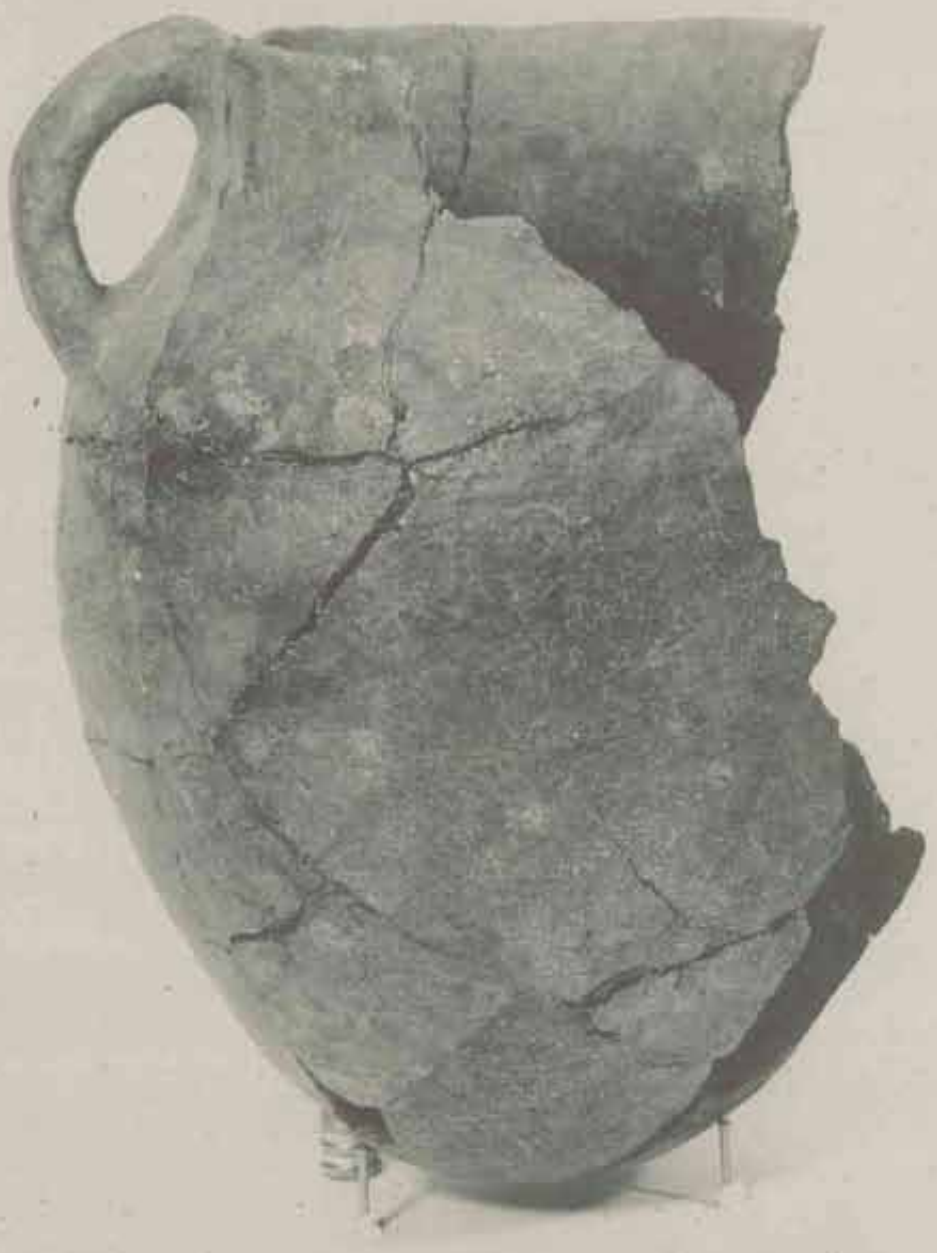
UTAH ARCHAEOLOGY
1998



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UTAH ARCHAEOLOGY 1998

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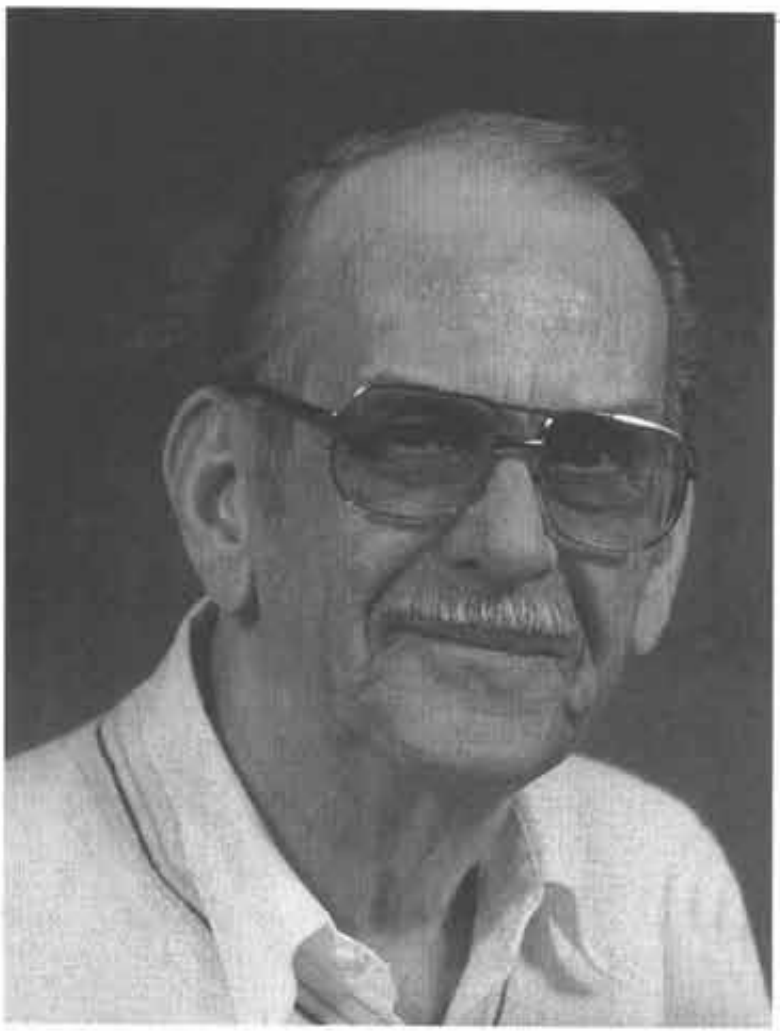
ARTICLES AND REPORTS

IN MEMORIAM

ROBERT B. KOHL

1920–1998



Robert B. Kohl, longtime supporter of archaeology in Utah, member of the Utah Statewide Archaeological Society, and Co-Editor of *Utah Archaeology*, passed away in St. George July 8, 1998. Bob was a tireless crusader for the causes he believed in, and his work on behalf of the Utah Statewide Archaeological Society, *Utah Archaeology*, and the Southwest Indian Museum Association leaves a legacy which will benefit the cultural resources of Utah for years to come.

Bob attended the University of Illinois, Champaign, served in the U.S. Army during World War II, and worked as a draftsman and as a professional fashion photographer in Chicago. He married his sweetheart, Helen Lucille Horne on February 14, 1942. Bob and Helen were owners and operators of a resort on Big Turtle Lake in Bemidji, Minnesota, for 32 years. At Kohl's Last Resort Bob and Helen took care of guests, raised three children, and adopted many orphaned wild animals. During those years in Minnesota Bob was a lobbyist for the tourism industry, served on the Minnesota Small Business Administration Board, and was an announcer and editorialist for KBUN Radio in Bemidji.

Bob and Helen moved to Utah in 1981 and built a home in Ivins. Bob was a charter member of the Jennifer Jack/Dixie Chapter of the Utah Statewide Archaeological Society, served as president of the chapter, and was Co-Editor of *Utah Archaeology* from 1991 until his death. Bob was also instrumental in founding the Southwest Indian Museum Association, and worked very hard toward the goal of building a state-of-the art museum in Southwest Utah. He obtained numerous grants, toured the country visiting museums to learn about museum construction, organization, and exhibits, and infused the effort with his contagious enthusiasm.

Bob was a talented speaker and writer. Many of us recall his witty and informative presentations about travel in Utah, and his many book reviews in *Utah Archaeology* have been very valuable to its readers. Bob was one of those people who did things—he didn't talk and grouse about what someone else should do, he stepped forward and took action. His contributions to raising public awareness about archaeological resources in the area are numerous, and his optimism and witty conversation will be greatly missed.

Bob is survived by his three children, seven grandchildren, and his loving wife, Helen, who continues his work with the Southwest Indian Museum Association.

Kevin T. Jones

THE CONFLUENCE SITE: AN EARLY FREMONT PITHOUSE VILLAGE IN CENTRAL UTAH

Rand A. Greubel, Alpine Archaeological Consultants, Inc., P.O. Box 2075, Montrose, Colorado 81402

Archaeological investigations at the Confluence Site in Emery County, Utah, so named because of its proximity to the confluence of Ivie and Muddy Creeks, have revealed a preceramic occupation characterized by substantial habitation structures, large storage pits, bow-and-arrow technology, and reliance on maize farming. The site represents the most complete example of a preceramic Fremont village excavated to date in central Utah.

INTRODUCTION

Recent years have seen a steady flow of new data relevant to the timing of the introduction of maize horticulture into the American Southwest, in the form of an increasing number of very early radiocarbon dates on maize and discoveries of unexpectedly early pithouse farming communities (see Matson 1991; Smiley 1993, 1994, 1997; Wills 1992, 1995). These developments to the south have been paralleled by a number of recently investigated sites north of the Anasazi area that have revised our conceptions of preceramic maize farming on the northern Colorado Plateau and adjacent areas (Tucker 1986; Wilde and Newman 1989; Jett 1991; McKibbin 1992; Stiger and Larson 1992; Geib 1993; Coltrain 1994; Talbot and Richens 1994; Greubel 1996). The Confluence Site is among these.

The Confluence Site (42EM1887) is a preceramic pithouse village near Muddy Creek in central Utah (Figure 1). It was first documented during the Interstate-70 Castle Valley to Rattlesnake Bench archaeological survey in 1984 (Brown 1985). Site testing by Abajo Archaeology in 1987 revealed the presence of buried cultural deposits and charcoal-stained horizons, and established the high research potential of the site (Westfall 1988). The Utah Department of Transportation (UDOT) subsequently contracted with the University of Pittsburgh's Cultural Resource Management Program (CRMP) to conduct mitigative excavations at the Confluence Site and 10 other prehistoric sites along Interstate-70, in advance of highway construction work. This data recovery project was carried out during the winter of 1988-89, resulting in a descriptive interim report (Quinn et al. 1991). Alpine Archaeological Consultants, Inc. acquired the project in 1992, contracting with UDOT to conduct analyses of the materials and data recovered from the sites, and to prepare a final project report (Greubel 1996).

The CRMP's investigations on the Confluence Site included an exploratory phase during which several long backhoe trenches were excavated (Figure 2). This resulted in the discovery of a number of deeply buried structures and features. At the end of the field phase of the investigations, five shallow pithouses, five bell-shaped pits, and a variety of hearths, small pits, and roasting features had been excavated. The majority of the features are associated with a single preceramic component.

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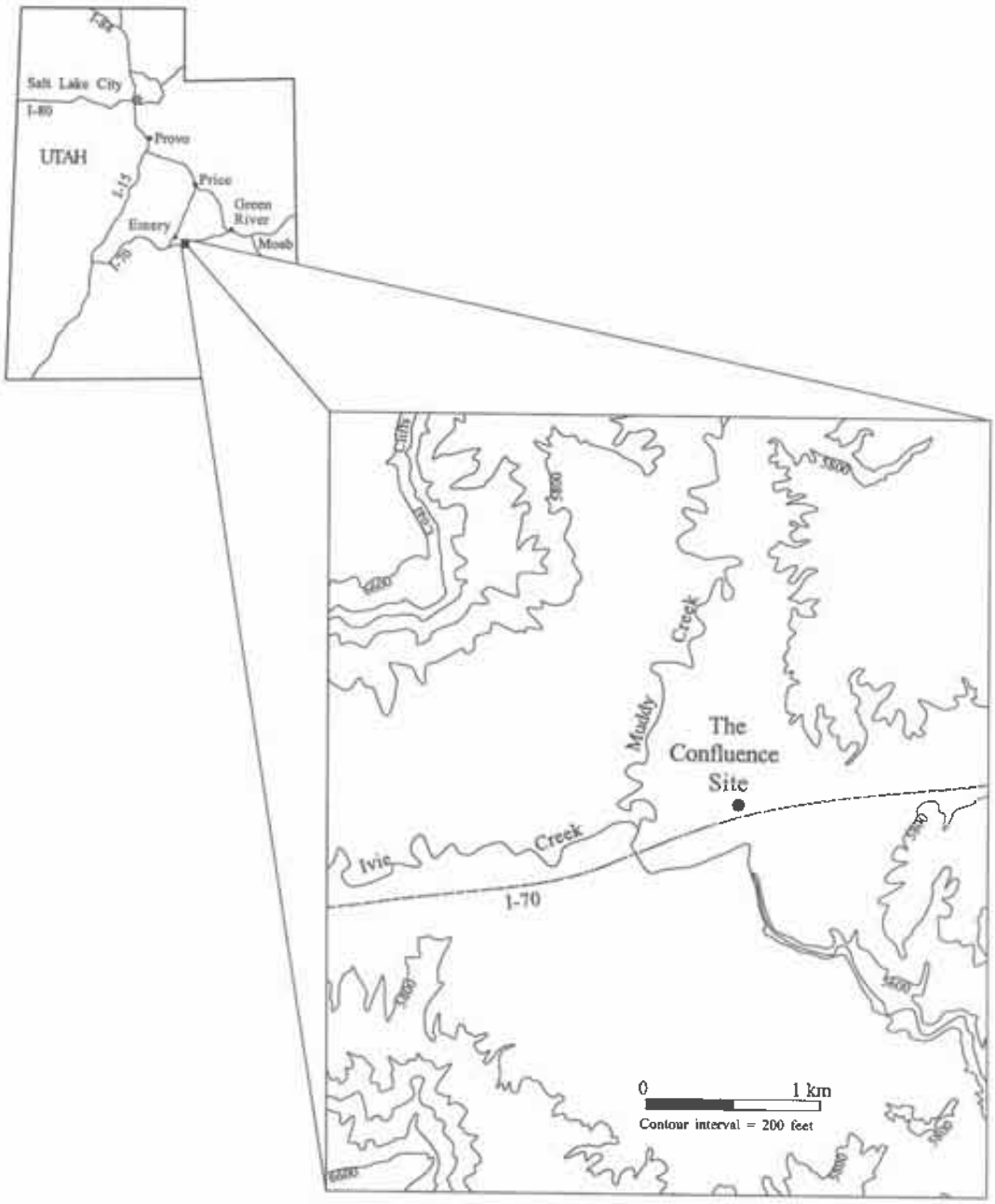

Figure 1. Location of the Confluence Site.

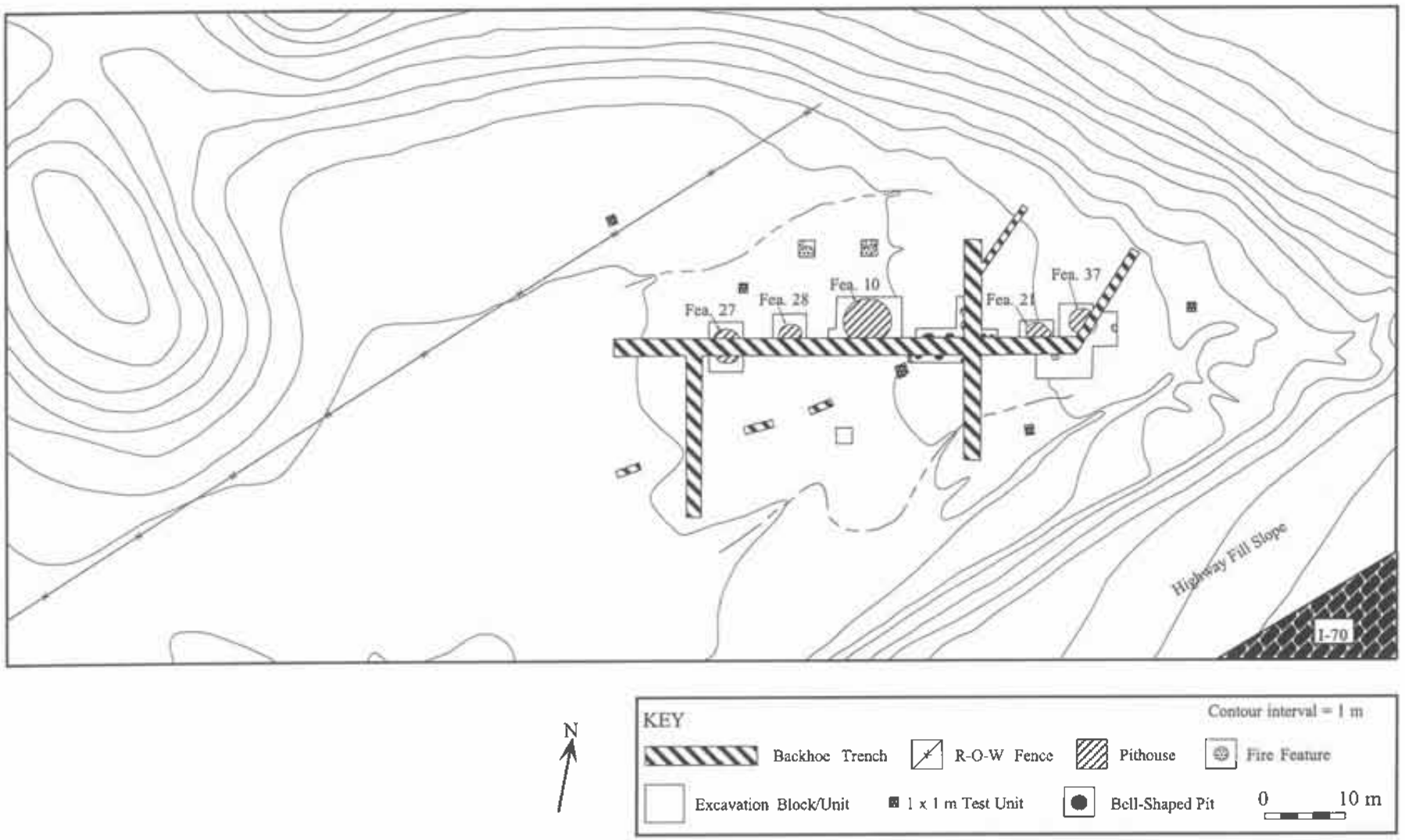

Figure 2. The Confluence Site (42EM1887).

SETTING

The Confluence Site is located in Emery County, Utah, approximately 100 km (62 miles) west of Green River, on a Quaternary eolian-alluvial terrace at the eastern border of the Muddy Creek floodplain (Figures 3 and 4). It lies near the confluence of Ivie and Muddy Creeks at an elevation of 1,722 m (5,650 ft), abutted on its northern and eastern edges by massive talus boulders below a low cliff face of Dakota sandstone. A Pleistocene gravel terrace remnant bounds the site to the west, and likely provided a source of serviceable toolstone. Most of the site was destroyed during construction of the westbound lane of Interstate 70.

Site vegetation is dominated by rabbitbrush, sagebrush, greasewood, blackbrush, prickly pear, Mormon tea, broom snakeweed, four-wing saltbush, squawbush, blue grama and other grasses, and a few juniper trees. Nearby riparian flora includes Fremont poplar, sandbar willow, foxtail chess, galleta, common reed, and Fremont barberry.

DATING AND CULTURAL COMPONENTS

Three cultural components were defined at the Confluence Site on the basis of stratigraphy, radiocarbon dating, and, to a minor extent, artifact cross-dating. Component 1 consists of materials recovered from Stratum 6, one of the lowermost strata defined at the site. These materials are presumed to represent an Archaic occupation, or occupations, based on their relationship to dated materials from superior strata. Component 2 comprises at least two occupations that embrace the majority of the 52 identified cultural features. The upper boundary of the strata containing Component 2 materials, including Stratum 7, Stratum 8, and the lower portion of Stratum 9, occurs 60-80 cm below the modern ground surface in the central site area. This group of strata ranges from approximately 70 cm to over 1 m in thickness. Component 3, stratigraphically superior to Component 2, is present in Stratum 11 and the upper portion of Stratum 9. It is regarded as an admixture of short-term Fremont occupations, likely dating between A.D. 700-1000, on the basis of diagnostic lithics and ceramics and one radiocarbon assay. This paper focuses principally upon Component 2, defined as a preceramic Fremont component with pithouse architecture and a subsistence pattern focused on maize horticulture. Because few such sites have been investigated in the Fremont culture area, chronology, architecture, feature types, material culture, and subsistence are described in some detail.

Dating at the Confluence Site was not straightforward. A perusal of the radiocarbon dates (Table 1) gives the impression that the site was occupied continuously for more than a thousand years, and that features associated with the preceramic component potentially date as early as the first century A.D., and as late as the Bull Creek phase of the San Rafael Fremont, A.D. 1000-1200 (Black and Metcalf 1986). I do not believe this to be the case. Stratigraphic associations and the homogeneity of features and artifact assemblages suggest a much briefer period of occupation. A closer examination of the radiocarbon dates resolves some of this discord. Radiocarbon dating is a probabilistic method and any series of radiocarbon dates—even if contemporaneous—can be distributed over a considerable range of radiocarbon years (Schiffer 1987; Shott 1992). Rather than accepting radiocarbon dates at face value, it is more fruitful to consider them raw data in need of careful interpretation. To achieve this goal, a combination of careful consideration of sample context, stratigraphic associations, and appropriate statistical treatment was employed. Pooled means of radiocarbon ages were calculated, following the procedure set forth in Ward and Wilson (1978) and using the CALIB *rev4.1* software program. Shott has recently discussed the pros and cons of averaging radiocarbon dates, concluding that "there are no a priori grounds for rejecting an approach that pools or averages assays" (Shott 1992:212). First, ^{14}C ages thought to date a period of occupation on the basis of stratigraphic or artifactual evidence

Figure 3. Overview of the Confluence Site before excavation, looking west.

Figure 4. Overview of the Confluence Site after excavation, looking northeast.

Table 1. Radiocarbon Assays from the Confluence Site.

Feature or Stratum Association	Radiocarbon Age B.P.	Calibrated Range 1 sigma (A.D.)	Calibrated Range 2 sigma (A.D.)	Laboratory No.
F-37, pithouse floor	1730 ± 85 (99†)[c]	220-420	80-550	PITT-552
F-1, bell-shaped pit	1645 ± 90 (103†)[a]	260-540	130-640	PITT-490
F-53, subfloor pit on F-29 floor	1560 ± 70 (86†)[a]	410-600	130-660	Beta-60746
F-16, hearth on F-10 pithouse floor	1535 ± 35 (61†)[a]	430-600	410-650	PITT-568
F-24, extramural hearth associated with F-21	1520 ± 80 (94†)[a]	430-640	265-680	Beta-60743
F-22, hearth on F-21 pithouse floor	1510 ± 80 (94†)[a]	430-640	340-685	PITT-565
Carbonized maize from F-4, extramural hearth	1450 ± 60 (78†)‡[a] (^{13}C corrected)	540-660	430-760	Beta-76002
F-26, hearth in F-10 pithouse postoccupational fill	1405 ± 35 (61†)[b]	600-665	540-760	PITT-567
F-27, pithouse floor	1290 ± 90 (103†)[b]	660-880	560-980	Beta-60744
F-31, slab-lined extramural hearth	1240 ± 80 (94†)[b]	670-890	640-1000	Beta-60745
Carbonized maize from F-37, pithouse floor	1150 ± 110 (121†)[b] (^{13}C corrected)	695-1020	655-1160	Beta-76001
F-5, bell-shaped pit	1120 ± 130 (139†)[c]	780-1030	650-1220	Beta-60742
F-50, hearth	1070 ± 95 (107†)	880-1040	720-1220	PITT-544
S-8	875 ± 80 (94†)[c]	1030-1280	990-1300	PITT-569
F-22, hearth on F-21 pithouse floor	815 ± 140 (149†)[c]	1040-1300	900-1420	PITT-566
Feature 21, pithouse floor	305 ± 120 (130†)[c]	1450-1950	1400-1950	PITT-514
Probable krotavina	205 ± 95 (107†)[c]	1640-1950	1450-1950	PITT-562

† This standard deviation includes additional variance (f^2) of 50^2.
‡AMS date.
Note: All samples were composed of wood charcoal except for Beta-76001 and Beta-76002, which were carbonized maize cob fragments.
[a]These six dates were pooled to produce a mean radiocarbon age of 1530 ± 34 B.P. (cal A.D. 410-650 at 2 sigma)
[b]These four dates were pooled to produce a mean radiocarbon age of 1317 ± 44 B.P. (cal A.D. 620-885 at 2 sigma).
[c]These six dates were rejected due to contextual incompatibility.

were tested for contemporaneity. Dates from the site fit Ward and Wilson's "Case II" situation, where the ^{14}C ages are derived from samples known *not* to be from the same object (1978:20), but can be statistically demonstrated to be consistent with a one age sample population. An average of the radiocarbon ages was calculated for those samples found to be statistically the same ($\alpha=0.05$). Following Clark (1975, as cited in Ward and Wilson 1978:23; Stuiver and Reimer 1993:226), an additional variance (f^2) of 50^2 was included in the calibration calculations. The addition of variance to account for sources of variance other than the laboratory count rate statistics, on which the radiocarbon age standard deviation is based (Stuiver and Reimer 1993; Stuiver et al. 1998), conforms with standard statistical methods. It is not argued that dates found to be statistically contemporaneous are dating a single event; rather, they are seen as dating a series of events closely spaced in time, the temporal span of which is bracketed by the calibrated, two standard deviation range of the resulting pooled average.

Seventeen radiocarbon dates were obtained from primarily feature-associated proveniences at the Confluence Site (Table 1). Six dates were rejected for contextual incompatibility or other reasons. Ten dates represent Component 2 and one date is associated with a Component 3 feature. The ten Component 2 dates are further divided, primarily on the basis of stratigraphic associations, into two groups that appear to date early and late occupations within the component. Six dates are associated with the earlier occupation, four with the later.

The rejected dates require some discussion. Beta-60742, with a calendrical range of cal A.D. 650-1220 (2 sigma), was derived from a sample of wood charcoal collected from the fill of Feature 5, a bell-shaped pit. Feature 5 originated in the upper zone of Stratum 7, near the contact between Strata 7 and 8. Other features that originated at or near this contact are confidently dated to a somewhat earlier range of radiocarbon years representing the earlier of the two Component 2 occupations. The Feature 5 sample would seem to be too late to date the actual use of the pit, and probably represents charcoal from a later occupation that washed in after abandonment. Two of the three radiocarbon dates from Feature 21 obtained by the University of Pittsburgh's radiocarbon lab—PITT-514 and PITT-566—are rejected for much the same reason: the feature they supposedly date is stratigraphically associated with other features that are securely dated to a considerably earlier period. It is also worth noting that the Pittsburgh investigators essentially rejected these dates as well, citing factors that cast doubt on the integrity of the samples (Quinn et al. 1991). PITT-552, a wood charcoal sample from the floor of Feature 37, yielded the earliest date from the site. It is rejected as "old wood" because it is at odds with a much later date obtained from a maize cob from the same context, a date that is accepted because it agrees with the stratigraphic evidence and is consistent with other dates suggesting a late Component 2 occupation. The remaining two dates, PITT-562 and PITT-569, are almost irrelevant; the former is exceedingly late and is associated with material from a rodent burrow that was apparently mistaken for a cultural feature, and the latter is a non-feature date from Stratum 8 that likewise probably represents contamination. Neither of these samples appear to relate directly to Component 2 and both, therefore, are rejected.

Ten radiocarbon assays appear to accurately represent Component 2. They are divided into two groups on the basis of stratigraphic associations (Table 1). The earlier group is represented by six samples that came from features that originated in the upper zone of Stratum 7 or at the contact between Strata 7 and 8. The later group, represented by four samples, was acquired from features that originated high in Stratum 8 or near the base of Stratum 9. The dates from the earlier group were found to be statistically contemporaneous ($t=2.39$) and were pooled to produce a mean radiocarbon age of 1530 $\pm$ 34 B.P., having a calendrical range of cal A.D. 410-650 (2 sigma). Similarly, the dates within the later group were determined to be contemporaneous with each other ($t=4.57$) and were pooled to produce a mean radiocarbon age of 1317 $\pm$ 44 B.P., which has a calendrical range of cal A.D. 620-885 (2 sigma). These two calibrated calendrical date ranges represent two discrete Component 2 occupations at the Confluence Site.

STRUCTURES AND FEATURES

A wide variety of features were ascribed to Component 2, including 5 pithouses, 18 intramural features, 6 extramural, bell-shaped pits (one of which was not excavated), 22 extramural hearths, pits, and miscellaneous features, and 1 anomalous feature (Feature 29) that may represent a pithouse or a highly disturbed intramural pit.

Pithouses

Feature 10. Feature 10 was the largest pithouse excavated at the Confluence Site. It was circular in plan and saucer-shaped in profile, 7 m in diameter and a maximum of 30 cm deep (Figures 5 and 6). The pithouse basin originated at the interface of Stratum 7 and Stratum 8, its central portion resting upon Stratum 6. The Feature 10 floor consisted of the original floor surface and up to 8 cm of overlying floor deposits comprising a grayish-brown, fine sand with charcoal inclusions. These deposits are seen as having accumulated gradually over the life of the structure, probably as a consequence of intensive occupation that introduced much ash and organic refuse, as well as outside sediments. Ten intramural features originated on the pithouse floor or within the floor deposits, including one central hearth; six possible fire features, ash dumps, or heating pits; two small pits, and one larger, irregularly shaped pit. Fourteen to seventeen postholes were identified, most of these occurring on or near the pithouse perimeter. Profiles of the postholes indicate that the perimeter posts leaned inward at angles ranging from 50° to 60°, with a mean angle of 54°. At least one interior feature, 25 cm in diameter, is believed to represent a posthole for an upright roof support post. Evidence of collapsed structural beams or posts was found in the eastern half of the pithouse, consisting of four decomposed logs in a partial radial arrangement, lined in places with a green or lightly oxidized adobe, resting atop the floor deposits. These appear to have been sidewall leaner posts extending inward from the perimeter of the structure. An apparent ramp entryway was present at the northeast edge. There was no evidence that the structure burned.

Figure 5. View of the big pithouse (Feature 10), with metates *in situ*.

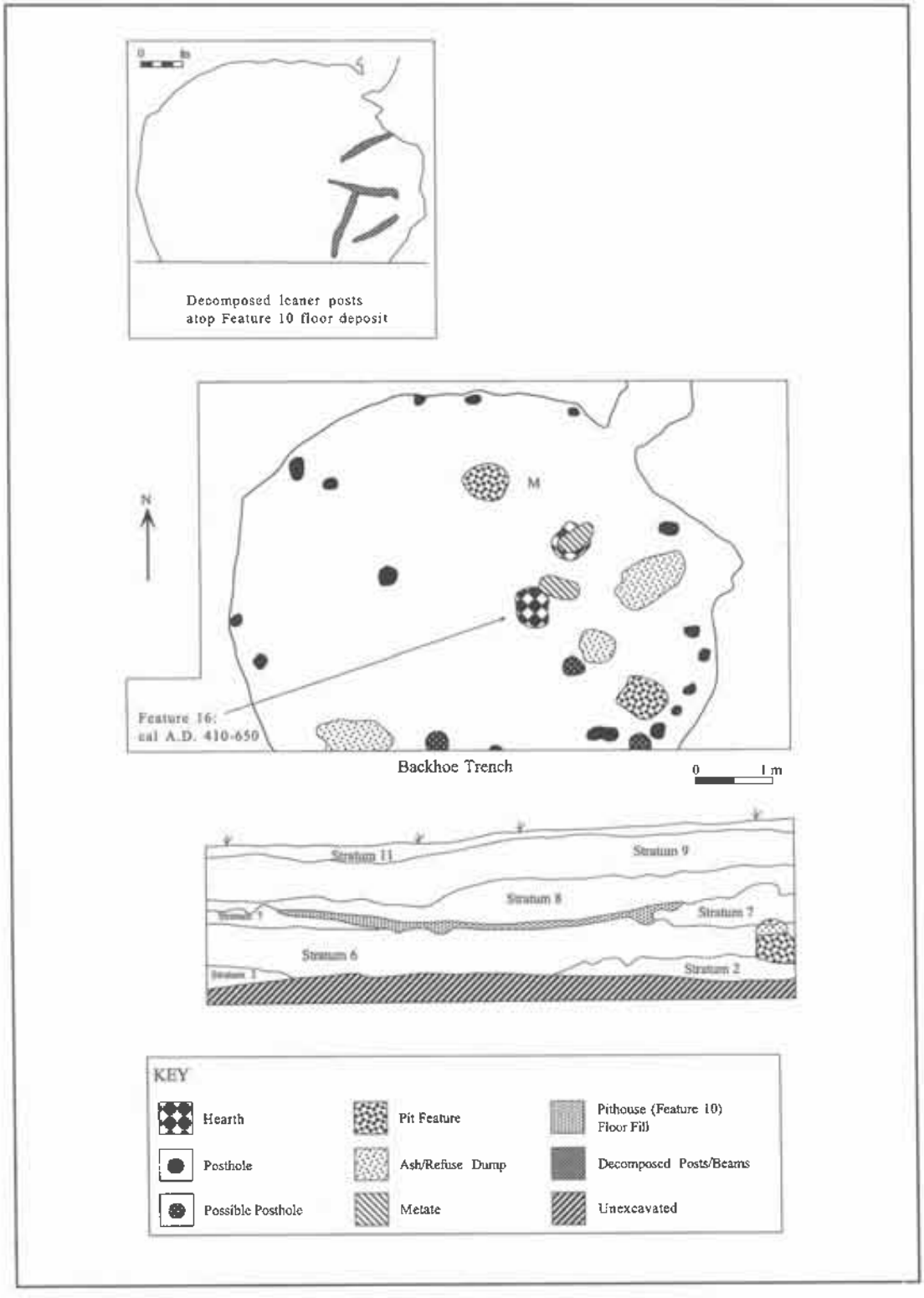

Figure 6. Plan and profile of the big pithouse (Feature 10).

Floor Artifacts. Because the excavators did not differentiate artifacts found in the floor deposits from those resting on the original floor surface, the patterning seen in the distribution of these artifacts cannot be confidently interpreted as the residue of discrete, individual use episodes; more likely, it reflects trends in the spatial organization of activities spanning the use-life of the structure. This is true for all of the Confluence Site structures, which all exhibited accreted floor deposits that were excavated using similar methods. With this caveat in mind, some very pronounced spatial patterning was seen in the floor assemblage. Two metates, a hammerstone, and several flake tools were associated with the central hearth and represent an apparent work station associated with food processing. An assemblage consisting of bifacial tools, projectile points, flake tools, debitage, and microdebitage was largely restricted to the northern portion of the house, and seems to indicate a focus on lithic manufacture and perhaps maintenance of hunting equipment and other gear. Another cluster of flake tools was noted in the southwestern quadrant of the house. Jet beads and bead manufacturing debris were recovered from units in the central and southern areas of the floor. The areas of the floor with the fewest artifacts were immediately west of the central hearth (Feature 16), and along the western edge of the house interior. High lithic densities were noted in units outside of the house boundary, adjacent to the entrance, suggesting either an extramural lithic workshop near the house entryway, or a doorway refuse dump. Nothing is known, of course, of the southern edge of the house, which was truncated by the backhoe trench.

Feature 21. Feature 21 consisted of a pithouse floor and floor deposits. In plan view it was ovate, comprising a shallow basin in profile (Figure 7a). Its widest dimension after backhoe truncation was 3 m. Its maximum original dimension before backhoe truncation was less than 5 m, with a maximum depth of 33 cm. The floor deposits, composed of grayish-brown fine sand with charcoal fragments, were a maximum of 13 cm thick, with an average thickness of 6 cm. The pithouse basin originated at or slightly below the base of Stratum 8, near the Strata 7/8 interface. The floor lay upon both Strata 6 and 7. No entryway was apparent. Two intramural hearths originated on the pithouse floor. Ten postholes were identified along the perimeter of the floor. Based on the presence of burned adobe and substantial quantities of charcoal in the post-occupational fill overlying the floor deposits, the structure may have burned.

Floor Artifacts. A considerable amount of Feature 21 was lost during backhoe trenching, hampering interpretations of intramural activities. Nevertheless, some simple statements can be made on the basis of the distributions of artifacts in the intact northern portion of the house. Artifacts, consisting of flake tools, a hammerstone, and debitage, were clustered close to the house walls. No ground stone was recovered. Overall, the artifactual data suggest either that activities were conducted away from the center of the house or that the central area was periodically cleaned and larger items were swept or manually placed close to the walls.

Feature 27. Feature 27 consisted of a pithouse floor and overlying floor deposits. In plan view the structure floor was circular, with a saucer-shaped profile, measuring 4.2 m long by 3.6 m wide (Figure 7b). The floor deposits were an average of 10 cm thick, with a maximum thickness of 14 cm. These deposits consisted of an oxidized fine sand, interspersed with areas of unburned, lighter colored sediments. The pithouse basin originated in Stratum 8 and was a maximum of 20 cm deep, resting upon Stratum 7. No entryway was apparent. No intramural hearths or pits were identified on the pithouse floor, possibly because the central portion of the floor was removed by backhoe trenching. Eight perimeter postholes were identified. Burned roofing material in the form of a patterned cluster of carbonized twigs was found on the surface of the floor deposits in the northern half of the structure.

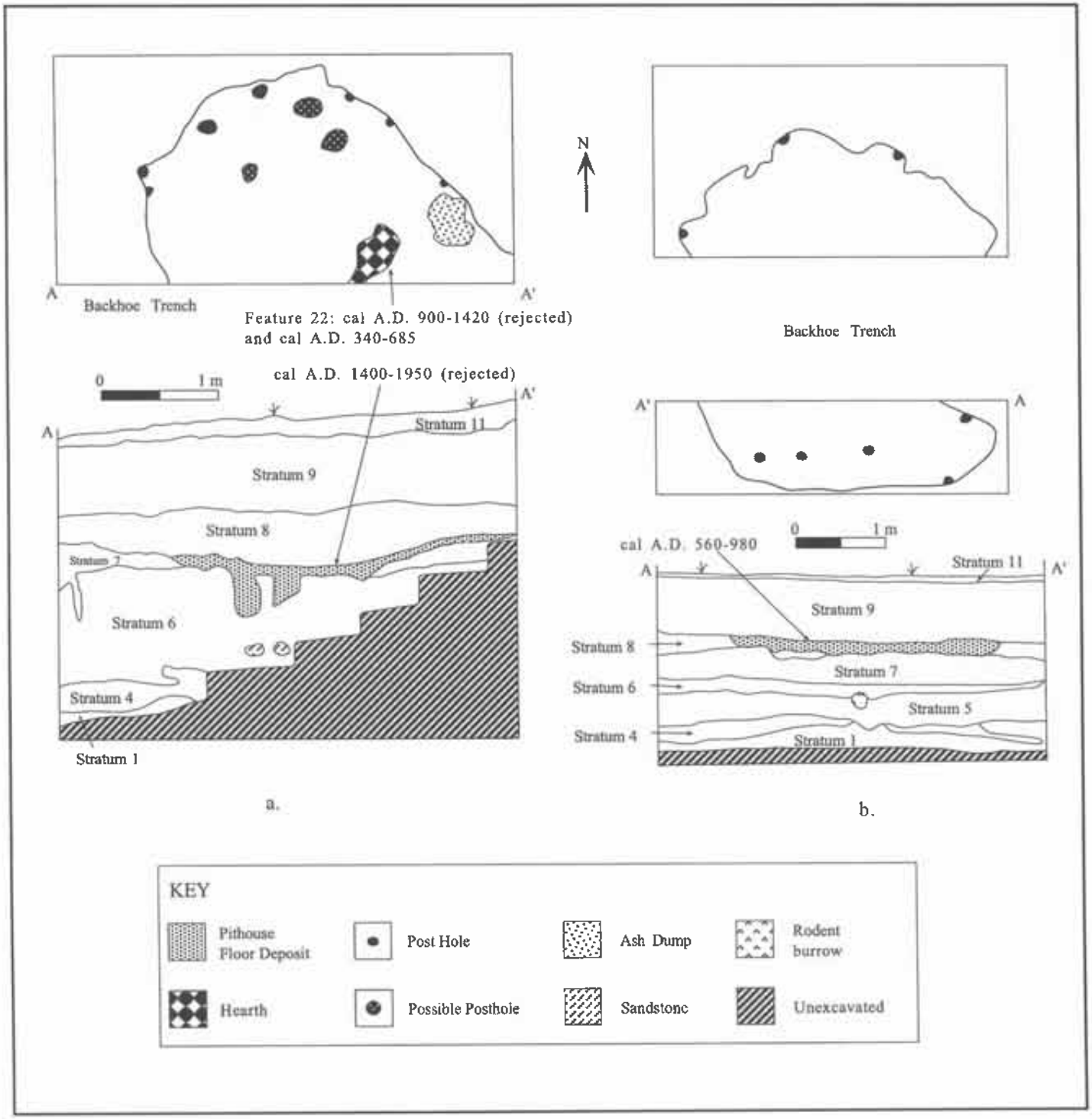

Figure 7. Plans and profiles of pithouses: a) Feature 21 and b) Feature 27.

Floor Artifacts. Like Feature 21, interpretations of interior use of space in this structure are limited by the destruction wrought by backhoe trenching. However, the intact portions of the floor yielded a small but relatively diverse assemblage of tools. Two arrow points, two drills, a hammerstone, seven flake tools, two unusual hafted knives (or combination knife/drills) with concave blade edges, and a considerable amount of debitage were recovered from the northern portion of the house floor. The southern portion of the structure, in comparison, yielded two manos, a hammerstone, one arrow point, three flake tools, and a small quantity of debitage.

Feature 28. Feature 28 was a pithouse floor and 10 cm of floor deposits. In plan view it was roughly circular, and formed a saucer or shallow basin in profile (Figure 8a). It measured 3.2 m east-west. Its north-south dimension was incomplete due to backhoe trenching. The floor deposits, described as a fire-reddened fine sand with charcoal inclusions, were an average of 10 cm thick, with a maximum thickness of 17 cm. The Feature 28 basin, a maximum of 15 cm deep, originated in Stratum 8, resting upon Stratum 7 along most of its length. No entryway was apparent. One intramural feature, a probable hearth, originated on the pithouse floor. A second, possible, intramural feature was Feature 29, which was either a heavily disturbed pit that originated on the structure floor or a portion of an earlier pithouse upon which Feature 28 was constructed. No postholes were recognized in association with the Feature 28 floor. There was no evidence that the structure burned.

Floor Artifacts. The floor of the Feature 28 pithouse was relatively free of tools, compared to other structures. One mano, one arrow point, one biface flake tool, a bead, and a substantial amount of debitage were recovered from the floor deposits. The mano was found adjacent to a small hearth.

Feature 37. Feature 37 was a pithouse floor and overlying, stratified, floor deposit. In plan view the pithouse was circular, measuring 3.6 m north-south by 3.4 m east-west, with a saucer-shaped profile (Figure 8b). The floor deposits were a maximum of 20 cm thick. Unlike the other structures, the Feature 37 floor deposits exhibited stratification, with internal charcoal stained layers separated by relatively clean sand strata, suggesting two or more discrete occupations. The pithouse basin originated in the lower portion of Stratum 9, and was underlain by Stratum 7 (Stratum 8 was not present in this area of the site). No entryway was defined for the structure. Three features originated on the pithouse floor. One was clearly a hearth; the other two were perhaps cooking features or ash pits. Six postholes were identified along the perimeter of the structure. As many as five were present in the central floor area. A decomposed post backed with unburned adobe lay on the structure floor along the eastern edge of the interior. There was no evidence that the structure burned.

Floor Artifacts. One mano fragment was recovered from the central floor area near the hearth and other features. Flake tools also were clustered in the central units, as was lithic debitage. Thus, there seems to be substantial evidence that domestic activities took place within a circumscribed area surrounding the central hearth and ancillary features. In addition, two bifaces, a hammerstone, and several flake tools were recovered from units nearer the periphery of the house floor, possibly signifying that activities requiring these tools were conducted in areas away from the hearth.

Discussion of Pithouses

The Confluence Site pithouses seem to evidence similar methods of construction. A circular to slightly oval, shallow basin or saucer-shaped pit, ranging from 15 to 30 cm deep, was excavated. Floor preparation consisted of

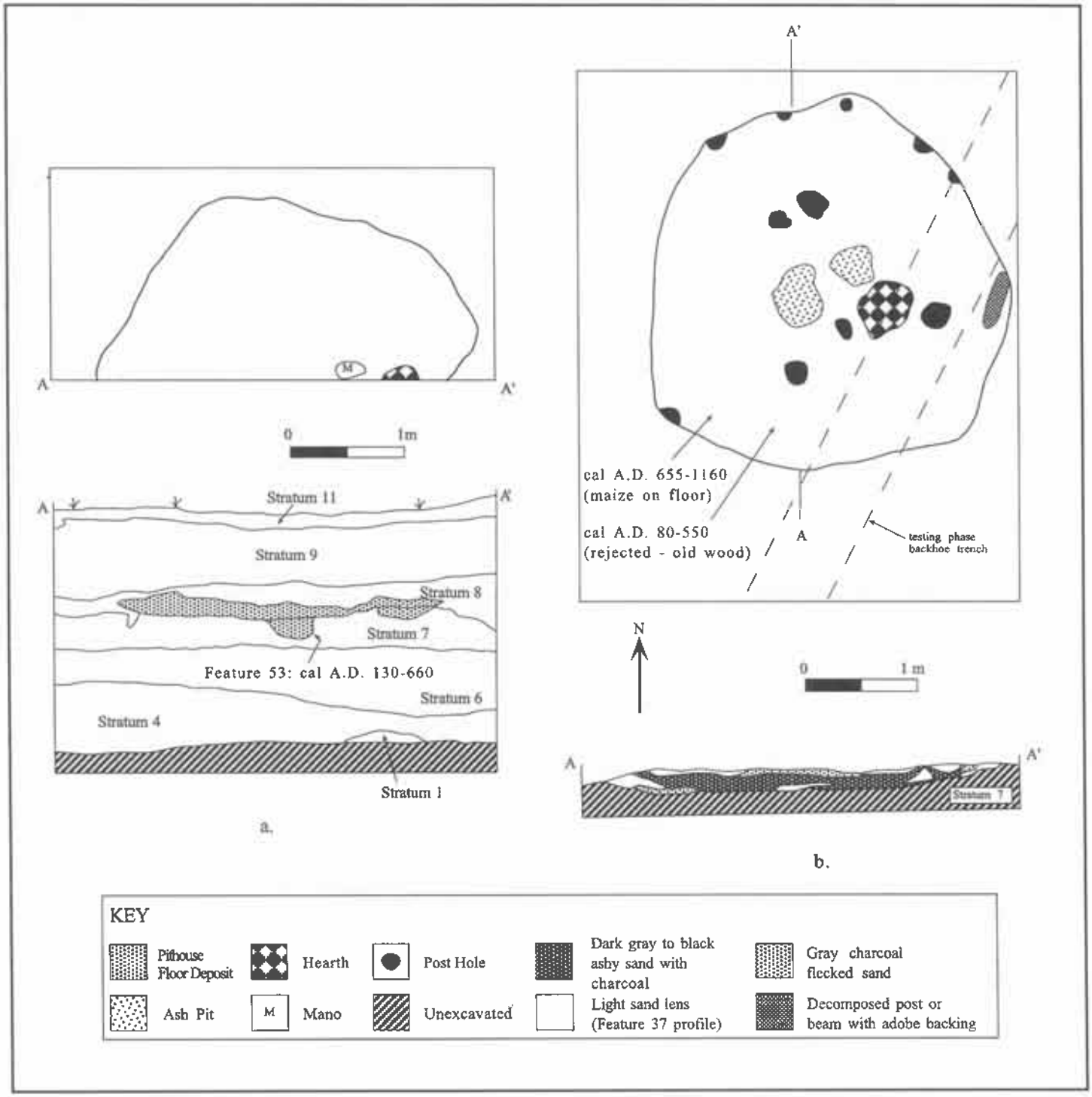

Figure 8. Plans and profiles of pithouses: a) Feature 28 and b) Feature 37.

smoothing and packing the native sediments. A series of posts, probably of juniper, were set into postholes, ranging from 4 to 19 cm in depth, along the perimeter of the floor and leaned inward to rest upon multiple stout roof supports, at least in the larger structures. The leaner posts of the smaller structures exhibited angles from 42° to 48°. Those of the big pithouse, Feature 10, ranged from 50° to 60°. The identification of sagebrush, cottonwood or willow, and reed culm within a vegetal sample taken from suspected roof fall in the big pithouse suggests that this framework was further covered with light brush and reeds. Further evidence of the nature of the vegetal closing material was the carbonized wattle seen in Feature 27. Adobe, which was identified in three of the pithouses (Features 10, 21, and 37), was apparently applied over these closing materials. The two smallest domiciles (Features 21 and 28) had no clear evidence of central roof support posts. Possibly, these structures consisted of poles arranged in a conical fashion over the shallow floor basin, and then finished like the larger structures with brush and mud. It is even possible that Features 27 and 28, where no adobe was identified, were finished with brush only. Whether jacal or brush, such structures would have been more similar to protohistoric Navajo forked-stick hogans (e.g., Reed and Horn 1990) than to Basketmaker or later Fremont pithouses. The only structure with clear evidence of an entrance is Feature 10, the big pithouse, which exhibited a ramp entryway. The other structures may have been entered through a simple break or partition in the wall.

The floor features, like the floor artifacts, likely reflect the nature and complexity of intramural activities. Although they were probably created over a number of years of occupation and only a few may have been in use simultaneously, the numerous and heterogeneous features associated with the floor of the big pithouse suggest that a variety of activities were conducted within the structure, a conclusion that is supported by the diverse floor artifact assemblage. In contrast, the few hearths and ash pits present on the floors of the smaller structures—in particular, Features 21 and 28—imply fewer and less complex intramural activities, perhaps mainly sleeping and occasional craft work and food preparation.

The patterning of floor artifacts reflects the organization of activities within the structures, which in turn reveals something about social organization, seasonality, and subsistence. While a detailed consideration of this subject is beyond the scope of this paper, it points to a more general issue of great importance—the nature of the ashy, charcoal-stained deposits that yielded the artifacts. The possibilities that these deposits, which rested atop the floor surfaces, represent roof fall, postoccupational fill, or even evidence of the construction of multiple floors were considered, and ultimately discarded (with the exception of Feature 37). There are clear indications, instead, that the deposits represented gradually accreted floors. The most direct evidence was the presence of roof materials and large, relatively immobile artifacts such as metates, found resting on the *upper surfaces* of the deposits; the former was seen in Features 10 and 27, the latter in Feature 10. Furthermore, the patterned distributions of artifacts within the pithouse floor deposits are strong evidence that the floor fills were culturally deposited, and are not roof fall or postoccupational fills. Ethnoarchaeology studies have demonstrated that dirt floors are dynamic and can grow vertically at a surprising rate. In an earthen-floored dwelling in Ecuador, 5-7 cm of deposits were documented on heavily utilized portions of the floor after only four years of occupation—despite daily sweeping; floor deposits up to 20 cm deep were seen in dwellings that were occupied for a longer period of time (Stahl and Zeidler 1990:154). These deposits were largely anthropogenic, composed primarily of ash and food refuse, compacted by foot traffic. Other materials contributing to house floor buildup might include sediments washed, blown, tracked, scuffed, or incidentally carried into the structure during its occupation, eroding roof sediments filtering or dribbling down onto the floor (Schiffer 1987:228), and even artifacts themselves as they become trampled into the floor sediments. Given these processes, it is not difficult to imagine that an earthen house floor could accumulate substantial deposits over a lengthy period of intensive occupation.

The artifacts that accumulated within the structure floors at the Confluence Site are likely composed of several

classes of materials: provisional refuse, comprising items set aside for eventual disposal, such as broken or dulled lithic tools that nonetheless retained some reuse potential (Hayden and Cannon 1983; Schiffer 1987); primary deposits of small refuse (e.g., debitage, bead scrap) with low "hindrance" potential (Hayden and Cannon 1983); de facto (abandonment) refuse (Schiffer 1987); as well as items that were simply lost or misplaced and ultimately became incorporated into the thin churn zone that must have existed at the upper surface of the constantly growing floor deposit. Table 2 lists lithic tools recovered from pithouse floors.

Bell-Shaped Pits

Six bell-shaped pits were identified during data recovery at the Confluence Site, all exposed in the walls of a 57-m-long, east-west oriented backhoe trench. The bell pits were clustered to the east of the big pithouse. All but one were excavated. Table 3 presents stratum associations and dimensions of the pits.

The pits were bell-shaped in profile, with fill consisting of alternating microstrata of sand and charcoal, and occasionally fire-cracked rocks (Figures 9-11). The sides of the pits demonstrated no evidence of fire hardening.

Flotation samples were taken from deep within the pit fill; pollen samples were acquired from scrapes at the base of the pits. Table 4 lists macroflora and pollen observed in pit fill samples.

The macrofloral remains recovered from the pits are similar to those recovered from other site contexts, such as intramural and extramural hearths. This similarity, and the burned condition of the economic taxa, suggests that these materials were secondarily deposited from other contexts and are not fossils of resources that were stored within the features. The pits were apparently emptied at abandonment, remaining open for an unknown period of time and refilling gradually. In contrast to the macrobotanical evidence, the pollen evidence may indicate that maize, chenoam, and, possibly, prickly pear plant parts were stored within the features (Gish 1996). Based primarily on morphology and secondarily on pollen, the pits are interpreted as food storage facilities.

Table 2. Lithic Tools from Pithouse Floor Deposits at the Confluence Site.

Pithouse	Utilized Flake	Retouched Flake	Biface	Hafted Knife	Projectile Point	Drill	Metate	Mano	Total Tools
Feature 10*	46	10	6	—	3	—	2	—	67
Feature 21	11	3	—	—	—	—	—	—	14
Feature 27	11	2	—	2	3	3	—	2	23
Feature 28	2	1	1	—	1	—	—	1	6
Feature 37	10	1	2	—	—	—	—	1	14

* Feature 10 also contained a small hafted scraper.

Table 3. Details of bell-shaped pits at the Confluence Site.

Pit	Stratum of Origin	Maximum Depth	Maximum Width	Radiocarbon Date
Feature 1	Unknown	Unknown	114 cm	cal A.D. 130-640
Feature 3	Stratum 7	104 cm	145 cm	---
Feature 5	Upper Stratum 7	99 cm	125 cm	cal A.D. 650-1220
Feature 8	Interface of Strata 7 & 8	97 cm	194 cm	---
Feature 9	Interface of Strata 7 & 8	112 cm	162 cm	---
Unexcavated	Lower Stratum 7	ca. 95 cm	ca. 195 cm	---

Table 4. Results of flotation and pollen sampling of bell-shaped pits at the Confluence Site.

Pit	Charred Plant Remains Present	Pollen Present[1]
Feature 1	maize cupule fragments, goosefoot seeds	maize, cheno-am
Feature 3*	maize cupule, goosefoot seeds	maize, cheno-am, prickly pear
Feature 5*[2]	maize cob fragments, goosefoot seeds	maize
Feature 8*	maize kernel, maize cupule, goosefoot seeds	prickly pear
Feature 9*	maize cupule, maize cob fragment, maize glume	cheno-am

*These samples were only scanned.
[1]Only potentially economic pollen is listed here.
[2]Maize cob fragments were recovered in the field from the fill, but were not seen in the flotation sample.

Figure 9. Bell-shaped pit (Feature 3) in profile prior to excavation, looking south.

Figure 10. Bell-shaped pit (Feature 5) prior to excavation, looking south.

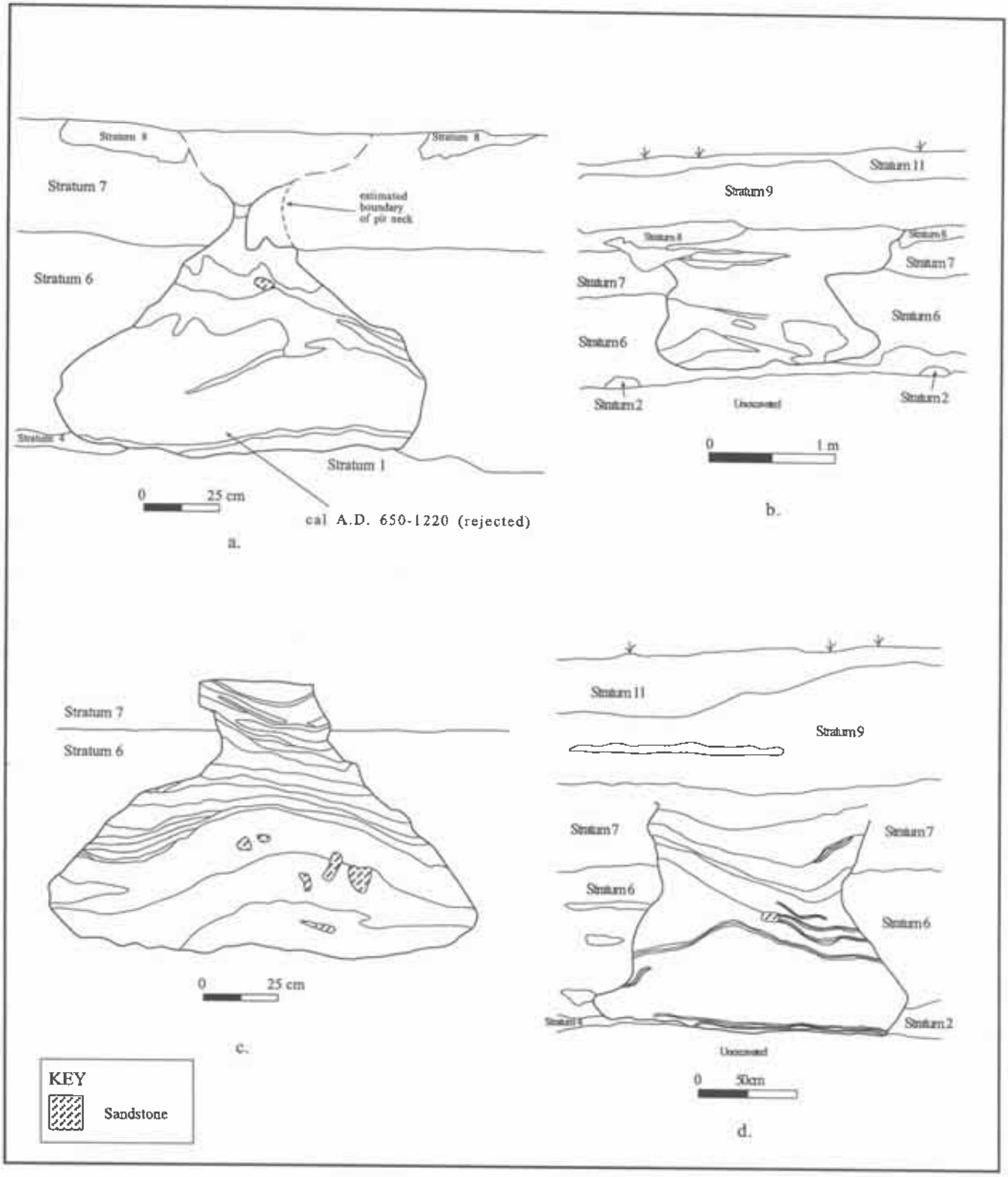

Figure 11. Bell-shaped pits of the Confluence Site: a) Feature 5, b) Feature 8, c) Feature 3, and d) Feature 9.

Other Extramural Features

Hearths. Eleven extramural hearths were excavated (Features 4, 6, 7, 24, 25, 32-35, 44, and 49). This group of features includes prepared, basin-shaped hearths; large, possibly multiple-burning-episode surface hearths or roasting features; and expedient hearths ranging from 18-78 cm in diameter and from 2-17 cm thick. In general, the features yielded charred goosefoot seeds and maize. The few hearths for which pollen analysis was conducted produced maize and prickly pear pollen.

Slab-Paved Hearth or Roasting Pit. One slab-paved hearth or roasting pit, Feature 31, was excavated. This feature, located to the east of the big pithouse, consisted of a deep pit with its base lined with oxidized sandstone slabs and a large slab metate leaning against the western wall. It was round in plan view, steep-sided and flat-bottomed, measuring slightly over 72 cm long by 68 cm wide by 37 cm deep. A large Elko corner-notched knife and a utilized flake were recovered from the fill. Prickly pear pollen was identified in the pollen sample, and charred goosefoot seeds and maize were found in the fill.

Disturbed and Deflated Fire Features. Five large, irregularly shaped features (Features 36, 42, and 45-47) proved difficult to interpret. Three of the features (45-47) were located north of the big pithouse and were incompletely excavated. They ranged from 80 cm to over 2 m in diameter, with depths of 14-15 cm. The large size and dispersed nature of these features suggest that they were hearths or clusters of hearths disturbed by intensive foot traffic and other human activity, or deflated and enlarged by postoccupational erosion. In general, these messy features produced numerous artifacts and moderate quantities of charred maize, goosefoot, and other plant seeds. One of the features contained burned cottontail bone and a mountain sheep molar.

Unexcavated Extramural Features

Five features (Features 41, 43, 48, 51, and 52), identified in the walls of backhoe trenches and 2 m by 2 m excavation units, were not excavated. Based on the profiles, these features likely represented extramural hearths.

ARTIFACTS

Component 2 strata and features at the Confluence Site yielded a large assemblage of lithic artifacts, comprising over 14,000 pieces of lithic debitage, 133 bifaces, 55 projectile points, 8 hafted knives, 1 uniface, 1 hafted scraper, 1 hafted graver, 11 drills, 7 choppers, 413 expedient flake tools, 5 core tools, 4 slab metates, 1 trough metate, 1 one-hand mano, 1 two-hand mano, 8 mano fragments, 4 miscellaneous ground stone fragments, and 23 hammerstones. A small collection of bone, jet, shell, and clay items was recovered, including 24 modified bone artifacts consisting of tubular beads and scored-and-snapped small mammal long bone pieces, 29 jet beads, 9 jet bead preforms, 1 shell bead, 1 shell pendant preform, and 2 fired clay objects.

Microwear analysis of all expedient and shaped stone tools was undertaken in an attempt to determine the function of individual tools and to elucidate patterns of tool use. The technique used in this analysis has been termed the low power approach (Tringham et al. 1974; Odell and Odell-Vereecken 1980). Use wear was found macroscopically or by scanning edges with a 10X or 20X hand lens. Upon identification, use wear locations were examined under 10X

to 45X magnification with a binocular microscope to determine type of use wear (e.g., scar shape, battering, polish, striae), use action (e.g., longitudinal, transverse, boring, chopping), and material worked, comprising five categories ranging from soft to hard. Interpretations of observed use wear were made according to criteria established by Tringham et al. (1974) and Odell and Odell-Vereecken (1980) through experimental research.

All stages of biface manufacture (Callahan 1979) are represented in the Confluence Site biface assemblage. The great majority of bifaces of all stages exhibit use wear, generally indicating use as cutting tools. Even as many as 90 percent of stage two bifaces, which are traditionally considered unfinished tools, exhibit use wear under low power microscopic examination. As important as bifaces appear to have been, unmodified or marginally retouched flake tools are the dominant class of flaked stone tool at the Confluence Site. Flake tools were recovered in a broad range of sizes and shapes, from microtools to flake knives to large, hand-held flake choppers. Of the 496 utilized edges examined, low power use wear studies suggest that 50 percent were used for cutting or sawing; 47 percent were used for scraping, whittling, or shaving; and 2 percent were used for chopping. Use action was not determined for the remaining 1 percent. Only two formal, shaped scrapers were identified; scraping tasks were performed almost exclusively with expedient tools.

Within the arrow point assemblage there is considerable variation, with corner-notched, low side-notched, and stemmed forms represented (Figure 12). Despite variable basal configuration, the majority of these points can be typed as Rosegate (Holmer 1986), with the remainder, perhaps, considered as Rosegate variants (Table 5). Small arrow points are the only projectile points in evidence at the Confluence Site; use wear analysis indicates that the few Elko series points that were recovered are hafted knives (Figure 13).

In general, the ground stone tool assemblage is unremarkable with the exception of a shallow trough metate from the floor of the big pithouse. The metate is trapezoidal in plan with rounded corners (Figure 14). It exhibits a shelf at the narrow end, resembling Utah metates common in Fremont contexts.

Hard hammer flakes, defined according to the same criteria as Ahler's (1986) hard hammer "and other good flakes," compose 76.5 percent of the debitage assemblage, compared to 20 percent biface thinning flakes and 3.5 percent retouch/finishing flakes. These figures seem to indicate that, although hard hammer reduction of cores was the dominant on-site lithic technology, biface manufacture was clearly important as well. The core reduction aspect of the technology likely reflects the production of flakes, which served both as expedient tools and as blanks for the manufacture of bifacial tools. Over 90 percent of the debitage consists of chert, with lesser amounts (in descending order) of chalcedony, siltstone, quartzite, basalt, quartz, limestone, and obsidian. With the exception of one obsidian flake, the lithic materials appear to be derived from local sources.

SUBSISTENCE DATA

Macrobotanical Remains

Maize remains were recovered from five interior features in the big pithouse (Feature 10), one interior feature in in the Feature 21 pithouse, and on the floor of the Feature 37 pithouse. All of the investigated bell-shaped pits yielded maize macrofossils. Maize parts were tabulated or noted in 8 out of 11 extramural features, primarily hearths, for which flotation samples were processed. Three cob fragments were recovered from strata that seem to be associated with the earliest Component 2 occupation of the site. Charred goosefoot seeds were found in eight interior features

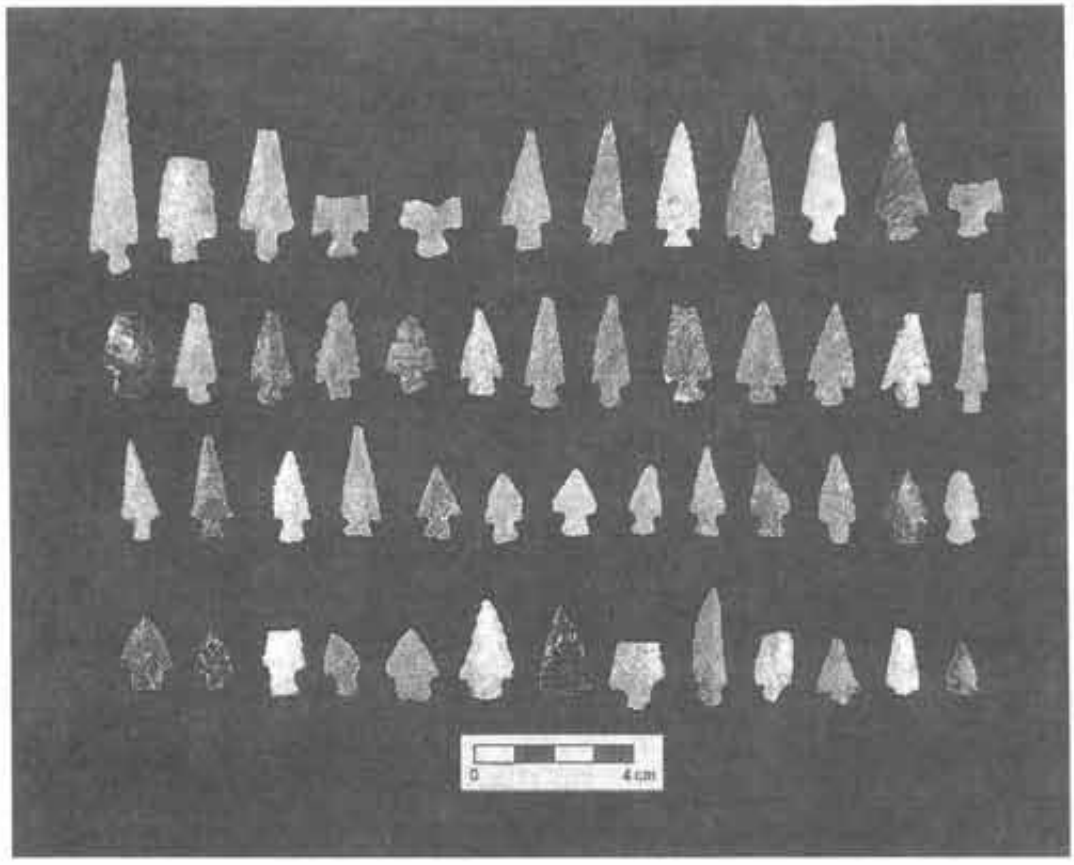

Figure 12. Arrow points from Component 2 of the Confluence Site.

Table 5. Component 2 Hafted Knife and Projectile Point Metric Data

Point Type	Mean Length (mm)	Mean Width (mm)	Mean Thickness (mm)	Mean Neck Width (mm)	Mean Weight (gm)
Elko CN (n=2)	41.5 (s=24.7)	25.5 (s=3.5)	5.5 (s=0.7)	12.6 (s=3.5)	6.4 (s=4.1)
Elko SN (n=1)	38.0	27.0	6.0	17.7 (s=4.7)	7.3
Rosegate (n=20)	22.3 (s=6.9)	10.5 (s=1.4)	2.1 (s=0.6)	4.5 (s=0.8)	0.6 (s=0.3)
Stemmed arrow (n=4)	16.8 (s=1.5)	11.3 (s=2.1)	2.3 (s=0.5)	5.2 (s=1.6)	0.5 (s=0.1)
Untyped arrow (n=1)	20.0	10.0	2.0	5.0 (s=1.7)	0.5
Undiagnostic SN (n=1)	35.0	23.0	4.0	14.5 (s=0.7)	3.5

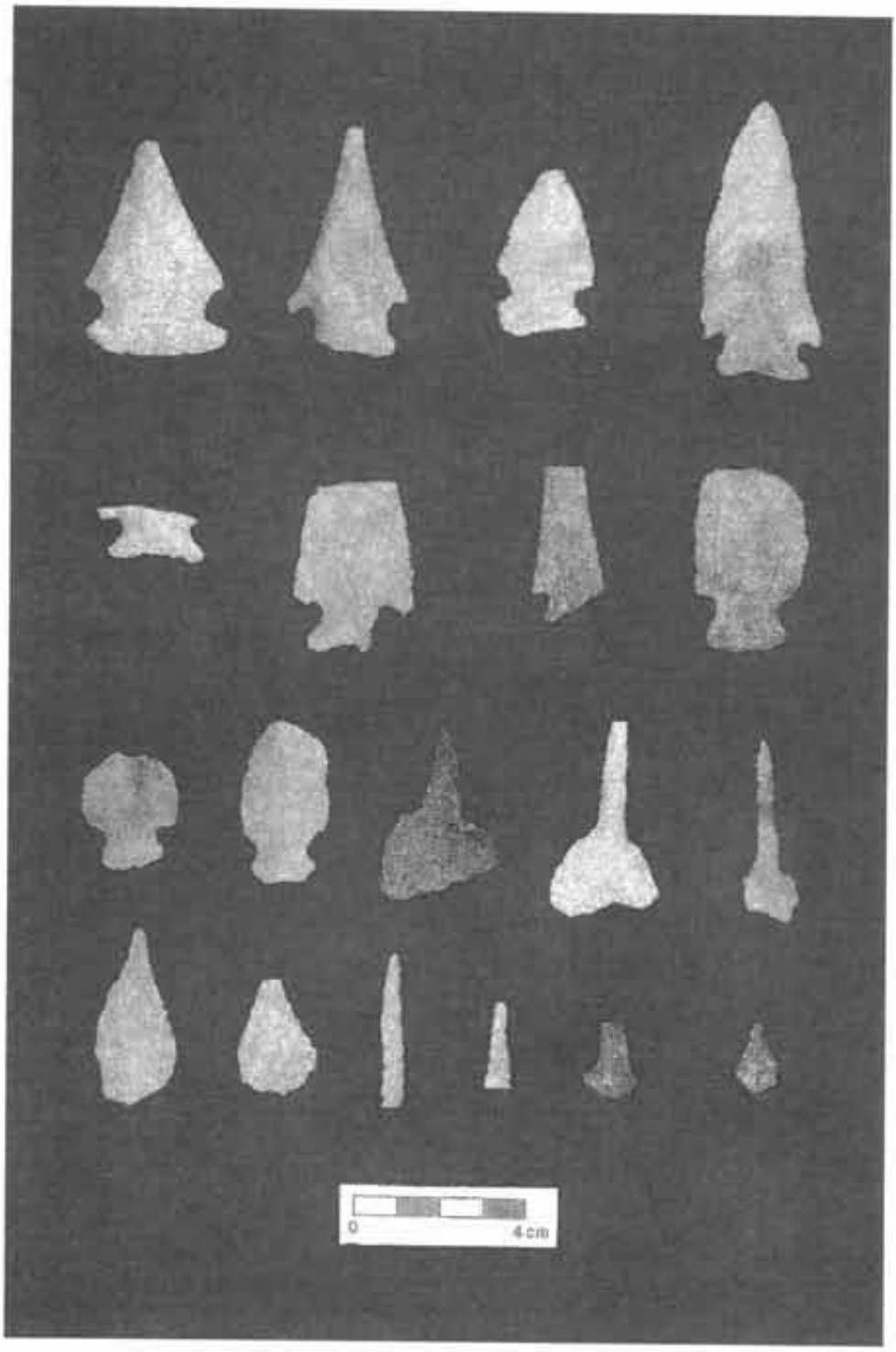

Figure 13. Hafted knives, hafted scrapers, and drills from Component 2 of the Confluence Site.

Figure 14. Metate from the floor of the big pithouse (Feature 10).

in the big pithouse, both interior features in the Feature 21 pithouse, all three interior features in the Feature 37 pithouse, and in all investigated bell-shaped pits. Seven out of 11 extramural features for which samples were processed yielded carbonized goosefoot seeds. In addition to maize and goosefoot, several features yielded charred bugseed (*Corispermum*), dropseed (*Sporabolus*), Indian ricegrass (*Oryzopsis hymenoides*), and unidentified grass seeds in small quantities, mildly suggesting exploitation (Matthews 1996).

Pollen

The pollen evidence unequivocally demonstrates not only the presence but the ubiquity of maize at the Confluence Site (Gish 1996). Of the 84 pollen samples analyzed from cultural proveniences, 56 (67 percent) contained maize pollen. Maize pollen was present in all five pithouses. It was identified in 41 out of 55 pithouse floor samples and in seven out of nine intramural hearths, including two hearths that yielded no maize macrofossils. Aggregates of maize pollen suggesting processing were found in samples associated with two metates in the big pithouse. Maize pollen was found in three out of the five extramural bell-shaped pits. Finally, maize pollen was identified in three of four extramural hearths. Prickly pear (*Platyopuntia*) pollen was also widespread on the Confluence Site, occurring fairly consistently in both control column samples and in samples from cultural features. Its presence in all of the pithouses and a majority of the extramural features argues for economic use. However, some doubt is cast upon this interpretation by the lack of macrobotanical evidence for prickly pear use. The other major taxon with probable economic implications is cheno-am (Chenopodiceae-*Amaranthus*). In 30 out of 55 samples from pithouse floors and in all nine intramural hearths from which samples were analyzed, cheno-am pollen values were sufficiently enhanced

to suggest economic use. High values were also obtained from three of the five bell-shaped pits, and from one of the four sampled extramural hearths. Isolated occurrences of other pollen that probably represent preparation or consumption of wild plant foods include purslane (*Portulaca*), noted from one floor location in the Feature 28 pithouse; cattail (*Typha*), found in one ground stone wash sample; and hedgehog-type cactus (*Echinocereus*-type), found in Feature 31.

Fauna

Component 2 faunal remains consist of a total of 297 bones. The assemblage is exceedingly fragmentary. Identified species include cottontail (*Sylvilagus* sp.), jackrabbit (*Lepus* sp.), wood rat (*Neotoma* sp.), and ground squirrel (*Spermophilus* sp.). A single mountain sheep (*Ovis canadensis*) molar was recovered. The majority of the collection comprises unidentified medium-sized mammal bones and indeterminate fragments (Table 6). Fifty-six percent of the faunal material was recovered from floor, hearth, and pit contexts within the big pithouse. The postoccupational midden fill of this structure yielded an additional 25 percent of the assemblage. Three other pithouses produced very small bone counts, amounting to 6 percent of the total. The remaining bone was recovered from three of the bell-shaped pits (8 percent of the total) and from non-feature proveniences (5 percent). The bone from the bell-shaped pits is interpreted as debris deposited postoccupationally.

The bone assemblage was examined for breakage patterns, burning, butchering and gnawing marks, weathering, and cultural modification. Few butcher or gnawing marks were seen. Twenty-four percent of the bone, mostly medium mammal, exhibits longitudinal breaks. Forty-eight percent of the assemblage, excluding beads and bead scrap, is either calcined or carbonized. A small assemblage of bone beads, bead fragments, score-and-snap long bone shafts, or otherwise worked bone was recovered. Interestingly, certain common classes of modified bone artifacts such as awls were not recovered at the Confluence Site, although the tip of a bone awl or needle was recovered from a microrefuse sample collected from an intramural feature.

The faunal assemblage is unusually small and lacking in diversity for a large, long-term habitation site. Analysis of weathering and deterioration suggests that this is not merely a reflection of poor bone preservation. In general, the collection is very well preserved. Taken at face value, the faunal evidence suggests that animal resources played a very minor role in the subsistence regime. Yet, the lithic evidence suggests that hunting was rather more important. One explanation for the paucity of bone is sampling bias. The data recovery methods employed at the Confluence Site were feature-focused. Large expanses outside of pithouses and away from extramural pits and hearths were not investigated. It is possible that middens containing more abundant and perhaps more diverse faunal refuse were present at the site but were simply not discovered. Other explanations are discussed below.

The faunal evidence is complemented by protein residue analyses of a number of lithic tools. Four positive results were obtained using cross-over electrophoresis (Table 7). Collectively, these data suggest that the site occupants exploited rabbits, pronghorn, bighorn sheep, and bison. The protein residue results are interesting, but must be viewed critically. Immunological-based analysis of protein residues as applied to archaeological materials is a relatively new procedure, and it seems additional research is needed to define more precisely the types of use events and animal fluids and tissues that can leave identifiable residues on stone tools.

Table 6. Faunal specimens from Component 2 of the Confluence Site.

Taxon/Size	Number	Elements*
Sylvilagus sp.	10	2 molar fragments; 1 scapula fragment; 1 humerus, distal end (burned); 1 radius, proximal end (burned); 1 first phalanx, distal end.
Lepus sp.	10	1 molar fragment; 9 score-and-snap long bone fragments.
Neotoma sp.	1	1 molar fragment.
Spermophilus sp.	2	2 mandibles.
Ovis Canadensis	1	1 molar fragment.
Indeterminate small mammal	1	1 long bone bead.
Indeterminate medium mammal	68	2 rib fragments (1 burned); 57 long bone diaphyses (34 burned); 2 metapodials, distal ends (1 burned); 6 long bone beads; 1 long bone.
Indeterminate deer-sized mammal	1	1 incisor fragment.
Indeterminate mammal	90	90 indeterminate fragments (39 burned).
Indeterminate vertebrate	113	108 indeterminate fragments (64 burned); 1 long bone diaphysis (burned); 4 tubular long bone beads.
Total	297	

*Unburned unless noted otherwise.

DISCUSSION

Component 2 at the Confluence Site represents a small settlement of preceramic farmers who were likely the ancestors of later Fremont peoples in central Utah. In terms of subsistence and certain aspects of the material culture, the component strongly resembles the Basketmaker II pattern, although it postdates the preceramic Anasazi and is coeval with Basketmaker III. The most intensive occupation at the site occurred between A.D. 410-650, based on the 2 sigma calibrated range of six pooled, statistically contemporaneous radiocarbon dates. A late Component 2 occupation postdates A.D. 620, the lower end of the 2 sigma calibrated range of four pooled, contemporaneous ^{14}C dates that would seem to represent an episode of pithouse construction that took place just prior to the introduction of ceramics into the region, which is thought to have occurred around A.D. 700 (R. Madsen 1977; Black and Metcalf 1986). The lack of pottery in this late Component 2 occupation—which, based on the radiocarbon data, may date as late as the second half of the ninth century—is curious, and suggests the possibility that some prehistoric farming groups in this region did not acquire ceramics until relatively late.

Table 7. Protein residue analysis of Component 2 lithic tools.

Artifact type	Provenience	Result
Rosegate projectile point	Lower Stratum 9	Negative
Rosegate projectile point	Lower Stratum 9	Negative
Rosegate projectile point	Lower Stratum 9	Negative
Rosegate projectile point	Feature 27, pithouse floor	Negative
Rosegate projectile point	Feature 10, pithouse floor	Very faint positive for Nordic sheep, negative for O/T sheep and bovine[1]
Rosegate projectile point	Feature 10 postoccupational fill*	Negative
Rosegate projectile point	Feature 10 postoccupational fill	Negative
Serrated Rosegate point	Feature 27, pithouse floor	Negative
Small stemmed point	Feature 10 postoccupational fill	Negative
Bifacial knife	Lower Stratum 9	Negative
Elko Corner-notched	Feature 10 postoccupational fill	Negative
Elko Corner-notched	Feature 31, slab-lined hearth	Negative
Large side-notched	Feature 10 postoccupational fill	Negative
Discoidal scraper	Feature 10 postoccupational fill	Negative
Utilized flake	Feature 10 postoccupational fill	Very faint positive for rabbit
Hide working/hammer stone[3]	Feature 10 postoccupational fill	Very faint positive for sheep[2]
Hide working stone[3]	Feature 8, bell-shaped pit	Very faint positive for bovine

*The postoccupational fill of Feature 10 is subsumed within Stratum 8.
[1]Nordic sheep antiserum is broadly cross-reactive and will yield positive results for sheep, goat, bovine, and pronghorn. The negative results for bovine and for O/T sheep antiserum, which is specific to domestic and bighorn sheep, suggest that pronghorn residue was present on this specimen.
[2]This specimen was positive for O/T sheep antiserum.
[3]Hide working stones were identified on the basis of use wear patterns (Adams 1988).

The excavated pit structures are comparable to other circular, shallow-basined pithouses in Utah north of the Anasazi dating to the Late Archaic, the Archaic-Formative transition, and the early Formative period, such as Structure 2 at Icicle Bench dated to the second or third century A.D. (Janetski et al. 1985; Janetski 1993), the Late Archaic Pahvant Park pithouse at North Richfield (Talbot and Richens 1993), the Sandy Ridge pithouse south of Moab dated to A.D. 200 (Richens and Talbot 1989), the Orchard pithouse at Moab with dates as early as 300 B.C. (Louthan 1990), a contemporaneous pithouse at Hog Canyon Dune (Schleisman and Nielson 1988), a pithouse at 42DA393 in Browns Park dated to approximately A.D. 250 (McKibbin 1992), and pithouses at the Cocklebur Wash site in the Uinta Basin dating between A.D. 350-600 (Tucker 1986). These Late Archaic and early Formative pithouses are similar to Basketmaker II pithouses, but many of the latter exhibit one or more of a number of construction elements that the former lack, including deflectors, interior slab-partitioning, slab-lined entrances, slab-lined interior hearths and pit features, and, sometimes, antechambers and cribbed log construction (Morris and Burgh 1954; Eddy 1961; Reed and Kainer 1978; Matson 1991; Janetski 1993). Most of the Late Archaic and early Formative pithouses lack evidence of entryways, and are, in general, shallower than many Basketmaker II houses (Janetski 1993). Nevertheless, Basketmaker II architecture is quite variable (Cordell 1997; Matson 1991), and it cannot be readily concluded that the Confluence Site pithouses fall outside of this range of variation. The contrast between the Confluence Site habitations and contemporaneous Basketmaker III pithouses is less ambiguous. The latter commonly exhibit antechambers, deflectors, wing walls, architectural use of sandstone slabs, prepared floors, and vertical, frequently plastered, pit walls. None of these characteristics are seen at the Confluence Site.

Some continuity can be demonstrated between Confluence Site architecture and that of later San Rafael Fremont. Circular to ovoid pithouses have been found at the Old Woman site (Taylor 1957), the Fallen Woman and Ivie Ridge sites (Wilson and Smith 1976), Innocents Ridge (Schroedl and Hogan 1975), Snake Rock Village (Aikens 1967), the Bull Creek sites (Jennings and Sammons-Lohse 1981), and the Round Spring site (Metcalf et al. 1993). Most of these differ considerably from the Confluence Site pithouses, evincing true pit (as opposed to shallow depression) construction, prepared floors, and clay rimmed or paved hearths. Yet, a few are quite similar. In particular, the Confluence Site architecture might be regarded as an early, less formalized version of the type of structure seen later at the Fallen Woman site (Structure 1) and at the Ivie Ridge site (Structures 1 and 2). Perhaps the best evidence of architectural continuity between the Confluence Site and another regional Fremont habitation is found at site 42EM2095, in Huntington Canyon (Montgomery and Montgomery 1993). Structure 2 at this site resembles the Confluence Site pithouses—particularly Feature 10—with regard to construction method, the presence of numerous interior features, and a ramp entryway, although the saucer-shaped floor of this structure was so shallow that the excavators considered it a surface structure rather than a pithouse. Radiocarbon and archaeomagnetic dating suggest that the structure was occupied ca. A.D. 680 (Montgomery and Montgomery 1993:126). A few Emery Gray ceramics were found in association with the structure, indicating that it may postdate Component 2 at the Confluence Site. This structure comprises the best regional example of an occupation transitional between the culture represented at the Confluence Site and the succeeding Muddy Creek phase of the San Rafael Fremont.

Bell-shaped pits similar to those at the Confluence Site are well known from Basketmaker contexts. A few other examples of such pits have recently been found in Utah north of the Anasazi culture area, including a bell-shaped pit dating prior to A.D. 1 excavated near Elsinore, Utah, which contained over 200 corn cobs (Wilde and Newman 1989), and early Formative (ca. A.D. 300) bell-shaped storage pits investigated at Steinaker Gap (Talbot and Richens 1994, 1996). Other bell-shaped pits have been reported in the Uinta Basin (Phillips 1994).

The apparent central position of the big pithouse suggests some degree of planning in site layout. In addition to the larger size of this structure, it is considerably more complex in terms of lithic tool diversity and internal patterning

of features and refuse. It may represent some sort of communal house, but one in which craft and food preparation activities, as opposed to—or possibly in addition to—special functions, took place. Cordell has noted that "community or special-function" structures have been found at nearly all early Southwestern villages with more than three houses (Cordell 1997:239-240). The centralized big house and the large, extramural food storage pits are consistent with the model of an egalitarian group practicing a communal mode of production (Hegmon 1989; Wills 1992).

The evidence suggests that the site was occupied year-round. Winter occupation can be inferred from the substantial architecture; it seems unlikely that the time, labor, and materials represented by the pithouses would have been invested in warm season domiciles. Additionally, interior hearths and abundant ash, charcoal, and fire-cracked rock are present in the Confluence Site houses, suggesting that heating the structures was important. Occupation during the remainder of the year is implied by the necessities of maize farming. The presence of at least a few individuals would have been required for planting and for tending the young plants throughout the early growing season, and possibly during the summer and fall months in order to protect the grain from pests.

The consistency noted in the cultural pollen and macrofloral record is taken as evidence of the importance of maize and goosefoot seeds in the diet of the Confluence Site inhabitants. The overall picture of subsistence based on these data is one of reliance on maize horticulture and the gathering of ruderal and wild plant resources, supplemented by the taking of small mammals, as indicated by the faunal data. However, the protein residue analyses, coupled with the rather abundant evidence of hunting tools in the flaked lithic assemblage, suggests that big game hunting may have been more important than is implied by the faunal assemblage. Sampling bias has been offered as one possible explanation for the paucity of large mammal bone. Another possibility is that larger game was field-processed, resulting in the discard of most of the bones in locations far from the habitation site (Metcalfe and Barlow 1992). Yet another explanation involves seasonal mobility. The occupants may have spent part of the year, presumably summer and fall, engaged in a highly mobile lifestyle, during which the focus may have shifted to a transhumant, more Archaic, subsistence regime that included big game hunting. A small workforce presumably remained behind to tend the crops, which were critical for the winter and early spring food supply. Overall, the Confluence Site seems to fit best a model of year-round occupation punctuated by seasonal forays of unknown duration to obtain big game and other resources to supplement the main diet of maize, goosefoot seeds, and small mammals.

The ubiquity of maize, the presence of large storage features, pithouses implying at least seasonal sedentism, and site location in an area with good agricultural potential collectively indicate a subsistence strategy that revolved around maize farming. Recent evidence (e.g., Coltrain 1994; McKibbin 1992; Talbot and Richens 1994, 1996; Talbot 1995; Tucker 1986; Wilde and Newman 1989) supports a model of preceramic, relatively sedentary peoples north of the Anasazi relying heavily on maize horticulture by the early centuries A.D. The Confluence Site appears to be a relatively late expression of this pattern.

The evidence from the Confluence Site suggests a pattern of settlement and subsistence that it is not so different from that of later Fremont occupations in the region. Far from being nascent, agriculture seems surprisingly well integrated into the economy and lifeway of these early farmers. This suggests a mature system that had been in place for a considerable period of time, which is not surprising in view of the evidence for the antiquity of maize growing that has recently come to light in the region (e.g., Wilde and Newman 1989; Jett 1991; Stiger and Larson 1992). In fact, although wild resources no doubt were important in this economy, in some ways these early farmers seem more reliant on maize horticulture than their presumed Fremont descendants, whose subsistence system one investigator has characterized as "avoidance of farming by whatever means possible" (Metcalf 1993:389).

The Confluence Site has provided a fairly comprehensive example of a preceramic farming village on the northern Colorado Plateau. The data from it and a growing number of other preceramic sites with evidence of cultigens north

of the Anasazi are key to understanding the processes behind the adoption of agriculture on the northern Colorado Plateau, which led to changes in many aspects of material culture and a divergence from Archaic patterns of mobility and settlement.

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REFERENCES CITED

Adams, J.L.
1988 Use-Wear Analyses on Manos and Hide-Processing Stones. *Journal of Field Archaeology* 15:307-315.

Ahler, Stanley A.
1986 *The Knife River Flint Quarries: Excavations at Site 32DU508.* State Historical Society of North Dakota, Bismarck.

Aikens, C. Melvin
1967 *Excavations at Snake Rock Village and the Bear River No. 2 Site.* Anthropological Papers No. 87. University of Utah Press, Salt Lake City.

Binford, Lewis R.
1983 *Working at Archaeology.* Academic Press, New York.

Black, Kevin D., and Michael D. Metcalf
1986 *The Castle Valley Archaeological Project: An Inventory and Predictive Model of Selected Tracts.* Cultural Resources Series No. 19. Bureau of Land Management, Utah State Office, Salt Lake City.

Brown, Gary M.
1985 *Interstate 70 Archaeological Survey from Castle Valley Rattlesnake Bench, Sevier and Emery Counties, Central Utah.* Abajo Archaeology, Bluff.

Callahan, Errett
1979 The Basics of Biface Knapping in the Eastern Fluted Point Tradition: A Manual for Flintknappers and Lithic Analysts. *Archaeology of Eastern North America* 7:1-180.

Clark, R.M.
1975 A Calibration Curve for Radiocarbon Dates. *Antiquity* 49:251-266.

Coltrain, Joan B.
1994 *Fremont Foragers and Farmers: A Stable Carbon Isotope Study.* Paper presented at the 24th Great Basin Conference, Elko.

Cordell, Linda S.
1997 *Archaeology of the Southwest.* 2nd ed. Academic Press, Inc., San Diego.

Eddy, Frank W.
1961 *Excavations at Los Pinos Phase sites in the Navajo Reservoir District.* Papers in Anthropology No. 4. Museum of New Mexico Press, Santa Fe.

Geib, Phil R.
1993 *New Evidence for the Antiquity of Fremont Occupation in Glen Canyon, South-central Utah.* Proceedings of the First Biennial Conference on Research in Colorado Plateau National Parks, edited by Peter G. Rowlands, Charles van Riper III, and Mark K. Sogge. Northern Arizona University, Flagstaff.

Gish, Jannifer W.
1996 Pollen Results. Appendix B in *Archaeological Investigations of 11 Sites Along Interstate 70: Castle Valley to Rattlesnake Bench*. Alpine Archaeological Consultants, Inc., Montrose, CO.

Greubel, Rand A.
1996 *Archaeological Investigations of 11 Sites Along Interstate 70: Castle Valley to Rattlesnake Bench*. Alpine Archaeological Consultants, Inc., Montrose.

Hayden, Brian and Aubrey Cannon
1983 Where the Garbage Goes: Refuse Disposal in the Maya Highlands. *Journal of Anthropological Archaeology* 2(2):117-163.

Hegmon, Michelle
1989 Social Integration and Architecture. In *The Architecture of Social Integration in Prehistoric Pueblos*, edited by W. D. Lipe and Michelle Hegmon, pp. 5-11. Occasional Papers of the Crow Canyon Archaeological Center, No. 1. Cortez.

Holmer, Richard N.
1986 Common Projectile Points of the Intermountain West. In *Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings*, edited by C. J. Condie and D. D. Fowler, pp. 89-115. Anthropological Papers No. 110. University of Utah Press, Salt Lake City.

Janetski, Joel C.
1993 The Archaic to Formative Transition North of the Anasazi: A Basketmaker Perspective. In *Anasazi Basketmaker: Papers from the 1990 Wetherill-Grand Gulch Symposium*, edited by Victoria M. Atkins, pp. 223-241. Cultural Resource Series No. 24, Bureau of Land Management, Utah State Office, Salt Lake City.

Janetski, Joel C., Asa S. Nielson, and James D. Wilde
1985 *The Clear Creek Canyon Archaeological Project: A Preliminary Report*. Museum of Peoples and Cultures Technical Series No. 85-99. Brigham Young University, Provo.

Jennings, Jesse D., and Dorothy Sammons-Lohse
1981 *Bull Creek*. Anthropological Papers No. 105. University of Utah Press, Salt Lake City.

Jett, Stephen C.
1991 Split-Twig Figurines, Early Maize, and a Child Burial in East-Central Utah.

Lindsay, La Mar W.
1986 Fremont Fragmentation. In *Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings*, edited by C. J. Condie and D. D. Fowler, pp. 229-251. Anthropological Papers No. 110. University of Utah Press, Salt Lake City.

Louthan, Bruce D.
1990 Orchard Pithouse. *Canyon Legacy* 7:24-27.

Madsen, Rex E.
1977 *Prehistoric Ceramics of the Fremont*. Museum of Northern Arizona Ceramic Series No. 6. Flagstaff, AZ.

Matthews, Meredith H.
1996 Macrobotanical Analysis. Appendix C in *Archaeological Investigations of 11 Sites Along Interstate 70: Castle Valley to Rattlesnake Bench*. Alpine Archaeological Consultants, Inc., Montrose, CO.

Matson, R.G.
1991 *The Origins of Southwestern Agriculture*. University of Arizona Press, Tucson.

McKibbin, Anne (editor)
1992 *The Questar North-South Pipeline: Final Report on Archaeological Investigations*. Volumes 1 & 2. Metcalf Archaeological Consultants, Eagle Co. Prepared for Questar Pipeline Company, Salt Lake City.

Metcalf, Michael D.
1993 Research Contributions. Chapter 12 in *Hogan Pass: Final Report on Archaeological Investigations Along Forest Highway 10 (State Highway 72), Sevier County, Utah, (Volume 3)*, edited by Michael D. Metcalf, Kelly J. Pool, Kae McDonald, and Anne McKibbin, pp. 387-403. Metcalf Archaeological Consultants, Inc., Eagle. Submitted to Rocky Mountain Regional Office, National Park Service, Lakewood.

Metcalf, Michael D., Kelly J. Pool, Kae McDonald, and Anne McKibbin, editors
1993 *Hogan Pass: Final Report on Archaeological Investigations along Forest Highway 10 (State Highway 72), Sevier County, Utah* . Metcalf Archaeological Consultants, Inc., Eagle. Submitted to Rocky Mountain Regional Office, National Park Service, Lakewood.

Metcalfe, Duncan and K. Renee Barlow
1992 A Model for Exploring the Optimal Trade-off between Field Processing and Transport. *American Anthropologist* 94(2):340-356.

Montgomery, Keith R., and Jacki A. Montgomery
1993 *Utah Department of Transportation State Route-31 Huntington Canyon Project: Archaeological Excavations at Sites 42EM2109 and 42EM2095, Emery County Utah* (2 volumes). Abajo Archaeology, Bluff.

Morris, Earl H., and Robert F. Burgh
1954 *Basket Maker II Sites near Durango, Colorado*. Publication No. 604. Carnegie Institution of Washington, Washington, D.C.

Odell, George Hamley, and Frieda Odell-Vereecken
1980 Verifying the Reliability of Lithic Use-Wear Assessments by "Blind Tests": the Low-Power Approach. *Journal of Field Archaeology* 7:87-120

Phillips, Blaine
1994 *42UN1877: A Report on the Removal and Analysis of a Prehistoric Child's Burial from Steinaker Reservoir, Uintah County, Utah*. Report on file, Vernal District of the Utah Bureau of Land Management, Vernal.

Quinn, A.G., B.J. Gundy, and J. Glenn
1991 Phase III Data Recovery in the I-70 Project Study Area, Emery and Sevier Counties, Utah. University of Pittsburgh Cultural Resource Management Program. Submitted to the Utah Department of Transportation, Salt Lake City.

Richens, Lane D., and Richard K. Talbot
1989 Sandy Ridge: An Aceramic Habitation Site in Southeastern Utah. *Utah Archaeology 1989* 2(1):77-88.

Reed, Alan D., and Jonathon C. Horn
1990 Early Navajo Occupation of the American Southwest: Reexamination of the Dinetah Phase. *Kiva* 55(4):283-300.

Reed, Alan D., and Ronald E. Kainer
1978 The Tamarron Site, 5LP326. *Southwestern Lore* 44 (1 & 2):1-47.

Schiffer, Michael B.
1987 *Formation Processes of the Archaeological Record*. University of New Mexico Press, Albuquerque.

Schleisman, Dean, and Asa S. Nielson
1988 *Archaeological Excavations at Hog Canyon Dune (Site 42KA2574), Hog Creek Canyon, Kane County, Utah*. Museum of Peoples and Cultures Technical Series No. 87-26. Brigham Young University, Provo.

Schroedl, Alan R.
1992 Culture History. In *The Burr Trail Archaeological Project: Small Site Archeology on the Escalante Plateau and Circle Cliffs, Garfield County, Utah*, by Betsy L. Tipps, pp. 5-20. Cultural Resources Report 439-01-9102. P-III Associates, Inc., Salt Lake City, Utah. Submitted to the Bureau of Land Management, Kanab Resource Area, Cedar City District, Kanab, Utah.

Schroedl, Alan R., and Patrick F. Hogan
1975 Innocents Ridge and the San Rafael Fremont. Antiquities Section Selected Papers No. 1(2):29-66. Division of State History, Salt Lake City..

Shott, Michael J.
1992 Radiocarbon Dating as a Probabilistic Technique: The Childers Site and Late Woodland Occupation in the Ohio Valley. *American Antiquity* 57(2):202-230.

Smiley, Frances E.
1993 Early Farmers in the Northern Southwest: A View from Marsh Pass. In *Anasazi Basketmaker: Papers from the 1990 Wetherill-Grand Gulch Symposium*, edited by Victoria M. Atkins, pp. 243-254. Cultural Resource Series No. 24. Bureau of Land Management, Utah State Office, Salt Lake City.
1994 The Agricultural Transition in the Northern Southwest: Patterns in the Current Chronometric Data. *Kiva* 60:165-189.
1997 Toward Chronometric Resolution for Early Agriculture in the Northern Southwest. In *Early Farmers in the Northern Southwest: Papers on Chronometry, Social Dynamics, and Ecology*, edited by Francis E. Smiley and Michael R. Robins, pp. 13-42. Animas-La Plata Archaeological Project Research Paper No. 7. Department of Anthropology, Northern Arizona University, Flagstaff, Arizona.

Stahl, Peter W., and James A. Zeidler
1990 Differential Bone Refuse Accumulation in Food-Preparation and Traffic Areas on an Early Ecuadorian House Floor. *Latin American Antiquity* 1(2):150-169.

Stiger, Mark, and Mark Larson
1992 A Radiocarbon Date from the Cottonwood Cave Corn Cache and Problems Interpreting the Origin of Farming in Western Colorado. *Southwestern Lore* 58(2):26-36.

Stuiver, Minze, and Paula J. Reimer
1993 Extended ^{14}C Data Base and Revised Calib 3.0 ^{14}C Age Calibration Program. *Radiocarbon* 35(1):215-230.

Stuiver, M., P.J. Reimer, E. Bard, J.W. Beck, G.S. Burr, K.A. Hughen, B. Kromer, F.G. McCormac, J. v.d. Plicht, and M. Spurk.
1998 INTCAL98 Radiocarbon Age Calibration 24,000 - 0 cal BP. *Radiocarbon* 40:1041-1083.

Talbot, Richard K.
1995 *Steinaker Gap: Basketmaker Farmsteading on the Northern Colorado Plateau.* Paper presented at the 2nd Rocky Mountain Anthropological Conference, Steamboat Springs.

Talbot, Richard K., and Lane D. Richens
1993 Archaeological Investigations at Richfield and Vicinity. Museum of Peoples and Cultures Technical Series No. 93-15. Brigham Young University, Provo.
1994 Steinaker Gap: An Early Fremont Agriculture Farmstead. Museum of Peoples and Cultures Technical Series No. 94-18. Brigham Young University, Provo.
1996 *Steinaker Gap: An Early Fremont Farmstead.* Museum of Peoples and Cultures Occasional Papers No. 2. Brigham Young University, Provo.

Taylor, Dee C.
1957 *Two Fremont Sites and Their Position in Southwestern Prehistory.* Anthropological Papers No. 29. University of Utah Press, Salt Lake City.

Tringham, Ruth, Glenn Cooper, George Odell, Barbara Voytek, and Anne Whitman
1974 Experimentation in the Formation of Edge Damage: a New Approach to Lithic Analysis. *Field Archaeology* 1:171-195.

Tucker, Gordon C.
1986 *Results of Archaeological Investigations Along Chevron's CO_2/PO_4 Pipelines in Northeastern Utah and Northwestern Colorado.* Prepared by Nickens and Associates, Montrose, Colorado. Prepared for Woodward-Clyde Consultants, Walnut Creek, California. Ms. on file, Division of State History, Salt Lake City.

Ward, G. K., and S. R. Wilson
1978 Procedures for Comparing and Combining Radiocarbon Age Determinations: A Critique. *Archaeometry* 20(1):19-31.

Westfall, Deborah A.
1988 *The Interstate 70 Archaeological Testing Project: Significance Evaluations of Archaeological Sites along Interstate Highway 70: Castle Valley to Ghost Rock, Sevier and Emery Counties, Utah.* Abajo Archaeology, Bluff.

Wilde, James D., and Deborah E. Newman
1989 Late Archaic Corn in the Eastern Great Basin. *American Anthropologist* 91(3):712-720.

Wills, W.H.
1992 Plant Cultivation and the Evolution of Risk-Prone Economies in the Prehistoric American Southwest. In *Transitions to Agriculture In Prehistory*, edited by Anne Birgitte Gebauer and T. Douglas Price, pp. 153-176. Prehistory Press, Madison, Wisconsin.
1995 Archaic Foraging and the Beginning of Food Production in the American Southwest. In *Last Hunters—First Farmers: New Perspectives on the Prehistoric Transition to Agriculture*, edited by T. Douglas Price and Anne Birgitte Gebauer, pp. 215-242. School of American Research Press, Santa Fe, New Mexico.

Wilson, Curtis J., and Howard L. Smith
1976 Interstate Highway I-70 Salvage Archaeology. Antiquities Section Selected Papers 2(7):69-104. Division of State History, Salt Lake City.

CARCASS CORNERS (42WN1975): A LATE ARCHAIC SITE IN WAYNE COUNTY, UTAH

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Archaeological excavations of Carcass Corners (42WN1975) revealed a subsurface structure associated with storage features. Radiocarbon dates from these features and other associated archaeological evidence show occupation some 2,400-3,800 years ago during the Late Archaic period. While the data recovered from Carcass Corners is modest, it is significant because the site represents a little-known time period that is transitional between Archaic and Formative economies. Furthermore, it adds to the small, but growing, database on open Late Archaic sites with habitation features.

CARCASS CORNERS

Carcass Corners is a Late Archaic age archaeological site located approximately 2 miles southeast of Teasdale, Utah in Wayne County (Lupo 1996). The Fremont River is located less than 3/4 mile to the north and east of the site area. Surrounded by high plateaus to the northwest and Boulder Mountain to the southwest this is an isolated transitional zone between the Colorado Plateau and Great Basin. Previous archaeological investigations in this area are scant; the best known investigation was conducted by Noel Morss (1931) along the Fremont River, and more recent investigations are limited to the occasional cultural resource management projects (e.g., Hauck and Weder 1989; Westfall 1987). Cumulatively, archaeological investigations in the Teasdale vicinity show human occupation dating back to Paleoindian times.

Carcass Corners is a large open site, covering an area measuring 200 m by 100 m in surface area. Originally recorded and discovered in 1993, it was reinventoried, mapped and test excavated between August 6 and 15, 1995 by Desert West Research, Inc., under contract to the State of Utah, School and Institutional Trust Lands Administration (Lupo 1996). At that time portions of 42WN1975 showed evidence of recent disturbance. The southeastern portion of the site was bisected by a bulldozer cut and a jeep trail used by local residents to discard the carcasses of dead domestic animals, hence the site name. The site itself is spread across an extremely large multi-crested, semi-active dune and much of the artifact assemblage is visibly eroding out of the steep east and west dune slopes. Despite this disturbance some portions of the site within the dune area remain largely undisturbed beyond natural surficial erosion.

During the site reinventory, a small sample of surface artifacts was collected and all uncollected artifacts were tallied. Carcass Corners is associated with an enormous quantity of artifacts and displayed at least 20 surface stains, some associated with rock alignments (Figure 1). Most of the artifacts consist of lithic tool fragments and debitage

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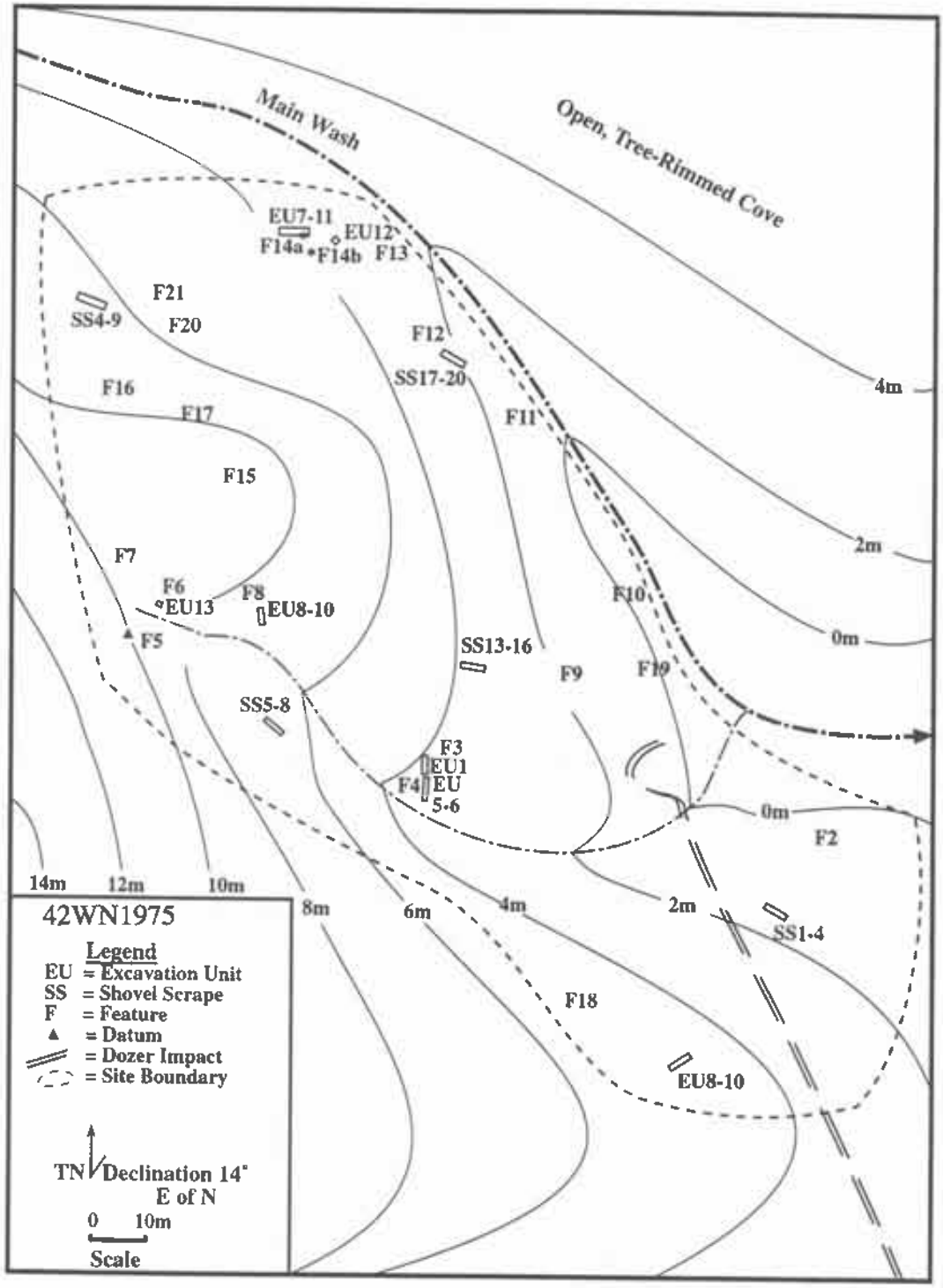

Figure 1. Plan map of site 42WN1975, Carcass Corners.

that is largely made from locally available material. Whole and fragmentary grinding stones are common, and some of these are constructed out of large non-mobile, basalt monoliths and show evidence of sustained use. Only a single ceramic pot sherd was found on the site from a heavily eroded area.

Field excavation methods were designed to maximize data collection while preserving as much of the site as possible (see Lupo 1996). Test excavation units were limited to those subsurface features that appeared to be the most promising and well-preserved. Sediments removed from excavation units were screened through 1/8 in mesh. In addition to excavation units, 20 randomly located shovel scrapes, consisting of sets of four contiguous 1 m by 1 m units were excavated to a depth of 5 cm. Shovel scrapes were used to test for features not visible from the surface and to obtain a sample of background artifact classes and densities.

While five features were excavated at Carcass Corners, discussion here focuses on the three features that yielded cultural and dateable material: a subsurface storage pit (Feature 14a), a subsurface structure (Feature 8) and a charcoal/ash stain (Feature 13).

FEATURES AT CARCASS CORNERS

Of the three subsurface storage features discovered at the site, only one, Feature 14a, was partially excavated. On the surface Feature 14a consists of a rectangular arrangement of four upright vesicular basalt boulders with a darkly stained sand fill (Figure 2). A second and very similar basalt arrangement lies just 60 cm away (Feature 14b), but remains unexcavated. Excavation units placed over Feature 14a, revealed a 28 cm deep basalt slab-lined pit. Natural basalt slabs are footed in the sand to form the steeply sloping sides and bottom of the pit (Figure 3). The slabs display little modification and are simply fit together; no mortar or chinking is visible in between the larger slabs and there was no evidence of vegetative lining. The sedimentary fill consists entirely of a rather homogenous black-stained sand mixed with charcoal pieces. At the very bottom of the pit, a 2 to 3 cm thick layer of charcoal chunks provided the raw material for radiometric dates.

From the surface, Feature 8 is a dark sediment stain that extends over a 4 m by 2 m area and is associated with a linear arrangement of basalt boulders (Figure 4). Large quantities of artifacts including three conjoinable fragments of a sandstone slab metate were collected on, near or within this stain. Three 1 m by 1 m excavation units placed over the stained area revealed three distinct strata; the two uppermost strata clearly delineated the profile of a basin-shaped subsurface feature (Figure 5). The uppermost stratum (Stratum 1), consists of 4 to 5 cm of loose sand that is slightly stained and contained some artifacts. A sharp contact zone with Stratum 2 consists of a more consolidated sand, rich in pebbles, small basalt cobbles, charcoal and especially artifacts (Table 1). Most of the artifacts found within Feature 8 were lithic tools and debitage, some groundstone fragments and about a handful of broken artiodactyla bones. One small concentrated pocket of charcoal within Stratum 2 provided a carbon sample for this level. Below Stratum 2 is Stratum 3, a clean, brown, sand that contained some artifacts. It is likely that the presence of artifacts within Stratum 3 resulted from horizontal migration due to trampling within the overlying feature.

The exact nature of Feature 8 remains unclear; no post-holes or central hearth were found. However, Feature 8 remains largely preserved; our excavation uncovered approximately half the estimated extent of this feature. Consequently, some internal features may remain undiscovered in the unexcavated portions. Even with only modest exploration, Feature 8 appears to be a basin-shaped structure with a partially intact basalt boulder foundation. It may be the foundation of a wickiup constructed largely of branches or wood that required stabilization from basal boulders in a sandy environment or a small-sized pithouse foundation.

Figure 2. Feature 14a prior to excavation. Trowel points north.

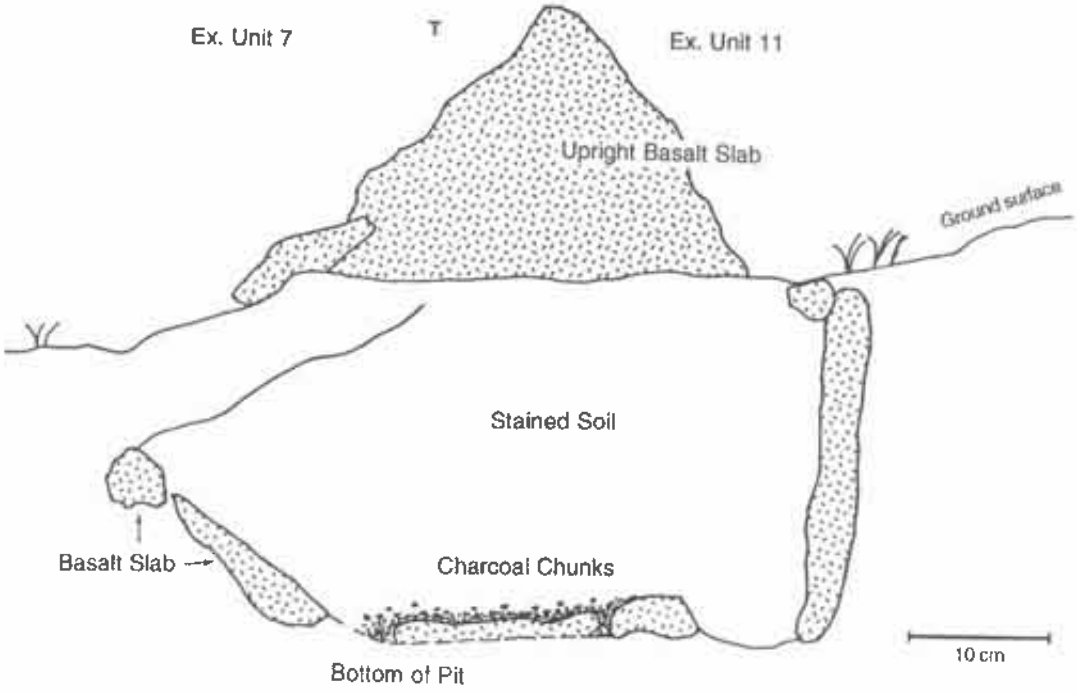

Figure 3. Cross-section illustration of Feature 14a showing stone slab-lining.

Figure 4. Feature 8 post-excavation. Trowel points north.

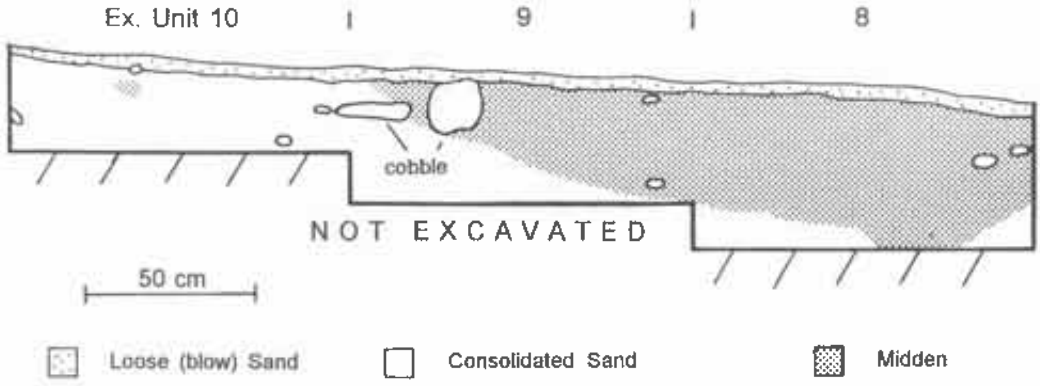

Figure 5. Profile of Feature 8 showing stratigraphic detail.

Table 1. Artifacts from Feature 8 at 42WN1975.

Stratum	1	2	3
Primary Flake	5	8	6
Secondary Flake	6	2	2
Biface Flake	7	12	5
Pressure Flake	11	17	13
Shatter	10	10	21
Unidentified Lithic	49	78	54
Core	1	1	-
Ground Stone Fragments	7	3	-
Bone Fragments	-	12	24
Total Artifacts	96	143	125

Note: These are artifacts collected from the surface and subsurface exploration of Feature 8. Subsurface excavation consisted of three contiguous 1 m by 1 m units excavated to a depth of 40-45 cm.

Feature 13 is an amorphous, dark sediment stain that extends over a gently sloping 3 m by 1 m area. The loose surface sand of Feature 13 is mixed with diffuse flecks of charcoal, and is associated with a few fist-sized, fire-cracked basalt cobbles and a small amount of lithic debitage. One 1 m by 1 m excavation unit placed over Feature 13 revealed a fairly thin (2-3 cm) ash and charcoal lens. A band of large charcoal chunks within Feature 13 was collected for radiometric analysis. Clean and unburned sand occurs directly below Feature 13. Feature 13 is most likely an ash and charcoal dump or smear from an undiscovered feature, but it probably is not a fire hearth or pit because there is not evidence of *in situ* burning.

CHRONOLOGY OF 42WN1975

Three charcoal samples recovered from the excavated features at Carcass Corners were submitted for radiometric analysis (Table 2). Two of these dates overlap (Feature 8 and 14a) and indicate site use during the Late Archaic period. The sample from Feature 13, however, calibrates to BC 1895 to 1685 and is considerably older than the those from Features 14a and 8. Nevertheless, it still falls within the Late Archaic, but may reflect an earlier period of site use. Further evidence of an earlier period of site use comes from storage feature characteristics discussed below.

Table 2. Chronometric Data for 42WN1975.

Feature/Description	^{14}C Age	95% Confidence Interval (Calibrated)
13 Subsurface charcoal lens	3480 ± 40 BP (Beta-91329)	BC 1895 - 1685
14a Subsurface basalt-lined pit	2310 ± 70 BP (Beta-91330)	BC 515 - 190
8 Structure floor	2160 ± 100 BP (Beta-91331)	BC 400 - AD 65

Note: $^{13}C/^{12}C$ ratio estimated.

DISCUSSION

42WN1975 is a unique site because the associated structural feature (Feature 8) is among the oldest discovered and dated in this area. Similarly old structures have been found in other parts of central Utah and the surrounding region. For example, Janetski et al. (1991) discovered basin-shaped features in Aspen Shelter on the Old Woman Plateau which they believe may be 4000 years old. Still older Archaic structures have been discovered on the Colorado Plateau (see Rood 1990, Wheeler and Martin 1982); most notable is the Yarmony Pit House site in Colorado which dates back some 7000 years BP (Metcalf and Black 1991). Other Late Archaic sites with structures have been reported in the close vicinity of Carcass Corners. These include Icicle Bench which dates to AD 200 (Janetski et al. 1985) and Pahvant Park dating to 2400-2500 BP (Talbot and Richens 1993). Richens et al. (1997) report two Late Archaic open-sites with architectural features in Capitol Reef. One of these (42GA4001) has a pithouse with a partial rock-lined wall and interior subfloor storage pit. Similarly, Tipps (1988) describes several Late Archaic sites in central and southern Utah and one of these has a circular stone enclosure. Near Moab, Utah, Louthan (1990) reports a structure in the same age-range. As reported earlier by Rood (1990) most of these Late Archaic features share common characteristics; all were probably short-term use and show only a low-investment in construction effort.

Feature 8 at Carcass Corner displays some of the characteristics of previously reported Late Archaic structures. While Feature 8 does have a partial stone foundation or wall, it lacks masonry, a prepared floor or any other internal features. Furthermore, there is evidence that Feature 8 was probably only intended for use over short periods of time. The high density and diversity of large (> 5 cm) and small-sized lithic artifacts (including numerous fragments of groundstone and bone) found inside the structure stands in marked contrast to artifact densities from other portions of the site. Artifact density within Feature 8 is 121.3 per square meter. In contrast, artifact densities from all other excavation units and shovel scrapes across the site are only 4.7 and 5.15 artifacts per square meter respectively. No other feature or area of the site yielded comparable artifact densities. Archaeological and ethnoarchaeological studies show that high densities of materials clustered within an occupational feature often reflect a lack of secondary disposal which may be associated with short-term use or a winter season of occupation (e.g., Simms 1989).

The associated subsurface storage features at Carcass Corners, such as Feature 14a, indicate that the site was, nevertheless, used repeatedly. Similar stone-lined pits are found throughout the Great Basin and Colorado Plateau (see Wilke and McDonald 1989 and the references therein) and were apparently used for a variety of purposes. At

Sudden Shelter, for example, slab-lined pits dating to the Archaic were used as roasting pits (Aikens and Madsen 1986). Although there was charcoal within the fill of the pit, it is unlikely that Feature 14a was actually used as a fire-pit. The slabs inside the pit are unburned and besides the charcoal there was very little evidence of *in situ* burning (i.e., lack of ash or burned sediment) and the charcoal in the Feature 14a was most probably deposited after the pit was originally used. Consequently, the date derived from the pit may not reflect the period of time when it was constructed or in use for its original purpose. The original use of the pit may have been storage of equipment or food.

While it is unclear what was stored in Feature 14a, the purpose of this feature is certainly not concealment, as the rock alignment that comprises the upper course is clearly visible from the surface. Although the slabs that comprise the lining are tightly fit together, the feature lacks juniper bark (or organic) lining and mortar so common in food storage features (see Wilke and McDonald 1989). Nevertheless, the slab rock lining in the sand could have served to protect the pit's contents from fossorial rodents or simply to create, demarcate and support a stable container in an otherwise unstable sandy location.

While the total amount of data from Carcass Corners is modest, it provides some additional information on the little known Late Archaic in Central Utah. Data from this site are consistent with what seems to have been a widespread Late Archaic pattern in many parts of the Colorado Plateau and along the easternmost edge of the Basin. Hopefully, additional data from other sites will continue to inform and add to this sparse database.

REFERENCES CITED

Aikens, C. Melvin and David B. Madsen

1986 Prehistory of the Eastern Area. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 149-160. Handbook of North American Indians, vol. 11. Smithsonian Institution Press, Washington, D.C.

Hauck, Richard F. and Dennis G. Weder

1989 *Ancient and Historic Occupants in the Fremont River Project Area of Wayne County, Utah*. Paper No. 41 of the Archeological-Environmental Research Corporation. Ms. on file, Antiquities Section, Utah Division of State History, Salt Lake City.

Janetski, Joel, Asa Nielson and James Wilde D.

1985 The Clear Creek Canyon Archaeological Project: A Preliminary Report. *Brigham Young University Museum of Peoples and Cultures Technical Series* No. 85-99, Provo, Utah.

Janetski, Joel, Richard Crosland and James D. Wilde

1991 Preliminary Report on Aspen Shelter: An Upland Deer Hunting Camp on the Old Woman Plateau. *Utah Archaeology* 4:32-43.

Louthan, Bruce

1990 Orchard Pithouse. *Canyon Legacy* 7:24-27.

Lupo, Karen D.

1996 *A Report of Archaeological Excavations on the Teasdale Parcel, Wayne County, Utah*. Desert West Research Technical Report. Submitted to Utah State School and Institutional Trust Lands, Salt Lake City, Utah.

Metcalf, Michael D. and Kevin Black

1991 *Archaeological Excavations at the Yarmony Pit House Site, Eagle County, Colorado*. Cultural Resources Series No. 31. Bureau of Land Management, Colorado State Office, Denver.

Morss, Noel M.

1931 *The Ancient Culture of the Fremont River in Utah*. Papers of the Peabody Museum of American Archaeology and

Ethnology Vol. 12, No. 3. Harvard University, Cambridge

Richens, Lane, Richard Talbot, Mindy Griffiths and Dale Gourley

1997 Capitol Reef National Park: 1996 Archaeological Survey and Testing Program, CARE-Preliminary Report No. 1. *Brigham Young University Museum of Peoples and Cultures Technical Series* No. 97-3. Provo, Utah.

Rood, Ronald

1990 Archaeological Excavations at 5LA2190: Evidence for Late Archaic Architecture in Southern Colorado. *Southwestern Lore* 56(3):22-29.

Simms, Steven R.

1989 The Structure of the Bustos Wickiup Site, Eastern Nevada. *Journal of California and Great Basin Anthropology* 11(1):2-34.

Talbot, Richard and Lane Richens

1993 Archaeological Investigations at Richfield and Vicinity. *Brigham Young University Museum of Peoples and Cultures Technical Series* No. 93-15. Provo, Utah

Tipps, Betsy

1988 *The Tar Sands Project*: An Inventory and Predictive Model for Central and Southern Utah. Cultural Resources Series No. 22. Bureau of Land Management, Utah State Office, Salt Lake City.

Westfall, Deborah

1987 *The Archaeological Survey of the Garkane Electric Power Association Proposed Lyman-Fruita 138 KV Transmission Line Corridor Near Torrey, Wayne County, Utah*. Abajo Archaeology. Ms. on file, Antiquities Section, Utah Division of State History, Salt Lake City.

Wheeler, Charles and Gary Martin

1982 The Granby Site: Early-Middle Archaic Wattle & Daub Structures. *Southwestern Lore* 48(3):16-25.

Wilke, Philip J. and Meg McDonald

1989 Prehistoric Use of Rock-Lined Cache Pits: California Deserts and Southwest. *Journal of California and Great Basin Anthropology* 11(1):50-73.

42UN1816 - MERKLEY BUTTE

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INTRODUCTION

In the early summer of 1990 members of the Uinta Basin Chapter of the Utah Statewide Archaeological Society (USAS) were hiking in the Ashley Creek area northwest of Vernal, Utah. While hiking on the steep slickrock areas west of the creek, they encountered a large Fremont site that was experiencing ongoing vandalism by unknown persons. The USAS members immediately reported the activity to Bureau of Land Management (BLM) archaeologists. Jeanne Moe from the BLM state office visited the site in August 1990 and reported 17 possible pithouse depressions, a large number of artifacts, and abundant evidence of buried deposits. Efforts were made by BLM and Forest Service law enforcement officers to apprehend the individuals responsible for the vandalism, but video surveillance failed to capture any additional activity at the site. Although no evidence was ever found to link anyone to the vandalism, the increased activity and interest in the site by local residents has ended the vandalism activity for the present.

After securing a grant from the Utah Division of State History, the Uinta Basin USAS chapter began salvage excavations in the fall of 1992 at the site we have named Merkley Butte site (42UN1816), after the family which homesteaded the area. The objectives of the excavation were to determine the extent of the vandalism and if possible excavate two pithouses for comparison to previously excavated ones in the Uinta Basin. Nearly 50 people participated in the six-week-long project, including individuals from the Forest Service, local USAS chapter, BLM, Northern Ute Tribe, Mesa College, and other local residents.

ENVIRONMENTAL SETTING

The Merkley Butte Site is located approximately 1.5 miles (2.5 kilometers) north of the confluence of the Dry Fork and Ashley Creek drainages (Figure 1), on a mesa top that rises 120 to 400 feet (40 to 120 meters) above the surrounding area (Figure 2). Site elevation is approximately 6380 feet (1945 m). The mesa dips slightly from west to east, with a slope of 2 - 5%. The site itself is on a 2% slope.

On the east side of the mesa a promontory with sheer rock cliffs rises approximately 400 feet (120 m) above Ashley Creek. This point is a narrow ridge extending out from the main mesa, with a veneer of Bishop Conglomerate capping the surface. The western edge of the mesa is a relatively broad windswept slope that dips toward the site. This rise provides the site some protection from westerly winds. The western edge of the mesa rises approximately 120 vertical feet (40 m) from the surrounding area. Access to the site is restricted to pedestrian travel using a small

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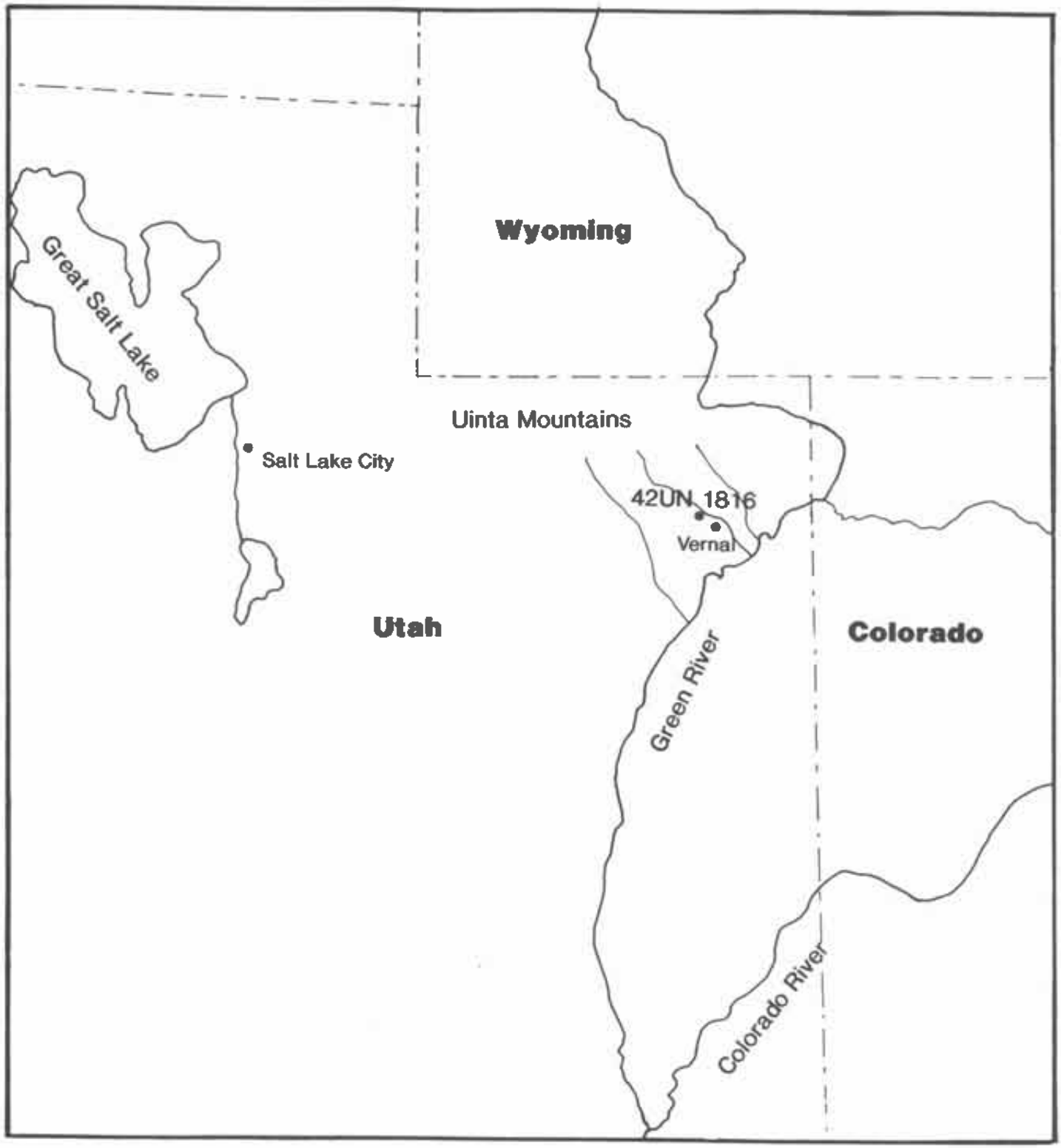

Figure 1. Location of Merkley Butte, 42UN1816.

Figure 2. Ashley Creek runs along base of cliff below site.

area on the south and one route on the north.

The landform itself is part of Little Dry Fork Mountain and occurs on Glen Canyon Group (Navajo) sandstone. In the Dry Fork and Ashley drainages, this formation is a resistant, pink, light gray, and buff color. This prominently crossbedded sandstone is mainly of eolian origin. The formation's massive basal part forms cliffs often 100 feet or higher. Little Dry Fork Mountain consists of crossbedded sandstone that has weathered into smoothly rounded domes and sharp turrets. This stark terrain is cut by steep walled box canyons that have eroded along northwest-southeast striking joints or faults (Kenney 1955). Many of these canyons contain noted prehistoric sites consisting of storage units, rock shelters, burials, petroglyphs, and camp sites.

The Merkley Butte site is located approximately ½ mile (1 km) from Ashley Creek (or from the eastern promontory 400 feet (120 m) directly above Ashley Creek) and 1.5 miles (2.5 km) from Dry Fork. This setting is important because of the numerous large and significant sites along the Dry Fork and Ashley Creek drainages, including the National Register petroglyphs at McConkie Ranch. Ashley Creek exits a deep gorge approximately two miles (3 km) north of the site and enters an alluvial river bottom 1/4 mile (.4 km) in width. Ashley Creek is a perennial stream that drains the Ashley Creek Watershed in the Uinta Mountains and provides the municipal water for Vernal, as well as irrigation water for Ashley Valley. Ashley and Dry Fork Creeks obtain their maximum discharge from melting snow in late spring, often resulting in flooding in May and June. Dry Fork is also perennial in its upper reaches, but after spring runoff, the lower portion of the boulder covered streambed becomes dry. Numerous springs occur in the area, some of which dry up in the summer, while others retain some flow.

Normal annual precipitation in the area is 16-19 inches (40-50 cm). Annual winter snow ranges from 70-99 inches

(180-250 cm). This area is in transitional between the canyon and Uinta foot hills so frost free days can range from 100 to 160 (Ashcroft et al. 1992). It is just above the foothill area which is currently a favored location for fruit tree orchards. The site is above the valley (Vernal and the Uinta Basin) inversion, which has a significant effect on temperatures. Summer temperatures are generally cooler than the valley, while winter temperatures are warmer. The cool air that drains from the foothills collects in valley bottoms and other depressions, forming "frost pockets" resulting in fewer frost free days in the valley than for this area.

The soils are shallow to deep psamments of loamy sand forming in sand dunes derived from the weathering of the Navajo formation. Shallow soils occur on the periphery of the mesa, especially on the mesa's western edge which is covered by stunted pinyon and shrubs. Rock fragments are abundant on and near the surface, with bedrock contact at 3 to 14 inches (8 - 34 cm). The interior of the mesa, where the site is located, consists of deep sands in which larger juniper and understory have stabilized many of the dunes. Between these stabilized dunes are windblown areas with lithic scatters and charcoal staining.

Vegetation at the site consists of pinyon/juniper, Birch Leaf Mahogany, prickly pear cactus, Indian Rice Grass, and a few other grasses and forbs. The windswept western part of the mesa consists predominantly of stunted pinyon, bitterbrush, and Birch Leaf Mahogany. The Ashley drainage below has irrigated pasture lands, with cottonwood, willow, dogwood and other riparian species along the river bottom.

There is a 360 degree view from the site. Ashley Gorge, plus the entire Ashley drainage below the gorge to the Dry Fork confluence can be seen. To the east, Red Mountain, Taylor Mountain and numerous rock shelters and drainages are within view. To the west, Dry Fork, McConkie Ranch, Little Mountain, Pine Ridge, and Sawtooth Ridge are visible.

Wildlife is abundant in the area and consists of deer, elk, moose, coyote, cougar, bobcats, occasionally bear, and many small animals such as rabbit and marmots.

The Ashley Creek area is private land owned predominantly by two families. It is currently being irrigated and used for pasture. Little development has occurred in the Ashley Creek drainage above its confluence with Dry Fork. Dry Fork, however, has approximately 90 homes and development is increasing with small acreage hobby farms dominating. Little Dry Fork Mountain, located between these two drainages, is public land administered by the Bureau of Land Management (BLM). The area now, as in the past, has high resource value and was nominated as an Area of Critical Environmental Concern (ACEC) in the BLM Diamond Mountain Resource Management Plan.

EXCAVATIONS

The site excavation consisted of two north-south oriented trenches. Each trench was started as a one meter test pit in an area that had been previously disturbed by vandals, but revealed a profile of undisturbed cultural fill. Excavations revealed the vandalism to be much more extensive than expected. In some cases the vandals appear to have been very systematic in their digging. The initial excavation pit fill from each trench was screened through quarter inch mesh. The depth and location of cultural fill in each area was determined from the initial one by one meter pits. After the initial test pits, the overburden of eolian deposited sand was quickly removed with shovels and only the lower cultural layers were screened. The overburden was over a meter deep in the dune area west of Trench 2, but in deflated or disturbed areas the cultural layer was visible on the surface. In general, no screening or collecting was conducted in areas which had obviously been excavated by vandals.

Trench 1

The first trench (F-5) was begun at grid 17 north and 1 west (17N 1W). The vandals had ended their work here and a clear profile was evident on the south side of the square. About 25 cm of overburden and 20 cm of cultural fill were evident in the profile (Figure 3). The overburden was tan eolian deposited sand (10 YR 5/3 dry brown - Munsell Soil Color Charts) The cultural fill in this trench was a gray material (10 YR 5/3 dry light brownish gray), a loamy fine sand with charcoal flecks and occasional artifacts including flakes, pottery, and bone. We expanded the trench three meters to the east in this location because evidence of a compact surface with some fire reddening was noted. Pieces of fire cracked rock, pottery, debitage, corn cob fragments and a large disk shaped bead were found in this area. However, vandals had destroyed nearly all this surface and excavated to the edge of whatever feature this had been. Almost no intact deposits were found along the western edge.

Trench 1 was continued six meters to the north. This was the area vandals had been working and undisturbed deposits were expected under a large back dirt pile in squares 19 and 20N. Instead, we found vandals had systematically excavated the entire area down to culturally sterile soil, even under the back dirt pile which was nearly a meter deep. At the far end of the trench, in 22N, it first appeared that there was an intact profile beyond clear signs of disturbance, but this area was also found to have been disturbed.

We abandoned the north end of the trench and excavated five squares to the south. Here intact cultural deposits were encountered. The cultural deposits were a very uniform 25 to 30 cm in thickness. The overburden gradually increased to a depth of 50 cm at the far southern end of the trench. Few artifacts and no features were encountered in the trench, although some small fire hardened clumps of clay were noted. A slight dark stain was noted in the west profile of 14N, but no additional charcoal or other material of interest was encountered. At this point we determined to concentrate our efforts on a second trench, located 22 meters west of Trench 1 where remains of a structure were found.

Trench 2

Trench 2 was begun in a looter's hole at 20N and 22W where a large amount of charcoal was evident. Although the upper fill of the initial pit had been disturbed, at the bottom intact burned branches were encountered. Additional branches were found at the base of the next square, again below disturbed deposits. This area was designated Feature 14 and will be described later.

The trench was expanded south to follow the edge of the looter activities. As we moved south, artifacts became more common and oxidized clumps of earth were uncovered. Several basin-shaped pits were encountered in this trench. Evidence of a possible lithic work area was noted in the south end of the trench . A large number of flakes (including dozens of small tertiary pressure flakes), preforms, bifaces, a hammerstone, finished projectile points and beads were concentrated in this area. A pile of hardened clay was also found in this area. It is suspected that this was part of an adobe wall, however the area adjacent had been disturbed and further investigation was futile.

The south end of the trench was extended east for several meters toward a unique, large doughnut shaped sandstone ring that was lying in a deflated area. Unfortunately the entire area around and under the ring had been disturbed. There is still no context for these rings, several of which have been found in the area. The ring is approximately 90 cm in diameter, with a hole diameter of 50 cm and a thickness of 10 cm.

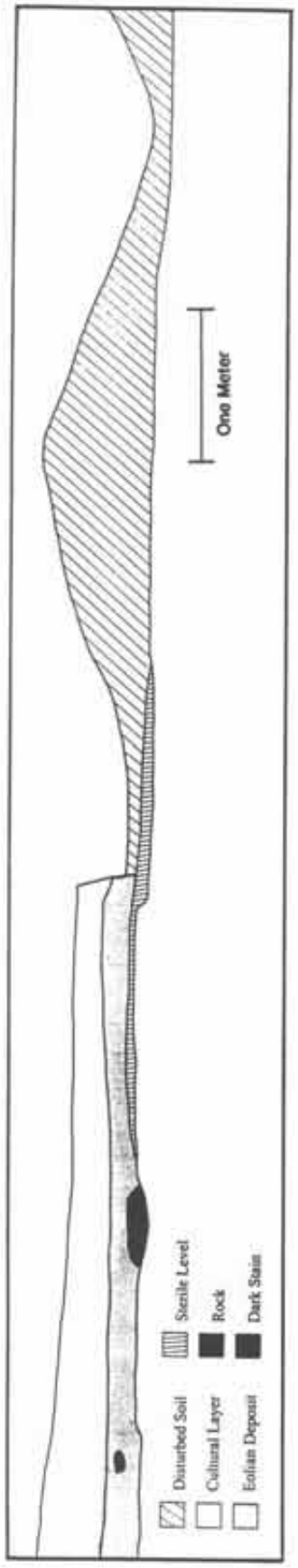

Figure 3. Profile of Trench 1.

Structure (F-14)

In the north end of Trench 2 remains of a brush structure were found. The structure, designated F-14, contained a radial pattern of burned timbers or branches (Figure 4). These were generally 5 to 10 cm in diameter and spaced about 5 to 25 cm apart. A dark layer, 5 to 20 cm thick, containing abundant charcoal covered the floor. This layer contained evidence of smaller branches and brush that may have covered the frame. The floor was compact, but no evidence of preparation was noted. The floor was dish shaped, rising by as much as 30 cm from the center to the west, north and south sides. There did not appear to be a rise or berm on the east side. However, the vandals had disturbed this side of the structure, leaving many questions about the shape and nature of the structure (Figure 5).

The structure appears to have been approximately six meters wide along a north-south axis and at least four meters east to west (Figure 6). No definite post holes were noted. On the west side the burned timbers and roof fall layer ended in the same location, where they met the rising floor. In these locations it appears a floor had been dug into the sand dune on the mesa top and branches were propped against the dune. The pattern of the timbers gives some indication the structure was not completely covered. Perhaps this feature served as some sort of wind break. The roof fall on the east end of excavation, along the edge of the disturbed area, was different from the rest of the structure. In this area the roof fall level contained large amounts of charcoal, but not in any discernible pattern, and evidence of hardened clay. These hardened clay patches were overlying the charcoal, suggesting earth placed on a brush framework as part of a wall or roof. It may also represent an adobe wall that collapsed onto the edge of F-14.

Two nearly complete, but broken, Uinta Gray pottery vessels were found near what is assumed to be the center of the structure (Figure 7). Few artifacts were found on the floor of the structure. Several floor features were noted, including four pairs of straight sided pits forming an arch across the floor area. This arch also tends to mark the end of the burned timbers. Some of these pits had been dug down into the bedrock on the mesa top and some had been lined with rock slabs. The function of these pits is not clear, although several have ash layers typical of hearths. They seem too narrow and deep to be typical hearths, however.

Three flotation samples from the floor of F-14 were analyzed for macro fossil botanical remains (Newman 1993), along with several seeds removed by eager volunteers. Although interesting, results (Table 1) were sparse and no firm conclusions can be drawn. Charred juniper (*Juniperus sp.*) leaves, charred cheno-am seeds, cactus (*Coryphantha sp.*) seeds, grass (*Gramineae sp.*) seed and a single corn kernel (*Zea mays*) were noted. In addition to the seeds mentioned above, chokecherry (*Prunus sp.*) seeds and a single pinyon hull (*Pinus edulis*) were recovered at the site. The cactus seed is interesting since Newman (1993:2) has identified this taxon at two other Fremont upland hunting sites in the area. It is difficult to draw conclusions on subsistence from such a limited amount of data. However, the single corn kernel indicates domesticated crops are present. The burned wild floral remains suggest that wild resources were important to the inhabitants.

Two radiocarbon dates were obtained from timbers within the structure. They are 930+/- 60 BP (Beta 62082) and 880 +/- 50 BP (Beta 62083). An averaged calibrated date of A.D. 1159 with a one sigma range of A.D. 1039 to 1180 (Stuiver and Pearson 1993) was determined for the structure. This is the latest reported date for the Uinta Basin Fremont from a residential site (Spangler 1995:479). However, five dates obtained from Mantle's Cave, Browns Park and Dinosaur National Monument have mid-ranges of A.D. 1172 to 1300 (Spangler 1995:491). Most of these radiocarbon dates are associated with maize or Fremont ceramics and were obtained from granaries and base camps.

The increasing number of "Fremont" dates after A.D. 1050 indicates a need to revise the dating of the Uinta Fremont. Marwitt's (1986:169) designation of a Fremont occupation in this area of A.D. 650 to 950, ending long before other Fremont manifestations in Utah, is no longer valid. Local archaeologists have suspected there was a late Fremont occupation in the Uinta Basin for years. However, some have doubted this: "the postulation of a Late

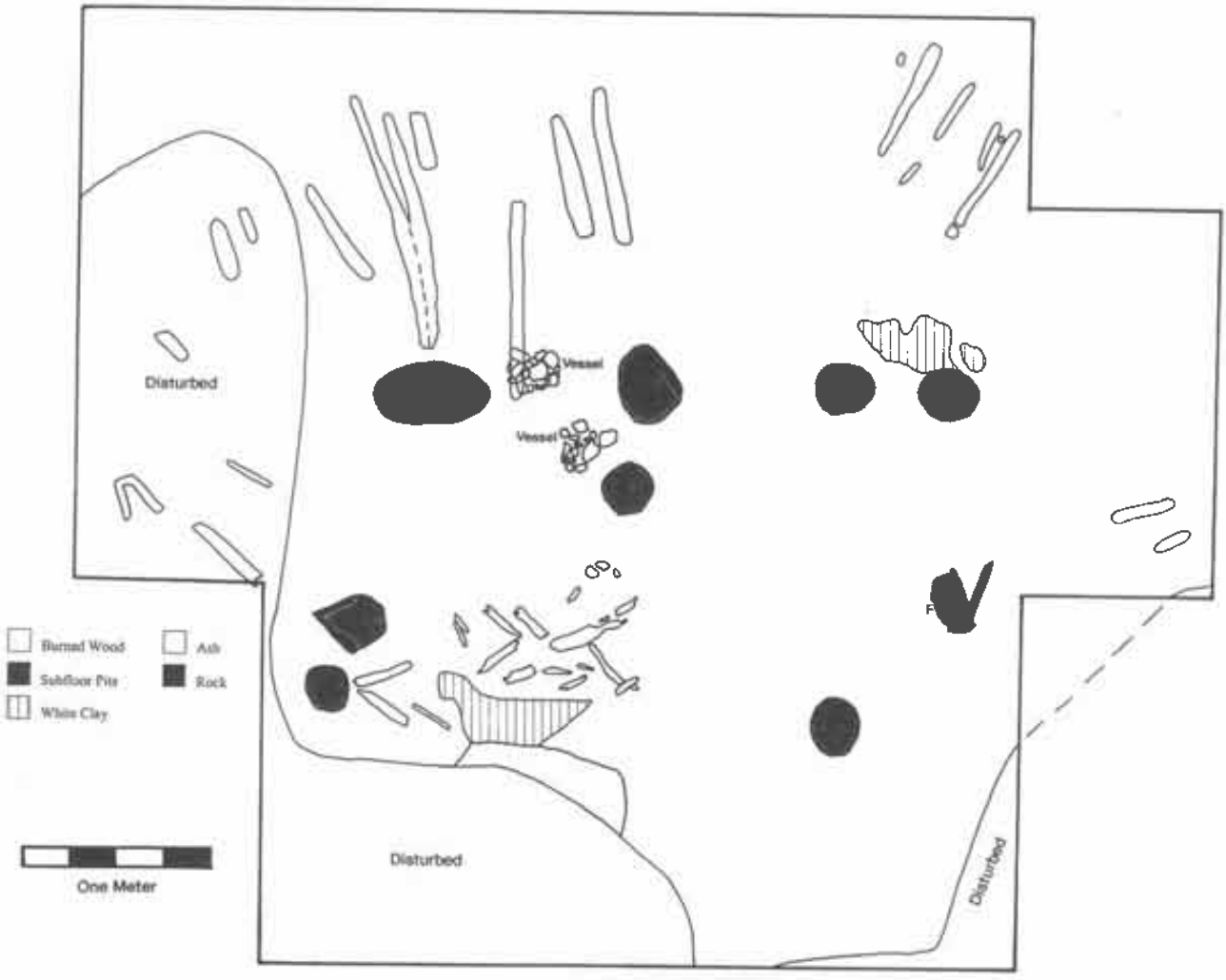

Figure 4. Plan map of structure.

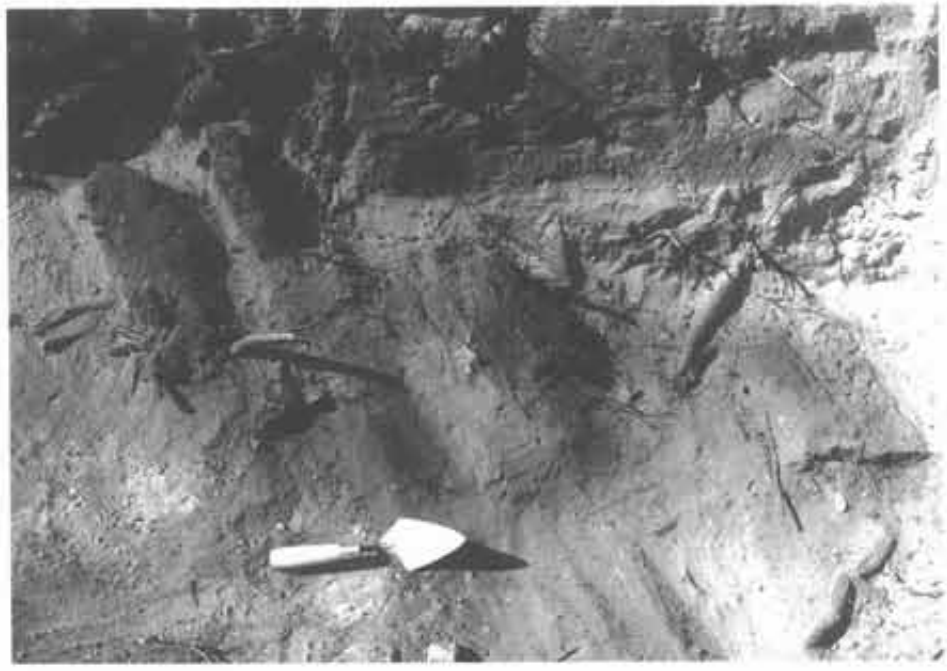

Figure 5. Remains of burned brush structure in Trench 2.

Figure 6. Merkley Butte structure after excavation, note arc of sub-floor pits.

Figure 7. Crushed ceramic vessels found near center of structure.

Table 1. Macrofossil remains from 42UN1816.

Taxa	Feature 14	Trench 1	Other Areas	Trench 1 Disturbed
Juniperus leaves charred	1			
Juniperus seed	4	3		2
Cheno-Am seed	6			
cf. Coryphantha seed charred	1			
Gramineae seed charred	1			
Corn kernel (Zea mays)	1			
Prunus seed fragment			6	
Pinus edulis hull fragments	1			

Fremont Period in the Uinta Basin proper is extremely speculative" (Spangler 1995:484). The paucity of dates between A.D. 1050 and 1300 is probably more a reflection of the small number of excavated village sites from the Uinta Basin. We suspect the large village sites in Dry Fork and on Brush Creek will contain additional occupations that date to this later period of time. Before this later period can be characterized, however, additional data is required.

Fremont Brush Structures

Brush structures have been reported locally at Dinosaur National Monument (Arndt 1970) and at Steinaker Reservoir (Phillips 1990). The Forest Service has also recently excavated two brush structures near Dutch John, Utah (Loosle and Johnson 2000). Several brush structures have also been tested at Greendale near the Green River just west of Dutch John (Atkinson and Loosle 1999). All of these structures were generally small, measuring 2.5 meters or less in diameter with a brush superstructure constructed on the surface or over a shallow basin. All of the structures have been located in pinyon-juniper woodlands, although the Steinaker and Cub Creek sites (Edwards 1996) are located on the edge of this zone. The Dutch John and Steinaker structures contain an interior hearth, while the Cub Creek structures do not appear to have hearths.

The Uinta Basin structures are similar to two structures reported at Topaz Slough (Simms 1990) and a single structure from Skull Valley (Smith 1994). These structures are about the same size, two to three meters in diameter, but only one is known to contain an interior hearth. Fremont pottery, projectile points and other artifacts have been found at all of the sites. However, the occupations at the West Desert sites of Topaz Slough and Skull Valley appear to be the result of different regimes then those at Steinaker and Cub Creek. The West Desert sites appear to be the result of village dwellers creating temporary camps while exploiting seasonal resources a substantial distance from their permanent dwellings. Although the Steinaker and Cub Creek sites may be temporary, they are relatively close to permanent habitation sites. These inhabitants did not move a long distance to exploit a unique environment. In contrast, the Dutch John sites may be seasonal camps similar to the West Desert sites.

The Merkley Butte structure is different from other brush structures discussed. It is located in a large village site and measures six meters by four meters. The Steinaker structure at 5.2 meters by 4.3 meters is similar in size, although Phillips (1990) refers to another large (5 meter in diameter) structure in Dry Fork dated to the mid seventh century AD. The rest of the structures are all under three meters in diameter. The Merkley Butte structure also does not appear to have been completely covered. Finally, unlike the others, which had no or only one interior hearth, this structure had at least at least five. It is unfortunate that looters had disturbed the east end of the structure. Many questions about the size, layout, and function of the structure could have been addressed with undisturbed deposits from this critical location. This structure may have been a semi-enclosed work area.

Features

A series of sub-floor pits were found in the areas excavated (Table 2). Generally these contained cultural fill and were straight walled. Bell shaped pits are common in the Uinta Basin (H. Blaine Phillips, personal communication 1997) so it is interesting that none were noted at Merkley Butte. Four pits in F-14 were dug into the bedrock. At least five pits appear to have been used as hearths. Those in Trench 2 are generally basin shaped. Two possible post molds were found in the workshop area.

Table 2. Sub-floor pits at 42UN1816.

Number	Shape	Width	Depth	Bedrock	Contents	Location
F-23	straight walled	29	40	yes	bottom ash layer	F-14
F-26	basin	41	23		cultural fill	F-14
F-27	straight walled	20	35		very fine ash	F-14
F-29	straight walled	30	24		stone slab lined	F-14
F-31	straight walled	25	22	yes	cultural fill	F-14
F-32	straight walled	32	25		cultural fill	F-14
F-33	straight walled	30	31	yes	ash and charcoal	F-14
F-34	straight walled	30	50	yes	ash and charcoal	F-14
F-35	oval	65/35	30		cultural fill	F-14
F-20	basin	45 cm	15 cm		cultural fill	Trench 2
F-24	basin	40	4		cultural fill	Trench 2
F-25a	basin	57	11		large amount ash	Trench 3
F-25b	straight walled	17	30		post mold?	Workshop
F-28	straight walled	5	9		post mold?	Workshop

MATERIAL CULTURE

Faunal Remains

A limited analysis was conducted on the faunal material recovered (Crosland 1993). The collection was fairly fragmentary, with about 12% burned (Table 3). A wide diversity of species were identified including bighorn sheep (*Ovis sp.*), deer (*Odocoileus hemionus*), jackrabbit (*Lepus sp.*), cottontail (*Lepus sylvilagus*), squirrel (*Sciuridae*), rock squirrel (*Spermophilus sp.*), woodrat (*Neotoma sp.*), vole (*Microtus sp.*), dog or coyote (*Canidae*), grouse (*Tetraonidae*), sparrow or bunting-like bird (*Fringillidae/Emberizidae*) and fresh water mussel (*Oreohelix sp.*). Cottontail rabbit (*Lepus sylvilagus*) was the most commonly identified animal, but large mammal bone was actually most common. Large mammal long bones were being broken and processed, marrow was probably extracted and grease may have been produced. The fresh water shell probably came from a local river or stream, but no determination was made as to whether mussels were collected for subsistence needs or for some other purpose. Only the premolar of a mountain sheep provided any clue to seasonality. The tooth was newly erupted with little wear, so the animal was probably killed in the early summer months.

Table 3. Faunal remains from 42UN1816

Taxon	*NISP	*MNI
Sheep	1	1
Deer	4	1
Jackrabbit	7	1
Cottontail	74	7
Squirrel	1	1
Rock Squirrel	4	1
Woodrat	3	2
Vole	7	1
Dog/Coyote	1	1
Grouse	8	3
Sparrow/Bunting	1	1
Land Snail	1	1
Fresh Water Mussel	3	1
Subtotal	115	22
Unidentifiable Bone		
Large Mammal	105	
Medium Mammal	1	
Small Mammal	24	
Microtine Fauna	1	
Unknown Mammal	35	
Large Bird	2	
Medium Bird	3	
Small Bird	1	
Unknown Phylum	2	
Total	289	22

*NISP stands for the number of bone elements identified to a genus or species.
*MNI stands for minimum number of individuals represented.

The worked bone at the site consisted of an incised antler, a bone tube, seven awls, three bones that exhibited evidence of grinding, and five beads. The antler had been incised longitudinally along the beam and also transversely and then snapped. Also, one jackrabbit femur exhibited transverse incising which had removed its proximal and distal ends.

Seven bone awls were found in the assemblage. Five of these were produced from the bones of a large mammal, probably deer. One was made from a metacarpal, one from a metatarsal, two from antler, and one from an indeterminate long bone. The remaining two awls were produced from the tibia of a cottontail rabbit. Five bone beads were examined as part of the faunal assemblage. They were all round in outline, thin and tabular in cross-section, and center drilled. Diameters range from 8 mm to 11 mm; thicknesses range from .8 mm to 2 mm. The holes in four of the beads were uniform in diameter (essentially identical), suggesting the possibility that the same tool was used to create each hole. One bead's hole was biconical in shape, showing it had been drilled from both directions. All of the beads have been highly shaped and polished. One bead was burned.

Chipped Stone

Debitage. A simple visual analysis of the debitage recovered at Merkley Butte provided some intriguing results (Figure 8). The two primary materials appear to have been obtained on the north slope of the Uinta Mountains, over 30 miles (50 km) from the site. The most common material was Tiger chert, comprising 51.8% of the debitage recovered. Tiger chert was quarried at the Pine Springs Site (48SW101) in southwestern Wyoming (Sharrock 1966). Tiger chert's most marked characteristic is a tan and dark brown banding. Tiger chert is found in the Eocene - Green River Formation in the Black and Cedar Mountain areas of southwestern Wyoming. "It produces one of the most dramatically patterned cherts in Wyoming. The banding is generally interpreted to be a preservation of stromatolitic structure by silica solutions" (Love 1977:23). Love also feels that the banded pattern of the chert only becomes apparent on weathered pieces. So "prehistorically the material was selected for practical reasons, not aesthetic ones." Love (1977:23) states that Tiger chert "has been transported widely, has been a source for at least 9700 years, and is enhanced by heat treatment." Pieces have been found as far away as Jackson Hole, Wyoming. Although a majority of pieces are dark brown or banded in color, a large number of flakes recovered on the north slope of the Uintas are an opaque tan color that appears to represent the lighter colored bands of the banded Tiger chert.

Although the extremely good quality of this material made it very desirable for nearly 10,000 years, it is still surprising to find such a large quantity almost 40 miles (60 km) across a major mountain range from its source. Although not tabulated, many of the Tiger chert flakes at the site had evidence of heat spalling, suggesting this material was generally treated to enhance its flaking qualities. Most of the Tiger chert from 42UN1816 is the dark brown color, which is beer bottle color in thin cross sections.

Sheep Creek quartzite, a light colored quartzite, comprises 43.3% of the debitage. This material is a well cemented, fine-grained quartzite that produces a nice conchoidal fracture. The most common color is tan or cream, with light gray also frequently encountered. These colors are sometimes banded. Colors such as dark gray, white and even red were occasionally noted. Lag deposits of this material were extensively quarried in Sheep Creek Canyon and its drainages on the north slope of the Uintas, approximately 30 miles (50 km) north of 42UN1816. Sue Ann Bilbey (personal communication 1997) thinks the color and quality of the Sheep Creek quartzite are unusual for Uinta Mountain quartzite and suspects it was formed along the fault zone in Sheep Creek Canyon, where water percolation and pressure formed its unique qualities. The remaining 4.9% of the debitage was placed in an "other" category. For the most part these pieces consisted of poor quality cobbles and heavily burned pieces.

Only six pieces of Tiger chert and none of the quartzite exhibited appreciable amounts of cortex. This indicates

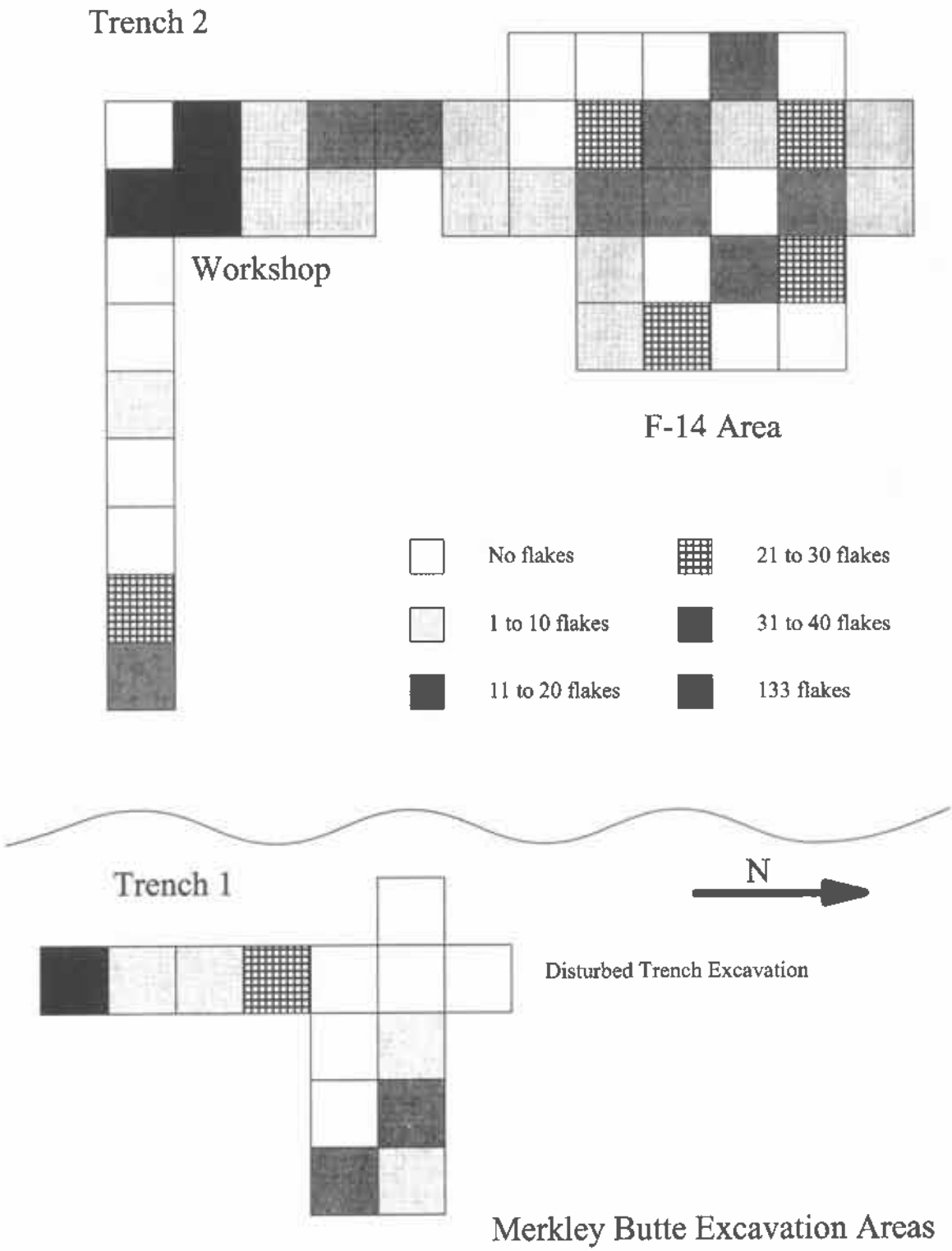

Figure 8. Debitage distribution.

the material was reduced at other locations before being transported to the site. This is expected for traded material (Vehik 1990:137). We have noted numerous large quartzite bifaces in the Uintas and suspect individuals were transporting them as raw material (Madsen et al 1999).

We once argued (Madsen et al 1999) that prehistoric hunters who utilized the High Uintas originated from the north slope and south slope individuals apparently did not visit these alpine areas. We showed that travel distances from the north foothills to the crest of the Uintas were only 5 - 7 miles (8 - 11 km) , contrasted with 15 or more miles (24 km) from the southern flanks. The preponderance of north slope derived lithic material (Tiger chert and Sheep Creek Quartzite) was one of the key pieces of evidence upon which we based this hypothesis. However, this hypothesis may need to be modified. In the summer of 1996 Forest Service crews and volunteers recorded a number of sites in the upper end of the Dry Fork drainage around Deadman's Lake and Lightning Park. Additional sites were noted in Blanchett Park further south in the drainage. All of these sites contained Tiger chert or Sheep Creek Quartzite. The Dry Fork drainage may have been the route individuals traveled carrying north slope materials to the site on Ashley Creek.

A number of questions are posed by the debitage data from Merkley Butte. Based on cursory examination of material at other sites in the Uinta Basin, the Merkley Butte assemblage seems atypical. These other sites seem to contain more river cobbles and a wide array of material types. Descriptions of material from other sites is limited or non-existent, but at Steinaker (Phillips 1990) Tiger chert was noted, as well as several pieces of dark brown chert. At Dinosaur National Monument (Jennings and Wade 1970:87-88) tan quartzite and brown chert are mentioned. At Steinaker Gap (Talbot and Richens 1996:86) a dark brown chert Rose Spring point was noted. It is not clear at this point if the lithic assemblage at Merkley Butte is typical of other sites within the Uinta Basin, or even in the Ashley-Dry Fork drainage.

Tools. A total of 21 chipped stone tools were recovered during excavations (Table 4 and Figure 9). The majority of these were projectile points, point fragments, or point preforms. Almost half of these came from the workshop area. A single drill and two biface knives were encountered. Most of the identifiable points were classified as Rose Springs (73% - 8 of 11). Two points were not assigned a formal type designation and the other was classed as a Uinta Side-Notch. The Uinta Side-Notch tip has been reworked into a punch. The workshop area stands out because of the variety of tools recovered there, including all of the non-Rose Spring points.

Tool material was more diverse than the debitage. Seven tools (33%) were made of Tiger chert, four (19%) of quartzite (including both bifaces), another 4 (19%) were made of a gray chert, while the remaining six were made from five different chert like materials.

Non-Chipped Stone Artifacts

A total of 34 non-chipped stone tools were recovered during the excavation (Table 5 and Figure 10). Thirteen of these were manos or mano fragments. Most of the manos were single handed. One very large item was designated as a mano because grinding wear was evident across a pecked/roughened area. The location and shape of the pecking on the face of the stone suggest it may be an anvil. Both of the metates were fragmentary.

The majority of these tools were made from local materials. The manos and metates were almost exclusively of tan sandstone. The hammerstones were generally made from river cobbles or lag deposits. The balls were also river cobbles rounded into a ball shape through pecking and grinding. The pendants were made from a very fine grained sandstone. Although fragmentary, one appears to be a piece of a disk-shaped pendant with a central hole. The other pieces were from a trapezoidally-shaped piece (similar pendants are commonly depicted in Fremont rock art), but no hole was evident.

Table 4. Chipped stone tools from 42UN1816.

Tool Type	Feature 14	Workshop	Trench 1	Other Areas	Totals
Rose Spring Point	4	2		2	8
Projectile Point Preform	1	2			3
Uinta Side-Notch Point		1			1
Other Projectile Point		2			2
Projectile Point Tip	2		1	1	4
Drill	1				1
Biface	1	1			2
Core	1			1	2

Ceramics

A total of 124 pottery sherds were recovered from the site (Figure 11), allowing partial reconstruction of two vessels. All the pottery, except one piece, contained crushed angular limestone temper. The one exception was a small piece about 1 cm in size that had a brown polished slip and black core. No temper was visible on this small piece. All the remaining sherds would be classified as Uinta Gray, although a great deal of variability was noted. The sherds were generally 2 cm or smaller in size and often very brittle and fragile. Thickness varied from .38 cm to 1.00 cm. Temper ranged from barely visible to large, abundant limestone granules constituting nearly 50% of the matrix of the sherd. Color varied from 7.5 YR 7/4 "Pink" to 10 YR 3/1 "Very Dark Gray" (Munsell Soil Color Charts). A large number seemed to fall toward the lighter tan or pink color, including one of the reconstructed vessels.

No decoration was noted on any of the ceramic pieces. However, two pieces appear to have been shaped. One complete asymmetrical cone-shaped piece was noted and a small fragmentary, roughly hexagonally-shaped piece was also found. It is not clear what the purpose of these two unusually shaped pieces was, but they reminded us of legs or supports. They both contained only a small quantity of very fine limestone.

Three handle pieces, four obvious neck/shoulder sherds and eight rim sherds were noted. Five of the rim sherds had a rounded lip, with some fingerprint marks and pinching evident. Three other rim sherds had been squared and flattened. One reconstructed vessel had both the rounded and flattened patterns evident, so rim shape varies even on a single vessel.

The majority of the pottery (66%) came from the structure (F-14), including both reconstructed vessels and both large vessel fragments. Twenty percent of the sherds came from the workshop area, but only 5% from Trench 1 and 9% from other areas.

Pottery Vessels. The first reconstructed vessel, (Vessel 1, Figure 12) from 21N 22W, had an amphora-like shape with a rounded pointed bottom, unlike any other previously recorded Uinta Gray vessel. Approximately two thirds of the vessel was restored. The vessel surface was very irregular and undulating with numerous finger marks. The

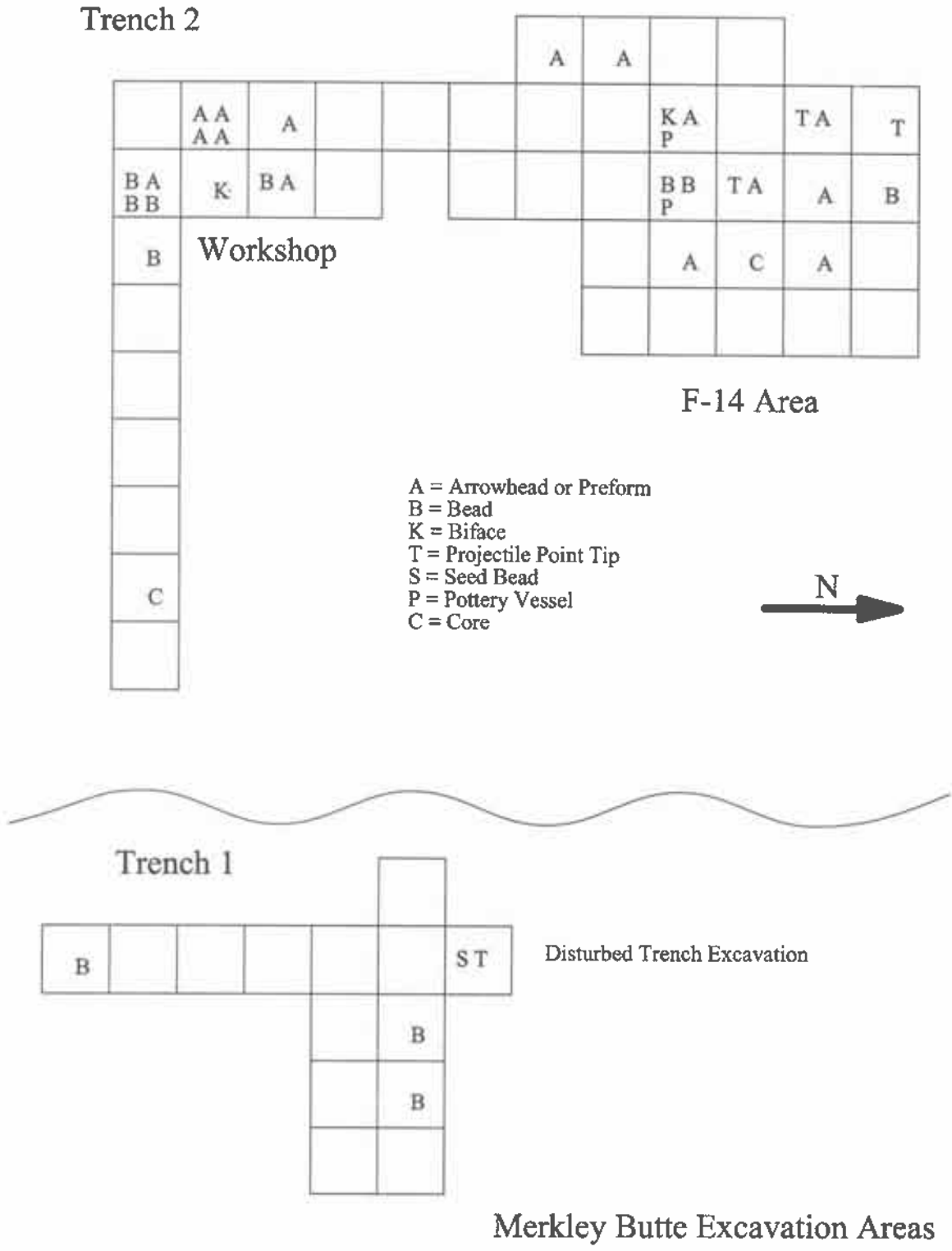

Figure 9. Artifact location.

Table 5. Non-chipped stone tools from 42UN1816.

Tool Type	Feature 14	Workshop	Trench 1	Other Areas	Unknown	Total
Mano	6	4	2	1		13
Metate		1		1		2
Hammerstone	5	4	2	1		12
Pendant	1				2	3
Shaft Straightener	1					1
Ball	1			1	1	3

coils were not well smoothed. Although crushed and generally a small size, abundant temper was visible in many locations, including the surface. There was no decoration evident on the vessel. A loop handle was attached to the rim and to the upper shoulder. A second handle is suspected, but the area where this other handle would be is missing. The vessel diameter at the opening is 13.8 cm and it is 20.3 cm in height. The rim is thin and rounded. The vessel has a relatively thin wall measuring 0.40 to 0.48 cm in thickness, with an average of 0.44 cm. The neck is about 3 cm in height and is slightly flaring. Surface color is variable with one small firing cloud. Color varies from 7.5 YR 7/4 "Pink" to 10 YR 5/2 "Grayish Brown."

Vessel 2 (Figure 13) is a small globular pot very similar to some from Caldwell Village (Jennings 1978:183 a-d). Over 80% of this pot was reconstructed. The vessel surface was somewhat irregular, but evidence of smoothing was apparent and the finish was much nicer than that of Vessel 1. A loop handle was attached to the rim and upper shoulder. Again we strongly suspect a second handle was present, but this is one of the few pieces missing from the vessel. The rim is generally rounded, although a 10 cm segment has been flattened. The vessel has a 16.5 cm diameter at the opening and is 17.8 cm in height. Typical vessel thickness is 0.48 to 0.60 cm. The neck is slightly flaring and about 4 cm high. Limestone temper is small, angular, and only visible in broken areas. Surface is an uneven gray varying between 10 YR 5/1 "Gray" and 10 YR 3/1 "Very Dark Gray."

Several sherds that fitted together were collected in the field as part of Vessel 2. However, they are not part of this vessel. Not only is there no room for these sherds in the other vessel, they are from a different vessel. These sherds are much thicker, 0.55 to 0.60 cm. Temper is more abundant and consists of much larger granules than the other vessels. The interior angle of the sherds also suggest they came from a much larger vessel.

Evidence of one other unique vessel was noted during analysis. A fragment of a bowl with evidence of a loop handle was found. Only two pieces were encountered, measuring 3 cm in length. A very crude estimate of vessel opening suggests a possible opening of 21 cm. Vessel walls were very thin, 0.31 to 0.34 cm in thickness. Bowl height was about 5 cm. The vessel has a very uneven surface as the coils had not been smoothed very well, especially for such a thin vessel wall. Color was 10 YR 3/1 "Very Dark Gray." Although bowls have been noted for the later Whiterocks Phase of the Uinta Fremont, none have been noted with handles.

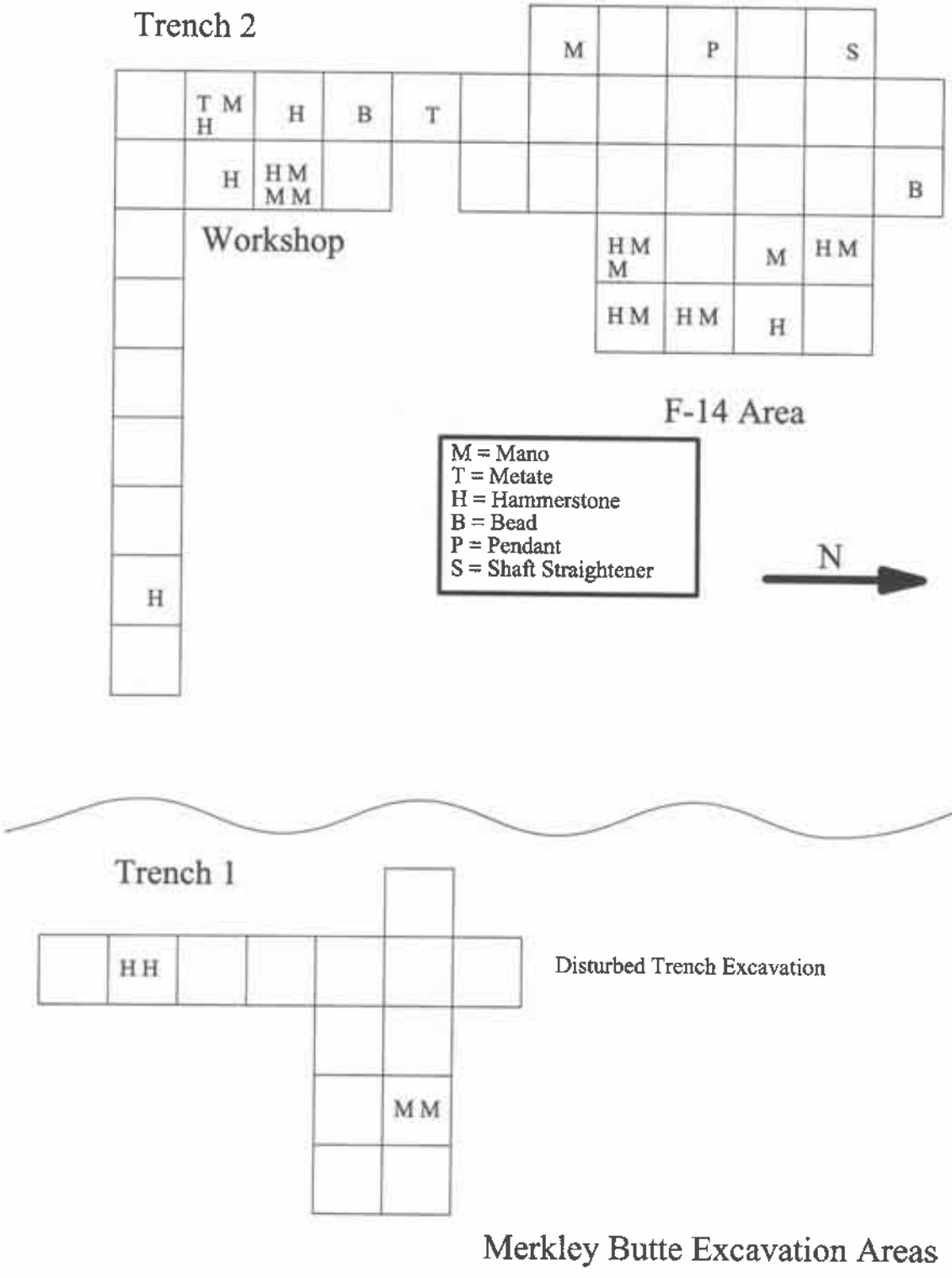

Figure 10. Non-chipped stone tool distribution.

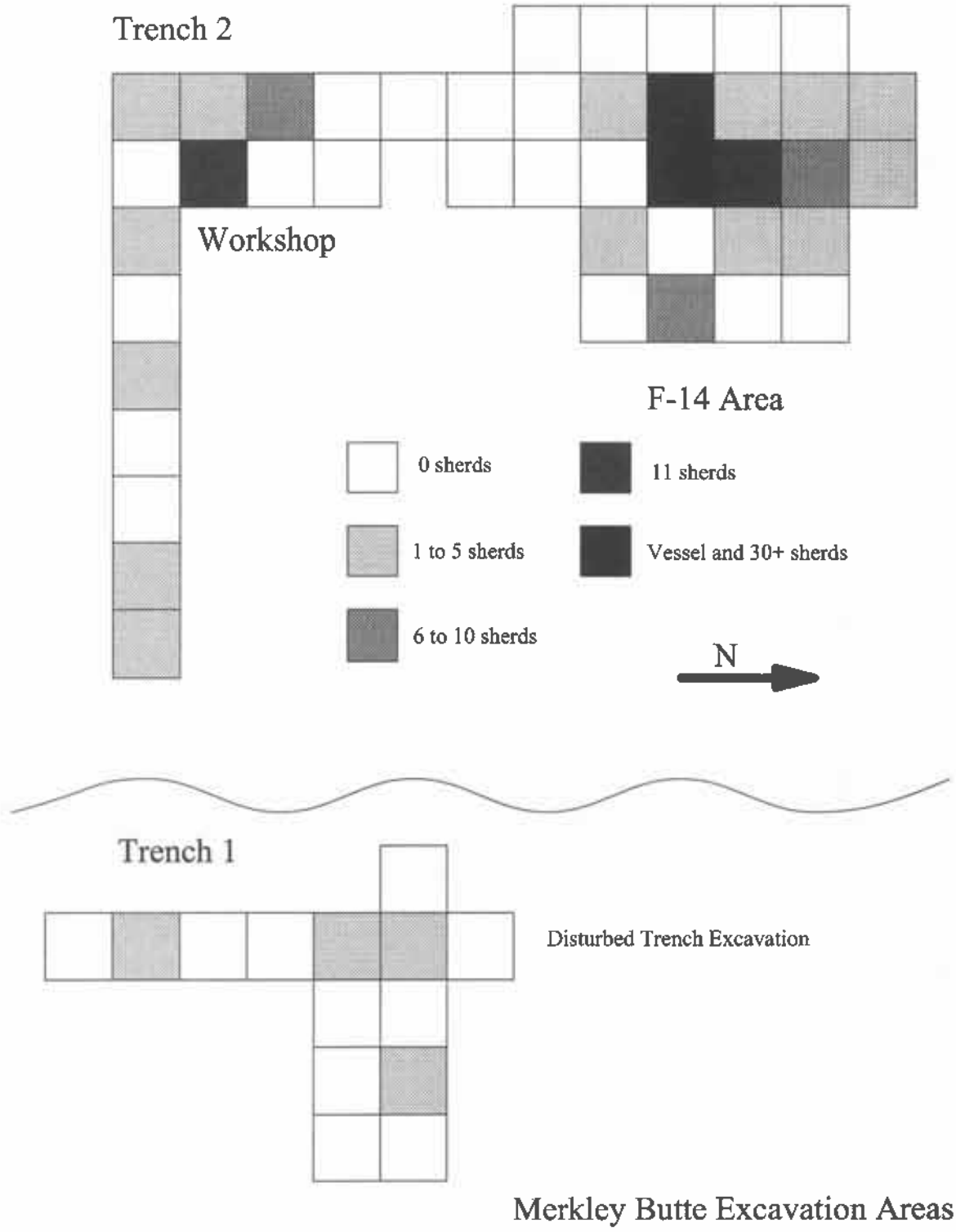

Figure 11. Ceramic distribution.

Figure 12. Reconstructed Vessel 1.

Figure 13. Reconstructed Vessel 2.

SUMMARY

The Merkley Butte site represents a significant contribution to the prehistory of the Uinta Basin. It is also significant because of the large number of individuals, agencies, and organizations that participated in its protection and research. It is a good example of the invaluable contribution avocational archaeologists make in protecting cultural resources and contributing to their research and understanding.

The structure that was excavated at 42UN1816 appears to represent a unique design that may represent a partially covered communal work area. The A.D. 1159 date obtained from the burned timbers suggests the Fremont Period persisted much longer in the Uinta Basin than previously thought. With additional data a new phase will need to be described for this later period of Fremont occupation in the Uinta Basin.

As expected, there was abundant evidence that the inhabitants of the Merkley Butte site relied extensively on wild resources. A wide array of faunal resources including rabbit, mountain sheep, and deer were utilized. Interestingly, the presence of smaller quantities of bird bone and mussel shell indicate a breadth of diet not demonstrated previously in the Uinta Basin. The chokecherry, cheno-ams, cactus, grass, and juniper seeds show a wide range of wild floral resources were exploited in addition to domesticates.

The wide range in tool types indicates a variety of activities occurred at the site. This supports the original hypothesis this was a residential village site occupied during much of the year. The range of floral and faunal resources also argue for a residential site. Summit Springs (42DA545), a hunting camp on the north flank of the Uintas, and other logistical sites have limited potential for faunal and floral resource exploitation. These logistical sites were utilized for a specific activity or to procure a specific resource which was then transported back to a residential location.

Our current excavation did not provide data to address the unique location of the site. Most Uinta Fremont village sites are on benches just above the flood plain. Merkley Butte is several hundred feet above the flood plain. Access is even more difficult since the only way on or off the butte is to the southwest away from the flood plain. Located midway between the Uinta Mountain flanks, marked by the deep Ashley Gorge, and the confluence of Dry Fork and Ashley Creek, Merkley Butte provides an impressive view of the surrounding area, particularly the Ashley Creek drainage. The location is very strategic and defensible. Could it also have been an important political, trade, or religious site? We cannot address any of these issues with the limited data we now have available.

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REFERENCES

Arndt, Donna L.

1970 Arrowhead Point Campsite, 42UN66. In *Archaeological Excavations in Dinosaur National Monument, Colorado-Utah, 1964-1965*, edited by David Breternitz, pp. 118-123. University of Colorado Studies Series in Anthropology No. 17. Boulder.

Ashcroft, Gaylen L., Donald T. Jensen, and Jeffrey L. Brown

1992 *Utah Climate*. Utah State University, Logan, Utah.

Atkinson, Scott and Byron Loosle

1999 *High Altitude Fremont Brush Structures at the Allen Creek Village Site, 42DA791*. Paper presented at the 4th Biennial Rocky Mountain Anthropological Conference, Glenwood Springs, Colorado.

Crosland, Richard

1993 *Faunal Observations at Merkley Butte (42UN1816)*. Ms. on file, Ashley National Forest, Vernal, Utah.

Edwards, Angela D.

1996 *The Uinta Fremont Utilization of Brush Structures*. Paper presented at the 25th Biennial Great Basin Conference, Kings Beach, California.

Jennings, Calvin H. and William D. Wade

1970 The Lowell Spring Site, 5MF224. In *Archaeological Excavations in Dinosaur National Monument, Colorado-Utah, 1964-1965*, edited by David Breternitz, pp. 83-92. University of Colorado Studies Series in Anthropology No. 17. Boulder.

Jennings, Jesse D.

1978 *Prehistory of Utah and the Eastern Great Basin*. Anthropological Papers No. 98. University of Utah Press, Salt Lake City.

Kenney, Douglas

1955 Geology of the Uinta River-Brush Creek Area Duchesne and Uintah Counties, Utah. *Geological Survey Bulletin 1007*, U.S. Government Printing Office, Washington D.C.

Loosle, Byron and Clay Johnson

2000 Dutch John Excavations: Seasonal Occupations on the North Slope of the Uinta Mountains. Forest Service Intermountain Region Heritage Report 1-1, Ogden, UT

Love, Charles M.

1977 Geological Influences on Prehistoric Populations of Western Wyoming. In *Joint Wyoming, Montana, Utah Geologic Associations Guidebook: Rocky Mountain Thrust Belt Geology and Resources, 29th Annual Field Conference*, pp. 15-29. Wyoming Geological Association.

Madsen, David B., Thomas R. Scott, and Byron Loosle

1999 Differential Transport Costs and High Altitude Occupation Patterns in the Uinta Mountains, Northeastern Utah. In *Intermountain Archaeology*, edited by David Madsen and Michael Metcalf pp 15-24. Anthropological Papers No. 122. University of Utah Press, Salt Lake City.

Marwitt, John P.

1986 Fremont Cultures. In *Great Basin*, edited by Warren L. d'Azevedo. pp. 161-172. Handbook of North American Indians, vol. 11, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Newman, Deborah E.

1993 *Analysis of Flotation Samples From Excavations at 42UN1816, The Merkley Butte Site*. Ms. on file, Ashley National Forest, Vernal, Utah.

Phillips, H. Blaine

1990 The Archaeology of 42UN1671: A Submerged Fremont Site, Uintah County, Utah. Ms. on file, Bureau of Land Management, Vernal, Utah.

Sharrock, Floyd W.

1966 *Prehistoric Occupation Patterns in Southwest Wyoming and Cultural Relationships with the Great Basin and Plains Culture Areas*. Anthropological Papers No. 77. University of Utah Press, Salt Lake City.

Simms, Steven R.

1990 Fremont Transitions. *Utah Archaeology* 3:1-18.

Smith, Shelley J.

1994 Fremont Settlement and Subsistence Practices in Skull Valley, Northern Utah. *Utah Archaeology* 7:51-68.

Spangler, Jerry D.

1995 *Paradigms and Perspectives: A Class I Overview of Cultural Resources in the Uinta Basin and Tavaputs Plateau*. Ms.on file, Bureau of Land Management, Vernal, Utah.

Stuiver, M. and G. W. Pearson

1993 High-Precision Bidecadal Calibration of the Radiocarbon Time Scale A.D. 1950-500 B.C. and 2400-600 B.C. Radiocarbon 31:1-25.

Talbot, Richard K. and Lane D. Richens

1996 *Steinaker Gap: An Early Fremont Farmstead.* Museum of Peoples and Cultures Occasional Papers No. 2. Brigham Young University, Provo, Utah

Vehik, Susan C.

1990 Late Prehistoric Plains Trade and Economic Specialization. *Plains Anthropologist* 35:125-145.

THE PAROWAN SITE AND MORTONSON'S SITE: A PRELIMINARY SUMMARY

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INTRODUCTION

From 1954 to 1964, the University of California (Los Angeles) Department of Anthropology conducted archaeological field school excavations in the Parowan Valley of southeastern Utah. During this time, a number of sites were investigated, all corresponding to the Parowan variant of the Fremont culture (Marwitt 1970). These included Evans Mound, Paragonah, the Parowan Site and Mortonson's Site, as well as several unnamed sites in the valley. To date, one report of investigations at Paragonah (Meighan et al. 1956) and a brief article detailing the activities at Evans Mound (Alexander and Ruby 1962) constitute the only published materials pertaining to these excavations. Since the late 1960's, two Fremont habitation sites in the Parowan Valley (Evans Mound and Median Village) have been extensively investigated by the University of Utah (Marwitt 1970, Berry 1972, Dodd 1982). In consideration of the present data on the Parowan Fremont, the particulars of the UCLA excavations at the Parowan Site and Mortonson's Site, having remained in obscurity for more than thirty years, are now brought to light and placed into their proper contexts within Utah prehistory and Fremont archaeology. Investigations at Evans Mound have been numerous and extensive by both the University of Utah and UCLA. For this reason, the UCLA investigations at Evans Mound will be excluded from this discussion except for reference purposes.

GEOGRAPHIC SETTING

The Parowan Valley is located in the eastern part of Iron County in southwestern Utah (Figure 1). Though it is included in the physiographic Great Basin (Berry 1972), its eastern border is comprised by the Hurricane Cliffs which form a small part of the transitional zone separating the Colorado Plateau and Great Basin physiographic provinces. In the western extreme of the valley is an extinct salt water lake dubbed the Little Salt Lake. It is believed that at one time it was fed by Summit, Parowan, Red and Little Creek drainages, as well as Fremont Wash flowing into the valley from the northeast. The Red, Grey and Black Hills form the low western boundary of the valley which itself trends northeast and is approximately 24 miles long and 7 miles wide. A seven-month growing season in the valley with a frost free period ranging from May 15 to October 4 is noted by Weide (1970). Berry (1972:160-161) reports that the Parowan Valley's frost-free period ranges from May 27 to September 27. Today the modern settlements of Parowan, Paragonah, and Summit occupy the broad alluvial fans protruding from Parowan, Little Creek/Red Creek and Summit Canyons respectively, and modern agricultural and livestock practices remain the primary industries in the Valley (see Weide 1970).

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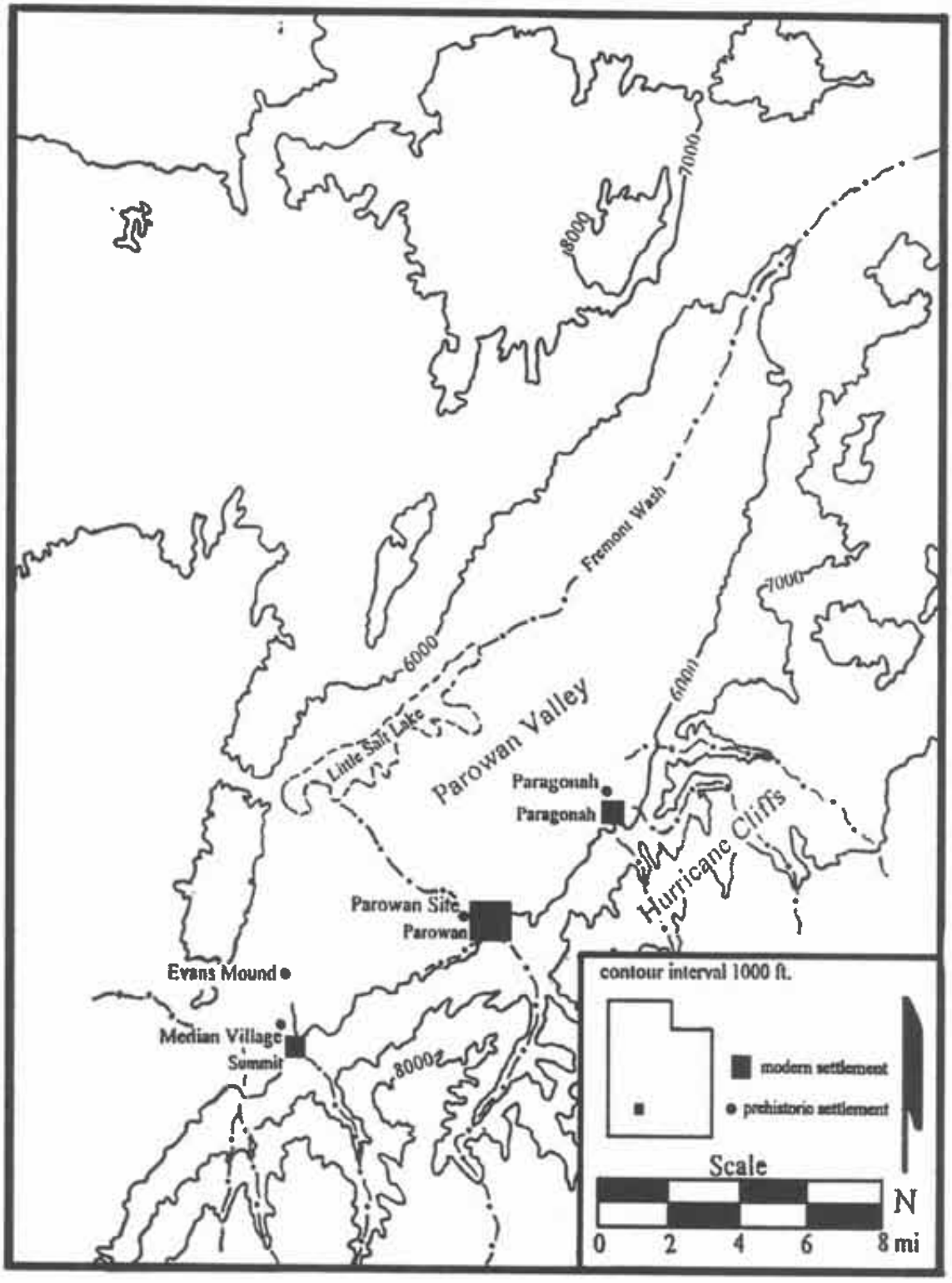

Figure 1. Contour map of Parowan Valley and immediate vicinity.

THE PAROWAN SITE

During the summer of 1964, excavations were conducted by UCLA at the Parowan Site, a Parowan Fremont village on the western edge of the town of Parowan in southwestern Utah. While continuing their investigations at Evans Mound, the field crew was informed of another large mound just outside the town of Parowan. In 1963, the site was tested, during which two five foot square test pits were dug reaching depths of 73 and 65 inches. Cultural materials were recovered until a sterile level comprised of a "rocky stream bed" was encountered (Peck and Burkeman 1963). In 1964, the site was selected for a full season of investigation based on the test excavations conducted the year before. The site itself was initially dubbed the Adams-Hyatt Mound, after the owner and lessee of the property, respectively.

The Parowan Site is located on the edge of a broad alluvial fan extending from Parowan Canyon (Figure 2). The trinomial that investigators used for the site was 42IN100 (current Utah State Historic Preservation Office records indicate that this listing is erroneous). Though at the time of excavation it was approximately a half-mile west of the town, the site would now be found well within the city limits of Parowan. In the last thirty years, the site has been leveled, exposing ceramics, chipped stone and bone. The Parowan Site, like Median Village, Evans Mound and Paragonah, is located near an ancient river channel, bordering on the remnant stream channel of Parowan Creek. Before historical agricultural practices diverted its flow, the creek passed close by the Parowan Site and emptied into Little Salt Lake.

During or shortly after the 1964 field season, a progress report (Anonymous 1964) was prepared, intended only as a preliminary summation. Unfortunately, the manuscript was neither refined nor published. The manuscript detailed the site, the local geography (including the geology, topography, flora and fauna of the Parowan Valley and surrounding mountains), methods of excavation, features and structures encountered, and a description of artifacts. Most of the following information is based on the manuscript itself and the field notes of the crew members.

The Parowan Site was composed of a low mound measuring roughly 240x70 feet (16,800 sq. ft.). Peck and Burkeman (1963) list the height of the mound as rising ten feet above the surrounding terrain. It was noted that "several smaller mounds appear in the immediate vicinity" (Anonymous 1964). At the time of excavation, it was not believed that the area had been plowed. This conclusion was based on stratigraphic profiles made during excavation.

The excavation grid was established according to the axis of the mound itself, rather than to true or magnetic north. The perpendiculars of the grid baseline were treated as if they lined up with true north and south, and the baseline itself was aligned east/west.

> The area to be excavated, measuring thirty by a hundred feet, was staked out in a grid of thirty squares. The north-south coordinates are designated by a...number, the east-west coordinates are designated by letter. ...The original grid is delimited on the west by line "11," on the east by line 21, on the north by line D, on the south by line G. The individual surface datum of each pit is the north-west (sic) corner at surface level. Rows 11 and 12 are designated Area 1. Rows 15 and 16 are designated Area 2. Rows 19 and 20 are designated Area 3. (Anonymous 1964)

Each excavation unit measured 10 feet square. One foot wide balks on each side of the units were left intact for stratigraphic controls.

A total of three adobe surface structures were excavated. These were identified as granaries, labeled structures 6 and 2, and a composite granary comprised of structures numbered 1, 13 and 14. All granaries conformed in shape and construction to those encountered not only in the Parowan Valley, but throughout the region designated under the Parowan Variant. However, these structures differed slightly from what Marwitt (1970) excavated at Median Village

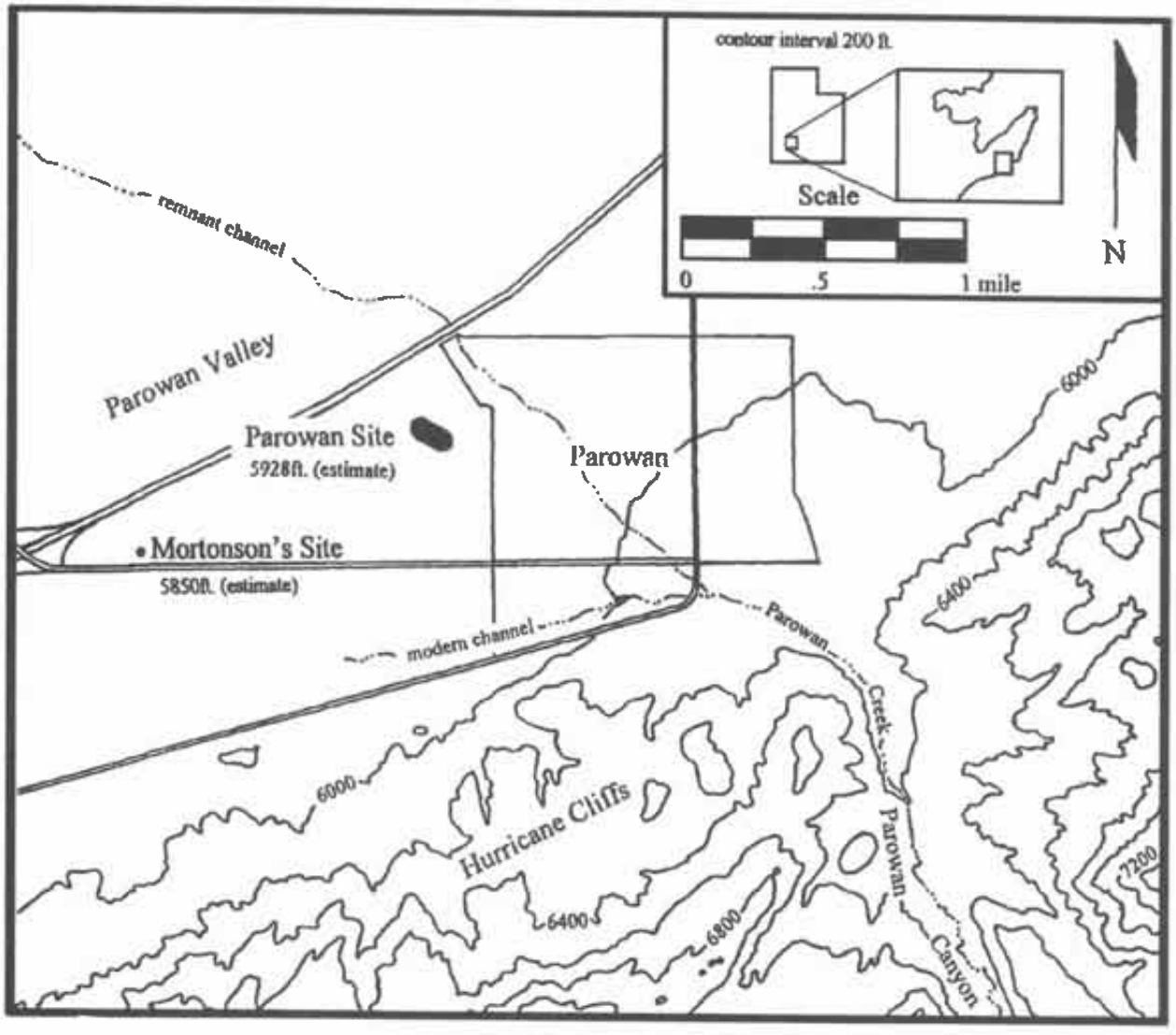

Figure 2. Map showing the location of the Parowan Site and Mortonson's Site.

(Structure 17). All adobe structures contained foundations composed of a "compact adobe base on which a 3 inch layer of stream cobbles were placed." The walls were not entrenched but were built on top of the cobbles (Anonymous 1964). This phenomenon has been observed at Paragonah (MacBain 1956:41) and Evans Mound (Alexander and Ruby 1962, Dodd 1982) and was noted by Jennings (1978:206) as an architectural trait found at Kanosh and Garrison, Parowan Fremont sites outside the Parowan Valley.

A total of seven to eight pit houses were unearthed during excavations at the Parowan Site. The authors note that all pithouses were in very poor condition and that these structures, like the granaries, resembled those excavated at both Evans Mound and Paragonah. These are described as: "a circular or rectangular pit, 6-12 inches deep and 10-20 feet in diameter, having a central fire pit and peripheral post-holes." The structures were built into a soft, silty midden layer, which apparently made their construction difficult and prone to a constant state of repair. "In many of the pit houses, slopewash and silt was in evidence above the floor and walls" (Anonymous 1964). Most of the pithouses were not completely excavated. Pithouse designations were made based on the presence or absence of central fire hearths, deflector walls, cache pits, side-walls and ventilator shafts. It is questionable whether square to sub-rectangular pithouses were found at Parowan or if an inference was made based upon earlier work at Paragonah and Evans Mound. A review of the photographs and field notes has not shown any evidence to confirm the presence of square to sub-rectangular pithouse architecture at the Parowan Site.

The authors (1964) felt it worth mentioning that the fire hearths encountered at Parowan were extraordinary in their construction. They were clay lined and circular/basin shaped. The authors note the unique cleanliness about which they were constructed and used, evidenced by a fine blue-gray ash in the basins of the hearths. All fire pits were lined with a fine sand upon which the ash deposits rested.

Four burials were discovered during excavation (Burials I, II, III, and IV). Burial I was the primary inhumation of an infant. The skeletal remains were heavily decayed and the sex was undetermined. The burial was found in what appeared to be a midden deposit. Burial II was an adult, buried in an adobe rubble matrix. "The skeleton itself was surrounded by sand brown midden." Sex was undetermined. Burial III was that of a young- to middle-aged adult female consisting of a "...primary inhumation in (a) loosely flexed position on the right side. The head (was found) sideways pointing west." Burial IV was a male, aged 4-6 years old, and was buried in midden fill. It will be noted, as it was in the manuscript, that both infant/child burials (Burials I and IV) were found in midden deposits whereas the adults (Burials II and III) were buried in pithouses (Structures 20 and 16, respectively) (Anonymous 1964). No grave offerings like those encountered at Paragonah (Davis 1956:82-87) and Evans Mound (Dodd 1982:104-105) were found in association with the burials.

Artifacts identified in the manuscript included modified bone, stone and shell ornaments, ceramics, and chipped and ground stone tools. No mention was given pertaining to faunal remains. It was stated that all artifacts recovered were curated. Catalog records from the site, however, fail to list unmodified faunal material. Bulk soil flotation samples were collected, though they were never analyzed.

Modified bone was divided into two categories: 1) non-utilitarian, and 2) miscellaneous and utilitarian. The first category included pendants, pendant blanks or preforms, gaming pieces, finger rings, bone beads, and tubular fragments. Of these, gaming pieces made up the majority (400 items). The second category included needles, worked artiodactyl rib bones, modified scapulae, ground gouges, antler tools, awls, gouges and fabricators.

Both stone and shell ornaments were found at the Parowan site, the stone ornaments consisting of a variety of materials. One turquoise bead and one turquoise pendant occurred within this assemblage. Other stone materials included lignite, tuff, oolitic sandstone, siltstone, marble, serpentine, sandstone and caliche. A total of 55 lignite beads were found at the Parowan site and represent the primary material of stone ornaments. A comparison to lignite beads recovered from Paragonah (Meighan et al. 1956, Hughes and Bennyhoff 1986:252), Evans Mound (Alexander and

Ruby 1962, Jarvis et al. 1964) and Median Village (Marwitt 1970) reveals that this number is high. Nine specimens were recovered from the 1954 work at Paragonah, followed by seven found at Evans Mound in 1964. No lignite beads were found at Median Village.

Olivella dama, originating from the Gulf of California, and O. biplicata, coming from the Pacific Coast, constituted the marine species represented (Hughes and Bennyhoff 1986:248). A total of 82 Olivella beads were recovered from the Parowan site. O. dama made up the majority with 53 specimens; O. biplicata comprised the remaining 29. This also seems an extraordinary amount when compared to the 6 O. dama and 4 O. biplicata shell beads recovered from the 1964 excavations at Evans Mound (Jarvis et al. 1964).

Five complete or nearly complete anthropomorphic figurines, as well as six fragments labeled "possible figurine appendages," were recovered from the Parowan site. A total of ten tubular clay pipe fragments were also found; all specimens were highly polished.

As at Median Village, the majority of ceramic sherds found at Parowan were Snake Valley Gray. These comprised the bulk of the collection (no percentage is given) followed by Snake Valley Black-on-Gray, making up 10 percent. Only one percent of the total assemblage was identified as Snake Valley Corrugated. Exotic wares included 32 sherds of Tusayan Black-on-Red, 7 sherds of Virgin Black-on-White, 1 sherd of St. George Black-on-Gray and 5 sherds of Sevier Gray.

The majority of identifiable and classifiable projectile points (133 out of 253 specimens) consisted of a "straight base" variety, most likely an unnamed point or Parowan Basal-notched preforms, though the former is assumed. Only 14 points were described as having basal-notches, though 41 were described as corner-notched, possibly indicating a mistake in descriptive terminology. It may be likely that the majority of so-called corner-notched points recovered from the site were indeed Parowan Basal-notched. This thought is supported by Marwitt (1970:86) through a personal communication with Clement Meighan. However, greater diversity of projectile point styles is noted by Marwitt (1970:139) as a diagnostic characteristic of the Paragonah Phase (A.D. 1125 to 1200) of the Parowan Fremont.

Ground stone was found in abundance and included manos, metates, stone balls, polishing stones, abrading stones and fragments of stone hatch covers. Two types of metates were represented, one being the Utah-type metate, the other called "Nevada metate," similar to the former except for the absence of a mano rest or depression at the closed end of the trough. No numbers were given identifying quantities of either type.

MORTONSON'S SITE

In July of 1964, while the UCLA field crew was excavating at the Parowan Site, investigators were informed of cultural deposits discovered on Mr. Vern Mortonson's property (Figure 2). Two twelve-inch wide perpendicular trenches were dug. A grid of eight, five-foot square excavation units was established immediately southwest of the trench intersection. The pits were excavated in natural levels to sterile soil. Nine inch-wide balks were left in place in every other unit for stratigraphic controls.

The remains of a badly damaged structure were found 10 inches below the ground surface (16 inches below datum). This is described as "...sun baked adobe with wattle impressions, some charcoal and black ash overlaid [with] burnt logs... Two three-inch posts, one carbonized, were uncovered and no walls could be found" (Balzer 1964). Though the structure was thought to be a ramada, its identification as a shallow pit house or surface use area should not be ruled out.

One burial was found at the site (Burial 1). It consisted of a primary inhumation of an adult male, with an age range

of 65 to 80 years old at the time of death. Cranial deformation of the individual was apparent. The skeleton was found semi-flexed, lying in a supine position, and was complete except for the bones of the left foot. No outlines of the grave were noticeable. The lack of a noticeable grave along with the absence of the left foot bones was attributed to rodent disturbances. Associated artifacts included two Snake Valley Gray sherds, three pieces of chipped stone debitage, wooden post fragments and two "fragmented halves of metates that were placed over the grave..." (Balzer 1964).

Artifacts recovered from the site included pottery, ground stone, wooden post fragments, chipped stone and lithic debitage. A total of 13 Snake Valley Gray sherds were found at the site (including the two associated with the burial). Six pieces of lithic debitage and one utilized flake comprised the chipped stone/debitage artifacts. A total of eight metate fragments were recovered, most of which were directly associated with Burial 1, several of which displayed ochre stains. Two ^{14}C samples (burnt log fragments) along with an unknown number of bulk soil/pollen samples were collected from the site for analysis.

Stratigraphy of the site was made up of three layers. The top layer was composed of a light brown silty loam humus. From eight to twenty inches below this was a layer of black ash and midden soil within a matrix of loam. Below this was sterile soil.

SUMMARY

All indications place Mortonson's Site firmly within Parowan Fremont contexts. Balzer (1964) makes mention of the unusual extent of the midden layer as it extends away from the main excavation units to the test trenches. Based on this, it is postulated here that the site was larger than could be determined at the time of excavation. A lack of corrugated pottery at the site suggests that it was occupied before A. D. 1125 during the Summit Phase of the Parowan Fremont. However, this is only speculation.

The Parowan site is difficult to classify. The structures and artifact assemblage seem to contain several qualities (possible absence of sub-rectangular pithouse architecture and minor quantities of corrugated pottery) indicative of the Summit Phase (A.D. 900 to 1125). However, the homogeneous traits described by Marwitt (1970) at Median Village are lacking. This is demonstrated by a variety of projectile point styles (discussed above), an unusually high number of Olivella shell and lignite beads, an apparent lack of superposition of structures seen at Evans Mound and Median Village, and finally, the relatively low quantity of Snake Valley Corrugated pottery in relation to these Paragonah Phase material traits.

Though not an adequate interpretation, what most clearly appears from the investigations at the Parowan Site is the alignment of this settlement along the developmental continuum established by Marwitt (1970), consisting of the demonstrated cultural continuity ranging from the Summit to Paragonah phases of the Parowan Valley. Within this model, the Parowan Site appears to have a temporal focus of occupation neither wholly within the earlier Summit Phase or the later Paragonah Phase (Figure 3). This idea is principally supported by the use of Snake Valley Corrugated and Tusayan Black-on-Red pottery as a temporal marker. The production of Snake Valley Corrugated ceramics dates to sometime around A.D. 1100 (Marwitt 1986:166). "Corrugated sherds represent less than 1% at all levels..." at the Parowan Site (Anonymous 1964) compared to 3% recovered during the 1971-72 field seasons at Evans Mound (Madsen 1972:46) and 20% recovered from the 1973 excavations at Evans Mound (Dodd 1982:49). This is also contrasted with Median Village, in which a fraction of a percent (literally a handful) of Snake Valley

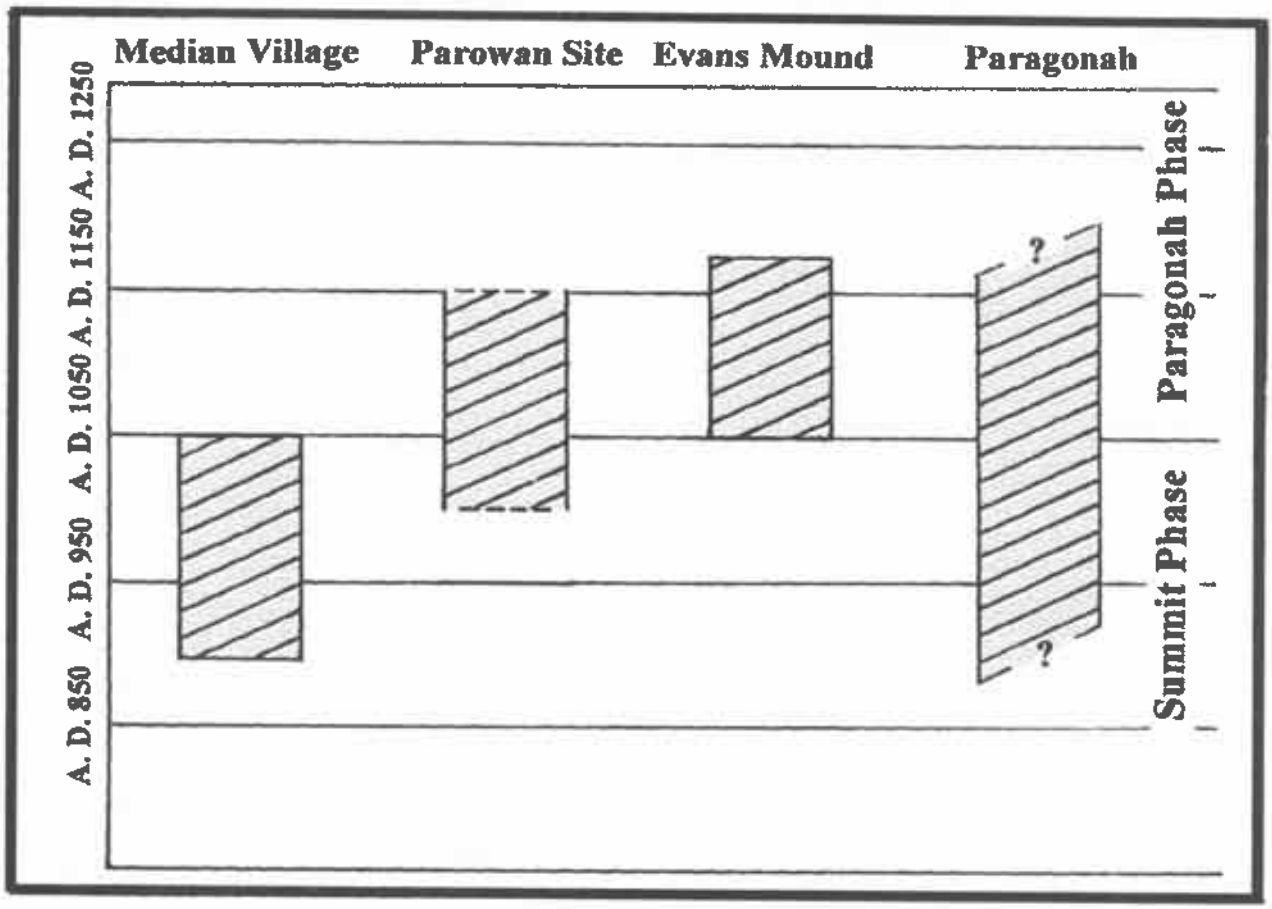

Figure 3. Chronology and phases of Parowan Fremont sites within the Parowan Valley.

Corrugated sherds were recovered (Marwitt 1970:Table 1). Berry (1972:43-44) mentions that the presence of Tusayan Black-on-Red at Evans Mound is in line with the radiocarbon and archaeomagnetic dating of the site. As with Parowan, the presence and dominance of Tusayan Black-on-Red among the assemblage of foreign Anasazi and Fremont wares suggests an occupation of the site around A.D. 1050 and 1150 (Berry 1972:67).

We may concede, then, that the span of occupation at the Parowan Site falls roughly between A. D. 1000 and 1150. This will place the Parowan Site on the line of transition between the Summit and Paragonah phases with abandonment of the site shortly after the beginning of the Paragonah Phase. Undoubtedly, this time range is tentative and may be called into question by one of two radiocarbon dates (listed by Marwitt 1970:144) obtained from samples taken during the 1964 excavation at the Parowan Site. Recovered from structure 8 and Unit E16, Feature 2, they are calibrated A.D. 945 +/- 80 (GX-1574) and A.D. 1250 +/- 80 (GX-1548) respectively. However, in light of the temporal sensitivity of Snake Valley Corrugated pottery within the Parowan Valley, the later date is most likely spurious. The fact that occupation of the Parowan Site does not seem to extend beyond A.D. 1150 is also supported by the lack of definitively rectangular or sub-rectangular pithouse dwellings found at the site. These factors suggest that site occupation occurred after occupation began at Median Village and before occupation at Evans Mound and Paragonah.

REFERENCES CITED

Alexander, Wayne and Jay Ruby

1962 Excavations at Summit, Utah: A Progress Report. *Nevada State Museum Anthropological Papers* 9:17-32, Carson City.

Anonymous

1964 42IN100 Progress Report. Ms. on file, Fowler Museum of Cultural History, University of California Los Angeles.

Balzer, Frank

1964 Field Report, Mortonson's Site 42IN103. Ms. on file, Fowler Museum of Cultural History, University of California Los Angeles.

Berry Michael S.

1972 *The Evans Site*. Department of Anthropology, University of Utah, Salt Lake City.

Davis, Frank D.

1956 A Pit House at Mound B. In: *Archaeological Excavations in Iron County Utah*, by Clement W. Meighan, Norman E. Coles, Frank D. Davis, Geraldine M. Greenwood, William M. Harrison and E. Heath MacBain, pp. 60-87. Anthropological Papers No. 25. University of Utah Press, Salt Lake City.

Dodd, Walter A.

1982 *Final Year Excavations at the Evans Mound Site*. Anthropological Papers No. 106. University of Utah Press, Salt Lake City.

Hughes, Richard E., and James A. Bennyhoff

1986 Early Trade. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 238-255. Handbook of North American Indians, vol. 11. Smithsonian Institution Press, Washington, D.C.

Jarvis, Julie, Richard Lisenby, and Charles Sivero

1964 1964 Excavations at Summit, Utah: A Progress Report. Ms. on file, Fowler Museum of Cultural History, University of California Los Angeles.

Jennings, Jesse D.

1978 *Prehistory of Utah and the Eastern Great Basin*. Anthropological Papers No. 98. University of Utah Press, Salt Lake City.

MacBain, E. Heath

1956 Excavation of Mound B. In: *Archaeological Excavations in Iron County Utah*, by Clement W. Meighan, Norman E. Coles, Frank D. Davis, Geraldine M. Greenwood, William M. Harrison and E. Heath MacBain, pp. 38-59. Anthropological Papers No. 25. University of Utah Press, Salt Lake City.

Madsen, Rex

1972 Evans Mound Ceramics. In: *The Evans Site* by Michael S. Berry, pp. 45-96. Department of Anthropology, University of Utah, Salt Lake City.

Marwitt, John P.

1970 *Median Village and Fremont Culture Regional Variation*. Anthropological Papers No. 95. University of Utah Press, Salt Lake City.

Meighan, Clement W., Norman E. Coles, Frank D. Davis, Geraldine M. Greenwood, William M. Harrison, and E. Heath MacBain

1956 *Archaeological Excavations in Iron County Utah*. Anthropological Papers 25. University of Utah Press, Salt Lake City.

Peck, Joel S., and Walter Burkeman

1963 Adams-Hyatt Mound, Preliminary Statement. Ms. on file, Fowler Museum of Cultural History, University of California Los Angeles.

Weide, David L.

1970 The Geology and Geography of the Parowan and Cedar Valley Region, Iron County, Utah. In: *Median Village and Fremont Culture Regional Variation*, by John P. Marwitt, Appendix III: 173-93. Anthropological Papers No. 95. University of Utah Press, Salt Lake City.

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