedony	1	-	1	-	-	-	-	-	-	-	-	-	2
Chert (general)	1	-	-	-	-	-	-	-	-	-	-	-	1
Morrison formation	-	-	-	-	1	-	-	-	-	-	-	-	1
Quartzite	-	-	-	-	1	-	-	-	-	-	-	-	1
Grants obsidian	1	-	-	-	-	-	-	-	-	-	-	-	1
Plaza Area 5 fill													
Petrified Wood													
Conchoidal	5	4	-	-	-	-	1	1	5	2	-	-	18
Nonconchoidal	-	-	-	-	-	-	-	-	1	2	-	-	3
Chalcedony	-	-	-	-	-	-	-	-	1	-	-	-	1
Plaza Area 5 floor													
Conchoidal petrified wood	1	-	-	-	-	-	3	-	-	-	-	1	5
Nacimiento quartzite	-	1	-	-	-	-	-	1	-	-	-	-	2
Subtotal, Plaza Areas	12	11	1	-	6	1	11	11	7	4	-	1	65
Total, Plaza Areas	23		1		7		22		11		-	1	65
House 2 fill													
Conchoidal petrified wood	-	1	-	-	-	-	-	-	-	-	-	-	1
Chert	-	-	-	-	-	-	-	2	-	-	-	-	2
House 2, Burn Feature A													
Chinle petrified wood	1	-	-	-	-	-	-	-	-	-	-	-	1
Chalcedony	1	1	-	-	-	-	-	-	-	-	-	-	2
Subtotal, House 2	2	2	-	-	-	-	-	2	-	-	-	-	6
Total, House 2	4		-	-	-	-	2		-	-	-	-	6

Non-C = noncortical; C = cortical

Appendix 3, Table 5. Chipped stone artifacts from the trash mound

	Utilized		Retouched		Whole Flakes		Debitage		Cores		Corner-Notched Points	
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	Total
Grid AX fill												
Conchoidal petrified wood	2	-	-	-	2	-	2	5	-	-	-	11
Chalcedony	1	-	-	-	-	-	1	-	-	-	-	3
Quartzite	-	-	-	-	-	1	-	-	-	1	-	1
Grid BX fill												
Conchoidal petrified wood	-	2	-	-	1	2	1	-	-	1	-	7
Chalcedony	1	1	-	-	-	-	-	-	-	-	-	2
Grid CX fill												
Conchoidal petrified wood	4	1	-	-	-	-	1	1	-	-	-	7
Chalcedony	-	-	-	-	-	-	1	1	-	-	-	2
Grid DX fill												
Chert	-	1	-	-	-	-	-	-	-	-	-	1
Quartzite	-	1	-	-	-	-	-	-	-	-	-	1
Grid EX fill												
Conchoidal petrified wood	2	1	-	-	1	-	-	1	-	-	-	5
Chalcedony	1	1	-	-	-	-	-	-	-	-	-	2
Grid FX fill												
Petrified Wood												
Conchoidal	3	3	-	-	3	-	1	-	-	-	-	10
Chinle	1	-	-	-	-	-	-	-	-	-	-	1
Chalcedony	-	-	-	-	-	-	-	1	-	-	-	1
Grid GX fill (adobe basin)												
Conchoidal petrified wood	2	-	-	-	1	-	1	-	-	-	-	4
Chert (general)	1	-	-	-	-	-	-	-	-	-	-	1
Chinle	-	1	-	-	-	-	-	-	-	-	-	1
Washington Pass	1	-	-	-	-	-	-	-	-	-	-	1
Grid HX fill												
Conchoidal petrified wood	-	2	-	-	-	-	-	-	-	-	-	2
Grid IX fill												
Conchoidal petrified wood	1	1	-	-	-	-	-	-	-	-	-	2
Lateral Trench Extension												
Level 1 - conchoidal pet. wood	-	-	-	-	-	-	1	-	-	-	-	1
Level 2 - conchoidal pet. wood	1	-	-	-	-	-	-	1	-	-	-	2
Level 3 - chert	1	-	-	-	-	-	-	-	-	-	1	2
Subtotal	27	15	-	-	8	3	9	10	-	2	1	70
Total	37		-		11		19		2		1	70

Non-C = noncortical; C = cortical

Appendix 3, Table 6. Chipped stone artifacts from the backdirt

	Utilized		Retouched		Whole Flakes		Debitage		Nucleii-Cores		End-scrapers	Drill	Subtotal		
	Non-C	C	Non-C	C	Non-C	C	Non-C	C	Non-C	C	C	Non-C	Non-C	C	Total
Petrified Wood															
Conchoidal	52	55	9	11	33	27	42	44	7	6	1	1	145	143	288
Nonconchoidal	1	1	-	-	-	3	1	5	-	-	-	-	2	9	11
Chinle	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1
Chalcedony	3	2	-	-	6	4	8	3	2	1	-	-	19	10	29
Chert (general)	2	1	-	-	-	-	3	-	-	-	-	-	5	1	6
Morrison formation	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1
Fossiliferous	2	-	-	-	-	-	-	-	-	-	-	-	2	-	2
San Juan fossiliferous	2	1	-	-	1	1	-	-	-	-	-	-	3	2	5
High-surface	-	1	-	-	-	-	-	-	-	-	-	-	-	1	1
Washington Pass	1	1	-	-	-	-	-	-	-	-	-	-	1	1	2
Quartzite	1	1	-	-	-	2	-	1	-	-	-	-	1	4	5
High-surface	2	3	-	-	1	1	-	-	1	-	-	-	4	4	8
Nacimiento	1	-	-	-	-	1	-	-	-	-	-	-	1	1	2
Jemez obsidian	2	-	1	-	-	-	1	-	-	-	-	-	4	-	4
Subtotal	69	66	10	11	41	39	56	54	10	7	1	1	188	177	365
Total	135		21		80		110		17		1	1	365		365

Non-C = noncortical; C = cortical

Appendix 4

Appendix 4, Table 1. Colors of turquoise from 29SJ1360: System 1 emphasizes hues, System 2 emphasizes values

System 1			Munsell	System 2		
Group/ Color	Code	Description		Group/ Color	Code	Description
	13	light green	5G7/4		13	light green
	14	light green	5G8/1		14	light green
1	19	grayish yellow green	5GY7/2	1	19	grayish yellow green
light	20	moderate yellow green	5GY7/4	light	20	moderate yellow green
green	23	moderate yellow green	10GY6/4	green	23	moderate yellow green
	30	very pale green	10G8/2		30	very pale green
	45	very light green blue	2.5BG9/2		45	very light green blue
	46	very light green blue	2.5BG8/4		46	very light green blue
	47	light green blue	2.5BG7/8		47	light green blue
2	48	light green blue	2.5BG7/6		48	light green blue
light	49	light green blue	2.5BG7/4	2	49	light green blue
	50	green green-blue	2.5BG6/10	light	61	very light greenish blue
	51	green green-blue	2.5BG6/8		66	light greenish blue
	52	green green-blue	2.5BG6/6		67	light greenish blue
	54	green green-blue	2.5BG5/8		75	very light bluish green
					76	very light bluish green
	61	very light greenish blue	5BG9/2		78	light bluish green
	66	light greenish blue	5BG7/6		79	light bluish green
	67	light greenish blue	5BG7/8		90	very light blue green
2	69	greenish blue	5BG6/6		92	light blue green
light	70	greenish blue	5BG6/8		93	light blue green
	71	greenish blue	5BG5/4			
	72	greenish blue	5BG5/6		50	green green-blue
	73	greenish blue	5BG5/8		51	green green-blue
					52	green green-blue
	75	very light bluish green	7.5BG9/2		54	green green-blue
	76	very light bluish green	7.5BG8/4		69	greenish blue
3	78	light bluish green	7.5BG7/8		70	greenish blue
dark	79	light bluish green	7.5BG7/6	3	71	greenish blue
	81	bluish green	7.5BG6/8	dark	72	greenish blue
	84	bluish green	7.5BG5/8		73	greenish blue
					81	bluish green
	90	very light blue green	10BG9/1		84	bluish green
	92	light blue green	10BG7/6		95	blue green
3	93	light blue green	10BG5/8		96	blue green
dark	95	blue green	10BG6/8		97	blue green
	96	blue green	10BG5/6			
	97	blue green	10BG5/8			

Appendix 4, Table 2. Distribution of turquoise color groups

Provenience	System 1 Color Groups (light - dark) 1	2	3	Subtotal	Total	System 2 Color Groups (light - dark) 1	2	3	Subtotal	Total
Kiva A fill	-	4	3	7		-	5	2	7	
Level 1	3	4	8	15		3	10	2	15	
Level 3	3	3	2	8	30	3	4	1	8	30
Pithouse B,										
Level 1	-	1	1	2		-	1	1	2	
Level 2	-	1	2	3		-	3	-	3	
Level 3	2	2	1	5		2	2	1	5	
Bench	1	15	18	34		1	27	6	34	
Subfloor	1	2	-	3	47	1	1	1	3	47
House 1,										
Room 3/10 fill	-	1	-	1		-	1	-	1	
floor	-	-	1	1		-	1	-	-	
Room 4 (basin-shaped pit)	-	1	-	1		-	1	-	1	
Room 11 floor	-	-	1	1	4	-	1	-	1	4
Ramada, Feaure A	-	1	-	1	1	-	1	-	1	1
Plaza Area 2 fill	-	1	-	1		-	1	-	1	
Area 3 fill	-	1	2	3		-	2	1	3	
Area 5 fill	1	3	2	6		1	4	1	6	
floor	1	6	3	10	16	1	4	5	10	16
Trash Mound	1	-	2	3	3	1	2	-	3	3
Surface	-	-	5	5	5	-	4	1	5	5
Backdirt	2	2	3	7	7	2	3	2	7	7
Total	15	48	54	117	117	15	78	24	117	117
% of total	13	41	46	100	100	13	67	20	100	100
Ratio Light:Dark		1.1:1					3.3:1			

Appendix 4, Table 2. (continued)

Tests for Color and Matrix:

	System 1 Turquoise Color		
	Light	Dark	
Pithouse B	16	18	34
Kiva A	17	13	30
	33	31	64

$x_C^2 = .267$

$0.75 < p < 0.5$

	System 1 Turquoise Color		
	Light	Dark	
Pithouse B	16	18	34
Kiva A, Level 3	6	2	8
	22	20	42

$x_C^2 = .406$

$0.5 < p < 0.25$

	Matrix Color/Pattern		
	Gold	Black	
Kiva A	6	5	11
Pithouse B	19	12	31
	25	17	42

$x_C^2 = .001$

$0.95 < p < 0.9$

Appendix 4, Table 3. Distribution of turquoise artifacts by color

	Pendants			Blanks and Inlay			Beads			Bead Blanks			Debris and Other				
Provenience	Light Green	Light	Dark	Light Green	Light	Dark	Light Green	Light	Dark	Light Green	Light	Dark	Light Green	Light	Dark	Subtotal	Total
Kiva A fill	-	-	-	-	-	-	-	1	-	-	-	-	-	3	3	7	
Level 1	-	-	-	-	-	-	-	-	-	-	-	-	3	4	8	15	
Level 3	-	1	-	1	-	-	-	-	-	1	-	-	1	2	2	8	30
Pithouse B,																	
Level 1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	2	
Level 2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	
Level 3	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1	5	
Bench	-	1	-	-	1	1	-	-	-	1	-	1	-	13	16	34	
Subfloor	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-	3	47
House 1,																	
Room 3/10 fill	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
floor	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	
Room 4 (basin-shaped pit)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Room 11 floor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	4
Ramada, Feaure A	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1
Plaza Area 2 fill	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Area 3 fill	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	
Area 5 fill	-	-	-	-	-	-	-	-	-	-	-	-	1	3	2	6	
floor	-	-	-	-	-	-	-	-	-	-	-	1	1	6	2	10	20
Trash Mound	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	3	3
Surface	-	-	-	-	-	-	-	-	-	-	-	1	-	-	4	5	5
Backdirt	-	1	-	-	-	-	-	-	-	-	-	-	2	1	3	7	7
Total	-	6	1	2	2	1	-	1	1	3	-	3	10	39	48	117	117
Total by artifact type		7			5			2			6			97			117
% of total artifacts		6			4			2			5			83			100

(continued)

Appendix 4, Table 3. (continued)

	Artifacts			Debris		
	Light Green	Light	Dark	Light Green	Light	Dark
Number	5	9	6	10	39	48
% of color group	33	19	11	67	81	89

	Matrix Group				
	1	2	3	4	Total
Number	6	2	10	2	20
% of total	32	11	50	11	100

Appendix 4, Table 4. Distribution and descriptions of matrix patterns and colors of turquoise

	Matrix Groups					
Provenience	1 None	2 White	3 Honey-Gold	4 Black	Subtotal	Total
Kiva A fill	4	1	2	-	7	
Level 1	7	2	2	4	15	
Level 3	5	-	2	1	8	30
Pithouse B,						
Level 1	1	-	1	-	2	
Level 2	2	-	1	-	3	
Level 3	-	-	3	2	5	
Bench	7	3	14	10	34	
Subfloor	2	-	1	-	3	47
House 1,						
Room 3/10 fill	-	-	1	-	1	
floor	-	1	-	-	1	
Room 4 (basin-shaped pit)	-	-	1	-	1	
Room 11 floor	1	-	-	-	1	4
Ramada, Feaure A	1	-	-	-	1	1
Plaza Area 2 fill	-	-	1	-	1	
Area 3 fill	-	3	-	-	3	
Area 5 fill	5	-	1	-	6	
floor	1	-	6	3	10	20
Trash Mound	3	-	-	-	3	3
Surface	1	-	4	-	5	5
Backdirt	1	1	5	-	7	7
Total	41	11	45	20	117	117
% of total	35	9	38	17	100	100

(continued)

Appendix 4, Table 4. (continued)

Matrix Color and Pattern

Group Code	Source Code	Pattern	Description	Light Green	Light	Dark	Total
3	1	Kings Manassa	Extensive dark gold "moss"	1	-	-	1
2	4	Cripple Creek	Whitish pitted inclusions	-	2	8	10
4	6	Santa Rosa	Pitted metallic black with white pits and lines; crackled	-	2	2	4
4	7	Santa Rosa	As above (with hematite)	-	7	8	15
4	8	Tyrone	As Source Code 6 but with black lines and mottling	-	1	-	1
3	9	Hachita	Light gold "moss" (as Source Code 1)	7	19	18	44
2	16	Lone Mountain	Meandering large whitish inclusions	-	-	1	1
1		none	No matrix visible	7	17	17	41
Total				15	48	54	117

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