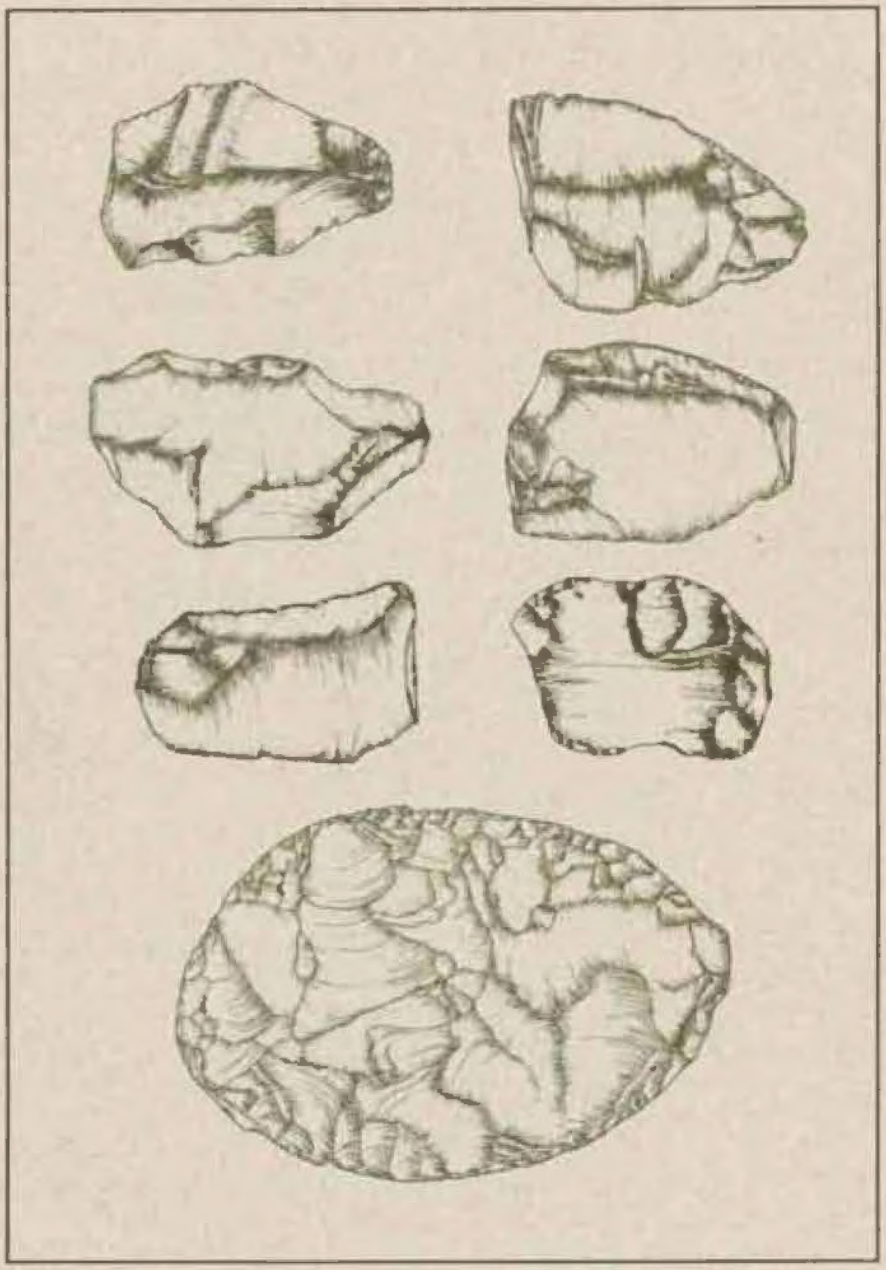
UTAH ARCHAEOLOGY 1988



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Utah Division of State History

UTAH ARCHAEOLOGY 1988

UTAH ARCHAEOLOGY 1988 is an annual publication of USAS, UPAC and the Utah Division of State History. The purpose of this publication isto disseminate information relevant to archaeological research both historic and prehistoric in the state of Utah. Subscriptions are available through memberships in the USAS, UPAC or the Publication Department of the Utah Division of State History. Authors interested in publishing contact the editors for manuscript guide.

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Front cover: Quarry blanks from the Loa Obsidan Cache (see pp. 37-65).

Editor's Preface to the First Edition

UTAH ARCHAEOLOGY 1988 represents a considerable effort by the professional and amateur archaeological communities in the state to publish current local research in a quality format. It is an annual publication distributed to the membership of the Utah Statewide Archaeological Society (USAS) and the Utah Professional Archaeological Council (UPAC), but is available for purchase through museum bookstores and visitors centers throughout the state.

For this publication to be successful, the editors believe that the scope and underlying philosophy needs to be clearly stated from the onset. The purpose of the publication is to disseminate information about historic and prehistoric archaeological research in Utah to the public, the avocationalist and the professional. As the series is a joint effort of USAS and UPAC, the editors encourage submittals by professionals and amateurs written in a style appropriate for public consumption, but with professional constraint and documentation. All papers submitted will be reviewed by three individuals recognized for their expertise in the topic presented. Paper purpose, content and length will sort the submittals into Articles or Reports. The former will contain papers that are more theoretical, and/or more synthetic, and will generally be longer. The latter section will be characterized by papers that are more descriptive, more specific, and shorter. Reviews of current literature will also be included in each volume. These reviews will be invited by the editors and will be done by both amateurs and professionals.

This first edition contains some of all of the above, but in limited quantities. For the series to be satisfying to the membership it needs to be fuller. Both communities being served need to participate in this series if it is to be viable: the amateurs cannot assume that the volume will automatically fill up through the apparently continual generation of data by professionals, and the professionals must see this publication as an acceptable alternative to writing for the traditional journals. If we are going to have a good publication, all must participate. Send us articles! And don't be discouraged if reviewers call for changes to make your paper suitable for publication. All papers require some revision and editing.

Publication is the end result of archaeological research. Without the distribution of findings for the consumption of the interested public and professionals, archaeology is not being done. Utah Archaeology 1988 is an appropriate place for that material to appear.

Joel C. Janetski, *editor* for UPAC
Steven J. Manning, *editor* for USAS

Memorial to Jennifer L. Jack (1951-1987)

It was with sadness and disbelief that the archeology community learned of the death of Jennifer Ladd Jack, age 36. Her sudden and untimely death in January of this year was a great loss to colleagues as well as to family and friends.

Jennifer was born on October 23, 1951, to William T. and Evelyn Meyers Jack. She grew up in Texas and graduated from Commerce High School. She later earned a Bachelor's degree in Anthropology form East Texas State University with High Honors

and Superior Academic Standing. After a number of years in the work place, Jennifer returned to East Texas State to begin working on her graduate degree. Later, she continued her studies at Southern Methodist University and the University of Nevada at Reno.

Jennifer began her archaeological career in 1971, working as a research assistant for East Texas State University doing survey, laboratory analysis and write-up. She later worked in the Southwest and Great Basin for several agencies and contractors, and recently became involved in the prehistory and ethnohistory of the Arizona Strip. For the last three years, Jennifer was the Bureau of Land Management Vermillion Resource Area Archaeologist. In this capacity, she participated in two major land exchange surveys, worked on finalizing and implementing several vandalism patrol plans and supervised various contracts and cooperative agreements. She worked closely with the Paiute Indian Tribe of Utah to insure that their concerns about cultural resources were considered. She was also the district's coordinator for the Arizona Site Steward program.

Jennifer had a rare capacity to perform scientific research in spite of bureaucratic constraints and the confinements of governmental procedures. She always remained enthusiastic about the research potential of the Arizona Strip and was dedicated to helping others appreciate the area's rich culture history. The extent of her dedication was demonstrated on the Pinenut Archaeological Project. On this project, she almost singlehandedly coordinated the BLM, the State of Arizona, an energy company, and the professional and avocational archaeologists in completing research on an important Virgin Anasazi site on the Arizona Strip. It was largely because of her efforts that the results of this project were made available to the public through the newly formed Arizona BLM publication series.

Jennifer was always generous with her time and knowledge. She was instrumental in organizing the Dixie Chapter of the Utah Statewide Archaeological Society which has been renamed the Jennifer Jack Dixie Chapter in her honor. She served as the chapter's advisor and taught their first certification class. As a member of the Arizona Archaeological Council, she was also a member of the Education Committee which devised the "Outreach" program--teaching archaeology to both teachers and students, primarily at the elementary level. Many of these activities were done above and beyond her normal job duties, and for this extra effort she was officially recognized by the BLM for outstanding performance in public relations.

Jennifer had a sense of humor and a zeal for life that carried over into her love of anthropology, and a pragmatism that enabled her to put her ideals into practice. These threads were woven throughout her life, whether it was her period of "homesteading" in a canyon east of Sigurd or her return to archaeological practice with the Bureau of Land Management. She never lost sight of anthropology as being a higher endeavor and had the insight that allowed her to see the difference between responsibility to higher ideals and the day to day machinations of human folly.

It is fitting for this memorial to appear in the first issue of *Utah Archaeology 1988*. Jennifer would have proudly supported and encouraged the development of a publication outlet for avocational and professional archaeologists alike. It is for this reason that this issue is dedicated to her memory. Jennifer was a rare spirit. Her professional enthusiasm, dedicated and cheerfulness will be sorely missed by all who knew her.

Acknowledgement. My thanks to the following for contributing information to this memorial: Bill Davis, Bob and Helen Kohl (USAS), LaMar Lindsay, Rick Malcomsen, James O'Connell, Steve Simms, Pat Stout (USAS), Debbie Westfall, and Jim Wilde.

Betsy L. Tipps
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Fluted Projectile Points in Utah

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ABSTRACT

The locational and morphological characteristics of 43 Clovis and Folsom projectile point specimens from 40 locations in Utah are described. Morphologically, they fall well within the range for specimens from other sites outside of Utah. While the number of finds argues for the presence of Late Pleistocene and early Holocene human populations in Utah, a direct association with extinct megafauna remains has not yet been verified.

INTRODUCTION

The archaeological resources of Utah are rich and abundant. These resources span a period of at least 10,000 - 12,000 years and document the presence of hunting and gathering populations as well as Formative agriculturalists. The best known from both a scientific and popular perspective are the Fremont and Anasazi cultures. However, considerable evidence also exists for the earlier aceramic Archaic periods. Danger Cave, located in northwestern Utah, is one of the most famous of western Archaic period sites and provided an early definition and description of the Desert Culture of the western United States (Jennings 1957).

Evidence for human occupation and exploitation of the Utah region prior to the Archaic period is generally scant. When compared to the tens of thousands of Archaic and later period sites, the evidence for Paleo-Indian occupation is meager. The general scarcity of Paleo-Indian material in sealed contexts in Utah, and the desert regions of the western United States in general, led Jennings (1966) to state that these traditions were not present. Current evidence in the west directly contrasts this view. Several authors (e.g., Aikens 1978; Davis and Shutler 1969) have documented and argued the case for a Paleo-Indian occupation in the western deserts of North America. For Utah, Madsen et al. (1976) provide one of the more comprehensive reviews of the issue to date. These authors note that the presence of fluted points may be considered evidence of Paleo-Indian occupation, but acknowledge that even with the abundant evidence of extinct Pleistocene megafauna in the eastern Great Basin and the northern Colorado Plateau, direct association between man and extinct fauna has not been established.

The purpose of this paper is to provide a comprehensive description of known fluted projectile points in Utah. This paper will not settle the question of man-megafauna relationships in Utah, but this does not prevent identification and description of locational and morphological characteristics of fluted projectile points in Utah and some suggestions concerning future Paleo-Indian studies.

The data for this study come from a variety of sources that included published articles or reports, unpublished cultural resource management reports, government files, and private collectors. Interviews were conducted with a few private collectors, principally in the Moab area. This information was gathered over a period of several years and represents, to the authors' best knowledge, the known record of professionally identified and verified fluted projectile points in Utah to date.

Information was colleeted about the morphology and locational context of each specimen. Most, but not all, of the specimens were individually examined by the authors. In a few cases, professionally reported and verified specimens that were unavailable for examination are included in this study (e.g., 42Sa798). A few professionally documented specimens that are currently unaccounted for (i.e., lost) have also been included (e.g., 42Ga312). In regards to private collections, only those specimens that could be physically examined and verified were included within this study. Additional specimens known by the authors to exist in other private collections were not included because they have not been documented or otherwise critically examined. In some cases, data concerning a particular morphological or locational category was unavailable for consideration because the report, site record, or collector did not possess that information. Any sites or isolated finds that

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had not been officially recorded were assigned Smithsonian trinomial numbers and site forms were completed in so far as possible given data limitations. This data has been submitted for inclusion in the Intermountain Antiquities Computer System (IMACS) files at the University of Utah, the Bureau of Land Management, and the State Historic Preservation Office in Salt Lake City, Utah.

A Brief Summary of the Clovis and Folsom Periods

Where radiocarbon dates exist, sites with Clovis period human and extinct fauna associations tend to fall within a brief period between 9,500 - 9,000 B.C. (Haynes 1970). Clovis sites are typically associated with the remains of mammoth, though bison, horse, tapir, cervids, canids, antelope, bear, jackrabbit, and camel have also been found at sites with Clovis remains (Cordell 1984). Meltzer and Mead (1985:164) suggest that there was only a 300 year overlap between extinct megafauna and human occupation. Clovis projectile points are characteristic of this period, but other artifacts include spurred end-scrapers, large unifacial side scrapers, backed worked blades, gravers, flake knives, perforators, and miscellaneous bone tools (Haynes 1970, 1980). Clovis sites are found scattered throughout North America but are most prevalent in the western United States, particularly the American Southwest and the High Plains. Most of the known sites are associated with marshes or bogs and are typically kill sites.

Clovis points are characterized by a broad lanceolate spear point fluted on both faces with a concave base (e.g., Bradford 1976). The flutes are usually short, extending only about a third of the length of the point and one flute is usually shorter than the other (Wormington 1957:263). Several flakes may be removed at the base to create the flute. The edges are gently curved from tip to base and the tip is fairly narrow, pointed, and thin. Maximum width of the point is just below midpoint. Basal and lower lateral edge grinding is common. Specimens may be described as thick and heavy in contrast to later Folsom points. Size ranges from 35 - 154 mm in length with an average of 66 mm.

The Folsom period is generally dated to about 9,050 - 7,750 B.C. (Jennings 1974). Folsom materials are typically associated with an extinct form of bison (*Bison antiquus*) and are usually found in kill sites. It would appear that with perhaps very few exceptions (e.g., camel at Lindenmeier, Roberts 1937), the megafauna that is more often found in association with Clovis sites had become rare, if not extinct, and thus unavailable to Folsom hunters. Besides bison, other fauna available to Folsom hunters that have been found at kill and processing sites include modern forms of antelope, canids, and jackrabbit (Cordell 1984). One attribute of Folsom bison kills is that the mean number of bison per site is 15.25 for Folsom periods kills as opposed to near 100 per site for other late Paleo-Indian kill sites (Judge n.d.:61). This period is characterized by the Folsom point, but other items in the tool kit include burins, end scrapers, bifacially prepared cores, denticulates, backed flake tools, gravers, bifacial knives, and miscellaneous bone and antler tools (Frison and Bradley 1980, Irwin and Wormington 1970). Frison (1978:132) has noted that the butchering tools recovered from the Hanson site in Wyoming appear identical to tools recovered from other bison kill sites spanning 10,000 years. Unfluted points that basically conform to the Folsom design are called Midland, and appear to be part of the complex, though the relationship is unclear (Frison 1978; Judge 1970). Folsom specimens have been found over most of the United States, but are especially numerous on the High Plains, which likely coincides with the distribution of significant bison populations.

Folsom points are characterized by well made symmetrically lanceolate shaped spear points that are bifluted with the flute extending almost to the tip (e.g., Bradford 1976). The flutes combine to make the points thin in cross-section, one of the characteristics of the type. Though there may be some overlap in size, Folsom points are usually smaller and lighter than Clovis (Wormington 1957:263). Grinding of the lower lateral edges and the basal concavity is common and the lateral edges tend to be finely retouched. The base is concave with pronounced auricles and a remnant of the fluting nipple is often present. It is believed that indirect percussion was used for the removal of the fluting flakes (Judge 1970:45). The maximum width of the points is characteristically well above the mid-section, though some specimens have nearly parallel sides. Sizes range from 33-76 mm with an average of 50 mm.

Occasionally, fluted specimens are found that appear to bridge the classic technological characteristics between Clovis and Folsom. Judge (1973:69) has termed these kinds of specimens "proto-Folsom" and Frison (1978:30) has simply

identified them as points that may technologically fit between Clovis and Folsom.

DESCRIPTION

Forty-three fluted projectile points from forty separate locations are included in this study. This includes 18 Clovis and 25 Folsom specimens. Eight of these specimens are reported here for the first time. The distribution of these specimens is shown in Figure 1. Corresponding site numbers and data references for Figure 1 locations are presented in Table 1.

As evident from Figure 1, the majority of the finds are located in the southeastern quarter of the state in an area bounded on the north by the Book Cliffs and on the west by the Wasatch and southern plateaus. Sixty-two percent of the locations (n=25) occur in this area of the northern Colorado Plateau. Eight percent (n=3) occur in the Uintah Basin of northeastern Utah. The remaining 30 percent (n=12) occur in the eastern Great Basin area of western Utah. The western specimens are found primarily in the Escalante, Sevier, and Black Rock Desert areas. The overall distribution may be somewhat fortuitous given known but currently undocumented fluted specimens in private collections. The affect of an uneven distribution of archaeological fieldwork in the state may also have some bearing on this patterning.

Environmental Variables

Environmental and contextual attributes, as currently available, are given in Table 2. This information seeks to characterize and describe the range and variation of the physical settings at which fluted projectile points have been found. In most cases, the specimens have been found at lithic scatters. However, one was found at a lithic quarry, three were associated with rock shelters, two from caves (see below), three are isolated finds, two apparently came from drainage cut bank situations, and six of the specimens are from unknown contexts. Of those with known contexts, 19 occur on sites that contain or appear to contain materials from later periods (i.e., Archaic, Anasazi). Most of the discoveries have been found on the surface. The two specimens from cave contexts were recovered from Danger Cave by Smith (1942). Interestingly, these points were subsequently lost (Jennings 1957:47), but one has recently been relocated (Homer 1986:95).

Morphological Variables

The morphological characteristics of each specimen are given in Table 3 and Table 4. Individual narrative descriptions are given in the Appendix. Attributes recorded include condition, material, length, width, thickness, base width, flute width, flute depth, and the presence of basal and lateral edge grinding.

Clovis

There are seven complete and eleven fragmentary Clovis specimens in the study collection. Twelve are from the Colorado Plateau area, five are from the eastern Great Basin Area, and one is from the Uintah Basin. Drawings of some of these specimens are shown in Figure 2. The fragments are all bases and all but one terminate in hinge or lateral snap fractures, a characteristic of when the stone for any reason has exceeded its elastic limits when stress is applied (Crabtree 1972). The one exception appears to terminate in a crenated fracture, a characteristic of intense heat (Purdy 1975). Most appear to be finished specimens, though two (42Ga3049 and 42Sa13267) appear to have been broken during manufacture. Overall form varies from triangular to slightly expanding lanceolate with concave bases. Most are bifluted and some have flutes that are typically short and shallow. Some of the specimens still possess the fluting nipple in the basal concavity. Where information is available, lower lateral edge grinding is present on 81 percent of the specimens and 73 percent have basal grinding. Twenty-nine percent of the specimens show some evidence of reworking.

Chert is the predominate material utilized (44 percent). Twenty-eight percent of the specimens are made of obsidian, 17 percent are made of chalcedony, and 11 percent are quartzite. The source of the obsidian has not been identified at this time, however, all of the obsidian Clovis points occur in western Utah and relatively near obsidian source areas (Nelson and Holmes 1979). Of interest concerning Utah obsidian and Clovis points, the Denver Museum of Natural History has in their possession a Clovis specimen (#1454/1) that has been traced to the Wild Horse Canyon source in

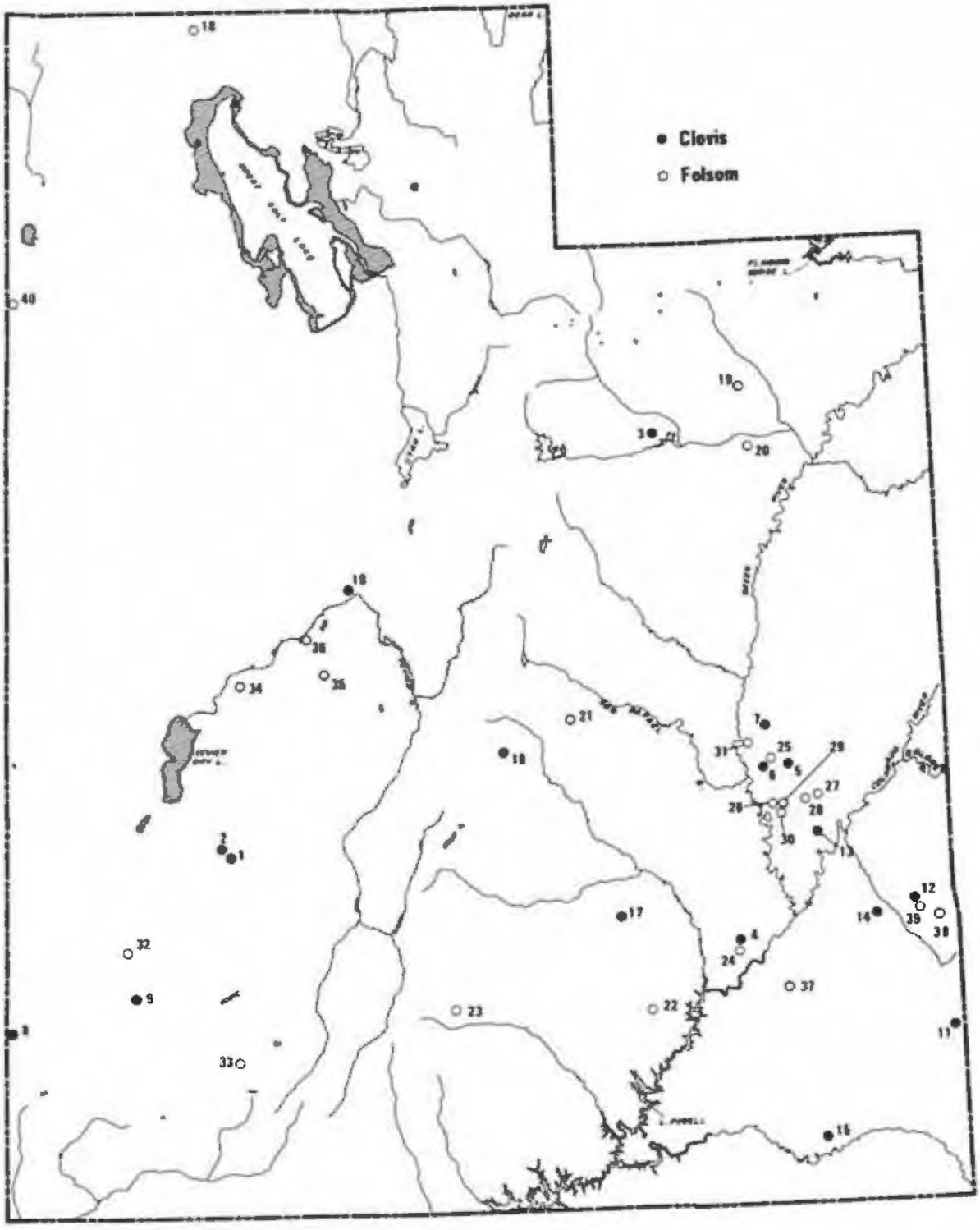


Figure 1. General distribution of fluted specimens in Utah. See Table 1 for references.

TABLE 1. Figure 1 References, Site Numbers, and Data References

	Figure 1 Reference	Site Number	Data Reference
	1	42Be93	BLM files
	2	42Be703	BLM files
	3	42Dc502	Crouse 1954
	4	42Ga3049	Brewer and Geib 1987
	5	42Gr1564	Private collection
C	6	42Gr1565	Private collection
L	7	42Gr2130	Senulis 1987
O	8	42In110	BLM files
V	9	42In183	BLM files
I	10	42Jb180	BLM files
S	11	42Sa4753	Lindsay 1976
	12	42Sa9799	Black et al. 1982
	13	42Sa13267	Private collection
	14	42Sa13268	Private collection
	15*	42Sa16857	Green 1978, Davis 1986
	16	42Sv1618	Tripp 1966
	17	42Wn624	BLM files
	18	42Bo463	Butler 1973
	19	42Dc221	Lindsay 1976
	20	42Dc353	Hauck 1981
	21	42Em8	Gunnerson 1956
	22	42Ga312	BLM files
	23	42Ga899	BLM files
	24	42Ga3034	Brewer and Geib 1987
	24	42Gr1566	Private collection
F	26	42Gr1567	Private collection
O	27	42Gr1568	Private collection
L	28	42Gr1569	Private collection
S	29	42Gr1570	Hunt and Tanner 1954
O	30	42Gr1571	Hunt and Tanner 1954
M	31*	42Gr1956	Davis 1985
	32	42In462	BLM files
	33	42In1132	BLM files
	34	42Md300	BLM files
	35	42Md381	BLM files
	36*	42Md454	BLM files
	37	42Sa798	Sharrock and Keane 1962
	38	42Sa8540	Neily et al. 1982
	39	42Sa11422	Copeland 1982
	40	42To13	Smith 1942, Holmer 1986

Note: An * indicates multiple specimens at location.

TABLE 2. Environmental Variables

	Site Number	Site Type	Other Components	Context	Elevation	Vegetation	Landform	Aspect	Water
	42Be93	LS	N	S	1,951 m	P/J	Canyon	S	400 m
	42Be703	IF	N	S	1,993 m	J	Ridge	NW	≥3,200 m
	42Dc502	LS	Y	S	1,920 m	P/J	Gully	–	≤100 m
	42Ga3049	LS	N	S	1,664 m	SH	Canyon rim	S	600 m
	42Gr1564	LS	-	S	1,402 m	–	—	SE?	— m
C	42Gr1565	LS	-	S	1,256 m	–	Dune	–	— m
L	42Gr2130	LS	Y	S	1,536 m	SH	Bench	S	50 m
O	42In110	Q	Y?	S	1,756 m	S	Ridge	S-SE	30 m
V	42In183	LS	Y	S	1,554 m	SH	Dune	360°	950 m
I	42Jb180	LS	Y?	S	1,469 m	P/J	Dune	SE	450 m
S	42Sa4753	RS	Y	S	— m	P/J	—	–	— m
	42Sa9799	LS	Y	S	1,908 m	P/J	Mesa top	E	150 m
	42Sa13267	LS	-	S	1,768 m	–	Ridge	–	— m
	42Sa13268	LS	-	S	2,103 m	–	Ridge	–	— m
	42Sa16857	LS	N	S	1,524 m	SH	Mesa top	S	300
	42Sv1618	–	-	-	2,438 m	PD	—	–	— m
	42Wn624	LS	Y	S	1,695 m	P/J	Bench	N	≤100 m
	42Bo463	–	-	CB	1,352 m	S?	Slope	S	≥800 m
	42Dc221	IF	N	S	— m	P/J	Dune	W?	— m
	42Dc353	LS	Y	S	1,608 m	SH	Ridge	S	100 m
	42Em8	RS	N?	CB	— m	–	—	S	0 m
	42Ga312	LS	Y	S	2,039 m	P/J	Ridge	360°	≤50 m
	42Ga899	LS	Y	S	2,060 m	P/J-PD	Terrace	S	120 m
	42Ga3034	LS	N	S	1.679 m	SH	Bench	NNE	20 m
	42Gr1566	–	-	S	1,402 m	–	—	SE?	— m
F	42Gr1567	–	-	S	1,573 m	–	—	S	— m
O	42Gr1568	LS	Y	S	1,366 m	J	Ridge	N?	≤1,000 m
L	42Gr1569	–	-	S	1,463 m	–	Bench	W?	≤1,000 m
S	42Gr1570	LS	Y	S	1,433 m	–	—	S	≤500 m
O	42Gr1571	LS	-	S	1,554 m	–	—	NE	≤1,000 m
M	42Gr1956	LS	N	S&E	1,231 m	SH	Bench	S	180 m
	42In462	LS	Y	S	1,828 m	P/J	Bench	S-W-N	30 m
	42In1132	LS	Y	S	2,835 m	SP/F	Ridge	SE	0 m
	42Md300	LS	Y?	S	1,387 m	SH	Dune	–	800 m
	42Md381	LS	N?	S	1,646 m	J	Dune	SW	100 m
	42Md454	LS	N	S	1,463 m	–	Dune	W	3,200 m
	42Sa798	LS	Y?	S	2,438 m	P/J?	Ridge	SW	600 m
	42Sa8540	MD	Y	S	1,341 m	SH	Bench	S	500 m
	42Sa11422	IF	N	S	1,914 m	S	Valley	E	150 m
	42To13	RS	Y	E	1,295 m	SH	Cave	E	— m

Site Type: LS = Lithic scatter
IF = Isolated find
Q = Lithic quarry
RS = Rock shelter
MD = Midden

Other Components: Y = Yes
N = No

Context: S = Surface
CB = Cutbank
E = Excavation

Vegetation: P/J = Pinyon and Juniper
PD = Ponderosa pine
SH = Miscellaneous shrubs
SP/F = Spruce and Fir
J = Juniper
S = Sage

TABLE 3. Clovis Technological Variables

Site Number	Condition	Material	Length	Width	Thickness	Base Width	Flute Width	Flute Depth	Lateral Grinding	Basal Grinding
42Be93	F	OB	50x	34	11	27.5	17	1.5-2	+	+
42Be703	F	OB	48x	30x	8	--	13x	.5x	+	-
42Dc502	C	CT	66	25	-	18*	12	-.-	-	-
42Ga3049	F	CT	24x	29x	6	13*	15	2.0	o	o
42Gr1564	C	CT	51	23	9	20	9	.5-1	+	+
42Gr1565	F	CY	47x	31.5	7	24.5	13	.5-1	+	+
42Gr2130	C	CT	48	25	6	20.5	11	1.0	+	+
42In110	F	OB	37x	33	7	29	18	1.5	+	+
42In183	F	OB	13.5x	21.5	4.5	19	10	.5	+	+
42Jb180	C	OB	60	30	8	29	13	1-1.5	+	+
42Sa4753	C	CT	45	24	6.5	24	11	-.-	o	o
42Sa9799	F	CT	31x	28.5	7	21	13	1.0	+	+
42Sa13267	F	CY	25x	30	5.5	20.5	11	.5	o	o
42Sa13268	F	CT	18x	31	6.5	27	13	.5-1	+	+
42Sa16857a	F	QT	30x	26	7	22	18	1-1.5	+	+
42Sa16857b	F	QT	15x	28x	6	24.5	20x	.5-1	+	+
42Sv1618	C	CT	73	27	6	25	16	-.-	+	o
42Wn624	C	CY	60*	26*	-	21*	10*	-.-	-	-

Condition: C = Complete
F = Fragment

Materials: OB = Obsidian
CT = Chert
CY = Chalcedony
QT = Quartzite

Grinding: + = Present
o = Absent

Measurement Symbols: x = Incomplete attribute
* = Estimate with confidence

Note: All measurements in millimeters (mm)
Blank spaces represent absent or missing data

TABLE 4. Folsom Technological Variables

Site Number	Condition	Material	Length	Width	Thickness	Base Width	Flute Width	Flute Depth	Lateral Grinding	Basal Grinding
42Bo463	C	CY	49	25	5	19*	14*	-.-	+	+
42Dc221	F	CT	12x	15	-	--	10	-.-	-	-
42Dc353	F	CT	40.5x	24	5	--	14	.5	+	o
42Em8	C	CT	56.6	24.5	-	--	--	-.-	-	-
42Ga312	F	CY	25x	25	4	21*	12	.5	+	o
42Ga899	F	CT	14x	22.5	4.5	--	10	1-1.5	-	-
42Ga3034	F	CT	25x	23x	5	12	13	.5-1	+	+?
42Gr1566	F	CT	33x	33	5	--	23	1.0	o	-
42Gr1567	C	CT	31	22	4	16.5	15	.5-1	+	+
42Gr1568	F	CY	--	--	-	--	---	.-	-	-
42Gr1569	F	CY	17.5x	24x	5.5	18	11	.5-1	+	+
42Gr1570	C	CY	37	21.5	6	18	11	.5-1	+	+?
42Gr1571	F	CT	41.5x	25.5	5	21*	15	.5-1	+?	+?
42Gr1956a	F	CT	39.2x	21x	4.6	20.5	15.2	.9	o	+
42Gr1956b	F	CY	16.6x	22x	4.4x	--	12.2	.6	o	o
42In462	F	CT	21x	23	4	21	13	.5	+	o
42In1132	C	CT	45.7	23.5	5.5	20.9	15.5	.5	o	o
42Md300	C	OB	46	24	--	20	18	-.-	-	+
42Md381	F	CT	22x	18	4	17	9	.7	-	-
42Md454a	F	CY	26x	26.5	6	23	15	.5	+	o
42Md454b	F	OB	30x	24	5	18	12	.5-1	+	o
42Sa798	F	--	--	--	-	--	--	-.-	-	-
42Sa8540	F	CY	--	30	6	--	10	-.-	-	-
42Sa11422	F	CT	16.5x	22	5	17.5	12	.5	+	o
42To13	C	OB	37.5	24	7	18.5	7	.3	o	o

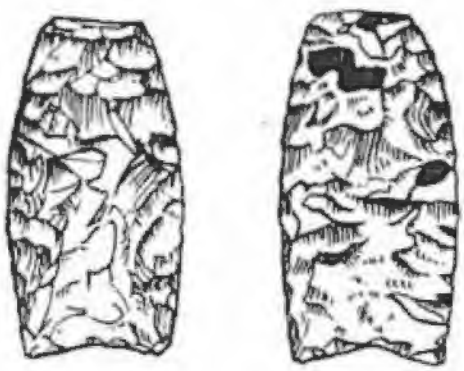
Condition: C = Complete
F = Fragment

Materials: OB = Obsidian
CT = Chert
CY = Chalcedony
QT = Quartzite

Grinding: + = Present
o = Absent

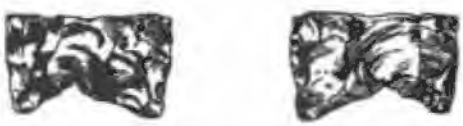
Measurement Symbols: x = Incomplete attribute
* = Estimate with confidence

Note: All measurements in millimeters (mm)
Blank spaces represent absent or missing data



42Gr2130

42In110



42In183

42Jb180

42Sa9799

42Sa13267

Figure 2. Clovis projectile points discussed in text. All points are actual size.

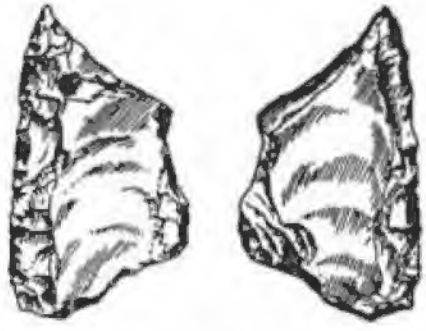
42Sa13268

42Sa16857a

42Sa16857b

42Sv1618

42Wn624



42Dc353

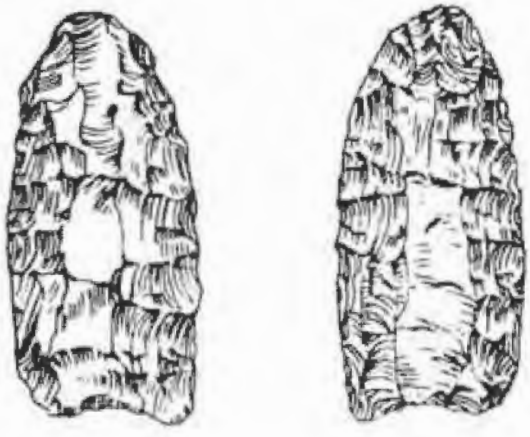
Figure 2 (continued). Clovis projectile points discussed in text. All points are actual size.

42Be93

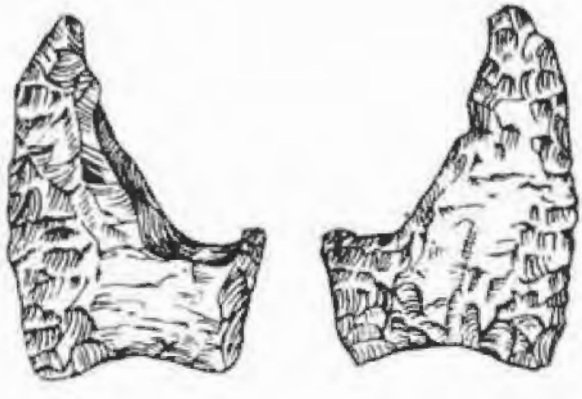
42Be703

42Dc502

42Ga3049



42Gr1564



42Gr1565

Figure 2 (continued). Clovis projectile points discussed in text. All points are actual size.

the Mineral Mountain Range, Beaver County, Utah (Jane Day, personal communication 1988). This specimen was accessioned in the 1930s and is believed to come from the Blackwater Draw site in eastern New Mexico.

The dimensions of the projectile points are well within the range exhibited by Clovis materials from such locations as Blackwater Draw Locality #1 (Hester 1972), Naco (Haury 1953), Lehner (Haury et al. 1959), the Rio Grande Valley (Judge 1973), Domebo (Leonhardy and Anderson 1966), Kentucky (Rolingson 1964), and St. Louis (Smail 1951). Descriptive statistics comparing the Utah materials to these sites or areas are given in Table 5. The Utah specimens tend to be slightly shorter than elsewhere, but are otherwise similar in most regards. When the Utah specimens were compared to each other by geographical area (Colorado Plateau, Great Basin, Uintah Basin), no significant differences were found; variation in size amounted to only a few millimeters.

Folsom

There are 25 Folsom specimens in the collection, seven of which are complete. The remaining are base or midsection fragments terminating in hinge or lateral snap fractures. Fifteen are from the Colorado Plateau area, eight are from the Great Basin area, and two are from the Uintah basin. Drawings of some of these specimens are shown in Figure 2. Most appear to be finished pieces though at least three (42Ga3034, 42Md454a, 42Gr1956b) appear to have been broken during manufacture. The overall forms are slightly expanding lanceolates with concave bases. The auricles vary from pronounced to poorly defined. Where information is available, lateral and basal edges are often ground (69 percent and 36 percent respectively). With three exceptions (42Ga3034, 42Md454a, 42SaGr1956b), all of the specimens are bifluted. The flutes are characteristically longer and deeper than the Clovis specimens and are more generally pronounced in appearance. In some cases, fluting nipples are still present in the basal concavity.

Like the Clovis specimens, chert is the predominant lithic material utilized in the Folsom collection (54 percent). Chalcedony and obsidian represent 33 percent and 13 percent of the collection respectively. The source of the obsidian has not been identified at this time, though all the obsidian points occur in western Utah and two are within the general proximity of major obsidian sources (Nelson and Holmes 1979).

The physical dimensions fall well within the range exhibited by other Folsom materials from Blackwater Draw Locality #1 (Hester 1972), the Elida Site (Hester 1962), Lindenmeir (Wilmsen 1974), and the Rio Grande Valley (Judge 1973). Descriptive statistics comparing the Utah materials with the aforementioned sites are given in Table 6. The Utah Folsoms tend to be longer, wider, and thicker than others compared. When the Utah specimens were compared to each other by geographic area, no significant differences were observed; again size variation amounted to only a few millimeters.

DISCUSSION

There are sufficient numbers of fluted points in Utah to conclude that Paleo-Indian populations probably did occupy the northern Colorado Plateau and the eastern Great Basin, even though the co-occurrence of cultural materials in the context of extinct megafauna have not yet been discovered here. However, it seems reasonable to hypothesize that the association probably exists.

To date, only three Paleo-Indian sites have been systematically investigated in Utah: Lime Ridge, Montgomery, and 42Md300. The Lime Ridge site (42Sa16587) is a clovis campsite located on a ridge with a commanding view of a drainage area west of Bluff, Utah (Davis 1986, Davis and Brown 1986). No features such as hearths are reported from the site, which consists entirely of lithic materials with no apparent mixing of later cultural debris. The assemblage consists of 294 lithic artifacts that include unutilized debitage, cores, simple flake tools, side and end scrapers, three notched flake tools, three bifaces, eight other unifacial tools, two *pieces esquilles*, and six projectile point fragments, two of which exhibit fluting scars and appear to the senior author of this papers to be more representative of Folsom specimens than Clovis as documented by the site investigators. The scrapers exhibit edge damage characteristic of bone, wood, and/or antler working. Lithic materials are predominantly petrified wood, quartzite, and jasper. The petrified wood seems to be the material of choice for unifacial tools while the quartzite is predominant for the projectile points. The assemblage is

TABLE 5. Comparative Statistics for Clovis Specimens (Means, Standard Deviations, Range)

	Length	Width	Thickness	Base Width	Flute Width	Flute Depth
Utah	57.6±10.1 (47-73)	27.7±4.2 (21.5-34)	7±1.6 (4.5-11)	23.3±3.5 (13-29)	13±3 (9-18)	1.2±5 (.5-2)
Blackwater	- (51-153)	- (25-51)	- (5-10)	- -	- -	- -
Naco	64±18.2 (58-116)	28.3±3.4 (23-34)	8.4±.7 (7.5-9.5)	24.9±2.9 (19-27)	- -	- -
Lehner	66.4±19.8 (31-97)	26±4.9 (17-31)	7.5±1.1 (5-10)	22.7±3.8 (15-27)	- -	- -
Rio Grande	- -	26±a39 (22-32.2)	5.8±1.2 (4.1-9)	23.9±2.7 (19-29)	12.3±1.6 (9.9-16.5)	- -
Domebo	67.7±10.5 (57-78)	24.3±3.5 (21-28)	8.5±2.1 (7-10)	21.7±2.5 (19-24)	11.7±8.3 (5-9)	- -
Kentucky	76.9 (32-195)	28.3 (27-52)	7.2 (7-11)	25.8 (25-44)	16.3 (16-30)	- -
St. Louis	133 -	45.5 -	8.7 -	- -	- -	- -

TABLE 6. Comparative Statistics for Folsom Specimens (Means, Standard Deviations, Range)

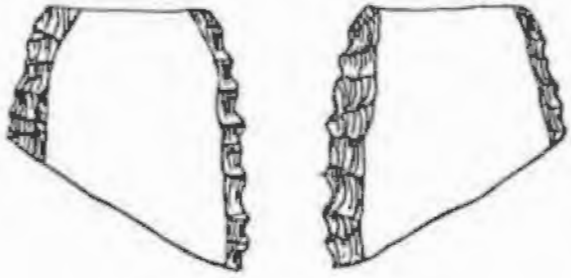
	Length	Width	Thickness	Base Width	Flute Width	Flute Depth
Utah	43.±8.6 (31-56.6)	23.8±3.8 (15-33)	5.1±.8 (4-7)	18.9±2.6 (16.5-24.5)	13±3.5 (7-23)	.8±.3 (.3-1.5)
Blackwater	36.1 (25-51)	18 (15-20)	3.6 (2.5-5.1)	- -	- -	- -
Elida	- (17.8-43)	- (15-25)	- (2.5-5.1)	- -	- -	- -
Lindenmeir	35±11.3 -	18.3±3.8 -	3.6±.8 -	15.7 -	- -	- -
Rio Grande	- -	21.5±1.5 (18.5-25)	3.8±.5 (3.1-5)	19.4±1.1 (17.2-22)	13.4±1.5 (8.5-15.5)	- -

Note: All measurements in millimeters (mm).
Blank spaces represent data not available in published source.

42Ga312

42Ga899

42Ga3034



42Gr1566

42Gr1567

42Gr1569

Figure 3. Folsom projectile points discussed in the text. All points are actual size.

42Gr1570

42Gr1571

42Gr1956a

42Gr1956b

42In462

42In1132

Figure 3 (Continued). Folsom projectile points discussed in the text. All points are actual size.

42Md300

42Md381

42Md454a

42Md454b

42Sa11422

Figure 3 (Continued). Folsom projectile points discussed in the text. All points are actual size.

characterized by a high ratio of tools and implements to debitage (1:1.63). The site is believed to be a specialized site, probably representing a brief encampment such as a hunting station.

The Montgomery Site (42Gr1956) is located a few kilometers south of Green River, Utah, on a bench within 120 m of the Green River (Davis 1985). The site yielded 188 tools and 737 pieces of debitage for a tool to debitage ratio of 1:3.92. Tools present on the site include two Folsom projectile point fragments, spurred transverse end scrapers, borers/gravers, and miscellaneous flakes with befacial retouch and heavily ground platforms. Several discrete concentrations of artifacts suggest that the site may have been used more than once and perhaps functioned as a base camp.

Site 42Md300 has been tested by Weber State College and radiocarbon dates derived from shell and organic sediments. The dates bracket the depositional zone believed to be the source of fluted points surface collected at the site. The dates range from ca. 8,480 - 5,760 B.C. (Simms 1985). Complete reporting on the work at this site is scheduled for 1988 in the Nevada State Museum Anthropological Papers.

While Lime Ridge, Montgomery, and 42Md300 will provide useful information, and the final reports will contribute significant information on Paleo-Indian lithic assemblages, there remains at least five broad problem domains requiring further attention before Utah Paleo-Indian studies can advance much further: 1) Late Pleistocene environmental reconstruction; 2) Holocene erosional studies; 3) cultural ecological models; 4) site recognition in the absence of traditional diagnostics; and 5) archaeological survey research designs.

Until paleo-environmental zones and climatic variations are reconstructed, the identification of the optimal habitat zones likely to contain megafauna is not possible. We would suggest that many areas in Utah are conducive to the herding behavior of megafauna i.e., broad valleys, flat plains, and the basins. Without the environmental data, the assessment of the potential areas that could support and maintain viable proboscidean or other megafaunal populations cannot be made with reliability. Not only would such studies identify optimal habitat zones, but the less desirable ones as well.

Holocene erosional processes and its effect on the visibility of Paleo-Indian sites in Utah remains unevaluated. As an example from an adjacent state, Cordell (1979:133) notes that all known open Paleo-Indian sites in New Mexico occur in areas of moderate to severe erosion. The Utah data at this time does not lend itself to evaluating the potential effect of this factor on interpreting site density and distribution.

Until recently, most studies and cultural ecological models of Paleo-Indian culture have stressed or emphasized the role of big game hunting to the near exclusion of smaller and more abundant (and more predictable?) animal and plant species. There now seems to be a general consensus that Paleo-Indian populations exploited a broad environmental niche. With the exception of the extinct megafauna, the Paleo-Indian ecological system may have been similar to the subsequent Archaic period. Aikens (1978) suggests that just the opposite may have been true and argues that the Archaic system was more cyclical and repetitive in site utilization while the Paleo-Indian system was more randomized. As a result, Paleo-Indian materials may not be found in deeply stratified contexts such as Archaic materials often are. The environment of Utah is different today from many adjacent areas and was so in the past (e.g., Betancourt and Beggar 1985; Agenbroad et al. 1986). It would not seem unreasonable to hypothesize that the ecological strategies of Utah Paleo-Indian people would be somewhat different than those groups occupying adjacent regions such as the High Plains. Researchers in Utah should not expect the subsistence systems to be the same as those found elsewhere, even though similar lithic tools are apparently shared.

Many sites in Utah are of unknown age. The probability would seem high that some of these are Paleo-Indian. Judge (1982) claims that without the presence of diagnostic projectile points, the identification of Paleo-Indian sites is impossible. This is no longer necessarily true. Many studies have been made that attempt to identify and order temporally distinct sites based on attributes other than the projectile points (e.g., Schutt 1980; Vierra 1980; Greenwald 1981; Phagan 1984; Copeland 1986; Rogers 1986). These studies consider detailed characteristics of flake assemblages, specialized tools other than projectile points, and the location and distribution of sites on the landscape. Davis (1986) has identified a specific tranchet technique flake for the Lime Ridge Site that may have diagnostic value

when projectile points are lacking. Similarly, the scrapers found at the Lime Ridge and Montgomery sites, as well as sites in the Glen Canyon National Recreation Area (Geib et al. 1986) appear to have chronological diagnostic value. Another possibility for chronological ordering is obsidian hydration. By comparing the hydration values of known Paleo-Indian materials with suspect materials, an approximate temporal ordering may be possible. Additional studies should be encouraged and pursued vigorously because this may be the only method to identify many of the small and otherwise unimpressive lithic sites of unknown age as Paleo-Indian in origin.

Finally, Utah archaeologists need to, as an initial step, develop and conduct Paleo-Indian oriented research programs on the order of Judge's (1973) Rio Grande Valley work. The profession seems to have a top-heavy preoccupation with the Anasazi and Fremont to the near exclusion of the earlier aceramic periods. While there have been notable investigations of a few Archaic sites in Utah, the state of Paleo-Indian investigations remains in its infancy. The emphasis on the current state of predictive modeling on site locations must also proceed from its generic level approach that considers all sites equal, to one that recognizes temporal distinctiveness between sites and site types. This situation must clearly change if any advances are to be made.

Much of the current knowledge concerning the artifactual remains of Utah Paleo-Indian cultures would not be available were it not for the aid and cooperation of the non-professional public. Professional archaeologists often visit areas only once, or sporadically at best. The local informant often has a considerable amount of significant knowledge from long association with the land and is usually willing to impart this information to sincere investigators that recognize the informants particular expertise in an area. In many cases, private collectors have allowed archaeologists, including these authors, access to their collection for study and examination. This assistance is gratefully acknowledged.

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This paper was first presented in 1984 at the 57th Pecos Conference, Flagstaff, Arizona. Since then it has gone through a series of revisions, reviews, and critiques as new information became available and as our vision has changed. The authors would like to acknowledge the cooperation and assistance of Gene and Dallas Tanner, Agnus Walker, and George Tripp in studying their collections. The drawings were rendered by B. J. Earle and John Nielsen. LaMar Lindsay, Gardiner Dalley, and anonymous reviewers provided useful comments and the assistance of numerous other professional and lay archaeologists is also recognized. The authors of course assume full responsibility for the content of the paper.

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APPENDIX
INDIVIDUAL SPECIMEN DESCRIPTIONS
(Figure Reference/Site Number/Description)

1/42Be93: This is a bifluted Clovis base fragment. There are well pronounced auricles and shoulders. The lateral and basal edges are heavily ground. All edges are finely retouched and the retouch encroaches unto the flute on one side. The flutes are well pronounced and the surfaces of each flute has longitudinal scratches present measuring ca. 2 - 10 mm in length.

2/42Be703: This is a bifluted Clovis blade fragment. The distal end is also slightly damaged, suggesting that it may have broken on impact during use. There is light grinding along one lateral edge. Both flutes are encroached upon by edge retouch.

3/42Dc502: This is a complete Clovis point. Other than some measurements, no additional information is available from the published reference (Crouse 1954). It is fluted on both sides and appears well made from the published photograph. It was originally typed as a Folsom.

4/42Ga3049: This is a unifluted Clovis base fragment. Approximately one-half of the base is missing. The specimen was apparently broken during manufacture as the first and only flute overshot its intended point of termination and the blade terminates in a lateral snap fracture. There is no evidence of basal or lateral edge grinding. There is no evidence of further modification after breakage. The specimen is made of Cutler Jasper (chert).

5/42Gr1564: This is a complete unifluted Clovis point. The distal end has been reworked to repair what appears to be an impact fracture, part of which is easily visible on one side. The lateral and basal edges are ground. The unfluted side is characterized by the removal of several basal thinning flakes. The existing flute is well pronounced and is not encroached upon by edge retouch. A pot lid fracture is present on the specimen.

6/42Gr1564: This is a bifluted Clovis base fragment. The entire base and about one third of the blade is present. The blade appears to be broken by a crenated type fracture. The lower lateral edges and the base are ground. The fluting one side is characterized by the removal of several basal thinning flakes. Edge retouch does not encroach upon the flutes.

7/42Gr2130: This is a bifluted Clovis with only the extreme distal end missing, probably from impact. The flutes are shallow and not readily apparent. The flutes are not encroached upon by edge retouch. The lower lateral edges and the base are ground.

8/42In110: This is a bifluted Clovis base fragment. The distal end terminates in a hinge fracture that has been heavily retouched. The lower lateral edges and base have been found. The base also appears to have been damaged and reworked. All of the retouch flakes that are part of the repairing or reutilization of the tool appear as if they may post-date the initial manufacture of the point by some time. All of the retouch flakes look much fresher than the overall weathered surfaces of the point. The retouching encroaches heavily upon the flutes.

9/42In183: This is a small bifluted Clovis base fragment. Both the lateral and basal edges are ground. The flutes are not encroached upon by edge retouch and the point is extremely weathered in appearance.

10/42Jb180: This is a complete bifluted Clovis point that appears to be reworked. This reworking is characterized by fresher looking flake scars that contrast with the overall dull and more weathered flake scars of the initial manufacturing episode. The base and a small section of one lateral edge are ground. The lack of more extensive lateral edge grinding would also seem to suggest reworking. The fluting on one side of the point has been nearly obliterated by retouching.

11/42Sa7453: This is a complete bifluted Clovis point. It may be reworked as suggested by an irregular flaking pattern illustrated on the blade in Lindsay (1976). Grinding is not evident on the point and the flute shown in the published drawing does not appear to be encroached upon by edge retouch. The object weighs seven grams.

12/42Sa9799: This is a bifluted Clovis base. There is some apparent use wear step fracturing on the broken distal end. The lower lateral edges and the base are ground. One flute terminates in a huge fracture and one flute is encroached upon by edge retouch.

13/42Sa13267: This is a unifluted Clovis base. It is likely that it was broken during manufacture for the following reasons: no edge grinding, only one flute, and a fluting nipple is still present. The flute is not encroached upon by edge retouch.

14/Sa13268: This is a bifluted Clovis base. The lower lateral edges and the base are ground. Retouching does not encroach upon the flutes. The edges are finely retouched.

15/42Sa16857: There are two specimens from this site. Specimen "a" is a bifluted Clovis base with pronounced auricles. The base and lateral edges are ground. One auricle was apparently broken and has been reworked, but not reground. Edge retouching slightly encroaches

not possible to observe any edge grinding. All the edges, including broken areas, have been weathered and rounded smooth.

31/42Gr1956: There are two specimens from this site. Specimen "a" is a bifluted Folsom fragment with one pronounced auricle. The distal end is missing and terminates in a transverse impact fracture. There is grinding on the basal edges only. Specimen "b" is a unifluted Folsom mid-section, apparently broken during manufacture. here is no lateral grinding.

32/42In462: This is a bifluted Folsom base. The auricles are pronounced and a fluting nipple is present. The edges are finely retouched and the retouching slightly encroaches upon the flutes. Only the lateral edges are ground. THe base is retouched.

33/42In1132: This is a bifluted Folsom fragment. It has pronounced auricles. An impact fracture is present on the distal end. The edges of the flake scars and the fluting are smoothed from weathering. It is difficult to determine presence or absence of edge grinding due to weathering.

34/42Md300: This is reported as a Folsom fragment. It is currently unaccounted for and no additional information is available.

35/42Md381: This is a bifluted Folsom base with pronounced auricles. There is fine edge retouching with no encroachment upon the flutes. Only the lateral edges are ground.

36/42Md454: There are two specimens from this site. Specimen "a" is a unifluted Folsom base. It appears to have been broken during manufacture. There is an off-center longitudinal medial ridge present on one side where the flute has not been removed. A fluting nipple is present. There is fine edge retouch and the retouching encroaches upon the one flute. There is some grinding on one lateral edge. Specimen "b" is a bifluted Folsom base. It is heavily reworked on the base and along one lateral edge. The edges are finely retouched and the retouching encroaches upon the flutes. Only the lateral edges are ground.

37/42Sa798: This is a Folsom base. No additional information is available from the published reference (Sharrock and Kean 1962).

38/42Sa8540: This is a bifluted Folsom blade fragment with both distal and proximal ends missing. It is described as being "marginally retouched on both sides" (Neily et al. 1982). No additional information is available.

39/42Sa11422: This is a bifluted Folsom base. There is fine edge retouch and the retouching encroaches upon the flutes. Only the lateral edges are ground. The base is retouched and a fluting nipple is present.

40/42To13 (Danger Cave): This is apparently a bifluted Folsom point that has only recently been discovered in the collections of the Utah Museum of Natural History, Salt Lake City. A drawing in Holmer (1986:Figure 4b) shows a complete specimen with a long flute, and a concave base. Edge retouching appears to encroach upon the flute. A second specimen that apparently was found in association with the first specimen is still unaccounted for and no information is available.

upon the flutes. Specimen "b" is a bifluted Clovis base with a concave base and ground lateral and basal edges. The ventral side of the specimen has a single flute scar while the dorsal has multiple scars. Both specimens are made of metamorphosed quartzite.

16/42Sv1618: This is a complete bifluted Clovis point. The lower lateral edges are ground. Retouching encroaches upon the flutes. No additional information is available.

17/42Wn624: This is a complete Clovis point. There is some slight damage to the distal end. While topologically verified by a photograph, no additional information is available.

18/42Bo463: This is a complete bifluted Folsom point. The lateral edges and the base are ground. The auricles are well pronounced. A published photograph shows that the edges are finely retouched and retouching does not appear to encroach upon the illustrated flute (Butler 1973).

19/42Dc221: This is a bifluted Folsom bladc fragment. Both the proximal and distal ends are missing. The published drawing suggests that it is finely retouched along the lateral edges (Lindsay 1976). There is no information on edge grinding.

20/42Dc353: This is a bifluted Folsom fragment. The distal end and most of the base are missing. The remaining basal edge is not ground. One lateral edge appears ground. The flutes are not encroached upon by edge retouch. This specimen is covered with a heavy patina and some fresh flake scars are present.

21/42Em8: This is a complete bifluted Folsom point. It was apparently found in a buried context. The reference (Gunnerson 1956) does not type the point but based on a description of the flutes (length of flute vs. overall point length), it has been typed as Folsom in this study. No additional information is available.

22/42Ga312: This is a Folsom fragment with unknown characteristics. It is currently unaccounted for and no additional information is available.

23/42Ga899: This is reported as a bifluted Folsom blade fragment with both distal and proximal ends missing. It is currently unaccounted for and not additional information is available.

24/42Ga3034: This is a bifluted Folsom base fragment. The distal end of the blade is missing and the specimen appears to have been broken during manufacture. The blade terminates in a lateral snap fracture. There is minor production oriented grinding on the lateral and possibly the basal edges. there is no apparent post-breakage modification to the specimen. It is made of chert.

25/42Gr1566: This is a bifluted Folsom blade fragment. Both the distal and proximal ends are missing. it is finely retouched and there is not encroachment upon the flutes. The edges are slightly serrated and beveled.

26/42Gr1568: This is a complete bifluted Folsom point. It has well pronounced auricles. It is one of the finest specimens in the study collection. there is fine retouching and some of the retouching encroaches upon the flutes. The base and lateral edges are ground. The base has been further thinned by flake removal after the flute was taken off. This is the shortest specimen in the study collection and may be a reworked point.

27/42Gr1568: This is a bifluted Folsom base. A fluting nipple appears to be present. It is currently unaccounted for and no additional information is available.

28/42Gr1569: This is a bifluted Folsom base. One flute has been obscured by basal thinning. The lateral edges are finely retouched and the retouching encroaches upon the flutes. Both the base and lateral edges are ground.

29/42Gr1570: This is a complete bifluted Folsom point. It has been retouched to repair an impact fracture on the distal end. Some of the repair retouch encroaches upon the flutes. the lateral edges are ground. The base may be ground but the evidence is not conclusive.

30/42Gr1571: This is a bifluted Folsom base. One auricle is missing. The broken distal end has been retouched but is still rather squared off. There is fine edge retouching that does not encroach upon the flutes. The existing auricle is well pronounced and the fluting nipple is still present. The specimen is so weathered that it is

Changes in Anasazi Perceptions of Household and Village Space at Nancy Patterson Village

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ABSTRACT

Illuminating changes in Anasazi household units, made up of associated habitation and storage rooms, as well as socio-religious structures such as kivas, was the primary aim of research at Nancy Patterson Village. The focus on households representing the two most intensive occupations at the site, during late Pueblo I and early Pueblo II, and then again during middle to late Pueblo III, allowed a detailed look at prehistoric uses and perceptions of space. We argue that an open posture, possibly related to a commitment of interaction at the household, community and regional levels, characterized the first major occupation. Evidence from the Pueblo I/II household and nearby open socio-religious structure can be extrapolated to the village, suggesting Nancy Patterson's role in interacting or controlling communication and transportation up and down Montezuma Canyon. This is compared to an apparent contraction of household space, limiting it to increasingly defined interior areas during the middle to late Pueblo III occupation. The latter suggests a decreasing commitment to community and regional interaction, giving the impression of a group of closed, withdrawn households, forming a poorly integrated community that was abandoned near the end of the thirteenth century.

INTRODUCTION

The Nancy Patterson Village Archaeological Project has been conducted by private individuals and archaeologists at Brigham Young University to explore and protect a unique site in southeastern Utah (Janetski and Hurst 1984; Hurst and Janetski 1985; Thompson et al. 1986; Thompson et al. 1988). The property is owned by Mark Evans, an attorney from Miami, who allowed it to be studied for four years between 1983 and 1986. Analyses are still underway (Thompson et al. n.d.), but several interesting aspects of site development relating to Anasazi uses and perceptions of space have come to light. These are derived from studies of architecture, and are based on the location and progression of construction as a reflection of prehistoric social dynamics.

Recognition of the usefulness of architecture in understanding social systems is steadily increasing (Fletcher 1977; Gilman 1983). Most studies focus on archaeologically recognizable households (Wilk and Rathje 1983) but vary in their emphases. Some are primarily concerned with defining household boundaries and functions (Wilcox 1975; Adams 1983; Ciolek-Torrello 1984), while others further place households in site (Wilcox 1981) or regional (Kane 1986) contexts. Still others emphasize small-group social dynamics by focusing on long-term changes in household form (McGuire and Schiffer 1983; Gilman 1987; Lyneis 1986). Recent studies of relatively short-term changes in spatial relationships of features have succeeded in outlining important social changes (Lipe et al. 1985).

This paper aspires to similar sucesses: directly stated, we believe that the location, intensity and kinds of architectural development at Nancy Patterson Village reflect changing patterns of Anasazi spatial perceptions. These also suggest how such perceptions of household, community and regional space may have controlled the way the site was inhabited. These patterns, in turn, reflect changing social dynamics within the site itself, as well as suggesting its inhabitants' commitment to regional interaction at various times in the past.

The focus of research at Nancy Patterson has been on economic and social dynamics of household units. These units are defined as contiguous blocks of habitation and storage rooms, associated with one or more pit structures and outside activity areas. Broader site information has been derived from limited test excavations of middens, other selected domestic features, and possible community integrative structures.

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Nancy Patterson Village is located just above the confluence of Cross and Montezuma creeks in lower Montezuma Canyon (Figure 1). It occupies the crest of Nancy Patterson Mesa and portions of the nearby floodplain in the canyon bottom (Figure 2). The site contained evidence of two major occupations, dated by ceramics to late Pueblo I and early Pueblo II (ca. A.D. 875-950), and middle to late Pueblo III times (ca. A.D. 1200-1300), as well as relatively minor occupations during Basketmaker III (ca. A.D. 500-725), early Pueblo I (ca. A.D. 725-875), and middle to late Pueblo II (ca. A.D. 950-1100). Each of these was centered in a different portion of the site.

The Basketmaker III component was mostly confined to a low bench on the western side of the site, between the base of Nancy Patterson Mesa and Montezuma Creek (Figure 3A). It was only briefly explored, but consists of several upright slab-lined cists surrounded by a relatively dense lithic scatter. Ceramics were rare, but enough were recovered to assign this portion of the site to Basketmaker III times.

The primary focus of the Pueblo I occupation was apparently on the crest of Nancy Patterson Mesa, with a small lithic and ceramic scatter located on the bench below, just north of the Basketmaker III component (Figure 3B). Few features assignable to this period were found, primarily because of the extensive re-use of space and material that occurred during later occupations on the mesa top.

Very late Pueblo I and early Pueblo II ceramics mark the major occupation on Nancy Patterson Mesa. This period saw the first extensive use of the site, covering most of the mesa top (Figure 3C). Extensive midden deposited at this time was identified on the eastern slopes of the mesa, and several pit structures were studied that had been built and renovated on the mesa crest. This period also saw the transition from pit structure to surface habitation in the studied south central portion of the mesa. Ceramic evidence suggests that this rather intensive occupation lasted perhaps only 75 years, before the mesa top was abandoned by early to middle Pueblo II times, around A.D. 950.

Use of the site apparently diminished after the extensive late Pueblo I/early Pueblo II occupation, resulting in a relatively minor occupation during middle to late Pueblo II (ca. A.D. 950-1100). The latter focused on the floodplain and alluvial slopes at the southern base of Nancy Patterson Mesa (Figure 3D), as well as on another mesa across Montezuma Creek to the southwest. No structures representing this time period were excavated at Nancy Patterson Village, but several portions of the middle Pueblo II midden around the base of the mesa were studied. These underlay and were obscured by many of the Pueblo III ruins on the floodplain.

A period of substantially reduced occupation, possibly even abandonment, occurred between middle Pueblo II and middle Pueblo III times, ca. A.D. 1100-1200. While it is possible that ceramic and other evidence of this period lie buried under relatively deep alluvium around the southern base of Nancy Patterson Mesa, the absence of such material in our collections strongly suggests a rather long break in occupation. The site was reinhabited rather quickly, however, in middle Pueblo III times, around the beginning of the thirteenth century.

Middle to late Pueblo III saw the largest occupation and most intensive use of the site (Figure 3E). This episode is marked by extensive, sometimes massive, rubble deposits covering over 2.5 acres on the Montezuma Creek floodplain. Two story room blocks, mostly enclosed courtyards is classic Mesa Verde style kivas characterize this component. Increasingly intensive use of space, eventually enclosing and limiting access to interior-pueblo courtyards, is also characteristic. These patterns came to a relatively abrupt end in the latter portion of the thirteenth century, when Nancy Patterson Village was abandoned. The focus on households representing the most intensive occupations at the site has allowed an even more detailed look at habitations and changes at Nancy Patterson Village. Detailed excavation and examination of complex stratigraphies have also allowed us to interpret rather short-term changes in Anasazi use of space. These seem to represent changes in the perceptions of the site's occupants concerning personal, family and community spaces, as well as possibly their perceptions about the site and its position in the world.

THE EARLY HOUSEHOLD AND VILLAGE

The excavated late Pueblo I to early Pueblo II household unit is located along the southern margin of the mesa top. The rooms are adjacent to a large circular, slab-lined plaza, and the kiva is located east of the rooms.

Figure 1. Nancy Patterson Village locality, looking southwest. The site is on top of and on the floodplain immediately behind the mesa at photo center.

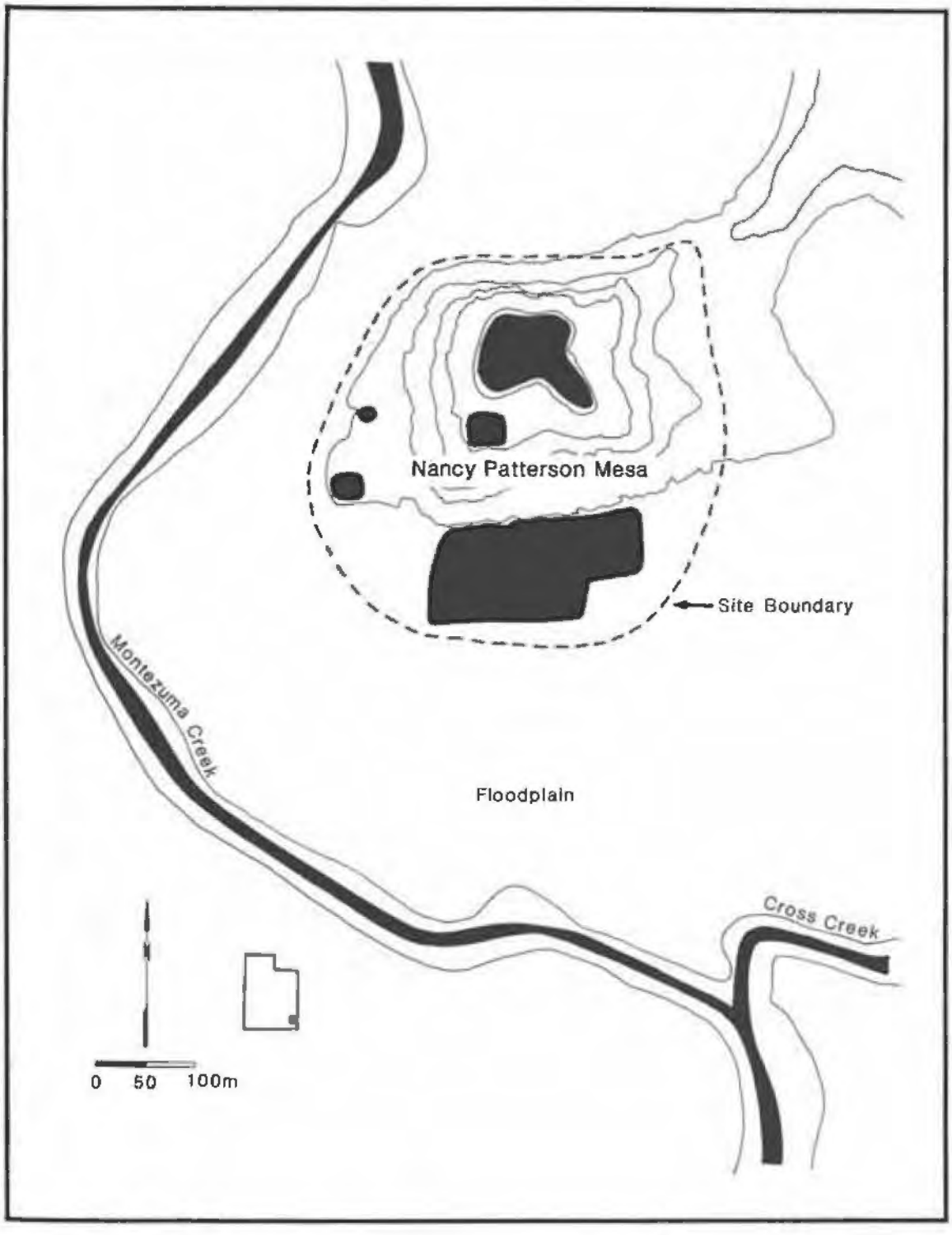

Figure 2. Overview of Nancy Patterson Village, showing environmental features and occupational loci. Contour interval is approximately 10 meters.

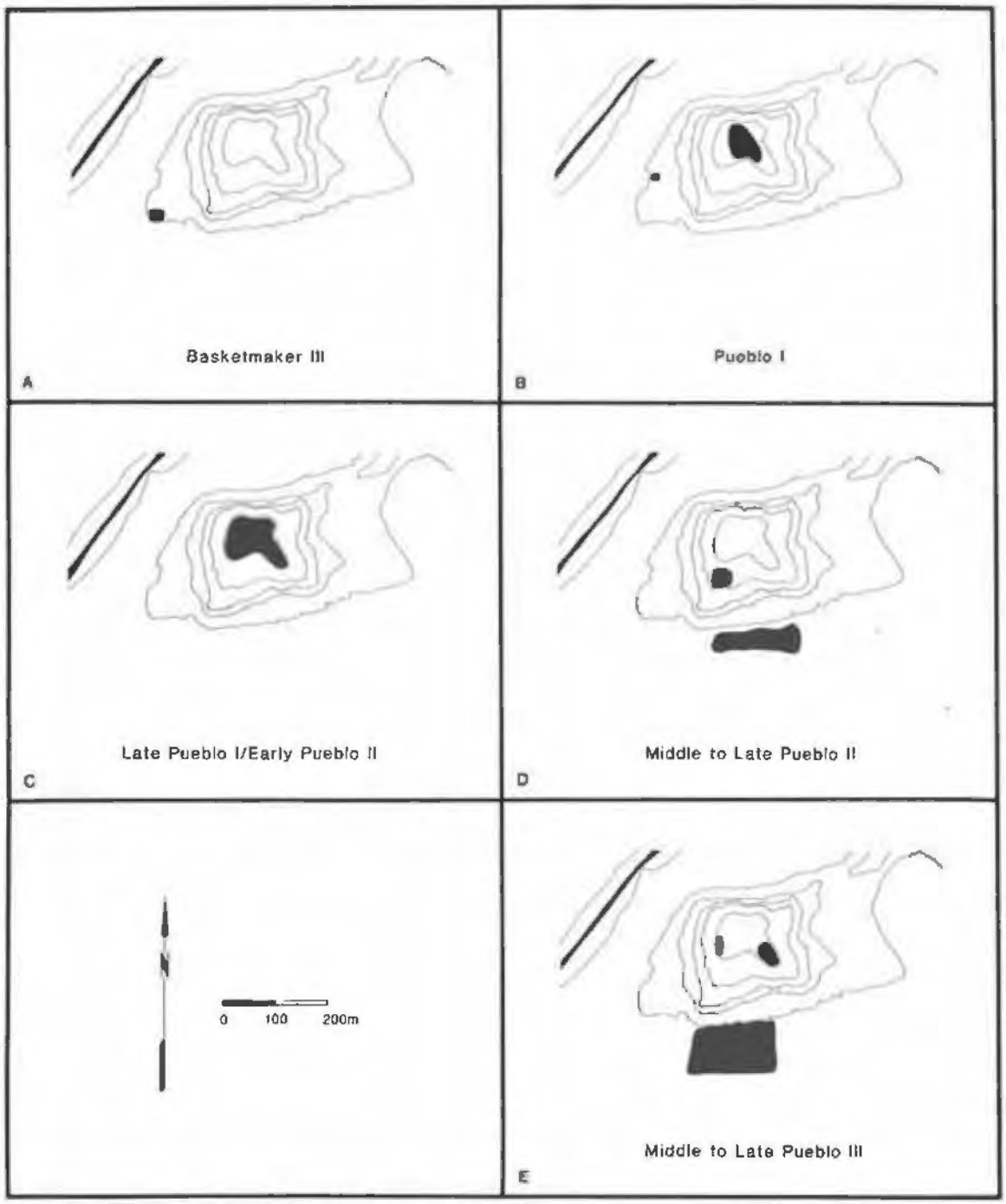

Figure 3. Generalized loci of occupation and use on Nancy Patterson Village between Basketmaker III and middle to late Pueblo III.

Occupation of this area began about A.D. 750, in Pueblo I times, with a pit structure that was deeply excavated into mesa-top gravel and caliche (Figure 4A). An associated use surface extended to the west, covering much of this portion of the mesa. It contained a dense array of large and small pits, hearths and small bins. Although some intriguing possibilities were found in tests, no conclusive evidence of contemporaneous rooms was found within this area, suggesting that any such features may have been located some distance to the north or west.

The area became increasingly developed in late Pueblo I, around A.D. 875, with the addition of three coursed masonry rooms to the west of the pit feature (Figure 4B). Room floors were laid directly on the previous use surface, whose pits were carefully capped with silt plugs. The southernmost room contained typical habitation features, including a hearth, as well as bins and subfloor pits (Figure 5). It also had an unusual, curving northeastern wall constructed of both coursed masonry and upright slabs set in mortar.

A new, smaller pit structure was constructed in late Pueblo I as well. It was built largely in the previous pit structure's excavation, but its north wall was placed further to the northwest in sterile deposits. The area between this structure and the roomblock to the west continued to function as domestic work space.

A significant increase in the complexity of the area occurred in very early Pueblo II, about A.D. 900 (Figure 4C). First, the household unit was fully developed with the attachment of three storage rooms to the back of the existing block of dwellings. The excavated southernmost habitation room was remodelled by moving its north wall further to the north. A masonry-lined kiva was constructed in the depression formed by the previous pit structures (Figure 6). Finally, a large circular plaza was built just to the west of the basic household unit. This was surrounded by a clay-capped bench, formed between two concentric circles of upright stone slabs. It probably functioned as a community-wide integrative structure.

This suite of functionally distinct features constituted a new kind of domestic unit. The transition from pit habitation structures to surface pueblo structures is clearly seen in this part of the site. Gilman (1987) has recently suggested that this transition was related to the need for larger and more secure storage units, associated with increasing dependence on stored agricultural foods. Construction of the three storage rooms in the early Pueblo II household unit at Nancy Patterson Village supports her contention, and shows how architectural remains can provide insights into socio-economic changes.

The increasing intensity of occupation, movement from below to above-ground structures, and other changes set into motion during the late Pueblo I period continued into very early Pueblo II (Figure 4D). Later in early Pueblo II, the household room block was expanded to reflect a growing emphasis on storage rooms. Habitation rooms were partially filled, new floors were utilized, and some masonry walls were moved northward. The overall impression during this period is of constant remodelling of habitation and storage structures, an apparent commitment to intensifying spatial use in this portion of the mesa. The circular plaza and kiva, however, remained essentially unchanged.

The final period of major occupation on the mesa occurred still later in early Pueblo II, probably around A.D. 925 (Figure 4D). This phase was characterized by purposeful room filling, wall stone robbing, and storage room remodelling and reuse. The latter included paving the floors of at least two storage rooms the household block (Figure 7). An apparent shift in the location of habitation rooms occurred as well, as the previously occupied rooms in the household were abandoned. The southern margin of the mesa was developed, enclosing the intramural space formed by the kiva roof and use area east of the room block. As in the previous period, the apparently constant remodelling and reuse of domestic space did not affect either the kiva or circular plaza.

The mesa top was abandoned at the end of this episode, probably around A.D. 950. At this point, the Pueblo II occupation diminished in scale, and was focused on the floodplain south of the mesa. The household rooms and kiva were apparently left intact as the population shifted to the lower level; ceramic evidence suggests that timbers and wall stones in the kiva, and possibly the rooms, were not removed for use elsewhere until Pueblo III times, some 150 years later. At that point the kiva was robbed down to its benches and left open; most of the room wall stones were removed down to the then-existing ground surface. Relatively little stone robbing was evident in the slab-lined plaza,

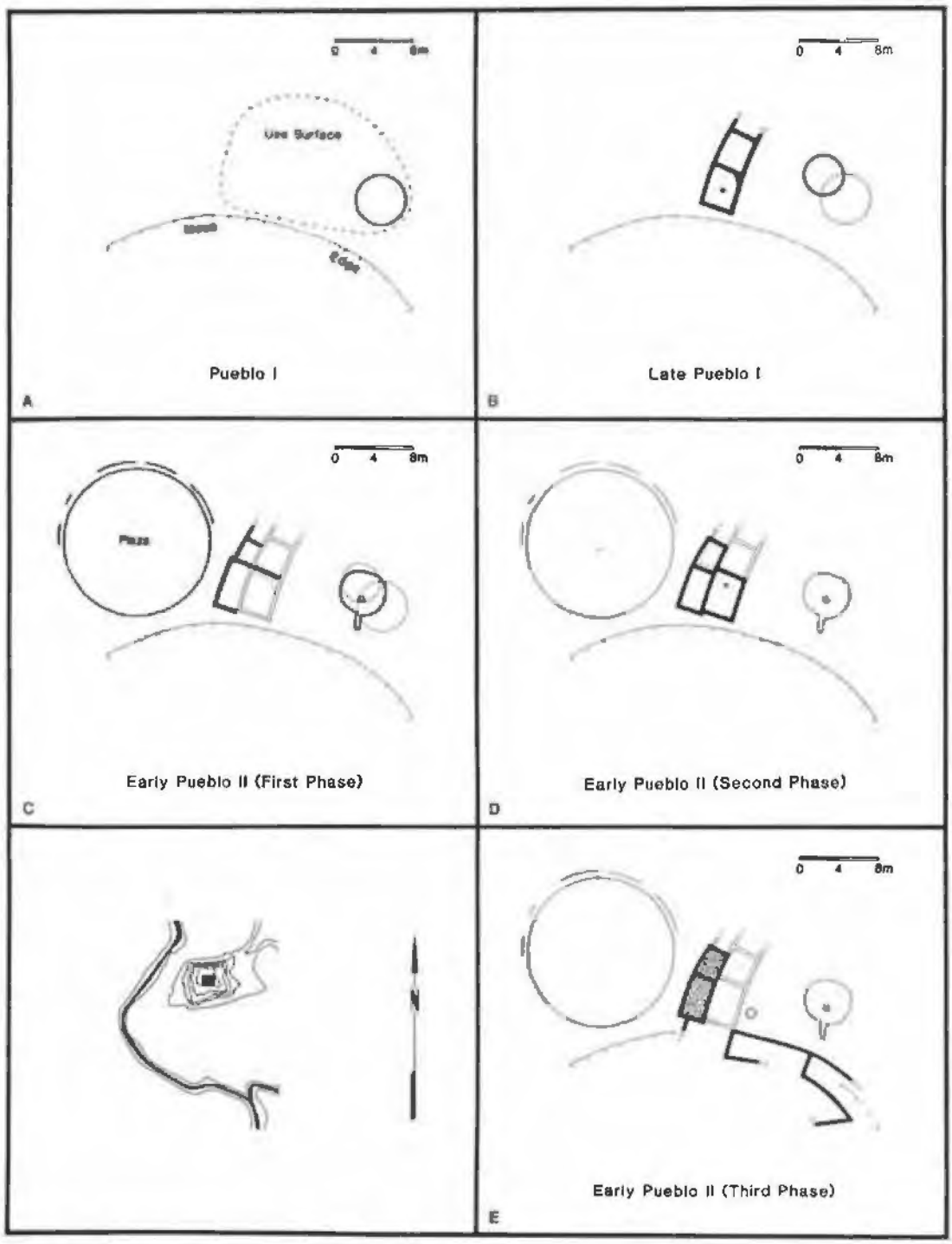

Figure 4. Sequential construction and use of space on Nancy Patterson Mesa.

Figure 5. Oblique view of the late Pueblo I habitation room, looking south, showing excavated pits associated with the room's floor and with the Pueblo I use surface.

Figure 6. West-facing view of the early Pueblo II kiva.

Figure 7. South-facing view of the paved floor in the northern early Pueblo II (third phase) storage room.

however, perhaps suggesting that this feature remained important to the site's later inhabitants.

THE MIDDLE TO LATE PUEBLO III VILLAGE

While Nancy Patterson may not have been totally abandoned after the early Pueblo II occupation, the period between middle Pueblo II and middle Pueblo III was marked by substantially reduced habitation. The major occupation on the floodplain, characterized by extensive rubble, became most extensive in area, and most intensive in construction, during middle to late Pueblo III times, between about A.D. 1200 and 1275.

The pueblo on the floodplain is made up of a series of loosely connected units, possibly household units, that were added sequentially to the original room blocks (Figure 8). The Pueblo III household unit chosen for study is in the linear addition just south of the original pueblo. This unit provides a possible model for household development throughout the lower pueblo.

The first structures in the area seem to have been two unconnected middle to late Pueblo III wall alignments, running roughly north to south (Figure 9A). The northernmost wall, which comes off the original pueblo, was probably built first. The southern alignment contains the household in which we were primarily interested. It is associated with a classic Mesa Verde style kiva, built at the same time as the room block. A low retaining wall separated the kiva-roof use area from the open courtyard to the north. Spatial associations to the south were less definable because a pot hunter's bulldozer had removed the southern portion of the block before the project began.

The second building phase consolidated the room blocks, cutting off access to the area outside the pueblo to the west (Figure 9B). A room built into the open courtyard began to divide the previously open space east of the main wall alignments. Both of these constructions served to close off pueblo-interior areas, showing an increasingly intensive use of space, possibly associated with family or household expansion. The kiva remained in use, and may have received a new floor at this time.

Space was defined even more precisely in the next phase, during late Pueblo III times (Figure 9C). Rooms were added to the north, further closing the courtyard and restricting access to other areas inside the pueblo. The level of the courtyard was raised by fill, room doorways were also raised, and a semi-enclosed mealing room was added to the northwest corner (Figure 10). At the same time, a square kiva was excavated into the southwestern corner of the courtyard, its roof forming the new level of activity in the space. Another low retaining wall was built to accommodate the raised fill and to separate the raised area from the Mesa Verde style kiva courtyard to the south. This created two distinct courtyards.

The overall impression during this period is similar in some aspects to that described for the last early Pueblo II occupation on Nancy Patterson Mesa. That is, spatial use was in flux, and although most room or areal functions were not changing, walls, doorways and use surfaces were intensively modified. The addition at this time of a square kiva in the courtyard suggests that space was at a premium, and ritualistic, spiritual and other uses had to be accommodated by what was available *inside* the pueblo, even in the face of relatively great amounts of labor.

The site was abandoned near the end of the thirteenth century, possibly around A.D. 1275, shortly after the last building phase. The square kiva was stripped of its roof and partially filled. The Mesa Verde style kiva was burned. Adjacent rooms were apparently abandoned intact, with many household goods, especially grayware vessels, in place. This was the end of Anasazi occupation in the region.

DISCUSSION AND CONCLUSIONS

While many of the changes in spatial use and habitation intensity seen at Nancy Patterson Village are mirrored elsewhere (cf. Neily 1983; Lipe et al. 1985; Lipe and Bradley 1986; Breternitz et al. 1986), the site has contributed to our understanding of Anasazi use of space. Trends have been outlined for intensive use of limited space, so that constant remodelling, changing and re-use of structures and areas was necessary. Trends have also been seen toward increasingly defining spaces within the household and pueblo, giving the impression that *contraction* of functions, communication and access corresponds to this intensity of use of limited interior space. Why do these trends occur? And what do they tell us about Anasazi spatial perceptions?

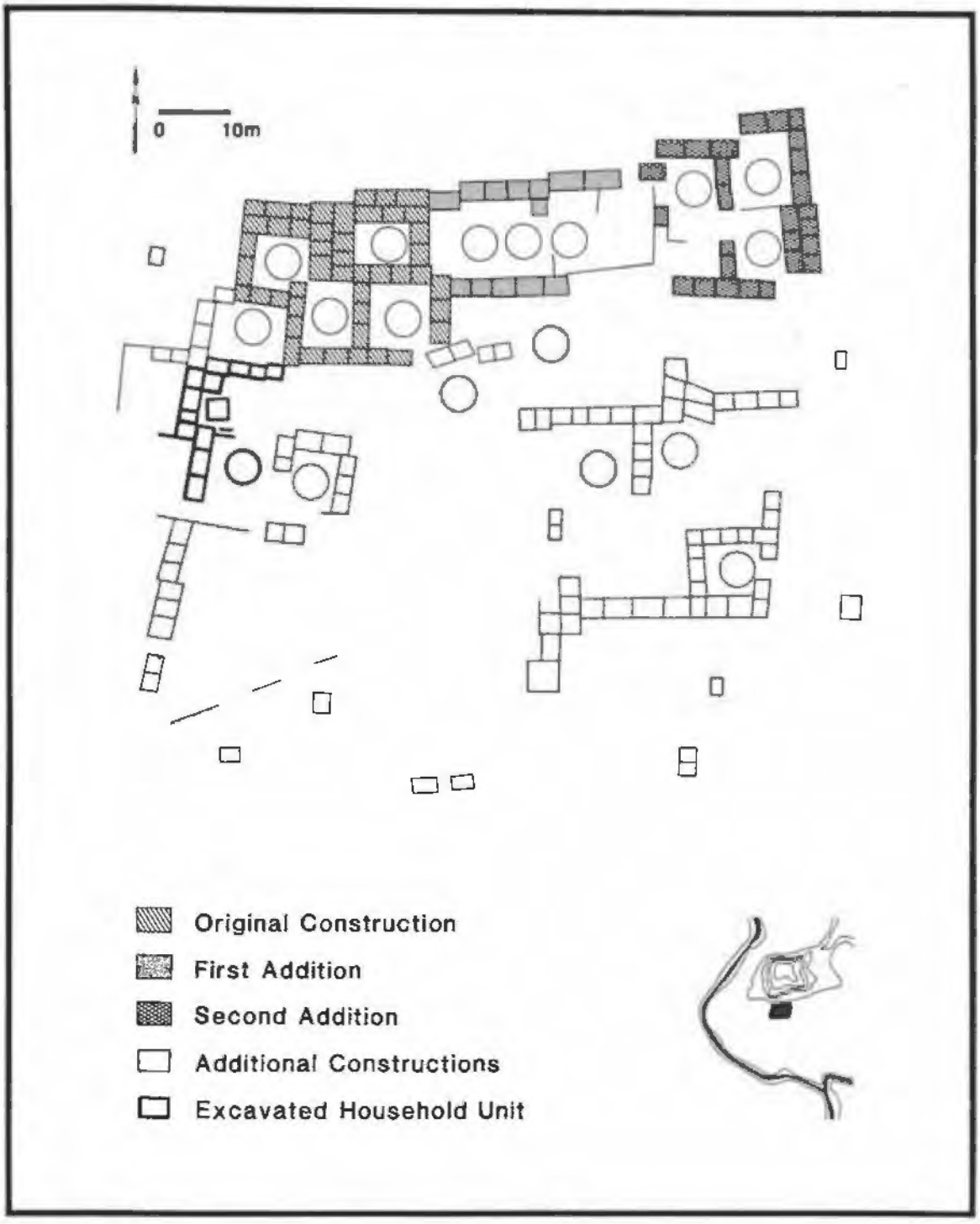

Figure 8. Sequential development of the lower pueblo, showing the location of the excavated household unit.

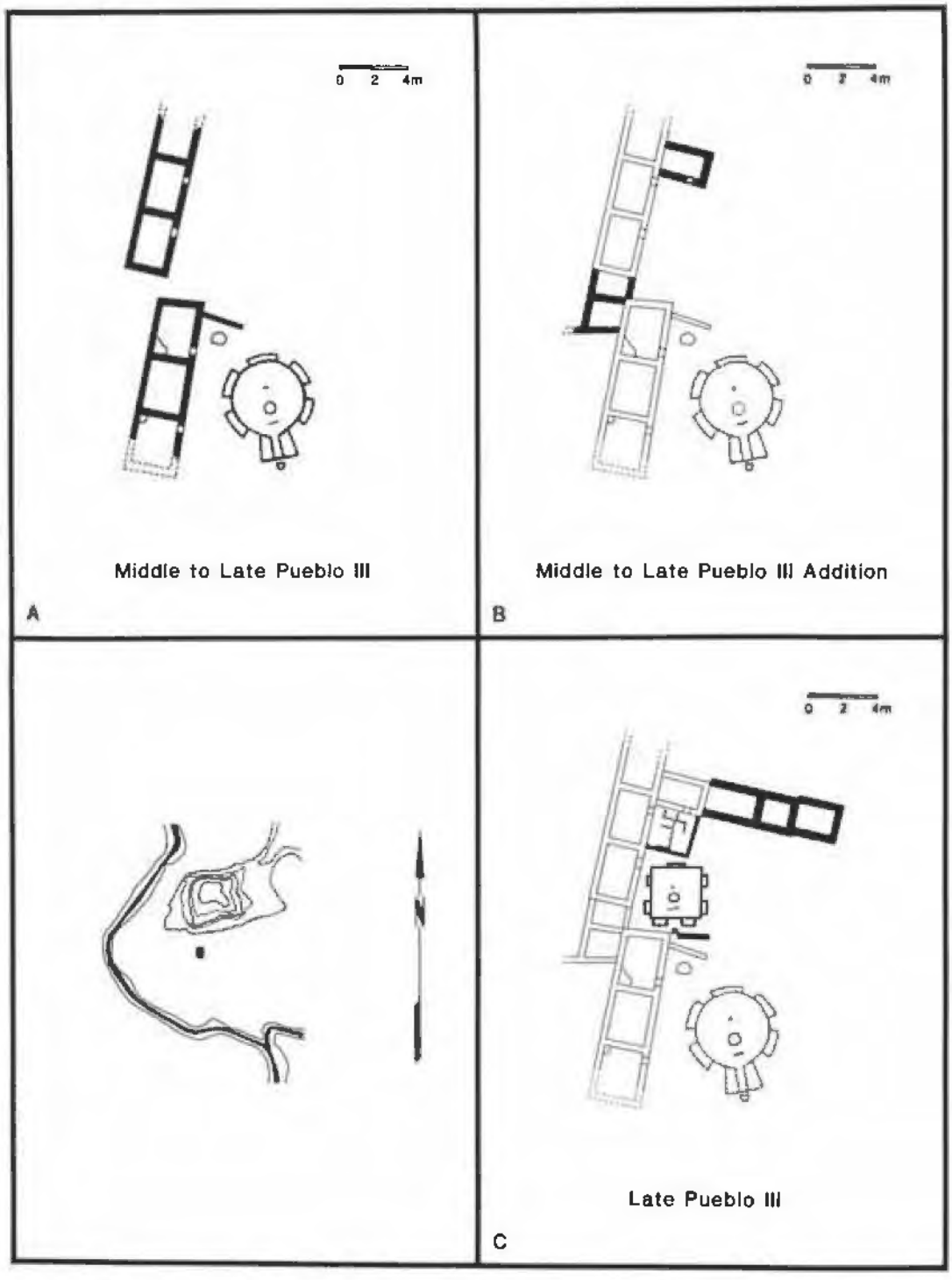

Figure 9. Details of construction and intensive use of space in the household unit, lower pueblo.

Figure 10. South-facing view of the late Pueblo III courtyard showing the mealing room and square kiva.

An answer to the first question might be related to one of Gilman's (1987:556) proposals. She argues that:

> Given increasing dependence on agriculture in the prehistoric Southwest, and the unpredictable nature of southwestern environments . . . , food information networks should contract [through time] from the entire community, or the extended family, to the more immediate family members. The result of this contraction is that food and information about food is shared with fewer, more clearly specified people.

She further states:

> . . . food, whether it is stored, prepared, or cooked, must be more carefully protected form thievery and from appraisal from non-family members. This protection can have an architectural solution, in that storage [preparation and cooking] facilities can be placed inside, rather than outside, structures . . . This problem, then is one of increasing differentiation of inside space (Gilman 1987:556).

We propose that this need for spatial differentiation, or as we have called it, spatial definition, is precisely the reason for the outlined trends. The need can be seen in the construction and remodelling of storage rooms on the mesa top, and in the constant contraction of interior space in the lower pueblo household unit. It is further supported by the late Pueblo III construction of an interior mealing room in a previously open courtyard.

What of Anasazi perceptions? Some interesting trends that might be related to ancient perceptions can be seen at Nancy Patterson Village. In general, openness seems to characterize the way space was perceived during early Pueblo II times. The mesa top location seems to have provided ideal conditions to view, and possibly control, communication and transportation up and down Montezuma Canyon. The crest of Nancy Patterson Mesa is visible for some distance in both directions in the canyon, but it is also in view from most mesa-edge locations on all the surrounding uplands. We suggest that the large, open, stone-lined plaza on the mesa was located so as to be maximally visible to much of the surrounding area. One can imagine sounds and sights of ceremonies on the plaza carrying for some distance, both up and down the canyon, and to upland sites within the visual catchment area. The intense occupation on the mesa implies a commitment to this open location.

Contrast this apparent openness, and its implied commitment to communication and interaction with the surrounding territory, with the late Pueblo III floodplain occupation, characterized by increasingly defined space *inside* the confines of the pueblo. True, a possible integrative structure that might have been associated with the late Pueblo III floodplain occupation was built on the southeastern point of the mesa. This was a kiva, however, that would not have communicated many ceremonial sights or sounds to either the village below, or to the surrounding territory. It is possible, however that this structure served a community integrative role, although the character of the late Pueblo III village seems to have been rather closed.

The late village gives at least two impressions. The first is of contraction, that is, space defined for common community use was diminishing, while that associated with households was being defined and increasingly closed from the rest of the village. Anasazi perceptions seem to have been such that interaction, even with other households, was threatening and not encouraged. The second is that space outside the pueblo was increasingly separated from that within, and access from one to the other was more and more restricted. The site's inhabitants may have perceived even greater danger in relations with the outside world.

The overall impression we have of the late Pueblo III village at Nancy Patterson is that of a group of closed, withdrawn households forming a poorly integrated community. A community that could not, and did not, remain viable for very long.

Acknowledgements

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REPORTS

AN UNUSUAL CACHE OF PAINTED BISON BONE FROM EASTERN BOX ELDER COUNTY, UTAH

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INTRODUCTION

The purpose of this article is to document a cache of painted bison bone in the Joseph Pauli collection of Ogden, Utah. Joseph or "Joe" Pauli was a hobbyist of many interests who made several large collections of specimens including rocks and minerals, historic Mormon and Chinese items and both prehistoric and historic Indian artifacts. I interviewed Mr. Pauli and examined his collection in 1981. Mr. Pauli passed away in February of 1988 and his heirs have retained possession of the collection.

Many of these Indian artifacts were collected during the winter months, when snow made agricultural pursuits impossible. During this time, Mr. Pauli and several associates would make random excavations into the numerous caves and rockshelters in the Promontory-Blue Creek area at the northeast edge of the Great Salt Lake (Figure 1). These non-professional excavations covered a period of time from the 1930 to the early 1950. After about twenty years of collecting, Pauli had accumulated an extensive collection of artifacts, ranging from the more common stone, bone and pottery artifacts to many perishable and unusual items. These artifacts represent thousands of years of prehistory in the Great Salt Lake region. Some of the more interesting artifacts in the Pauli collection are the painted bison bone artifacts described here.

LOCATION

The area in which Joe Pauli collected is immediately north and northeast of the Great Salt Lake in southeastern Box Elder County, Utah (Figure 1). Included within this area are extensive lake periphery marsh lands, embayments, salt and mud flats, a portion of the lower Bear River, the Blue Spring Hills, and the Promontory Mountains.

Although Pauli excavated in a number of caves and rockshelters, the general location of many of these sites remains obscure due to poor locational data and site documentation. As best as Mr. Pauli could recall, he excavated in caves on Little Mountain, northwest of Corinne, Boothe Valley on the east side of the Promontory Mountains, and Hansel Valley between the North Promontory and Hansel Mountains. Undoubtedly, many of these sites have been located through archaeological surveys and given state site numbers, while others remain undocumented.

The painted bone from the Pauli collection was recovered from a cave/rockshelter in Boothe Valley on the east side of the Promontory Mountains. Unfortunately, the exact location of this cave/rockshelter is unknown at present. About all that can be said is that caves and shelters which show signs of human occupation abound in the area.

PAINTED BISON BONE FROM THE PAULI COLLECTION

The Pauli cache includes seven specimens, five bison scapulae and two ribs of either bison or elk, with elaborately painted or etched/incised designs.

Joe Pauli reported that the painted bone artifacts were excavated near the side wall of a well-protected cave, under 16 inches of surface and occupational detritus in a strata containing Fremont pottery and Rosegate Corner-notched and Uinta Side-notched projectile points. At the time of discovery, the bone artifacts were cradled in what Pauli described as a nest of grass and had the appearance of being intentionally cached or hidden in what was probably a subsurface pit covered by a large flat rock. Two of the seven painted/decorated

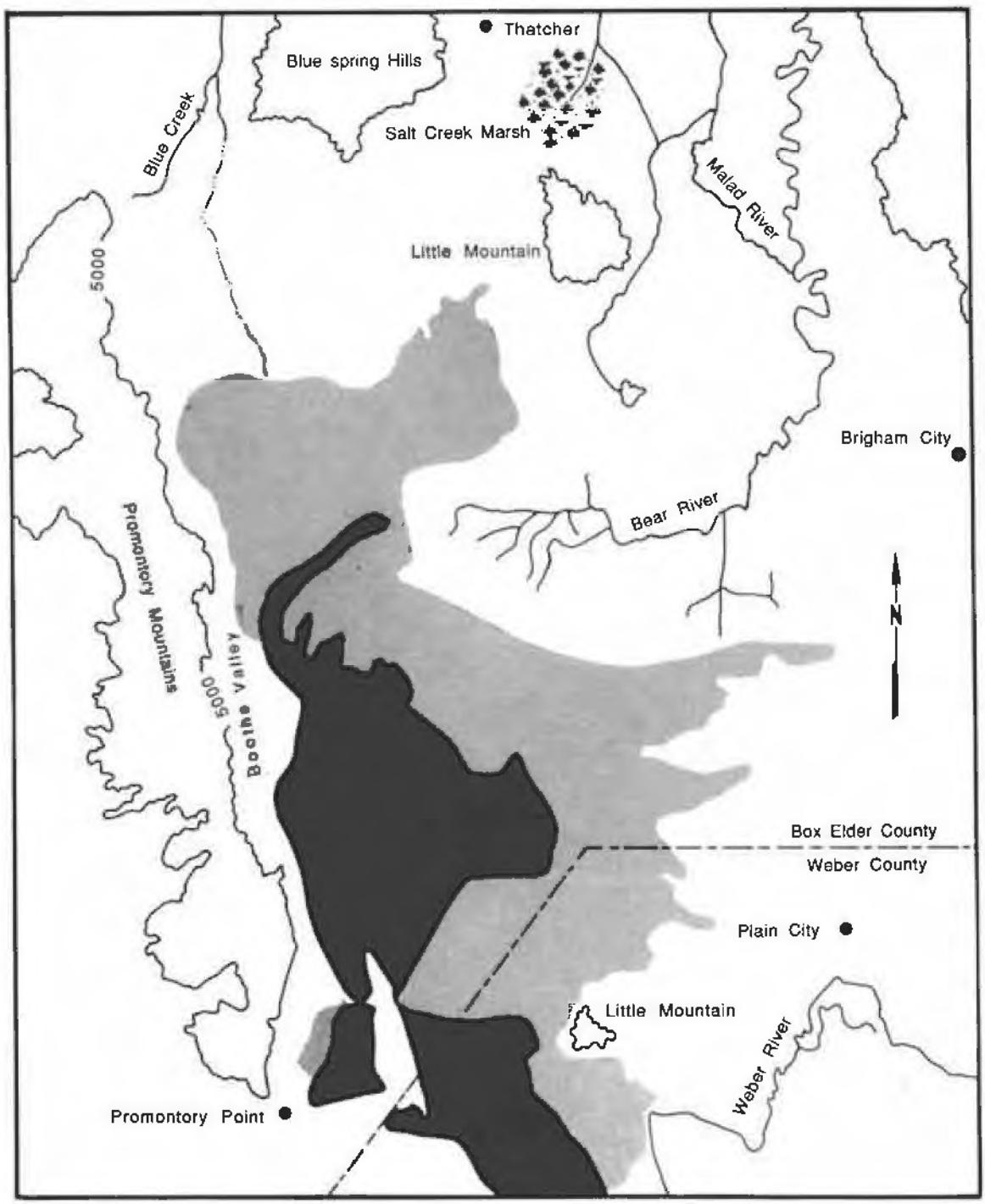

Figure 1. Northeast area of the Great Salt Lake. Area in black represents the 4,200 foot level of the lake; the gray is the 4,210 foot level.

bone artifacts were still encased in sheaths of leather. Each of the specimens is described below.

Specimen 1

Specimen 1 (Figure 2A) is a bison bone scapula 15.2 cm. long, 6.5 cm. wide and .7 cm. thick. On the flat outer surface of the scapula is a stylized, triangular anthropomorphic figure drawn with black pigment. The design essentially conforms to the configuration of the worked bone. The figure's head is represented by a checkerboard pattern with suspended vertical lines protruding down from the pattern. Two leaf or feather-like figures protrude from the head. It is possible that these figures represent a mask and/or headdress of some kind. At the lower end of the figure, two appendages or legs are formed by a deep basal concavity in the figure. The appendages also have protruding, suspended vertical lines which may represent a fringed robe or clothing.

Specimen 2

Specimen 2 (Figure 2B) is a piece of bison scapula 10 cm. long, 7.5 cm. wide and .7 cm. thick. Painted on the inner side of the scapula is a rectangular figure drawn with black pigment. The rectangular figure is 10 cm. x 4.7 cm. and is decorated by inward facing tick lines. At the upper end of the design, a curving, wandering line runs off the design and forms a rounded extension to the left side of the design. The rounded extension is bisected by three parallel vertical lines.

Specimen 3

Specimen 3 (Figure 2C) is a cut piece of rib from either a bison or elk. The size of the rib is 10 cm. long, 1.7 cm. wide and 1.1 cm. thick. A zoomorphic design drawn with black pigment is located on the lower half of the rib. The design consists of five parallel lines with connecting vertical lines. The vertical lines on the upper two rows are filled in to form a checkerboard-like pattern. At the bottom of the design are two parallel vertical lines.

Specimen 4

Specimen 4 (Figure 2D) is a piece of cut bison rib 7.4 cm. long, 3 cm. wide and 1.3 cm. thick with a black zoomorphic design drawn on it. The design consists of four long parallel horizontal lines and five short parallel vertical lines on the uppermost horizontal line. Of the five vertical lines, the last four are connected by three diagonal lines. A short vertical line also bisects the second lowest horizontal line near its center.

Specimen 5

Specimen 5 (Figure 2E) is an oblong piece of bison scapula ca. 13 cm. long, 3 cm. wide and 1 cm. thick. At the lower one-third of the scapula is a black zoomorphic design which resembles a long-legged Mule Deer or Pronghorn Antelope.

Specimen 6

Specimen 6 (Figure 3A) is a piece of bison scapula 18 cm. long, 5.6 cm. wide and .8 cm. thick. Painted on the flat side of the scapula is a stylized triangular anthropomorph drawn with black pigment. The figure is well executed in detail and form and is one of the finest examples of prehistoric art ever seen by this author. The anthropomorphic figure which covers the upper portion of the scapula piece is 15.5 cm. long and 5.6 cm. wide. The figure appears to be wearing a mask and/or a feathered headdress of some kind. The headdress is decorated by finely hatchured lines. As with Specimen 1, two appendages or legs are formed by a deep basal concavity in the lower end of the figure. The body portion of the figure is decorated by suspended vertical lines which may represent fringed clothing or a robe.

At the time of its discovery by Mr. Pauli, Specimen 6 was found inside a folded leather sheath (Figure 3B) made of intestine or bladder of some unidentified animal. The sheath is 10.8 cm. long, 6.3 cm. wide and is similar to a modern-day knife sheath.

Specimen 7

Specimen 7 (Figure 3C) is a triangular-shaped piece of modified bison bone scapula which has been covered on both of its outer and inner surfaces with diagonal crosshatching lines. A black pigmented line has been drawn across the upper portion of the scapula piece on both sides.

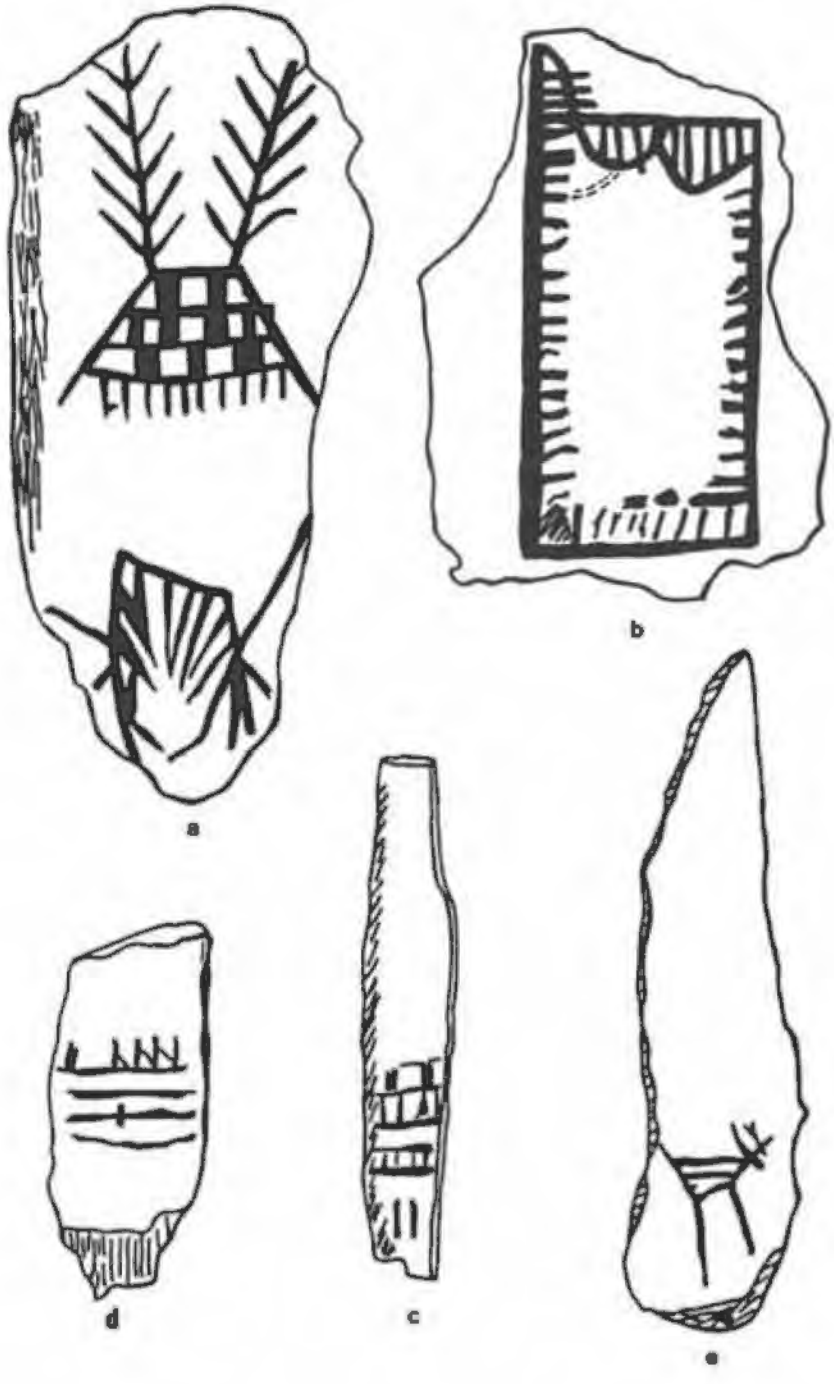

Figure 2. Painted Bone from the Pauli Collection: Specimen 1 (2A), Specimen 2 (2B), Specimen 3 (2C), Specimen 4 (2D) and Specimen 5 (2E) (seventy percent actual size).

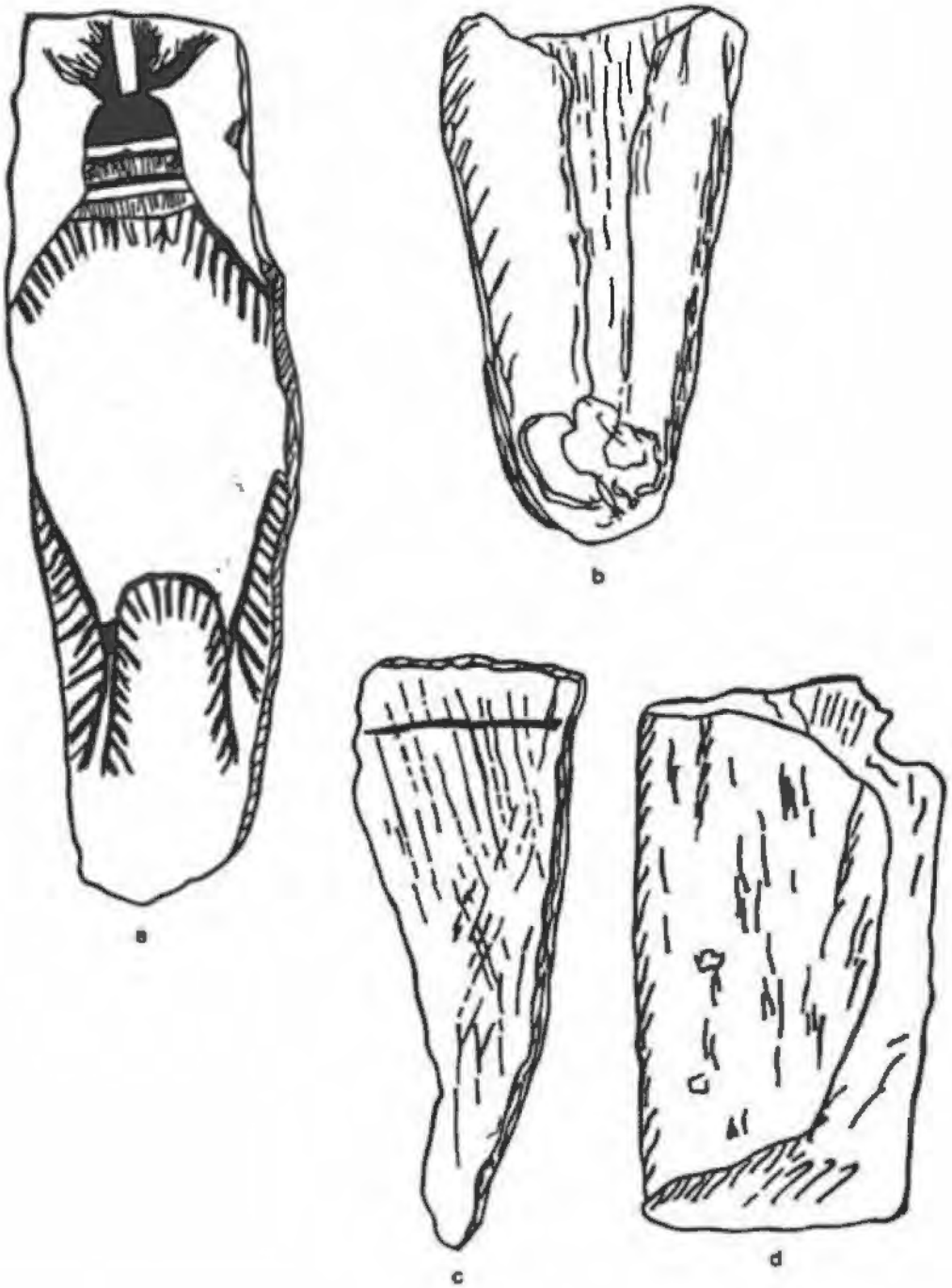

Figure 3. Painted bone from the Pauli Collection: Specimen 6 (3A) with leather sheath (3B), and Specimen 7 (3C) with leather sheath (3D) (seventy percent actual size).

Like Specimen 6, Specimen 7 was found in a tanned leather sheath which is 11 cm. long and 6.3 cm. wide (Figure 3D).

DISCUSSION

Painted bone artifacts have a sparse, but widespread distribution over the Great Basin and have been reported from several sites in northern Utah, although nothing on the order of the specimens from the Pauli Cache. Excavated sites yielding such objects include Promontory Caves (Steward 1937), Danger Cave (Jennings 1957), Hogup Cave (Aikens 1970), and Swallow Shelter (Dalley 1976). In all cases, painted bone artifacts are associated with Late Archaic or Fremont materials. Unfortunately, these published reports contain little discussion concerning painted bone objects. This is likely due to the difficulty or impossibility of discovering the meaning or purpose of these unusual objects.

It is apparent that much valuable information has been lost concerning the Pauli cache of painted bone because it lacks both locational and stratigraphic context. However, some valuable insights can still be drawn.

Two of the anthropomorphic figures (Specimens 1 and 6) are similar in form and detail to the red painted pictographs and incised stone figures commonly found in the Promontory-Blue Creek area and can reasonably be attributed to the Fremont culture (Schaafsma 1971; Castleton 1979; Jennings 1978). The two figures also resemble unfired clay anthropomorphic figurines found in Fremont sites (Aikens 1970; Dalley 1976; Jennings 1978; Madsen 1980). Based on artifact comparisons (i.e., Fremont pottery in the same stratum), it is probable that the Pauli cache of painted bison bone is of Fremont origin dating from ca. A. D. 500 - 1400.

The presence of the painted bison bone cached together in a grass line storage pit with some in leather sheaths, suggest the owner, who may have been a shaman, took great effort and care to preserve and protect these valued objects. As to the purpose of the painted bone objects, we can only speculate. Thomas (1983:349) discussing incised stone from Gatecliff Shelter in Nevada suggests "... the symbol system on portable art objects referred, at least in part, to the ritual dramatization of concepts relevant to communal hunting and gathering activities." In short, these painted bison bone may have been used in rituals pertaining to the acquisition of food.

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UTAH RADIOCARBON DATES I: PRE-1970 DATES

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INTRODUCTION

The following compilation of radiocarbon dates is ultimately derived from an extended personal search for the "Texas dates" from Danger Cave. As part of a recent research project at the site, we attempted to correlate existing dates with newly run dates from the site and continually ran across obscure references to a set of dates which had not been published in any of the original work or in the many subsequent archaeological and paleoenvironmental studies based extensively on the Danger Cave chronology. Despite the importance of Danger Cave and the widespread attention paid by world-class scholars to its chronology, these dates have never been used in the numerous papers on lake-level fluctuations, Holocene vegetational changes, Pleistocene/Holocene faunal change, early man in the Great Basin, etc. The reason appears to be, quite simply, that these many scholars were unaware that the dates even existed, or, if they did, did not know where to find them. This latter seems plausible in view of our own fruitless search through the files at the University of Utah and unproductive contact with those involved in the original excavation. We did at last finally find the dates, but, to make a long story short, only after a page-by-page search through the journal *Radiocarbon*.

A concomitant factor leading to the publication of this list was our inability to find references to several unpublished dates run by the Antiquities Section in the early 1970s in our own files. These references were finally located, but only after an extensive search that made us realize that fading memories and lost files are not uncommon the only reliable way to preserve information on events. Radiocarbon dates is to make it widely available through publication. The one significant difference between the lost materials at the University of Utah and those at the Antiquities Section is that the Danger Cave dates were published in *Radiocarbon* and ultimately could be relocated, while the Section dates were published nowhere and, given the vagaries of highway traffic and legislative funding, might never had been relocated. With the advent of commercial radiocarbon laboratories and a change in policy in publishing dates through *Radiocarbon*, it is unlikely that these Antiquities Section dates will ever be available in the same way dates were during the first two decades of the radiocarbon era. In short, it became evident that publication of a list of radiocarbon dates from Utah, together with a commitment to update that list on a regular basis, was a necessity.

PRESENTATION

The dates presented in this first compilation are those run prior to 1970. Additional lists consisting of dates from 1970-1979 and from 1980-89 are planned for future issues of *Utah Archaeology*. An annual update will be provided thereafter. This first list covers much of the same ground covered by Marwitt and Fry's (1973) compilation of Utah radiocarbon dates and much of it is derived from their work. However, since we have added a number of additional dates and additional information on those dates that were published, we thought it wise to republish the entire listing.

There are a number of differences between our compilation and that of Marwitt and Fry. Most importantly, we have restricted our commentary on the dates to technical factors (e.g., that a date is derived from solid carbon, bone carbonate, etc.) and/or to important associational factors (e.g., that a date on charred pickleweed mush relates to a particular kind of ceramic vessel). We have intentionally not provided interpretive comments such as "too early" or "too late" because interpretations change. For example, many of the Bear River dates described by Marwitt and Fry (1973) as "too late," are now considered quite acceptable by most researchers. We have also listed site numbers with the sites from which the dates are derived, and, where no site number had been given, have assigned site numbers based on information associated with the dates. Calendar years in the "Year Run" column are, in some cases, our best guess, since such information is rarely listed either in *Radiocarbon* or in archaeological publications. However, they should be correct to within two years. Often a number of references are available

for each date and we have attempted to cite the reference that gives the most comprehensive description of the date and its associations. The superscript after the site name directs the reader to the reference where dates were first published (see numbers in paranthesis in Reference Section). Where no archaeological publications are available, we have listed the correct *Radiocarbon* citation. We have also chosen to list all dates in radiocarbon years before present (1950) due to the continuing refinement in conversion tables. At present, we suggest using Struiver and Kra (1986) for conversion to calendrical years.

There are any number of ways that a compilation of radiocarbon dates can be listed: by site, by institution, by chronological position, etc. We have chosen to initially list the dates alphabetically by site name (where no site name exists, sites are listed as Unnamed Sites #1, #2, etc.). Upon completion of the initial three lists we will provide tables and charts which will display all pre-1990 dates in a variety of ways. One of the principal reasons we do not do so now is that we remain unconvinced that all available dates are listed here and not lost in some obscure file. A major reason for publishing these dates in this format is to solicit dates from anyone aware of any which may not be listed. We ask that any additional information and/or corrections be sent to us in care of the editor for inclusion in the first annual update.

PRE-1970 RADIOCARBON DATES FROM UTAH

Site Name	Site Number	Material	Context Stratum/Feature	Comments	Year Run	Lab Number	Date
Bear River #1[2]	42Bo55	bison bone	general occupation	—	1965	GX-0359	1065±120
Bear River #2[3]	42Bo57	charred wood	general occupation	—	1966	GX-0734	995±105
Bear River #3[23]	42Bo98	charred seeds	structure 7	—	1967	GaK-1562	1450±110
Caldwell Village[5]	42Un95	charred wood	pithouse 7	—	1965	GX-0357	1430±70
Coombs Village[18]	42Ga34	charcoal	Room 13, structure A	—	1964	TX-132	900±85
Coombs Village[18]	42Ga34	charred wood	structure Q	—	1964	TX-133	1115±85
Coombs Village[18]	42Ga34	charcoal	room 9, structure G	—	1964	TX-134	795±80
Coombs Village[18]	42Ga34	charred wood	room 2, structure J	—	1964	TX-135	785±80
Danger Cave[12]	42To13	sheep dung	DI	solid carbon	1951	C-609	11,453±300
Danger Cave[12]	42To13	plant stems	DI	solid carbon	1951	C-610	11,151±285
Danger Cave[12]	42To13	charcoal	DII	solid carbon	1951	C-611	9789±315
Danger Cave[12]	42To13	twigs	DV	solid carbon	1951	C-635	1970±120
Danger Cave[12]	42To13	twigs	DIV	solid carbon	1951	C-636	3819±80
Danger Cave[12]	42To13	rat dung	DI	solid carbon	1951	C-640	8960±170
Danger Cave[12]	42To13	sheep dung	DI	—	1953	M-118	11,000±350
Danger Cave[12]	42To13	twigs	DI	—	1953	M-119	10,400±350
Danger Cave[12]	42To13	charcoal	DI	—	1953	M-202	10,270±325
Danger Cave[12]	42To13	twigs	DV	—	1953	M-203	4000±175
Danger Cave[12]	42To13	sheep dung	DI	—	1953	M-204	10,270±325
Danger Cave[12]	42To13	twigs	DV	—	1953	M-205	4900±250
Danger Cave[25]	42To13	twigs	DI	—	1963	Tx-85	10,600±200
Danger Cave[25]	42To13	rat dung	DI	—	1963	Tx-86	8970±150
Danger Cave[25]	42To13	charcoal	DI	—	1963	Tx-87	10,150±170
Danger Cave[25]	42To13	sheep dung	DI	—	1963	Tx-88	9050±180
Danger Cave[25]	42To13	twigs	DI	—	1963	Tx-89	9740±210
Danger Cave[8]	42To13	twigs	DIV	—	1968	GX-1465	6825±160
Danger Cave[8]	42To13	twigs	DII	—	1968	GaK-1895	6960±210
Danger Cave[8]	42To13	pickleweed	DII	—	1968	GaK-1896	9590±160
Danger Cave[8]	42To13	pickleweed	DIII	—	1968	GaK-1897	7100±150
Danger Cave[8]	42To13	pickleweed	DIII	—	1968	GaK-1898	6560±120
Danger Cave[8]	42To13	twigs & dung	DII	—	1968	GaK-1899	10,130±250
Danger Cave[8]	42To13	pickleweed	DII	—	1968	GaK-1900	9900±200
Danger Cave[8]	42To13	pickleweek	DIII	—	1968	GaK-1901	6570±110
Danger Cave[8]	42To13	twigs	DIV	—	1968	GaK-1902	5050±120

Site Name	Site Number	Material	Context Stratum/Feature	Comments	Year Run	Lab Number	Date
Deluge Shelter[13]	42Un1	charcoal	level 3	—	1966	GX-0894	1030±85
Deluge Shelter[13]	42Un1	charcoal	level 4	—	1966	GX-0895	1215±85
Deluge Shelter[13]	42Un1	charcoal	level 5	—	1966	GX-0896	1625±95
Deluge Shelter[13]	42Un1	charcoal	level 8	—	1966	GX-0897	3260±120
Deluge Shelter[13]	42Un1	charcoal	level 11	—	1966	GX-0898	3840±210
Deluge Shelter[13]	42Un1	bone	level 12	carbonate fraction	1966	GX-0899a	1065±110
Deluge Shelter[13]	42Un1	bone	level 12	bone charcoal	1966	GX-0899b	3420±85
Dust Devil Cave[26]	42Sa19113	charcoal	Stratum VI-Hearth 3	—	1968	Tx-452	1820±80
Evans Mound[15]	42In40	charcoal	structure 14	—	1967	GX-1549	1295±90
Evans Mound[15]	42In40	corncob	17 - A - 23	—	1967	GX-1550	855±90
Evans Mound[1]	42In40	basketry	pithouse 67-1	—	1969	RL-53	1740±90
Evans Mound[1]	42In40	basketry	pithouse 67-3	—	1969	RL-54	860±120
Gilbert Site[20]	42Dc49	charred wood	structure 2	—	1966	GX-0825	1280±63
Gilbert Site[20]	42Dc49	charred wood	structure 2	—	1966	GaK-1305	632-modern
Goodrich Site[20]	42Un271	charred wood	structure 2	—	1966	GX-0826	1240±85
Goodrich Site[20]	42Un271	charred wood	structure 2	—	1966	GX-0910	1270±95
Grantsville[21]	42To105	charcoal	General Occupation	—	1967	Gak-1558	1780±80
Hogup Cave[4]	42Bo36	grass/sticks	Stratum 12	—	1967	GaK-1560	2920±80
Hogup Cave[4]	42Bo36	grass/reeds	Stratum 12	—	1967	GaK-1561	1530±80
Hogup Cave[4]	42Bo36	charcoal	Stratum 6	—	1967	GaK-1563	6400±100
Hogup Cave[4]	42Bo36	reeds	Stratum 8	—	1967	GaK-1564	3200±140
Hogup Cave[4]	42Bo36	grass	Stratum 16	—	1967	GaK-1565	1810±80
Hogup Cave[4]	42Bo36	grass/sticks	Stratum 16	—	1967	GaK-1566	480±80
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 6	—	1967	GaK-1567	5960±100
Hogup Cave[4]	42Bo36	sticks	Stratum 8	—	1967	GaK-1568	4610±100
Hogup Cave[4]	42Bo36	charcoal	Stratum 1	—	1967	GaK-1569	8350±160
Hogup Cave[4]	42Bo36	bone	Stratum 2	—	1967	GaK-1570	3970±100
Hogup Cave[4]	42Bo36	charcoal	Stratum 3	—	1968	GX-1286	6020±380
Hogup Cave[4]	42Bo36	bark	Stratum 4	—	1968	GX-1287	7815±350
Hogup Cave[4]	42Bo36	bark	Stratum 5	—	1968	GX-1288	5795±160
Hogup Cave[4]	42Bo36	feces	Stratum 10	—	1968	GaK-2076	4490±100
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 16	—	1968	GaK-2077	2200±70
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 14	—	1968	GaK-2078	1210±100
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 12	—	1968	GaK-2079	2550±70
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 14	—	1968	GaK-2080	620±100
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 10	—	1968	GaK-2081	2600±100
Hogup Cave[4]	42Bo36	sticks/bark	Stratum 5	—	1968	GaK-2082	7250±100
Hogup Cave[4]	42Bo36	sticks/dung	Stratum 3	—	1968	GaK-2083	8800±200
Hogup Cave[4]	42Bo36	feces	Stratum 7	—	1968	GaK-2084	6910±110
Hogup Cave[4]	42Bo36	feces/fur	Stratum 1	—	1968	GaK-2086	7860±160
Injun Creek[2]	42Wb34	charcoal	Mound 8/firepit 2	—	1965	GX-0552	345±100
Injun Creek[2]	42Wb34	charcoal	Mound 13/firepit 3	—	1966	GX-0553	585±90
Knoll Site[9]	42Bo109	charcoal	Structure 1	—	1969	RL-19	640±110
Levee Site[9]	42Bo107	charred wood	Structure 1	—	1969	RL-20	860±110
Levee Site[9]	42Bo107	charred wood	Structure 2	—	1969	RL-21	810±120
Levee Site[9]	42Bo107	charred wood	Structure 3	—	1969	RL-33	710±100
Levee Site[9]	42Bo110	charcoal	Structure 1	—	1969	RL-34	1170±140
Levee Site[9]	42Bo110	charcoal	Structure 3	—	1969	RL-35	1250±140
Lone Tree Dune[24]	42Sa363	charred beam	Pithouse	—	1964	Y-1350	1700±80
Median Village[15]	42In124	charred wood	Structure 2	—	1968	GaK-2114	1050±90
Median Village[15]	42In124	charred wood	Structure 8	—	1968	GaK-2115	1020±90
Median Village[15]	42In124	charred wood	Structure 9	—	1968	GaK-2116	990±100
Median Village[15]	42In124	charred wood	Structure 9	—	1968	GaK-2117	500±80

Site Name	Site Number	Material	Context Stratum/Feature	Comments	Year Run	Lab Number	Date
Nephi Mounds[19]	42Jb2	charred wood	Mound 1/pithouse 1	—	1965	GX-0648	1030±30
Nephi Mounds[19]	42Jb2	wood	Mound 3/dwelling 1	—	1966	GX-0790	1090±75
Nephi Mounds[19]	42Jb2	charcoal	Mound 2/dwelling 2	—	1966	GX-0791	280±80
Nephi Mounds[19]	42Jb2	charred wood	Mound 2/dwelling 2	—	1966	GX-0881	1170±85
Old Woman[6]	42Sv7	charred wood	House	—	1958	M-551	1170±125
Parowan Site[15]	42In00	charcoal	Structure 8	—	1967	GX-1547	1005±80
Parowan Site[15]	42In00	charcoal	B16/Feature 2	—	1967	GX-1548	700±80
Pharo Village[14]	42Md180	charred wood	Dwelling 1	—	1967	GaK-1557	760±80
Pharo Village[14]	42Md180	charred wood	Dwelling 3	—	1967	GaK-1558	1490±80
Pharo Village[14]	42Md180	charred wood	Granary 6	—	1967	GaK-1559	690±90
Poplar Knob[6]	42Sv21	charred wood	House 1	—	1958	M-552	1060±100
Promontory Cave[2]	42Bo1	leather	—	—	1965	GX-0551	840±75
Promontory Cave[15]	42Bo1	leather	Catalog #10244	—	1967	GaK-1578	320±80
Promontory Cave[15]	42Bo1	reed matting	Catalog #10459	—	1967	GaK-1579	1310±70
Sand Dune Cave[26]	42Sa19114	sandal	Stratum V	—	1968	Tx-447	7540±120
Sand Dune Cave[26]	42Sa19114	sandal	Stratum V	—	1968	Tx-448	7700±120
Sand Dune Cave[26]	42Sa19114	sandal	Stratum V	—	1968	Tx-454	7150±130
Sandwich Shelter[16]	42To108	charcoal	basal hearth	—	1969	RL-55	7040±280
Snake Rock[3]	42Sv5	wood	Structure 9	—	1965	GX-0358	1505±95
Spotten Cave[17]	42Ut104	organic material	Zone III	—	1968	I-3358	1310±90
Spotten Cave[17]	42Ut104	wood	Zone III	—	1968	I-3359	730±90
Spotten Cave[17]	42Ut104	wood	Zone III	—	1968	I-3360	185-modern
Spotten Cave[17]	42Ut104	charcoal	Zone II	—	1968	I-3361	3360±110
Spotten Cave[17]	42Ut104	charcoal	Zone Ib	—	1968	I-3362	4640±120
Spotten Cave[17]	42Ut104	charcoal	Zone Ib	—	1968	I-3363	4200±120
Spotten Cave[17]	42Ut104	charcoal	Zone Ib	—	1968	I-3364	2110±100
Spotten Cave[17]	42Ut104	charcoal	Zone Ib	—	1969	I-4484	5580±120
Thorne Cave[7]	42Un126	charcoal	Level 7	—	1964	W-1395	4170±125
Unnamed Site A[11]	42Gr196	wood	Granary	—	1952	Lamont	950±150
Unnamed Site B[10]	42Sa19115	charcoal	Hearth	—	1965	A-495	1510±80
Whirlwind Cave[24]	42Sa735	bark	Cist	—	1964	Y-1350	250±60
Whiterocks Village[20]	42Un170	charred wood	Structure 2	—	1966	GX-0902	1090±60
Whiterocks Village[20]	42Un170	charred wood	Structure 2	—	1966	GaK-1306	1130±80
Woodruff[22]	42Ri1	bison bone	Bone deposit	—	1968	GX-1124	1335±90

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THE LOA OBSIDIAN CACHE

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INTRODUCTION

In 1977 two residents of Loa, Utah, were hiking on a ridge above Road Creek north of their home town, when they observed a shining reflection from under one of the thousands of basalt boulders that cover the ridge. Upon closer inspection they discovered a cache of large obsidian artifacts which they carefully removed. The existence of these artifacts was brought to the attention of the Office of Public Archaeology at Brigham Young University who contacted the discoverers and received permission to study the cache. In February of 1987 the authors visited Loa and photographed, sketched, and took small samples of each artifact for sourcing. Later, authors Wilde and Janetski visited and recorded the site where the cache was located.

THE LOA OBSIDIAN CACHE

The site (42Wn1674) containing the cache is located on a sage covered and boulder strewn ridge above Road Creek in Dry Valley in central Utah (Figure 1). Evidence of prehistoric use of this area for occupation as well as resource storage is abundant. Lithic debitage is common along the ridge as are occasional Fremont grayware sherds and groundstone fragments. The scatter of cultural garbage is most dense in the immediate vicinity of several structural depressions, most of which have long since been destroyed by pothunting. Besides these clearly Fremont remains, the collectors of the obsidian reported finding a small, fingernail-impressed ceramic vessel under one of the other boulders on the ridge. The vessel (Figure 2) is a Late Prehistoric style and is evidence of post-Fremont use of the area. Both the obsidian artifacts and the vessel were located away from the main site area, in portions of the ridge without other cultural remains.

The obsidian cache was located under a non-distinctive basalt boulder on the southern edge of the ridge 100 m or so east and down slope from the Fremont structural depressions. The cache pit was small, less than 50 cm deep and across. The fill, according to the excavators, was dry and powdery. The artifacts were laid in the cache with the largest four stacked singly on the bottom (Figure 3). The six smaller specimens were arranged in pairs above.

OBSIDIAN ARTIFACTS

The ten large obsidian artifacts are probably quarry blanks, specialized cores used to create a variety of other lithic artifacts (Crabtree, 1972). Larger specimens are often called quarry blanks, because they may have been manufactured at or near quarry sites. Quarry blanks are particularly useful for people relying on lithic tools, because they combine several important attributes. Among these are ease of transport, ease of flake production, and usefulness as bifacial or flake tools. In effect, quarry blanks are highly efficient tool boxes, because they "contain" a large number and variety of individual tools that can be flaked off as desired. They provide a good way to carry sharp-edged tools, since flakes can be removed when needed,

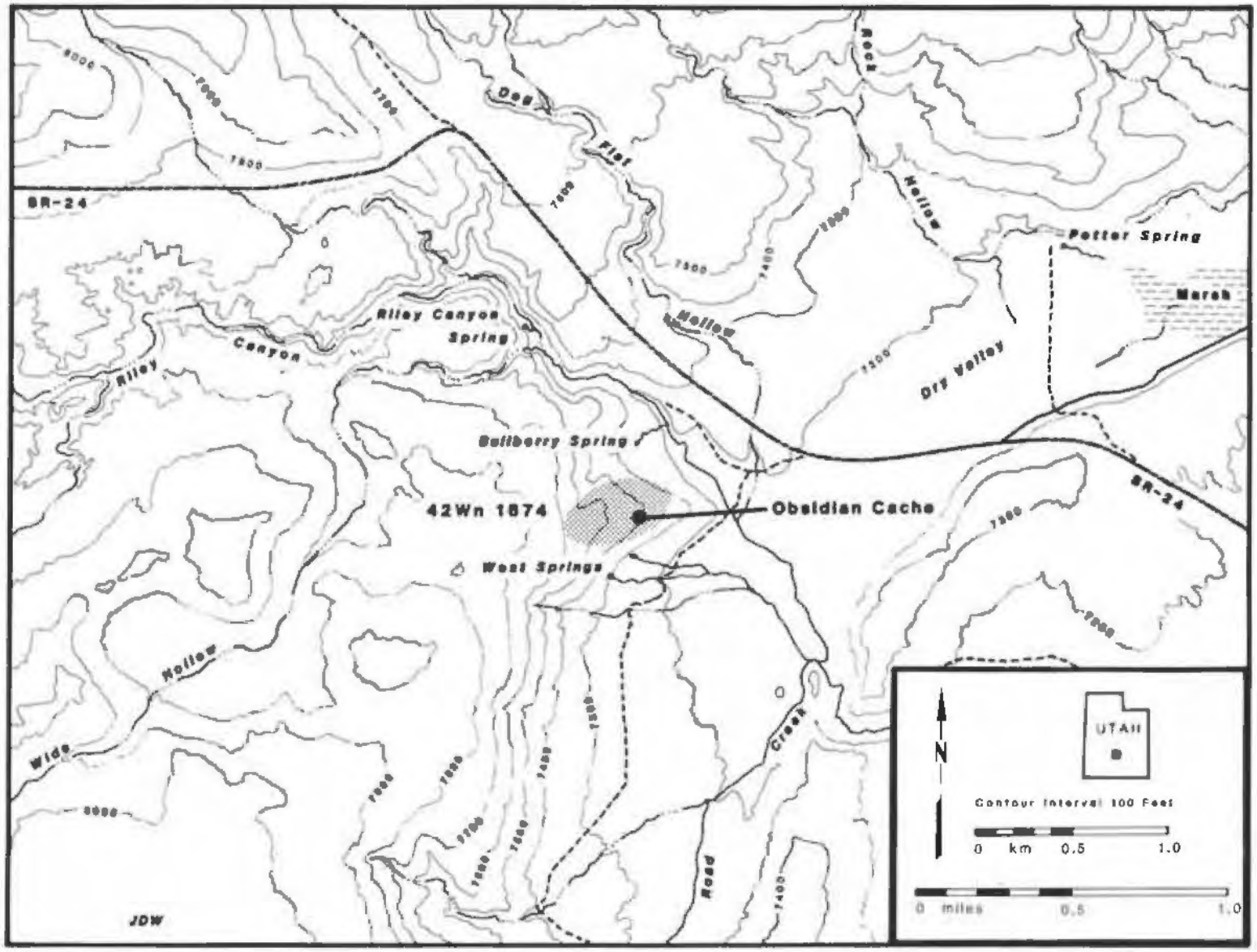

Figure 1. Location of cache in site 42Wn1674.

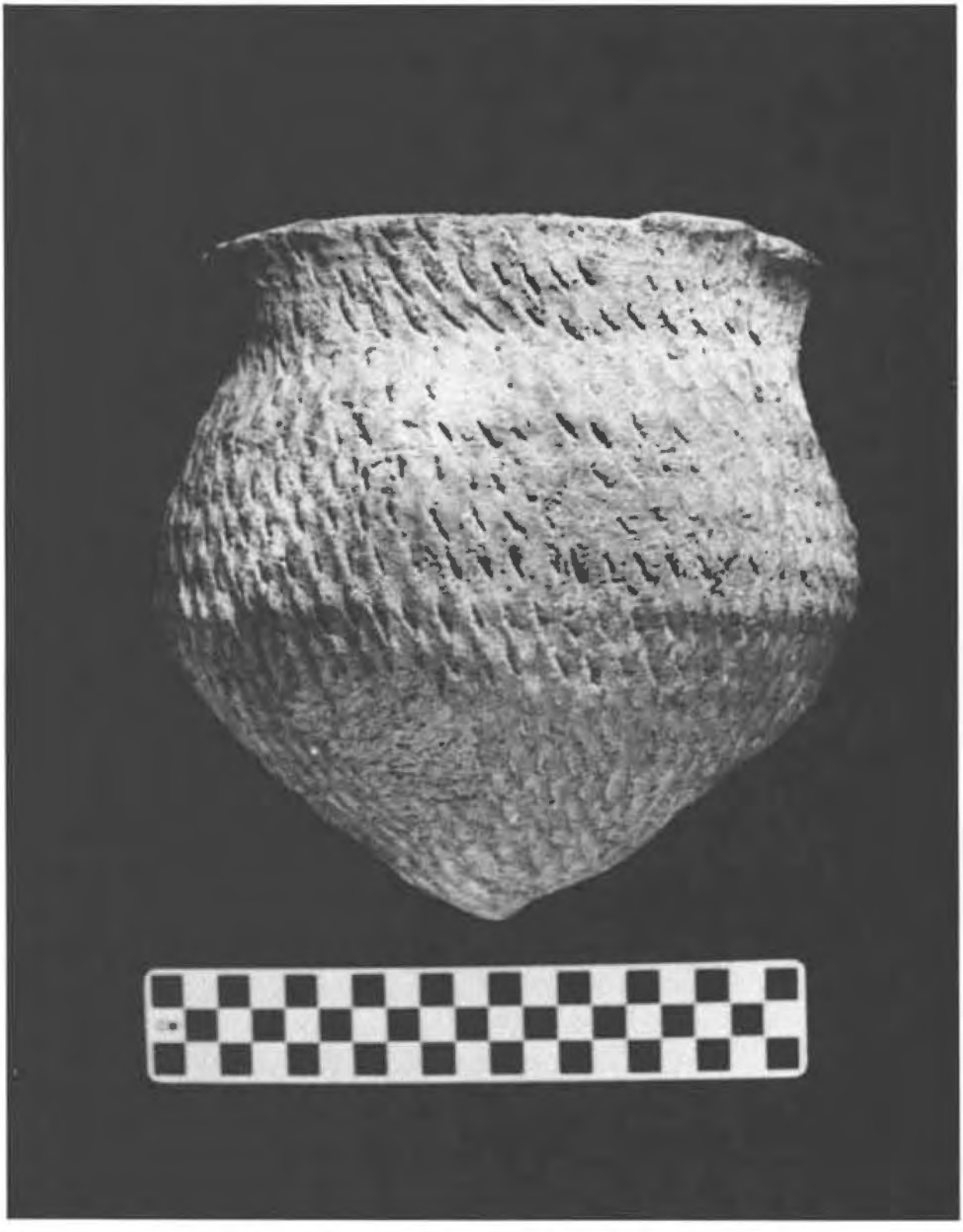

Figure 2. Late Prehistoric Ceramic Vessel attributed to 42Wn1674

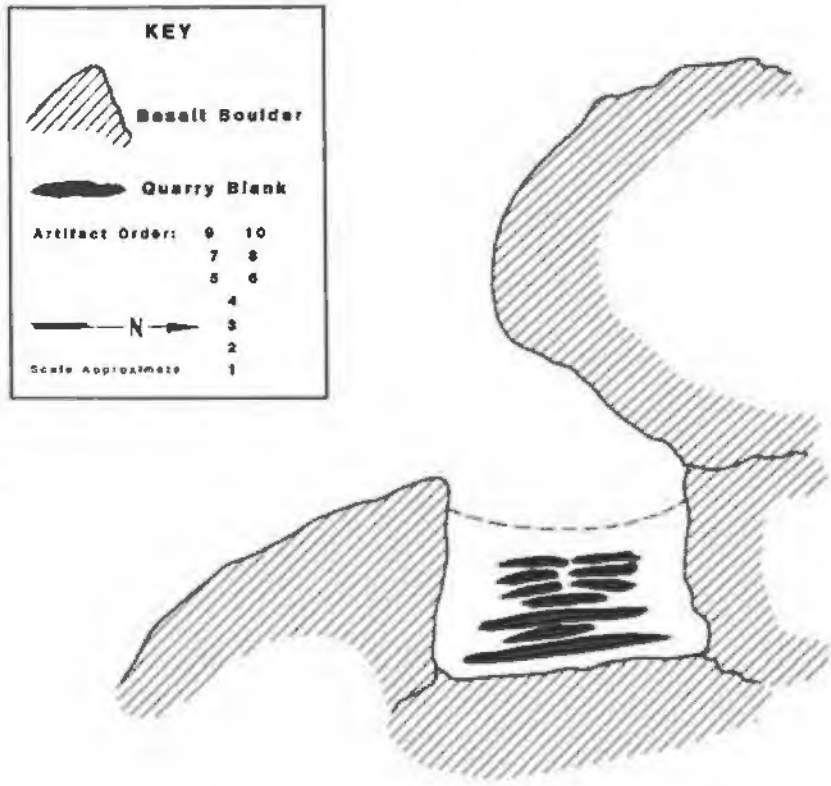

Figure 3. Idealized cross section of cache showing order of blanks.

eliminating the need to carry sharp items separately, risking both personal safety and dulling of edges. In contrast to individual loose items, they form rigid compact packages, easily carried in baskets or wrapped in fiber. Complex tools, such as projectile points or scrapers can be manufactured from removed flakes or spent blanks, when larger flakes are no longer possible. They form, then, the Swiss Army knives of prehistoric times.

Quarry blanks are usually bifaces, but large flakes function equally as well. In fact, such large flakes may become bifacial cores after the removal of several reduction flakes. The Loa Obsidian Cache contained both varieties, in all, four bifaces and six large flakes (Figures 4-5). Dimensions and other attributes of these are shown in Table 1; all are numbered in relation to their order of placement, from bottom to top in the cache. The table shows that the four large bifaces were shaped first with hard hammer, then with soft hammer percussion; the two smaller were also refined with pressure retouch, possibly to increase their symmetry or to prepare certain edges for flake removal or use. The smallest bifacial blank showed use-wear near its pointed end. Large flakes were generally not modified, although one contained soft hammer percussion scars and another showed evidence of edge refinement by both soft hammer and pressure retouch methods. All of the flakes had unifacial use-wear on one or more edges, indicating their use for cutting or scraping activities. Wear on both modified flakes occurred on edges that had not been flaked or retouched. Flake edge-angles ranged between 30 and 80 degrees, indicating a desire for thicker, more durable, and relatively

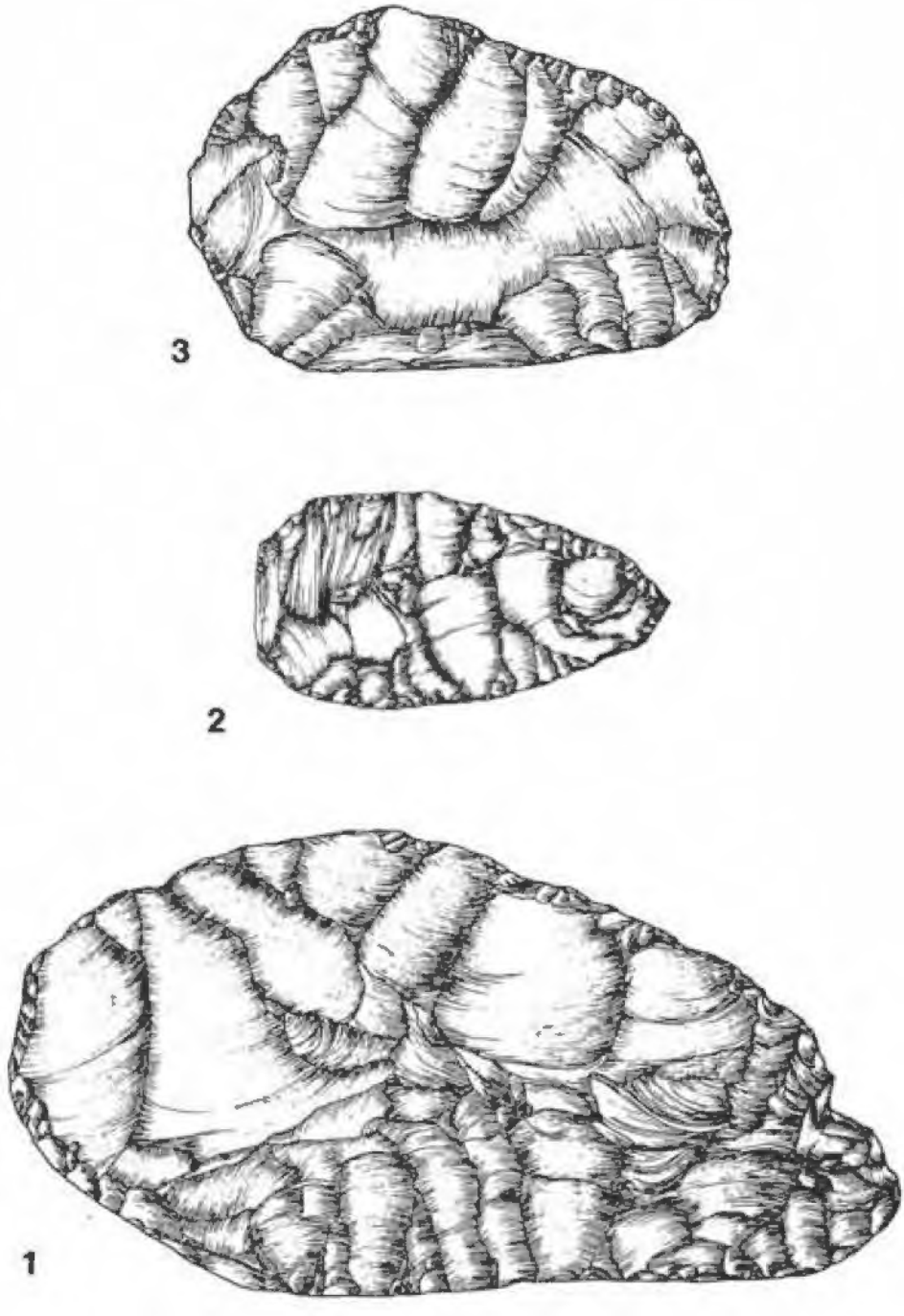

Figure 4. Blanks Number 1 - 3 (one-fourth actual size).

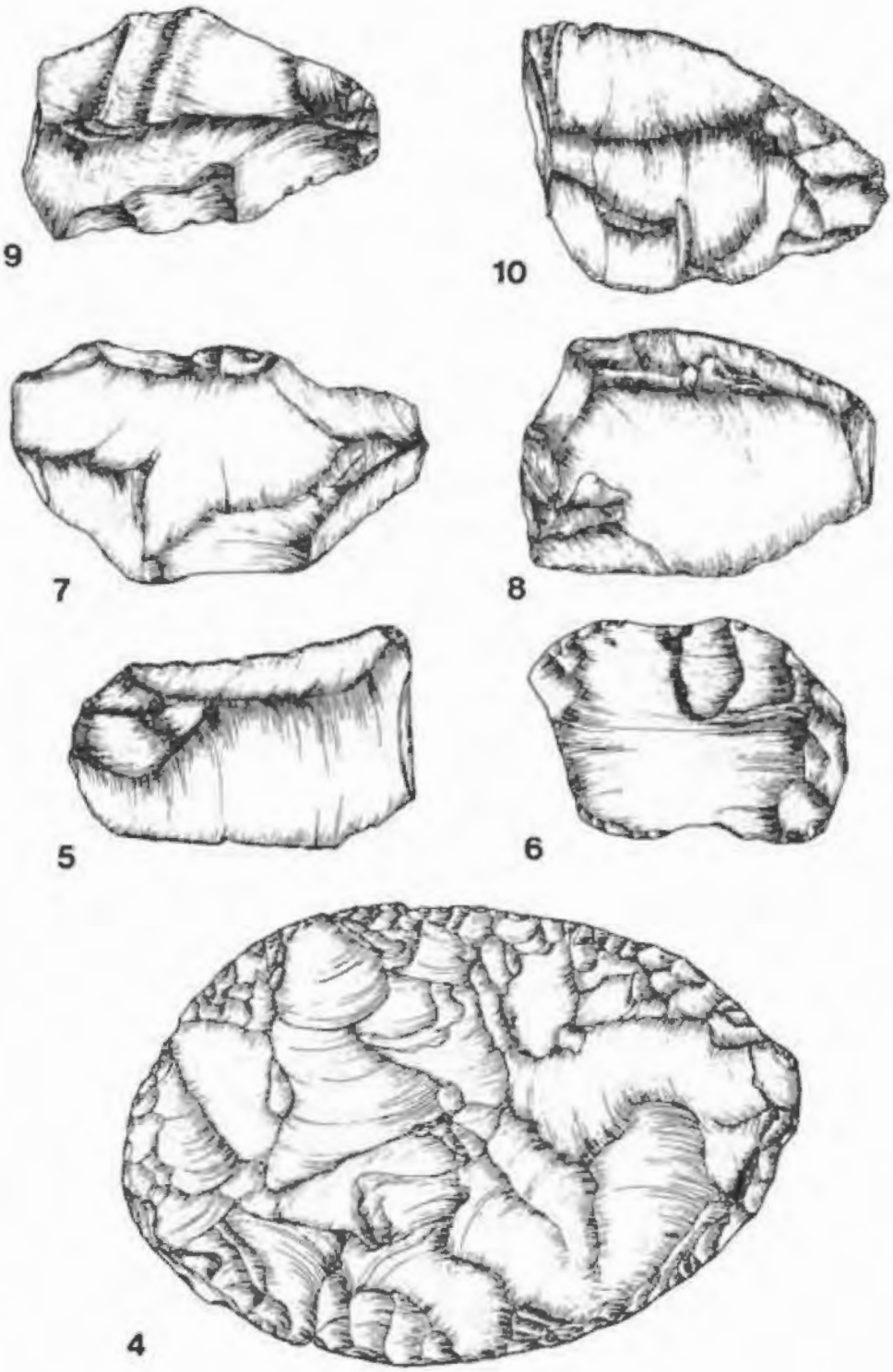

Figure 5. Blanks Number 4 - 10 (one-fourth actual size).

less-sharp edges on these transported items. It is also possible that these flakes were chosen as blanks because of the preponderance of edge-angles between 45 and 60 degrees, which are not extremely sharp, and are, therefore, safely handled. Blanks with these characteristics are ideal for future flake removal without much platform preparation.

SAMPLING AND SOURCING

To source the blanks, a sample of each was taken with a small hammer stone. These were analyzed for trace element variability using an X-ray Fluorescence technique (cf. Nelson 1984). The results are displayed in Table 2. The analysis concludes that all of the samples are from the Wild Horse Canyon obsidian flow in the Mineral Mountains west of Beaver, Utah.

The Mineral Mountains contain several flows that were intensively exploited, but prehistoric use of the Wild Horse Canyon source is poorly understood (Nelson and Holmes 1979). It is located over 125 km west of the cache site, but is the nearest source of high quality obsidian.

DISCUSSION AND CONCLUSIONS

While site 42Wn1674 contained abundant flakes and sherds, the obsidian cache itself apparently held no other artifacts or material, and therefore, cannot be assigned to any time period either through cross or absolute dating. It is possible that the cache is chronologically related to the Fremont or Late-Prehistoric component of site 42Wn1674. Dating could be attempted using obsidian hydration analysis, although that technique holds many questions and the owners of the collection would have to approve of additional damage to the artifacts. The Loa Cache contains implications for quality of the Wild Horse Canyon obsidian, as well as for exchange patterns in the eastern Great Basin - Colorado Plateau region. The persistent popularity of Mineral Mountain obsidian in prehistoric times is well documented (Nelson and Homes 1979, Nelson 1984, Simms and Isgreen 1984), but this is the first evidence that provides insights into obsidian abundance and aboriginal exploitation of the Wild Horse Canyon source. The sheer size of the blanks indicates that very large nodules of obsidian were once present in the flow. The fact that such nodules are not in evidence today (Fred Nelson, personal communication 1987) suggests that the area has been considerably depleted probably due largely to historic collecting.

The Cache also indicates that prehistoric peoples were visiting source areas and formally preparing large blanks such as these for transport. There is no way for us to know with current evidence whether these blanks were obtained directly by the prehistoric residents of the Loa Valley or whether they were traded through intermediaries. Nor do we know if they were strictly for local use, or for trade with other groups further to the east. Little is known about exchange systems in the eastern Great Basin and northern Colorado Plateau. Ericson's (1982:131) work in California has led him to conclude that obsidian is often reduced to "blades, flakes, bifaces or preforms at or near their source." Further, he has noted that regional exchange in goods such as obsidian is far more cost effective than direct access, as transport costs are avoided in a regional exchange system (Ericson 1982:131). Based on these statements it seems reasonable to assume that the Loa blanks were obtained through some form of exchange with people to the west.

Obsidian trade was prehistorically active in North America. Material from Obsidian Cliffs in Yellowstone Park, for example, has been found in Hopewell Mounds in the Midwest from Iowa to Ohio (Griffen et al. 1969, Anderson et al. 1986). Hester et al. (1986) have traced obsidian found in Texas sites to the Malad source in southern Idaho. More pertinent to this paper is the recent conclusion that obsidian from the Wild Horse Canyon source was used to produce a Clovis point found in Blackwater Draw in eastern New Mexico (Jane Day, personal communication 1988).

Very little is known about this early and persistent trade or about the movement of Idaho and Wyoming obsidian into the Plains and Midwest (however, see discussions by Hester et al. 1986 and Spielmann 1983 on movement of obsidian from western sources into and across the Plains). The Loa Cache documents the fact that large blanks were being manufactured, probably at the quarry source in the Mineral Mountains, and traded to the obsidian-poor east. It is possible that these blanks were destined to be traded beyond the Colorado Plateau, although evidence for this would be difficult to obtain. Future work focusing on questions of trade will undoubtedly show a temporally persistent, geographically widespread, and culturally complex

Table 1. Size and Technical Attributes of Quarry Blanks, Loa Obsidian Cache, Central Utah.

Specimen Number	Size (cm)	Bifacial Core	Flake	Modification Technique*	Wear Present
1	36 x 17 x 5	X		HH/SH	
2	16 x 8 x 1	X		HH/SH/PRt	X
3	26 x 17 x 5	X		HH/SH	
4	17 x 11 x 4	X		HH/SH/PRt	
5	13 x 8 x 3		X	-----	X
6	14 x 9 x 2		X	SH/PRt	X
7	19 x 11 x 3		X	-----	X
8	14 x 9 x 2		X	-----	X
9	14 x 9 x 2		X	-----	X
10	15 x 10 x 3		X	SH	X

* HH: Hard Hammer; SH: Soft Hammer; PRt: Pressure Retouch

Table 2. Results of analysis of obsidan artifacts from the Brown-New private collection, Loa, Wayne County, Utah. The obsidian for all of the artifacts appears to have come from the Wild Horse Canyon area, Mineral Mountain Range, Beaver County, Utah (Source #2). USGS Adamsville, Utah 15' quadrangle, 1958. T27S, R9W, Section 22, SW1/4.

Sample Number	Provenience	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	MnO %	Fe_2O_3 %	TiO_2 %	Ba ppm	Na_2O %	Obsidian Source
2290	Sample # 1	187.0	37.9	34.9	157.4	32.2	.053	.81	.150	181.4	3.39	2
2291	Sample # 2	191.2	44.0	20.0	157.2	31.5	.054	.81	.148	179.6	3.42	2
2292	Sample # 3	194.0	38.7	27.9	156.1	35.4	.053	.80	.147	175.6	3.01	2
2293	Sample # 4	190.3	37.0	33.3	154.6	33.8	.053	.78	.146	174.6	3.34	2
2294	Sample # 5	195.1	38.3	30.4	150.6	36.2	.053	.81	.148	181.4	3.38	2
2295	Sample # 6	185.1	39.3	26.8	158.4	34.8	.054	.81	.147	178.9	3.42	2
2296	Sample # 7	184.1	38.1	34.0	156.3	39.0	.055	.85	.151	172.7	3.45	2
2297	Sample # 8	197.1	38.0	24.4	155.0	33.8	.053	.82	.146	174.4	3.42	2
2298	Sample # 9	193.9	37.9	21.6	151.4	31.6	.053	.80	.146	175.3	3.27	2
2299	Sample #10	186.3	39.3	21.3	155.0	31.9	.053	.83	.147	180.3	3.39	2

economic network throughout the eastern Great Basin and Colorado Plateau.

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REVIEWS

Anthropology of the Desert West - Essays in Honor of Jesse D. Jennings, edited by Carol J. Condie and Don D. Fowler, University of Utah Anthropological Papers 110, University of Utah Press, Salt Lake City, Utah 327 pp., figures, references, $30.00 (hard), $15.00 (paper).

Reviewed by: **Robert B. "Bob" Kohl**
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The difficulty in adequately reviewing an introduction and 12 essays and properly crediting their 15 authors is monumental and could result in an overview as lengthy as the entire volume itself. Studied from the viewpoint of an avocational archaeologist, this volume represents a remarkable selection of material on a wide variety of sub-disciplines and touches on cultures ranging from the Paleo and Archaic, the Cochise and Hohokam, the Western Anasazi and Fremont, to the Northern Paiute and Shoshone, primarily the prehistoric people of the Great Basin.

Like the famed McGuffey Eclectic Readers whose 122-million copies between 1836 and 1857 helped shape the American mind, this collection of professional archaeological papers may well shape the mind and future energies of aspiring archaeologists at all levels. It requires more than a token interest and preliminary background knowledge of the field to fully understand, and for some it may be the segue between the popular pretty-picture books and the nitty-gritty of professional reports.

The "*Introduction*" by Carol J. Condie and Don D. Fowler, and the biographical sketch of "*Jesse D. Jennings, Archaeologist*" by C. Melvin Aikens provide many personl insights to the honored guest who is revered for his work from the 1930s to the 1980s. Jennings half-century career included numerous professional papers and books as author or editor, a considerable span as teacher at the University of Utah and the University of Oregon where he was rated a taskmaster, a lifetime of fieldwork, and establishment of the University of Utah Museum of Natural History.

The opening essay by C. Melvin Aikens (University of Oregon) and Younger T. Witherspoon (Bureau of Land Management, Portland) is titled "*Great Basin Numic Prehistory*" and launches the neophyte archaeologist immediately into a subject and a language that may cause him to reconsider his future. While a necessary adjunct to anthropology, the field of linguistics may be a career-stopper when that newcomer is confronted at once with such phrases as "the lexicostatistical method of glottochronology." Nevertheless, the first essay introduces reporting style, reference and bibliography, argument and hypothesis, problems and conclusions, and sets the stage for the conventions of professional reporting. Secretly, I wish the authors had expounded on the Utaztecan influence not only "deep into Mexico" but on the Mixtec, Olmec and on into South American.

"*Great Basin Nuts*," by David B. Madsen (Utah State Historical Society), has nothing to do with eccentries or the mentally disturbed, but is an engaging piece on the distribution, productivity and prehistoric use of pinyon nuts. The specifics include ethnographic methods of nut collecting, processing and storage patterns that probably began more than 2,000 years ago. The paper also introduces pollen and macrofossil analysis, as well as study of coprolites, as tools of the archaeologist. I would like to have seen included a parallel comparison of jojoba nut harvesting, processing, storage and use, as practiced a little farther south.

The paper titled "*Artifacts and Ethnicity*" by James M. Adovasio (University of Pittsburgh) is a good introduction to basketry techniques and styles terminology. The author makes a sound argument for identifying individual basket makers as well as for tracing the movement of early people by their woven artifact styles. He notes that basketry remains span some 11,000 years and this may cause

some reconsideration of the Pecos classification if Paleo people were actually weaving willow wefts some 9,000 years before the Basketmakers II and III received their honorarium.

The essay on "*Common Projectile Points of the Intermountain West*" by Richard N. Holmer (Idaho State University) should have a universal appeal in spite of the fact that Holmer gives an introduction to the "splitters versus lumpers" in classifications. His approach would eliminate weight, thickness and length of points (except for unbroken specimens) as he suggests a digitizing sequence involving seven coordinate points on each specimen with 13 accompanying angle and distance measurements. It could result in a whole new series of point-type splittings in an already splintered vocabulary.

Holmer's conclusion is that large points dating from 9500 B.C. through the Holocene were used primarily in spears or darts or knives (with hafting) for hunting large game while the smaller points became dominant with introduction of the bow and arrow about 450 A.D. for smaller game hunting. He also hypothesizes that contracting stem points had to be replaced when broken by heating the pitch hafting while the side-notched points became popular because they could be resharpened rather than replaced.

Joseph C. Winter and Patrick F. Hogan (both of University of New Mexico) contribute the lengthy-titled "*Plant Husbandry in the Great Basin and Adjacent Northern Colorado Plateau*" which is probably the easiest paper to digest and contains mostly "layman language." The paper discusses plant evidence site by site and then culture by culture, noting that human disturbance or manipulation of wildlings resulted in early cultivation of weed crops that led to domesticates. Coprolite and pollen analysis from dry caves lead them to the conclusion that plant manipulation dates back to at least 5000 B.C. while actual farming was not practiced until 455 A.D.

"*The Great Basin Lacustrine Subsistence Pattern - Insights From Utah Valley*" is a paper by Joel C. Janetski (Brigham Young University) that covers a field not often researched because of all of the attention directed to megafauna, and large and small mammal hunting. Descriptions of prehistoric lifeways along lakeshores, rivers and other watercourses in Nevada and Utah reveal the use of fish, waterfowl and shorebirds, as well as the use of underwater and emergent plants, as important dietary supplements. Janetski takes the reader into Ute and Shoshone times as well, noting the shooting, trapping, processing and storage of lacustrine foods well into post-contact times.

A short paper titled "*Cultural Resource Management in the Great Basin*" is the work of Don D. Fowler (University of Nevada-Reno) and is an assessment of the impact of federal legislation and regulations on Great Basin archaeology. He notes that reports of field studies, mostly surface inventories, are frequently laid to rest in scores of contracting agencies' file cabinets. And he argues that Bureau of Land Management divisions of land into smaller management units produces mindless searches rather than seeking sites near known water sources. While mitigation, formerly salvage archaeology, is the daily bread of many archaeologists today, Fowler implies that less time should be devoted to road projects, pipelines and power corridors and more time to "better places" where important information could be recovered.

Keith M. Anderson (University of Arizona and National Park Service) is author of "*Hohokam Cemeteries as Elements of Settlement Structure and Change*," a paper which is really a plea for more thorough research into burials as indicators of lifeways. "Because cemeteries are a focus of group identity," he sees them as clues to stability or change in housing, social and political organization. He also points up the difficulties associated with discussion with American Indians who are raising concerns about disturbance of their ancestors remains.

Carol J. Condie (Quivira Research Center) explores the difficult and complex field of linguistics in a paper titled "*Stability and Flexibility - Transivity Derivation in Zuni*." This is too involved for the layman or avocational archaeologist. Even graduate students in the field generally agree that their courses in linguistics were the most difficult. Condie unquestionably enjoys the challenge of her specialization and, to our untrained eye, succeeds in reducing Zuni verbs to a simplified set of three rules.

"*The Hunchback Dance of the Northern Paiute and Other Clown Performances of the Great Basin*," is the title of Catherine S. Fowler's (University of Nevada-Reno) contribution to this volume. She discusses the clowning dances of the Great Basin, noting that the Hump or Hunchback Dance is apparently indigenous to the Northern Paiute.

Kokopelc, the hunchback mischief-maker and flute-player so often seen in petroglyphs from Fremont to Navajo areas and in Hopi Kachinas, is replicated in costume, posture and mannerism in the Northern Paiute version. Usually associated with group activity during rituals relative to fish, fowl, mammal, and plant foods the Hunchback dance is believed to be an effort toward release of social tensions. This kind of clowning, says Fowler, includes the burlesquing of prominent individuals.

LaMar W. Lindsay (Utah State Historical Society) in his "*Fremont Fragmentation*" argues that departures of the culture was not an en masse movement, but varied from one small area to another. The slow exodus was a result of changes in temperature and precipitation as well as competition from incoming Paiute and Shoshone who were themselves seeking a better food supply than they had in their former home areas along the eastern Sierra slopes. He offers good reasons to believe that settlement patterns concentrated on higher elevations, but generally below 6,000 feet, where precipitation was adequate, or that the movement was to lower elevations along watercourses. This is supported by the obvious return to wild foods as lowered precipitation precluded farming.

Claudia F. Berry and Michael S. Berry collaborate on "*Chronological and Conceptual Models of the Southwestern Archaic*" in a paper that presents arguments for intermittent rather than continuous occupation by the Cochise culture in particular. Climatic change, they say, influenced both population movement and cultural change. The paper is lengthy and obviously well-researched, but its importance to the layman archaeologist may lay in the questioning the authors do of methods and assumptions in earlier reports. We quickly learn that once a paper is published it is fair game for other archaeologists to use supportive evidence to disagree, and for others to disagree with them, etc., ad infinitum.

This is the crux of research, to disagree with ideas and hypotheses, but not target individual persons. As each argument is presented it adds another page to the cumulative record in a book that is never finished. Ultimately, of course, there will be enough evidence to warrant sound conclusions, but even those will end with a question mark rather than a period. It also points up the paramount importance of the written archaeological record, the report that begins with the field survey and ends only after all of the lab work and analysis is finished--and the site is backfilled, stabilized, or reconstructed.

Perhaps the most important part of this tribute to Jennings is in the bibliography accompanying each paper. Here, each author reveals his references, a time-consuming, tiresome chore in itself. And here the avocational archaeologist can find the published material of his personal interest and "pick the brains" of hundreds of professionals who have reduced their cumulative knowledge to the written page.

The Pinenut Site: Virgin Anasazi Archaeology on the Kanab Plateau of Northwestern Arizona.

By Deborah Westfall. Bureau of Land Management Cultural Resource Series No. 4. Phoenix. 1987.

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The Pinenut site is a multicomponent homestead located at an elevation of 5,440 feet asl on the eastside of Water Canyon at the northeast edge of the Kanab Plateau in the Arizona Strip. It was investigated in 1986 by Abajo Archaeology under contract with Energy Fuels Nuclear. A five-room surface structure and cist (Feature 1), a pithouse (Feature 2), a cist complex (Feature 3), and a sheet midden (Feature 4) were wholly or partially excavated. In this final report, Deborah Westfall and her co-contributors provide a detailed description of their results. Mark Bond analyzes the ceramics, William E. Davis the lithics, Linda J. Scott the pollen, and Margaret A. Van Ness the floatation data. Westfall analyzes the environmental and cultural-historical context, presents the research design, describes the excavation methodology, analyzes the architecture, chronology, and occupation sequence, and offers a brief summary and conclusions. To an outside observer such as the reviewer, the report is informative and interesting, affording a good introduction to current research in the Arizona Strip. Yet it also contains some contradictions and disappointments, stimulating me to suggest alternative interpretations and directions for future work.

The culture-historical synthesis describes what various authors have claimed. It does not critically analyze the logic of the arguments made, nor does it test those claims by assembling all current data to assess them. The basic issue is taken to be the question of seasonality of occupation. Durable resources (plus corn) are said to characterize year-round habitation, while the opposite conditions define seasonal (summer only) occupation (p. 29). However, if an extended household lived at the site, some members could have farmed locally while others formed task groups to exploit a wide array of wild foods (see Sahlins 1957; Netting 1968). Due in part to her model of the site's construction history, Westfall concludes that it was summer farmstead whose surplus supported winter occupation somewhere else (p. 183). The flotation data, however, do not support his view. Seeds that do not mature until the fall were present in both Room 3 and the pithouse (pp. 176-180). I shall argue that architectural data indicate a year-round occupation for the second component.

Stratigraphic data, two clusters of C-14 dates, and ceramics document two periods of occupation separated by a century and a half hiatus. One C-14 date from an ash deposit in a small storage room (D) may also indicate a brief later episode of visitation. Westfall suggests that Rooms A and B and the pithouse constitute the early component, dated to the late 1000s, and that Rooms C-F were built later, in the middle 1200s (see below). As a large habitation space, Room E compares favorably in size to the pithouse. Thus the site in both periods is seen a being occupied by "a small family group" (p. 181).

My alternative reconstruction is as follows:

1. The arc formed by Rooms A, B, and C was built in the late 1000s (see Scott, p. 165.).

2. The pithouse, Room E, and the cist (Room F) were built in the middle 1200s with Rood D being added somewhat later. Rooms B and C were reroofed and the ramada, Room A, was reused as an activity area (on Floor 2: see pp. 41, 166).

From this perspective, the roof beams in Room E and the pithouse that are dated 980 and 1080, respectively, were probably reused from the earlier occupation. The date of 1290 on a beam in Room C denotes rebuilding of the roof. The "large piece of burned wood" in the central firehearth of the pithouse that dates to 1235 is difficult to explain except that the pithouse is contemporaneous with Room E and the cist (Room F), which have dates of 1265 and 1245, respectively. Ceramics on the floor of the pithouse include Shinarump Corregated and Moapa Black-on-gray (p. 79).

I believe that this interpretation more parsimoniously integrates all data from the Pinenut site. It implies that the earlier component was a small farmstead with a ramada (Room A), storage facility (Room B), and habitation space (Room C: four square meters in area [p. 47]) without an interior hearth. This may have been a short-lived seasonal (summer) occupation in the late 1000s, which the floor associations of North Creek Gray and St. George Black-on-gray (pp. 43, 46, 50) support. The later component probably was a year-round occupation of an extended family that had two habitation structures (Room E and the pithouse), and first two and then three storage rooms (B, C, D), plus several storage cists (Room F and Feature 3). That it is possible to construct this alternative model is a credit to the thoroughness of data presentation in the Pinenut report.

Another issue of great interest in this report is the dating of the second component to the middle 1200s. Most chronologies for the Virgin ANasazi postulate abandonment by A.D. 1150. The dates from the Pinenut site and those previously discounted from other sites (p. 95) suggest otherwise. While my present knowledge of this matter is limited, I have noticed that Kayenta Anasazi sites in the Grand Canyon interpreted to date 1050 to 1150 probably were later. The Bright Angell site, for example, contains large quantities of Flagstaff Black-on-white, Shinarump Corregated, and Virgin Black-on-gray (Schwartz et al. 1979). This means that the site should be dated to 1150-1250 (see Ambler 1985). Thus a site on the Kanab Plateau characterized by Shinarump Corregated and VIrgin Black-on-gray could date in the middle 1200s, but it should also have Flagstaff-style black-on-whites. Instead, the Pinenut site has 30 Sozi and 7 Dogoszhi-style sherds (p. 111). None of them are pictures, however, and I am led to wonder if the "Sozi" ones may actually be Flagstaff style? As ever, more research is needed to test alternative hypotheses. The Pinenut site affords a valuable stepping stone in that process.

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