

THE FORT SAGE DRIFT FENCE WASHOE COUNTY, NEVADA

LORANN S. A. PENDLETON AND DAVID HURST THOMAS

VOLUME 58 : PART 2
ANTHROPOLOGICAL PAPERS OF
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK : 1983

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ANTHROPOLOGICAL PAPERS OF
THE AMERICAN MUSEUM OF NATURAL HISTORY

Volume 58, part 2, pages 1–38, figures 1–7, tables 1–3

Issued August 3, 1983

Price: \$3.85 a copy

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ABSTRACT

The Fort Sage Drift Fence, approximately 50 km. north of Reno, Nevada, consists of a well-constructed rock alignment nearly 1800 m. long and in places almost a meter high. This site probably once functioned as an aboriginal hunting fa-

cility, built more than 3000 years ago by logistically organized hunter-gatherers. The drift fence was probably used to ambush antelope, although it could have been used in the hunting of bighorn sheep in late fall or winter.

INTRODUCTION

Archaeologists have traditionally focused on the stratified site, particularly to obtain chronological and subsistence data. This trend is evident in archaeological research throughout the world, but there are signs that the stress on the single stratified site is slowly changing to a more regional emphasis.

Increasingly aware of systemic implications of the archaeological record, many researchers are shifting their attention to the non-stratified site, particularly the surface archaeological manifestation. Although these surface sites and non-sites generally require externally derived chronological support, surface assemblages commonly contain spatial and functional patterning data unavailable in any single site approach.

Surface sites take several forms: the lithic scatter, the cache feature, the snow dam, the rock art location, the hunting blind, and the more permanent hunting facility. In this paper, we discuss the chronology and structure of one such permanent hunting feature, the Fort Sage Drift Fence. We also address the more general methodological issue of how one can breathe behavioral life into an otherwise static archaeological feature.

ACKNOWLEDGMENTS

We acknowledge financial and logistic support from the Bureau of Land Management, Carson City District. We are particularly grateful for encouragement and assistance from Mr. Brian Hatoff, District Archaeologist and Mr. Thomas Owen, District Manager of the Carson City District of the BLM. The Fort Sage project evolved as a cooperative

endeavor between federal and private research interests, and we thank the BLM for their innovative approach to archaeological administration.

For assistance in producing this report we thank Ms. Debra Peter and Mr. William Sandy who mapped the site during the summer of 1981. In addition to the authors, field crew included Mr. Joseph Dembo, Ms. Margot Dembo, Ms. Stacy Goodman, Mr. Brian Hatoff, Dr. Clark Spencer Larsen, Ms. Deborah Mayer, Mr. Dennis O'Brien, and Mr. Jack Pendleton. The artifacts were catalogued with the assistance of Ms. Diane Pitz and Ms. Lisa Rowe. We also thank Mr. Jack Pendleton for flying us over the Fort Sage Drift Fence in 1980.

We acknowledge the assistance of Ms. Margot Dembo for editing this manuscript. Mr. Dennis O'Brien supervised and created the graphics, and Mr. Nicholas Amorosi illustrated the artifacts. Ms. Joan Buttner, Ms. Patricia Bramwell, and Ms. Clarissa Wilbur assisted in preparing the typescript.

We thank Mr. Andy Anderson, Mr. Pardee Bardwell, Mr. Bill Stewart, and Mr. Jim Yoakum (all of the Nevada Bureau of Land Management) for providing useful information on the natural and historical environment of the Fort Sage area. Mr. Jim Jeffries and Mr. Mike Hess (Nevada Department of Fish and Game) supplied additional data on contemporary mammal herds of the area.

Finally, we sincerely thank Mr. and Mrs. W. Dalton La Rue Sr., for allowing us access to the Fort Sage Drift Fence, which lies in part on the Winnemucca Ranch.

THE FORT SAGE DRIFT FENCE: BACKGROUND

The Fort Sage Drift Fence (26Wa3030; CrNv-03-2496) was discovered in 1978 by Mr. Pardee Bardwell, Wildlife Biologist for the Bureau of Land Management. Mr. Brian Hatoff, Archaeologist for the Carson City District of the BLM, initially recorded the site. The site number is inclusive, referring to the rock wall, the associated surface scatter of artifacts, a nearby prehistoric midden, a now-looted rock-shelter, and a chert quarry located on the opposite hillside.

We became involved in the Fort Sage project as part of a long-standing research interest in prehistoric hunting features of the Great Basin (Thomas and McKee, 1974; Pendleton, McLane, and Thomas, 1982; Thomas, 1983, in press b). Our objective was to gather the information necessary both to provide a functional interpretation of the site, and also to guide the future management of the site as an archaeological resource.

Aboriginal rock alignments are ubiquitous throughout the Desert West (cf. Muir, 1894; Rudy, 1953; Wetherill, 1954; Heizer and Baumhoff, 1962; Matley and Turner, 1967; Rogers, 1966; Nissen, 1974, 1982; Sullivan, 1974; Thomas and McKee, 1974; Wallace, 1976; see also references in Brook, 1980, table 2). These features commonly lack clear-cut associations, making them difficult to analyze. The serious study of such satellite facilities has lagged behind that of easier-to-interpret lithic scatters and rock art locations.

THE NATURAL SETTING

The Fort Sage Drift Fence, located at an elevation of 1555 m. (5100 ft.), is within the Reno Floristic Zone (Cronquist et al., 1972, pp. 82, 90-91). In general, this long, narrow area which extends parallel to the Sierra Nevada, is characterized by relatively high rainfall. The southern portion of the Reno Floristic Zone is dominated by a piñon-juniper woodland. But the Truckee River marks the northern boundary of piñon in the western Great Basin, and piñon is thus absent from the Fort Sage area.

The local climate is heavily influenced by an orographic effect induced by the high mountains to the west. Most precipitation

occurs in winter and spring, although summer thunderstorms occasionally increase the available moisture.

The Fort Sage Drift Fence lies within the closed drainage basin of Dry Valley. The walls are constructed on low alluvial hills, underlain by basalt bedrock (Gianella, 1957).

The present vegetation in the Fort Sage area is sparse, but the ground cover was probably more extensive in prehistoric times. The Bureau of Land Management conducted a plant survey of a protected study area of Dry Valley, and these data provide the best estimate of the precontact environment (Pardee Bardwell, personal commun.).

Local native grasses, known to ripen in late summer and spring, include *Agropyron spicatum* (bearded blue bunch wheat grass), *Oryzopsis hymenoides* (Indian rice grass), *Sitanion hystrix* (bottlebrush squirrel tail), *Stipa* spp. (needle and thread grass), and *Poa* spp. (bluegrass).

Native forbs found in the area include *Wyethia* spp. (mule ears), *Lupinus* spp. (lupine and bluebonnets), and *Lygodesmia* spp. (skeleton weed). Browse cover, usually ripening in late summer and fall, includes the rabbitbrushes (*Chrysothamnus viscidiflorus* and *C. nauseosus*), *Purshia tridentata* (antelope bitterbrush), *Artemisia tridentata* (big sage), *Ephedra* spp. (Mormon tea), *Prunus andersoni* (desert peach), *Eriogonum* spp. (buckwheat), *Tetradymia canescens* (gray horsebrush), and *Ribes* spp. (gooseberry). A sparse juniper cover also occurs in the area.

Contemporary and prehistoric artiodactyl distributions in the Fort Sage area are discussed below.

HISTORIC OR PREHISTORIC FEATURE?

The most difficult task in studying rock alignments is to determine when the facility was constructed. There is, at present, no fool-proof method for resolving the historic/prehistoric problem, and we are forced to approach it with a less than satisfying argument by elimination.

When we first saw the rock walls at Fort Sage, we suspected that construction dated

from the historic period (although we now think otherwise). These walls are larger and more carefully constructed than any of the aboriginal walls we have studied elsewhere in the Great Basin.

There has been plenty of historic era activity in the vicinity. The site is named for Fort Sage, a military garrison used by troops patrolling the Reno-Ft. Bidwell road in the early 1870s (Jocelyn, 1953; Ruhlen, 1964, p. 51; see also Pendleton, McLane, and Thomas, 1982). Crumbling rock foundations, probably the ruins of Fort Sage, are visible near Miller Spring, approximately 5 km. southwest of Wa3030.¹

Ranching operations have been conducted for years at Newcombe Lake, a playa roughly 2 km. north of the drift fence; but there is no evidence that livestock-raising activities had anything to do with either constructing or embellishing the rock wall.

Today, the Winnemucca Ranch runs cattle in the area. Thinking that the rock walls might be of use for herding cattle or perhaps for rounding up horses, we questioned Mr. and Mrs. W. Dalton La Rue, Sr. (present owners of the Winnemucca Ranch) and Mr. Bill Stewart (former ranch foreman), asking whether they had any clue to the function of the rock walls. Stewart first saw the Fort Sage rock alignments in 1956, but he could not

identify any possible modern function. La Rue also denied using the walls in his cattle operation.

As discussed below, intensive surface collection at the Fort Sage Drift Fence revealed a total absence of historic debris in the immediate vicinity of the rock walls: no fence posts, no baling wire, no nails, no historic debris at all. The relatively high density of prehistoric aboriginal material, coupled with the lack of any obvious historic function, leads us to conclude that the wall was both constructed and utilized during prehistoric times. We will proceed to develop our most probable interpretation of the Fort Sage site, relying on this assumption as a baseline.

THE ABORIGINAL SETTING

Fort Sage is situated near the boundary between two Northern Paiute bands (the *Wada* and *Tasiget*), not far from the Northern Paiute/Washoe interface (d'Azevedo, n.d.). Specifically, Stewart (1939, p. 138) places the Fort Sage area within the territory of the *Tasiget tuviwarai* ("the between dwellers"). This aboriginal territory was centered in Winnemucca Valley, but Stewart notes that band identity in this area was relatively indistinct, perhaps due to the incorporation of individual bands into the Pyramid Lake Reservation during the nineteenth century.

Early explorers estimated *Tasiget* group size to be between 200–300 individuals, ranging over an area of about 2600 sq. km. (Stewart, 1939, p. 138). Winnemucca Valley, Spanish Springs Valley, and the lower Truckee Meadows seem to provide the most secure resource base within the *Tasiget* extended range.

¹ The precise location of Fort Sage is uncertain. Jocelyn (1953) and Ruhlen (1964) place it in Washoe County, Nevada. W. Dalton La Rue, however, suggests that it was in California; he believes that the rock foundations at Miller Spring were built by a Mexican landholder who purchased the property in the 1880s (personal communication.).

THE ARCHAEOLOGICAL RECORD

We learned of the Fort Sage Drift Fence when Brian Hatoff showed us photographs and a sketch map he had prepared of the site. We first saw the massive walls themselves in 1980, when we photographed the site from the air, as part of a fly-over of the entire Carson City District. We returned to the site several times in 1981 and 1982 in order to study the facility in detail. The wall configurations were mapped using a plane table and alidade (see fig. 1), and the area was then intensively surveyed for archaeological remains in a series of systematic transects. The crew walked shoulder to shoulder, covering an area of 25 m. on each side of the wall. The drift fence contains several distinct breaks, and these areas were surveyed by transects extending at least 50 m. north and south of the wall axis. All artifacts were collected and piece plotted; chippage was also collected, and distinct concentrations were plotted on the site map. The artifacts have been catalogued into the American Museum of Natural History system, and are currently stored at that institution.

THE WALLS

The Fort Sage Drift Fence site consists of five separate rock alignments spanning nearly 1800 m. The walls are separated by three drainages and extend across three low hills. In addition to the wall complex a rock-shelter/overlook (locus 12) and a quarry (locus 13) are situated nearby on the east and west sides, respectively, of an unnamed drainage to Newcombe Lake, which is some 1900 m. north of the walls (see fig. 7).

The rock walls, varying in height between 20 and 80 cm., are constructed of medium-sized boulders.

The easternmost wall complex (Walls I–III) consists of two long curving wing walls built on both sides of a canyon and a short wall on the western plateau overlooking the canyon.

Wall III, the easternmost extension of the site, consists of a 46 m. rock wall that curves from its southernmost point at the eastern canyon rim, down the canyon slope to the northwest, ending on the canyon floor. An

11 m. gap (break 1) separates Wall III from Wall II at the floor of the canyon (fig. 2).

Wall II has its southernmost point on the western canyon rim. It follows the slope of the canyon for 33 m. in a northeasterly direction, ending on the canyon floor (fig. 2).

The two wing walls, together with a small lithic scatter located in the break between the walls, constitute locus 4 (see table 1 for the distribution of artifacts). Another small lithic scatter, located some 100 m. down the canyon to the south on the west slope of the canyon, is locus 5 (loci are mapped on fig. 7).

Wall I was constructed on the western plateau, overlooking the canyon. It is 59 m. long, with a 1.5 m. gap (break 3) 31 m. east of the western end of the wall (see fig. 3).

Two large lithic scatters were collected from either end of the wall. Locus 3 is a large lithic scatter in a 45 m. wide area which separates Wall I from the canyon (break 2). Locus 1 is a dense lithic scatter due north of Wall I. Locus 11 is an extensive midden site, some 150 m. northwest of Wall I; it may be part of locus 1. The designation "locus 2" was applied to the artifacts directly associated with the wall—that is, all artifacts within the north/south survey areas.

Wall IV starts 250 m. west of Wall I, on the other side of an unnamed drainage from Newcombe Lake (break 4). Wall IV, overlooking a dry spring, is, perhaps, the best constructed of all the walls (see fig. 4). It is the highest (80 cm.) and it covers a 170 m. distance along a low hill. Three small breaks divide the wall: break 5 is 5 m. wide, starting 17 m. from the eastern end of the wall; break 6 begins 55 m. west of break 5, and it is 2 m. wide; break 7 starts 15 m. west of break 6, and it is 6 m. wide.

Several lithic scatters were collected from the north side of Wall IV. The most extensive, locus 6, is approximately 25 m. in diameter, and starts about 3 m. north of the wall. A smaller lithic scatter, locus 7, is adjacent to and northeast of locus 6, due north of break 7. Locus 7, which may be part of locus 6, is 30 m. in diameter.

A 290 m. break (break 8) separates Wall IV from Wall V to the west. The area between

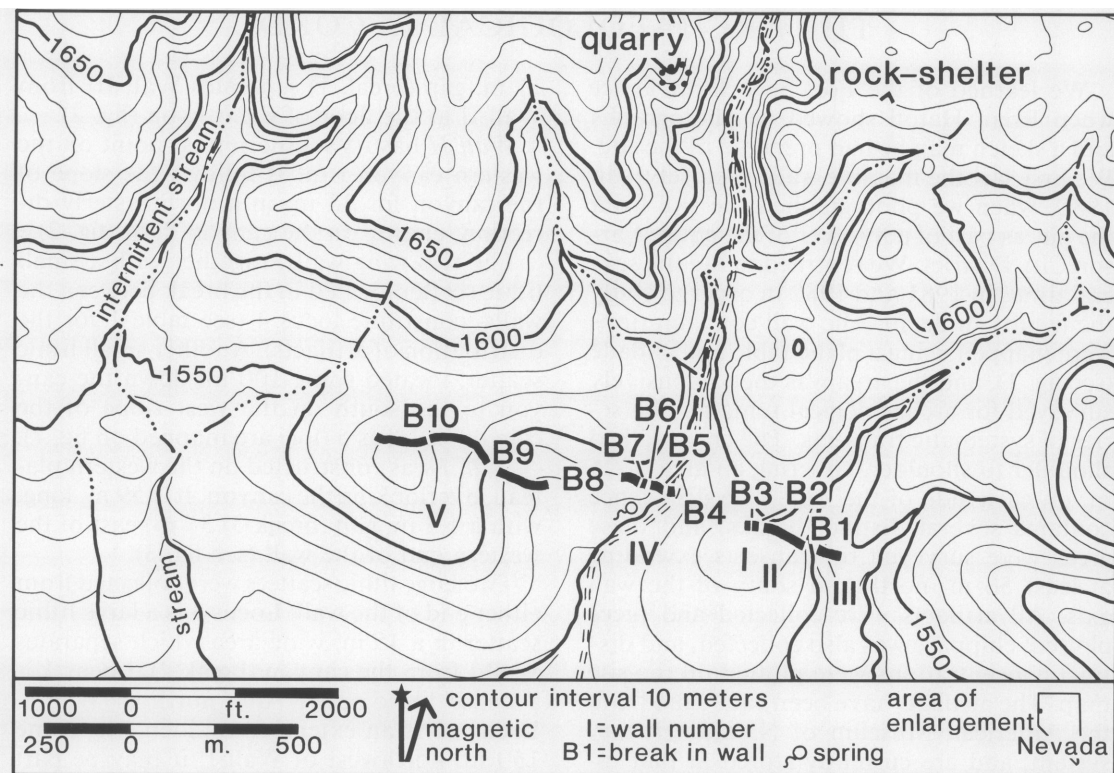


FIG. 1. Locator map of the Fort Sage Drift Fence, with detail of the breaks between the walls.

the walls spans a shallow drainage, which contains a small lithic scatter, locus 9.

Wall V (fig. 5) is the westernmost extension of the Fort Sage alignment. It is the longest wall, running about 500 m. with a 25 m. break (break 9) at 160 m. west and a 2 m. break (break 10) at 348 m. west. Artifacts along Wall V (locus 10) were extremely sparse.

PROJECTILE POINTS

Fifteen typable projectile points were recovered from the Fort Sage site (see table 2 and fig. 6). The points were categorized by the Monitor Valley typology (Thomas, 1981a). Nine of the points fit the Monitor Valley key. One side-notched point which did not fit the key (fig. 6o), appears similar to Riddell's (1956, Pl. 1, no. 35) type 9, a type absent from central Nevada (Thomas, 1981a, in press c). Five leaf-shaped points are larger than the Cottonwood Leaf-shaped type, and thus are also untypable by the Monitor Valley

criteria. Definition of terms used in this lithic analysis can be found in Binford (1963), Crabtree (1972) and Thomas (1981a, in press a).

The Fort Sage area has been severely vandalized, and this meager sample does not necessarily reflect an accurate point distribution at the site. These points do, however, span the entire Holocene period, suggesting a lengthy usage of the area.

Humboldt series points are notable by their absence, which is particularly curious in light of their frequency at similar sites elsewhere in Nevada (Thomas, in press b). Either Humboldt series points were not used at this site, or they may have been collected previously; they are reported for the area, and several have been observed in local collections. Humboldt series points are also absent from the Tommy Tucker Cave collection nearby (Fenenga and Riddell, 1949; Riddell, 1956); however, they were found at Karlo (Riddell, 1960a, pl. 2B). Elsewhere (Pendleton, 1979,

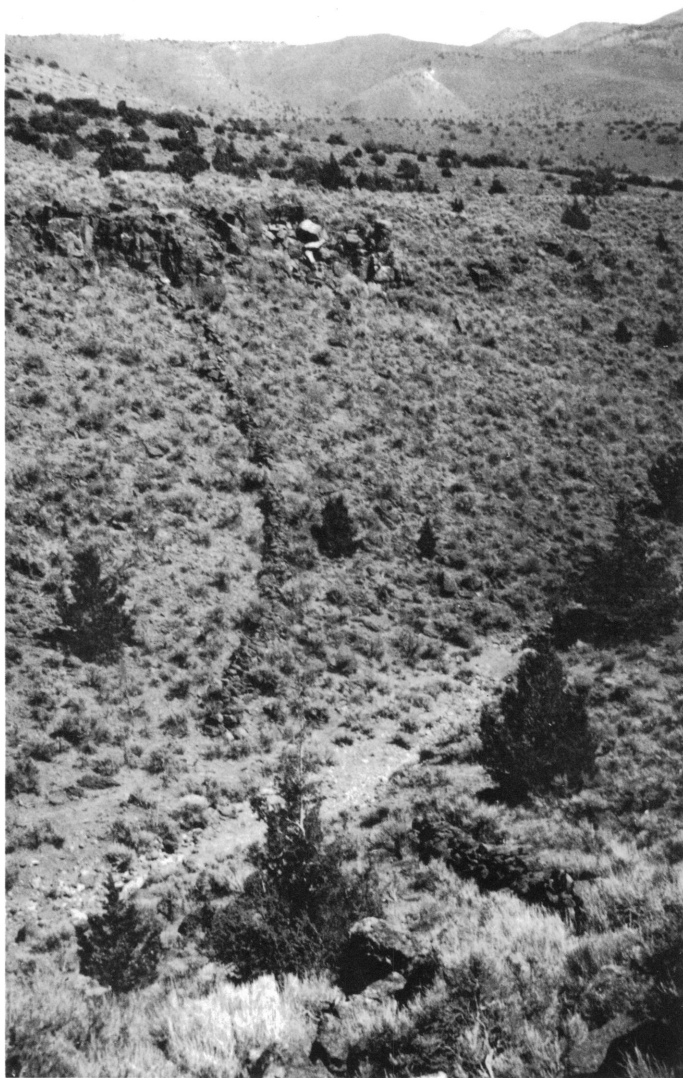


FIG. 2. Wing walls (II and III) at Fort Sage, facing south.

1982, in press) one of us has suggested that concave base points may be a relatively conservative functional category of projectile point/knife, and they are known to occur with some frequency at hunting locations (Thomas, 1981a).

GATECLIFF SERIES

Three Gatecliff series points were recovered (fig. 6g-i). The Gatecliff series (var-

iously called Pinto, Martis, Gypsum Cave, etc.) spans the interval between 3000 B.C. and 1300 B.C. at several sites, most notably Gatecliff Shelter (Thomas, 1981a, in press a), Hidden Cave (Thomas 1982a; Pendleton, 1982), and Kramer Cave (Hattori, 1982). Similar points were also recovered from excavations at Karlo, near Fort Sage, where they date to the Karlo Period (2000-400 B.C.: Riddell, 1960a, pp. 19, 91-92).



FIG. 3. Break in Wall I (facing south).

PROVENIENCE: Locus 3, 2; locus 9, 1.

TYPES: Gatecliff Contracting Stem, 2; Gatecliff Split Stem, 1.

MATERIALS: Basalt, 2; obsidian, 1.

DIMENSIONS: See table 2.

CONDITION: Whole, 2; perverse fracture (recovered), 1.

PLAN VIEW: Triangular blade margins; shoulders generally slope upward, with DSA greater than 180° . Bases are slightly constricting, with PSA less than 90° . The contracting stem points have flat to rounded bases, with LA/LM ratios of 1.0. The split stem point has a concave base with an LA/LM ratio of 0.94.

LONGITUDINAL SECTION: Plano-convex.

CROSS SECTION: Plano-convex, 1; lenticular, 2.

FLAKE SCAR PATTERN: Random pressure, 1; double oblique, 2.

FLAKE SCAR MORPHOLOGY: Thin overlapping pressure flakes which do not carry to the midline. The basalt points appear to be dou-

ble oblique flaked, although it is difficult to observe details on basalt.

ELKO SERIES

Three Elko Corner-notched points were recovered (fig. 6d-f). Elko series points have been found at dozens of sites in the vicinity of Fort Sage, including Karlo, 26Wa1016, the Pyramid Lake Shaman burial, the Towne and Thompson sites in the Steamboat Hills, and at the Hallelujah Junction complex (Pendleton, McLane, and Thomas, 1982). Elko points are generally dated between 1000 B.C. and A.D. 500 (O'Connell, 1967; Bettinger and Taylor, 1974; Heizer and Hester, 1978; Thomas, 1981a, in press a).

PROVENIENCE: Locus 1, 2; locus 11, 1.

MATERIALS: Obsidian, 2; basalt, 1.

DIMENSIONS: See table 2.

CONDITION: Broken, 3. All three points were broken by end shock fractures, presumably from impact.



FIG. 4. Aerial view of Wall IV at Fort Sage; note the intentional breaks.

PLAN VIEW: Blade margins are triangular; one point has been resharpened at least once and may have been used as a drill (fig. 6d). Shoulders are straight ($DSA \bar{X} = 182^\circ$). Basal margins are expanding ($PSA \bar{X} = 127^\circ$), leading to flat bases ($LA/LM = 1.0$).

LONGITUDINAL SECTION: Tending toward ovate, thickest over the shoulder.

CROSS SECTION: Ovate, 2; plano-convex, 1.

FLAKE SCAR PATTERN: Obscured.

FLAKE SCAR MORPHOLOGY: Obscured.

ROSEGATE SERIES

Two Rosegate series points were recovered (fig. 6b, c). The Rosegate series dates between A.D. 500 and A.D. 1300 (Thomas, 1981a). Similar points were recovered at a number of nearby sites including the Spanish Springs Canyon excavations, Black Springs, and the Hallelujah Junction sites (summarized in Pendleton, McLane, and Thomas, 1982), as

well as from sites throughout central Nevada and eastern California.

PROVENIENCE: Locus 1, 1; locus 3, 1.

MATERIALS: Obsidian, 1; chert, 1.

DIMENSIONS: See table 2.

CONDITION: Whole, 1; broken, 1. The fracture is an end shock, probably from impact.

PLAN VIEW: These small points (weight less than 2.0 grams) have triangular blade margins. The shoulders, which slope downward ($DSA \bar{X} = 145^\circ$), are notched and lead to slightly flared, rounded bases ($PSA \bar{X} = 103^\circ$; $LA/LM = 1.0$).

LONGITUDINAL SECTION: Plano-convex.

CROSS SECTION: Plano-convex.

FLAKE SCAR PATTERN: Generally random pressure, limited to the margins of the ventral face on 20.5/1555 (fig. 6b).

FLAKE SCAR MORPHOLOGY: Overlapping pressure; shoulders are formed by small pressure flakes. One shoulder of 20.5/1601 appears to have been dulled by haft wear. The

TABLE 1
Proveniences of Stone Artifacts from Fort Sage

| Type | n | Locus | | | | | | | | | | |
|---------------------------------|----|-------|---|---|---|---|---|---|---|---|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| PROJECTILE POINTS | | | | | | | | | | | | |
| Gatecliff Series | 3 | — | — | 2 | — | — | — | — | — | 1 | — | — |
| Elko Series | 3 | 2 | — | — | — | — | — | — | — | — | — | 1 |
| Rosegate Series | 2 | 1 | — | 1 | — | — | — | — | — | — | — | — |
| Cottonwood | 1 | — | — | — | — | 1 | — | — | — | — | — | — |
| Side-notched | 1 | 1 | — | — | — | — | — | — | — | — | — | — |
| Leaf-shaped | 5 | 1 | — | — | — | — | — | 1 | — | 2 | — | 1 |
| Fragments | 16 | 7 | — | 4 | — | — | 2 | — | — | 2 | 1 | — |
| BIFACES | | | | | | | | | | | | |
| Roughouts | 1 | 1 | — | — | — | — | — | — | — | — | — | — |
| Rough Percussion Blanks | 2 | — | — | 2 | — | — | — | — | — | — | — | — |
| Fine Percussion Blanks | 6 | 2 | — | 2 | — | — | — | — | 1 | — | 1 | — |
| Pressure Flaked Bifaces | 12 | 6 | — | 2 | — | — | 2 | 1 | — | 1 | — | — |
| ADDITIONAL BIFACIAL TOOLS | | | | | | | | | | | | |
| Retouched Flakes | 3 | 1 | — | 1 | — | — | — | — | — | 1 | — | — |
| Bifacial Core (Tools?) | 3 | — | — | — | — | — | 3 | — | — | — | — | — |
| PERFORATOR | 1 | — | — | 1 | — | — | — | — | — | — | — | — |
| GRAVERS | 5 | 1 | — | 2 | 2 | — | — | — | — | — | — | — |
| HAMMERSTONE | 1 | 1 | — | — | — | — | — | — | — | — | — | — |
| UNIFACES | | | | | | | | | | | | |
| Endscrapers | 10 | — | — | 5 | 3 | 1 | 1 | — | — | — | — | — |
| Unifacial Retouch/Unifacial Use | 9 | 1 | — | 5 | — | — | 2 | — | 1 | — | — | — |
| Unifacial Retouch/Bifacial Use | 4 | 1 | — | — | — | — | 3 | — | — | — | — | — |
| UTILIZED FLAKES | | | | | | | | | | | | |
| Unifacial | 8 | 2 | — | 2 | 2 | — | — | — | 1 | 1 | — | — |
| Bifacial | 9 | 3 | — | 4 | 1 | — | — | — | — | 1 | — | — |
| Bilateral | 2 | 2 | — | — | — | — | — | — | — | — | — | — |
| Unifacial/Bifacial | 2 | 2 | — | — | — | — | — | — | — | — | — | — |
| UNIFACIAL CORE (TOOLS?) | 7 | — | — | 1 | — | — | 3 | 1 | — | 1 | 1 | — |
| GROUND STONE | 4 | 2 | — | 1 | — | — | 1 | — | — | — | — | — |

flake ridges on the face between the shoulders are considerably more smoothed and polished than the flake ridges on the blade.

COTTONWOOD TRIANGULAR

One Cottonwood triangular point (fig. 6a) was recovered from the open site southwest of the wing walls (locus 5). Cottonwood points date to the protohistoric period (Lanning, 1963; Thomas, 1981a), and they have been recovered from surface sites throughout Washoe County (Pendleton, McLane, and Thomas, 1982, table 3): several occurred in stratified deposits at Hallelujah Junction (Elston, 1979).

MATERIAL: Chert.

DIMENSIONS: See table 2.

CONDITION: Tip broken by an impact fracture.

PLAN VIEW: Triangular point with a flat, straight base WB/WM = 1.0; LA/LM = 1.0).

LONGITUDINAL SECTION: Lenticular.

CROSS SECTION: Lenticular.

FLAKE SCAR PATTERN: Obscured.

FLAKE SCAR MORPHOLOGY: Obscured.

The margins of the point are lightly dulled, which could have resulted from projectile point wear, or resharpening preparation.

SIDE-NOTCHED POINT

One basalt side-notched point (fig. 6o), collected from locus 1, was untypable by the Monitor Valley criteria. Although most of its attributes classify it as a Desert Side-notched



FIG. 5. Aerial view of Wall V at Fort Sage.

point (see table 2), it is not triangular since it has a WB/WM ratio of 0.87, barely excluding it from the Desert Side-notched category (WB/WM greater than 0.90). The point is similar to Riddell's type 9h at Karlo (see Riddell, 1960a, fig. 7).

PROVENIENCE: Locus 1.

MATERIAL: Basalt.

DIMENSIONS: See table 2.

CONDITION: Whole.

PLAN VIEW: Triangular blade with high, shallowly notched shoulders. The basal margins are flared, leading to a rounded base (LA/LM = 1.0).

LONGITUDINAL SECTION: Concavo-convex.

CROSS SECTION: Concavo-convex.

FLAKE SCAR PATTERN: Obscured.

FLAKE SCAR MORPHOLOGY: Obscured.

LEAF-SHAPED POINTS

Five leaf-shaped points were collected. Leaf-shaped points are ubiquitous in north-

ern Washoe County, clustering around the Reno area where the larger varieties have been dated to *ca.* 1500 B.C. (Elko/Gatecliff times). They are rare in Owens Valley to the south, and to the north in Surprise Valley and in the High Rock Country (Thomas, *in press c*).

These points exceed the size range of the Monitor Valley criteria, but they are somewhat smaller than most leaf-shaped points from the Reno area.

PROVENIENCE: Locus 11, 1; locus 9, 2; locus 7, 1; locus 1, 1.

MATERIALS: Chert, 2; obsidian, 3.

DIMENSIONS: See table 2.

CONDITION: Whole, 4; end shock (cause undetermined), 1.

PLAN VIEW: Lanceolate, leaf-shaped points with slightly contracting bases (WB/WM \bar{X} = 0.61). The points are widest below the midpoint (MWP \bar{X} = 42%).

LONGITUDINAL SECTION: Asymmetrically concavo-convex, thickest over the base.

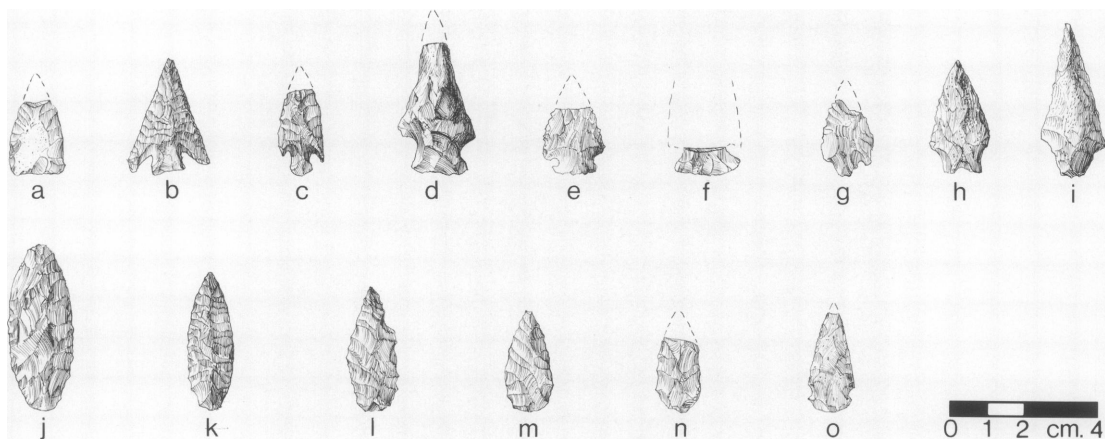


FIG. 6. Projectile points from the Fort Sage Drift Fence. a. Cottonwood Triangular; b–c. Rosegate series; d–f. Elko Corner-notched; g–i. Gatecliff series; j–n. leaf-shaped points; o. side-notched point. a. 20.5/1574; b. 20.5/1555; c. 20.5/1601; d. 20.5/1539; e. 20.5/1631; f. 20.5/1562; g. 20.5/1630; h. 20.5/1520; i. 20.5/1506; j. 20.5/1627; k. 20.5/1504; l. 20.5/1505; m. 20.5/1624; n. 20.5/1561; o. 20.5/1560.

CROSS SECTION: Ovate, 4; plano-convex, 1.

FLAKE SCAR PATTERN: Diagonal parallel pressure flaking, down to the right.

FLAKE SCAR MORPHOLOGY: Diagonal ribbon pressure, somewhat overlapping the midline.

PROJECTILE POINT FRAGMENTS

TIPS

NUMBER OF SPECIMENS: 6.

PROVENIENCE: Locus 1, 5; locus 3, 1.

MATERIAL: Obsidian, 3; chert, 3.

FRACTURES: Impact fractures, 4 (all hinged end-shocks); perverse fractures, 2 (probably occurred during resharpening).

MIDSECTIONS

NUMBER OF SPECIMENS: 8.

PROVENIENCE: Locus 1, 2; locus 3, 1; locus 6, 2; locus 9, 2; locus 10, 1.

MATERIALS: Chert 6; obsidian 2.

FRACTURES: Impact, 6; possible manufacturing, 2. Four of the midsections are from corner-notched points, with distal shoulder angles ranging between 150° and 190°. One of the points may be a Rosegate, another appears to be an Elko, and the last two seem to be Gatecliff series points.

BASES

NUMBER OF SPECIMENS: 2.

PROVENIENCE: Locus 3.

MATERIALS: Obsidian, 1; chert, 1.

FRACTURES: Unknown. Both bases appear to be from Elko Eared points.

BIFACES

Fort Sage bifacial lithic analysis follows Muto's (1971) biface production continuum model (also see Womack, 1977 and Thomas, in press a). We have divided the bifacial tools into production stages based on their relative degree of finish (e.g., rough percussion blanks, fine percussion blanks, pressure flaked bifaces, etc.). Pressure flaked bifaces are distinguished from projectile point fragments on the basis of size and symmetry. The bifaces have a maximum width greater than 25.0 mm., whereas the projectile point widths were generally less than 20.0 mm.

ROUGHOUTS

Roughouts are bifacially worked tools that contain relatively high proportions of cortex or inclusions. This is an initial biface trimming stage in which the shape of the finished tool is not yet clear.

TABLE 2
Fort Sage Drift Fence Projectile Points

| Specimen Number | Locus | Type | Length | | Width | | Width | | Thickness (mm.) | Weight | | DSA | PSA | Material |
|-----------------|-------|------|------------|-------------|------------|------------|-------------|-------------|-----------------|---------------|-------|-----|-----|----------|
| | | | Max. (mm.) | Axial (mm.) | Max. (mm.) | Neck (mm.) | Basal (mm.) | Actual (g.) | | Estimate (g.) | | | | |
| 20.5/1504 | 11 | LSP | 35.6 | 35.6 | 12.3 | — | 6.5 | 2.4 | 5.8 | 2.4 | 2.4 | — | — | Obsidian |
| 20.5/1505 | 9 | LSP | 31.8 | 31.8 | 13.5 | — | 8.3 | 1.8 | 4.9 | 1.8 | 1.8 | — | — | Obsidian |
| 20.5/1506 | 9 | GCS | 38.9 | 38.9 | 16.9 | 10.2 | 6.9 | 3.2 | 6.8 | 3.2 | 3.2 | 190 | 65 | Basalt |
| 20.5/1520 | 3 | GSS | 28.6 | 27.0 | 16.4 | 10.6 | 9.2 | 1.9 | 4.4 | 1.9 | 1.9 | 190 | 70 | Basalt |
| 20.5/1539 | 1 | ECN | (45.5) | (45.5) | 19.9 | 10.7 | 13.9 | 4.8 | 8.2 | 4.8 | (5.5) | 195 | 120 | Basalt |
| 20.5/1555 | 1 | RS | 29.9 | 29.9 | 21.1 | 7.0 | 8.2 | 1.5 | 3.2 | 1.5 | 1.5 | 140 | 110 | Chert |
| 20.5/1560 | 1 | SNS | 25.8 | 25.8 | 11.9 | 8.7 | 10.3 | 0.9 | 2.4 | 0.9 | 0.9 | 220 | 145 | Basalt |
| 20.5/1561 | 1 | LSP | (26.5) | (26.5) | 11.3 | — | 6.5 | 1.0 | 3.7 | 1.0 | (1.5) | — | — | Obsidian |
| 20.5/1562 | 1 | ECN | — | — | — | — | — | — | — | — | — | — | 130 | Obsidian |
| 20.5/1574 | 5 | CT | (27.0) | (27.0) | 14.9 | — | 13.9 | 1.1 | 3.3 | 1.1 | (1.4) | — | — | Chert |
| 20.5/1601 | 3 | RS | (28.5) | (28.5) | (12.5) | 4.7 | (6.0) | 1.0 | 3.7 | 1.0 | (1.5) | — | — | Obsidian |
| 20.5/1624 | 7 | LSP | 25.1 | 25.1 | 13.2 | — | 10.9 | 1.2 | 4.4 | 1.2 | 1.2 | — | — | (Chert) |
| 20.5/1627 | 9 | LSP | 43.5 | 43.5 | 16.8 | — | 8.5 | 5.7 | 6.9 | 5.7 | 5.7 | — | — | Chert |
| 20.5/1630 | 3 | GCS | (20.0) | (20.0) | 13.3 | 5.6 | 3.5 | 0.7 | 3.8 | 0.7 | (1.0) | 140 | 70 | Obsidian |
| 20.5/1631 | 11 | ECN | (25.0) | (25.0) | 15.9 | 8.5 | 10.3 | 1.0 | 3.7 | 1.0 | (1.5) | 170 | 130 | Obsidian |

NUMBER OF SPECIMENS: 1.

PROVENIENCE: Locus 1.

MATERIAL: Basalt.

CONDITION: Broken by end-shock fracture during manufacturing.

PLAN VIEW: Margins asymmetrically bi-convex; end has a shallow concavity.

LONGITUDINAL SECTION: Markedly sinuous and biconvex.

CROSS SECTION: Biplano.

FLAKE SCAR PATTERN: Highly irregular, covering the entire ventral face, but restricted to the margins of the dorsal face.

FLAKE SCAR MORPHOLOGY: Deep expanding flakes with deep negative bulbs. Flake scars are somewhat overlapping; margins are stepped and crushed from impact scars.

CORTEX: Present, in the center of the dorsal face.

This roughout appears to have been manufactured from a split basalt cobble. The size of the primary flake scars suggests that re-workable flakes were detached by percussion, perhaps for projectile point or scraper blanks. A basalt hammerstone was found nearby.

ROUGH PERCUSSION BLANKS

Rough percussion blanks are thinner and more symmetrical than roughouts; they bear clear indications of becoming bifaces or projectile points. All the cortex has been trimmed, but the margins are still quite sinuous.

NUMBER OF SPECIMENS: 2.

PROVENIENCE: Locus 3.

MATERIALS: Chert.

CONDITION: Both broken by perverse manufacturing fractures; both appear to be bases.

PLAN VIEW: Still asymmetrical in outline, but the concavo-convex margins appear more regular than in the previous stage.

LONGITUDINAL SECTION: Quite sinuous; thinning was unsuccessful, leaving an inclusion on the surface of 20.5/1530. The thickness/width ratio appears to exceed that for roughouts, but the sample is extremely small.

CROSS SECTION: Ovate; apparently, the thinning was unsuccessful leaving thick ovate cross sections, and it may have caused the breaks.

FLAKE SCAR PATTERN: Random.

FLAKE SCAR MORPHOLOGY: Fairly deep, expanding, irregular flake scars which are

slightly overlapping. Although flake scars are shallower than in the previous stage, we cannot determine the relative hardness of the hammerstone.

FINE PERCUSSION BLANKS

Fine percussion blanks have generally well-shaped symmetrical outlines, with straight to excurvate margins. Although none of the blanks are pressure flaked, the overlapping percussion flakes are patterned.

NUMBER OF SPECIMENS: 6.

PROVENIENCE: Locus 1, 2; locus 3, 2; locus 8, 1; locus 10, 1.

MATERIAL: Chert.

CONDITION: Bases, 3; midsections, 1; tips, 2. All appear to be the result of manufacturing fractures. Five of the bifaces broke from end-shocks; one has a perverse fracture, with the impact point visible on the margin.

PLAN VIEW: Bases are rounded, margins are straight, and the tips are fairly pointed. The form is generally symmetrical and slightly bi-convex. The outline tends toward teardrop shape, expanding toward the base.

LONGITUDINAL SECTION: Ovate to slightly triangular; margins are sinuous, but much straighter than in the previous stage.

FLAKE SCAR MORPHOLOGY: Shallow, wide overlapping flake scars, which may have been produced by a soft hammer billet. Flake terminations feather; relatively few are hinged or stepped.

Fine percussion blanks are considerably thinner and lighter than rough percussion blanks. They are finished with a high degree of regularity. The pressure flaking pattern is set up in this stage.

PRESSURE FLAKED BIFACES

Although these bifaces were shaped by pressure flaking, the final form is still to be defined (although they could certainly have been used as is).

NUMBER OF SPECIMENS: 12.

PROVENIENCE: Locus 1, 6; locus 3, 2; locus 6, 2; locus 7, 1; locus 9, 1.

MATERIALS: Chert, 9; obsidian, 3.

CONDITION: Tips, 3; midsections, 5; bases, 3; other, 1. The unclassifiable specimen is an asymmetrical pressure flaked biface with the

appearance of a crescent (Great Basin Transverse series). Most of the bifaces have perverse manufacturing fractures, the type most common to pressure work.

PLAN VIEW: The margins are symmetrical and biconvex. The bases are rounded and the tips are pointed, but not sharp. The midsections are fairly straight, tapering at the ends.

LOGITUDINAL SECTION: Biplano to concavo-convex.

CROSS SECTION: Plano-convex, 5; lenticular, 3; ovate, 2; concavo-convex, 2.

FLAKE SCAR PATTERN: Random, 9; overlapping diagonal parallel, 3.

FLAKE SCAR MORPHOLOGY: Some soft hammer work is evident on five of the fragments; it is obliterated on eight. Pressure scars are wide and overlapping; the bifaces could have used more thin pressure work.

ADDITIONAL BIFACIAL TOOLS²

BIFACIALLY RETOUCED FLAKES

Three chert flakes have been bifacially retouched along one margin. Use wear was noted on one flake, consisting of unifacial nibbling on the margin opposite the retouch.

BIFACIAL CORE TOOLS

Three core tools in the collection are made from bifacially trimmed cobbles of basalt, rhyolite, and chert. The cobbles are trimmed by hard hammer flakes, generally oriented toward the center of the core. All three have biconvex cross sections, forming a double-saucer profile. Two of the cobbles are naturally backed by cortex, and the use wear is restricted to the margin opposite the backing. Use wear generally consists of heavily crushed margins, somewhat rounded and quite stepped—similar to the use wear on hammerstones. The implements may have been used as hammerstones or choppers, but were probably just cores.

PERFORATOR

Artifact 20.5/1610 appears to be a perforator: the tip is more triangular than that of a

drill, and longer than that of a graver. The perforator was manufactured from a chert flake which had been unifacially pressure retouched into a long (11.7 mm.), sharp tip. The base of the leaf-shaped flake comfortably fits the hand. The ventral tip margin is dulled and rounded, with an edge angle of 60°.

PROVENIENCE: Locus 3.

GRAVERS

Five flake graters were made by unifacial or bilateral retouch into fine tips. All the tips appear slightly worn, but the primary wear is restricted to the adjacent margins. Four of the graters are made from chert, one from obsidian.

PROVENIENCE: Locus 1, 1; locus 3, 2; locus 4, 2.

HAMMERSTONE

One basalt hammerstone was recovered from locus 1. It is a naturally angular, somewhat bifacial basalt cobble, with extensive battering along one margin. The angularity of the cobble forms a natural backing which fits comfortably into the hand. Most of the step scars cluster on one face, but slightly overlap the margin. The hammerstone appears to have been held with the fingers, somewhat loosely in the palm; it was probably swung, with most of the movement in the wrist, toward a cobble held free in the other hand.

UNIFACIAL TOOLS

Although we view functional schemes with some skepticism (particularly for surface artifacts) we have used the same conservative functional approach as that for Hidden Cave materials (Pendleton, 1982, pp. 511–514). The categories that apply to unifaces include:

CUTTING: Bifacial or bilateral use wear on one or both margins. Use wear is restricted to the area immediately adjacent to the margin.

SCRAPING: Unifacial or bilateral wear on discrete margin elements.

GRAVING: Limited to tips or edge protrusions; wear is unifacial, adjacent to the tip.

Unifacial tools were initially categorized by the position of retouch or use; functional

² See table 1 for provenience data.

connotations were secondary (see table 1 for distributional data).

RETOUCHED FLAKES

UNIFACIAL RETOUCH, UNIFACIAL USE WEAR: In addition to the core tools (see following discussion), 19 flakes were unifacially retouched; use wear is concentrated on the retouched face. Ten of the flakes are endscrapers: elongated flakes on which one end has been retouched into a semicircle. The bulk of use wear on the endscrapers is clustered on this rounded margin; wear is generally unifacial, although some overlaps the margin. The wear patterns include non-overlapping nibbles and some step and scalar scars.

One endscraper is made from obsidian, the remainder are chert. Edge angles generally range between 70° and 85°; one has an edge angle of 55°. The spine plane angles (or angle of retouch) cluster around 65°; one endscraper has a 35° spine plane angle. Such angles are directly affected by resharpening, increasing with repeated resharpening.

One endscraper appears to have several graver tips, similar to those described on endscrapers from widely distributed contexts (Judge, 1968; Nissen and Dittmore, 1974; Wilmsen, 1968), but closer examination suggests that these "tips" are actually remnants of resharpening flakes. Apparently the endscraper was abandoned after it was resharpened. The flake ridges from the non-overlapping resharpening flakes are unworn, giving the appearance of tips.

The remainder of the 19 flakes have been retouched along one lateral margin. Two of the flakes are basalt, one is obsidian, and six are chert.

The use wear on eight of the flakes is restricted to the retouched margin; one, however, has been utilized on three margins. Use wear varies between light scalar wear and nibbling, which may have resulted from scraping soft, fibrous or hide materials (Tringham et al., 1974). Again, caution is required for functional interpretations in surface assemblages.

The wear on four additional flakes overlaps both margins. The bilateral wear may have resulted from cutting.

UTILIZED FLAKES

As with all surface artifacts, analysis of use wear on the Fort Sage materials showed it to be somewhat erratic. Delicate use wear, e.g., polish and striations, is obliterated by surface erosion. Use wear analysis of surface materials is biased towards heavier tasks. Nevertheless, we examined every flake microscopically, using a Bausch and Lomb binocular microscope from 7× to 30×. We noted placement of edge damage, the edge angle, and the direction of the use wear. We were *extremely* conservative in assigning a flake to the utilized category, realizing full well the potential of natural processes for causing non-cultural "utilization" of surface artifacts (see table 1 for distribution data).

UNIFACIAL USE: Eight chert flakes were unifacially utilized; five on one margin, the other three on both lateral margins. Edge angles tend to cluster tightly around $54^\circ \pm 13^\circ$. Five of the eight flakes are modified by nibbling oriented perpendicular to the margin, which may have resulted from scraping in a forward direction away from the user's body, probably on some fairly soft material. Two of the flakes have slanted, irregular scalar scars, often associated with medium to hard scraping. The flake ridges of many of the scalar scars are abraded. One flake is surrounded on three sides by obliquely oriented trapezoidal scars. Tringham et al. (1974) suggest this wear pattern may derive from cutting, rather than scraping.

BIFACIAL USE: Nine chert flakes were bifacially utilized, with mean edge angles of $52^\circ \pm 14^\circ$. The use-wear scars alternate along the margin; Tringham et al. (1974, p. 188, fig. 17) suggest this pattern can only be derived from a longitudinal cutting motion. Small nibbling and scalar scars constituted the bulk of the wear which probably resulted from cutting soft materials such as meat and hide.

BILATERAL USE: Two chert flakes were used bilaterally; that is, unifacially on opposite faces of two lateral margins. The edge angles averaged $45^\circ \pm 5^\circ$. Three margins have oblique scalar wear, probably from scraping some medium hard material like wood. One margin has a trapezoidal pattern, commonly

produced by whittling wood (Tringham et al., 1974, p. 191).

UNIFACIAL/BIFACIAL USE: Two chert flakes were utilized on both lateral margins; one shows dorsal wear, the other margin has bifacial wear. The edge angles averaged $45^\circ \pm 5^\circ$. All appear to have been utilized to cut and scrape a soft to medium hard material, e.g., wood.

UNIFACIAL CORES

Seven unifacial cores were collected (see table 1 for distribution data). The cores are made from split cobbles, one hemisphere forming a platform for unifacial trimming. Three cores are basalt, four are made from chert. Four of the seven retain cortex.

The cobbles were trimmed in one of two ways: several were trimmed on one end, retaining the cortex on the other end, which then served as a natural backing, producing a comfortable platform for a hand-held scraper plane. In the second technique the core was trimmed in a 360° circle, producing a small domed scraper.

Wear patterns on the cores are erratic, and could as easily have come from flake detachment as from use. But the edge angles of the scraper planes are about 80° , whereas domed scrapers usually have edge angles of over 100° , suggesting that some of the cores may have been used.

GROUND STONE

Four ground stone fragments were recorded at loci 1, 3, and 6. Metate fragments from loci 3 and 6 were not collected. The metates were imbedded in the soil matrix; each had one smooth, slightly dished surface which had been resharpened by pecking. The fragments were of a porphyritic material.

A mano fragment was recovered from locus 1. It was made from a very dense material which had been flaked and pecked into an oval breadloaf shape. One face was polished, with visible striae. This face had been resharpened; striae and polish covered the pecking.

One very small metate or "palette" was recovered from locus 1. It is made of a red

tuff or scoria. One face is dished, with heavy polish in the concavity. It may have been used as a small mortar, perhaps for paint.

LOCI

It was apparent from various pothunter debris that we were not the first group to collect the sites. Therefore, our artifact summary may not reflect the former site structure.

LOCUS 1

This is an 800 sq. m. lithic scatter that runs from 10 m. to approximately 50 m. northwest of Wall I. It is situated on a shallow alluvial slope, approximately 100 m. east of Wall IV (see fig. 7). A buried midden site (locus 11) is due north, upslope from locus 1; it is possible that locus 1 has eroded from locus 11.

Locus 1 artifacts were primarily concentrated in the northwest section of the scatter, 20 m. northwest of the wall. Although the chippage was fairly dense over the entire locus, it seemed most heavily concentrated in two areas. The first concentration was a 100 sq. m. area, 10 m. west and 10 m. north of the wall; in addition to the chippage, it contained two utilized flakes and a hammerstone. The second concentration was a 25 sq. m. area, located 10 m. west and 45 m. north of the wall; in addition to the chippage, four utilized flakes were collected from this concentration.

Two Elko Corner-notched point fragments (fig. 6d, f), one Rosegate (fig. 6b), one leaf-shaped (fig. 6n), and one side-notched point—probably Desert Side-notched (fig. 6o)—were collected from locus 1.

Based on projectile point data, this site seems to have been utilized from approximately 1000 B.C. into historic times.

Table 1 gives the overall artifact frequency for locus 1, and some observations can be drawn from these data. Although scant, the assemblage suggests that this site was used for several tasks, including hunting, seed processing, and other general utility work such as scraping, graving, and cutting. The hammerstone and biface production sequence, from roughout through pressure flaked bi-

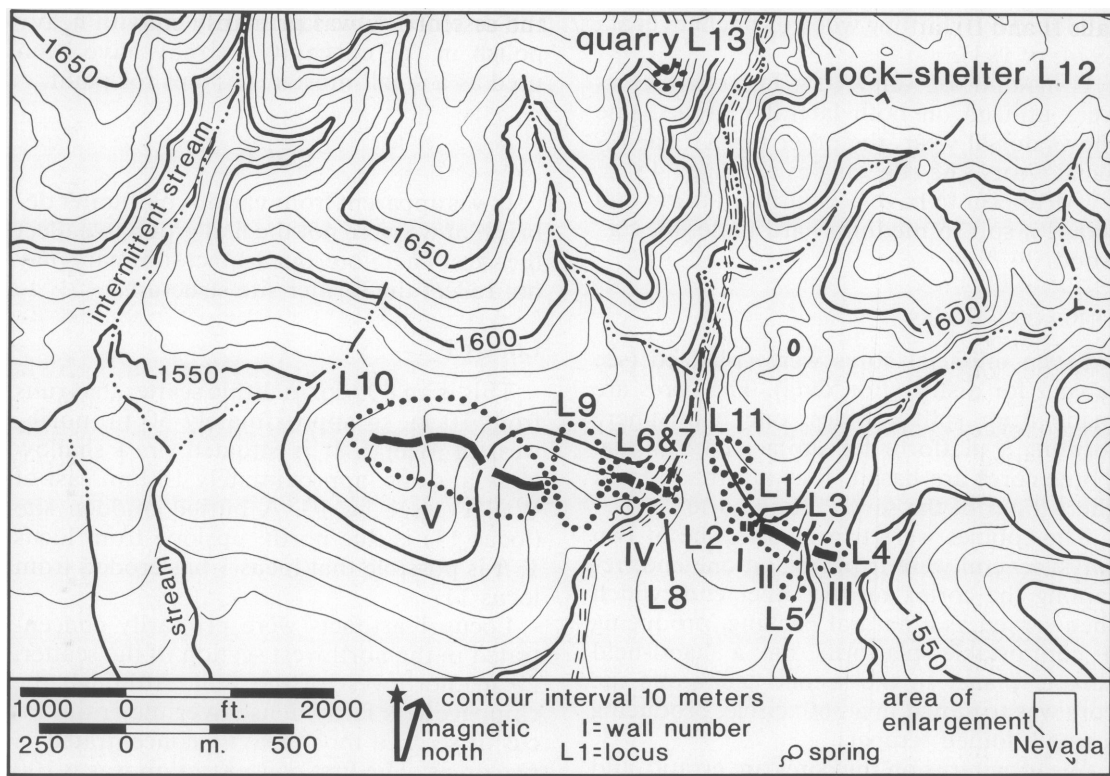


FIG. 7. Locator map of the Fort Sage Drift Fence, showing individual artifact loci.

faces, suggests secondary tool manufacture may have taken place at the site. Curiously, no cores or core tools were collected, which suggests that primary manufacture did not occur here.

The chippage is 70 percent chert—roughly two-thirds shatter, and the rest flakes. Several chert flakes retained cortex, and about 10 pieces of shatter were large—perhaps primary debitage. The flakes present a rather different picture from the tools. It appears that primary manufacture, in the form of chert cobble reduction, took place near the Fort Sage facility. About 25 percent of the chert flakes were of medium size, adequate for reworking into a variety of tools. But most of the flakes resulted from minor retouch, probably for tool repair. With the exception of one basalt biface, the bifaces and retouched flakes were made from chert.

Three percent of the debitage were small obsidian flakes. Obsidian tools were restricted to projectile points and fragments; the

points seem to have been manufactured elsewhere, and merely repaired on the site.

Twenty-six percent of the debitage and 11 percent of the tools from this locus were made from basalt. Since basalt debitage was relatively large, we suspect that there is a local source nearby. The basalt hammerstone found here was bifacially resharpened; several cortex flakes, which would have come from its manufacture, were also collected. Two of the projectile points from the site were made from basalt, and much of the debitage could have been produced in projectile point manufacture as well as resharpening. Most of the basalt flakes were tool-size, therefore it is surprising that so few tools at this site were made from that material. Chert is more easily flaked than basalt, and this, together with its local abundance, probably explains the higher percentage of chert tools and debitage.

Rhyolite constitutes only 1 percent of the debitage material. All five flakes are quite large (\bar{X} wt. = 3 grams).

LOCUS 2

Locus 2 consists of the debris directly associated with Wall I. It was collected by intensive transects extending 25 m. north of the wall (concentration D), 25 m. south of the wall (concentration B), and a 50 m. transect north and south of the break in the wall (concentration C).

Concentration D held one finely retouched gold chert domed scraper. The scraper was edge damaged with heavy unifacial step scarring on both ends; the method of manufacture has been described above. Seventeen fragments of chert debitage were also found distributed adjacent to the north side of the wall.

The assemblage from the south side of the wall was even more sparse than that on the north side, containing only three pieces of chert shatter, two of which had some cortex.

We expected to find hunting losses on one or both sides of the break, but this was not the case. No artifacts were found on either side of the break. However, five pieces of debitage, including one pressure flake, were collected.

No patterns were apparent from the sparse artifact assemblage associated with the wall. The heavier concentrations were on the north side, but even these were meager. The artifacts offer no clues to the function of Wall I.

LOCUS 3

Locus 3 is due east of Wall I, covering the entire plateau between Wall I and the Wing Walls II and III in the canyon below.

The lithic scatter runs about 60 m. north and 10 m. south of the wall. The artifacts were primarily concentrated in a 50 sq. m. area, about 50 m. due north of the wall. That area also contains one of the two densest chippage concentrations at this locale.

Diagnostic artifacts from this portion of the site comprise two Gatecliff series points (fig. 6g, h), one Rosegate series point (fig. 6c), and two ear fragments from what appear to have been Elko points.

These points suggest an earlier occupation than at locus 1. But, considering the obvious lack of integrity in the assemblage, this re-

mains little more than a casual observation. Nevertheless, the point sequence suggests utilization of this area from 3000 B.C., until perhaps A.D. 1300.

Table 1 lists the overall artifact frequency, and some interesting differences emerge between this assemblage and that at locus 1.

The projectile points found at locus 3 are earlier, fewer, and less diverse. Point fragments are also rare, although the two assemblages contain approximately the same number of artifacts.

Locus 3 has a higher proportion of end-scrapers and other unifacial tools than locus 1, which has a higher proportion of bifacial tools, particularly projectile point fragments and pressure flaked bifaces.

No hammerstones were collected from locus 3, although the chippage totals are about the same at both loci.

Eighty-eight percent of the chippage was chert—somewhat more shatter than flakes. The chert debitage was generally small (\bar{X} wt. = 1.6 grams), in fact only three of the 438 chert flakes weighed over 3 grams. Most of the flakes appear to come from biface thinning (possibly soft hammer), and small pressure retouch. Relatively little chert cortex was collected.

Three of the 35 basalt flakes had some cortex. Basalt constituted 7 percent of the debitage from the site and only 5 percent (2) of the tools.

Sixty-six percent of the points and point fragments were made from obsidian; 20 percent of the artifact assemblage was obsidian. Several obsidian cortex flakes were collected, indicating that obsidian was transported to the site as cobbles. Most obsidian debitage resulted from pressure retouch.

The tools at locus 3 comprise a relatively diverse lot: cutters, graters, scrapers, perforators, hunting tools, and one metate. This could suggest the site was used as a base camp, but the assemblage diversity might also be explainable by its relatively large size.

LOCUS 4

Locus 4 consists of the lithic debris directly associated with the Fort Sage wing walls. It was derived from 25 m. transects north and

south of Walls II and III, and 50 m. transects north and south of the gap at the constriction of the wings in the canyon bottom (see fig. 7).

This locale produced an extremely sparse assemblage. One bifacial tool, apparently used as a graver or perforator, was found along the north side of Wall II, along with one chert flake.

An endscraper and seven chert flakes were found along the south side of Wall II. Not so much as a flake was recovered from either side of Wall III.

The canyon bottom (break 1) contained a sparse lithic scatter consisting of one small basalt flake, 18 relatively small chert flakes (\bar{X} wt. = 1.8 grams); and 14 rather large pieces of chert shatter (\bar{X} wt. = 6.5 grams). In addition, a flake cutter, two retouched end-scrapers, an obsidian graver, and two other utilized flakes were collected from the canyon bottom.

It is conceivable that all the artifacts from locus 4 could have washed down from locus 3. This possibility is suggested as much by the paucity of the assemblage as by the absence of any artifacts at Wall III across the canyon.

LOCUS 5

Locus 5 is an extremely sparse lithic scatter, some 100 m. due south of Wing Wall II (see fig. 7).

The site consists of a chert Cottonwood point (fig. 6a), a chert endscraper, and 13 pieces of chippage (one small obsidian cortex flake and 12 chert flakes from at least five different cobbles).

The assemblage could perhaps reflect a single-episode task site: a lone hunter waiting to intercept game transiting the canyon. The wing walls are visible from this spot, which is somewhat elevated from the canyon floor.

LOCI 6 AND 7

Loci 6 and 7 seem to be parts of the same lithic scatter, and are combined for this discussion. Locus 6 consists of all materials collected from the north side of Wall IV, and locus 7 was collected from the north side of

break 7. The assemblage was primarily concentrated at a spot 127 m. west of the east end of the wall (fig. 7); the entire wall is 170 m. long, and break 7 is about 100 m. west of the east end of the wall.

Locus 6 is a 600 sq. m. lithic scatter, beginning about 3 m. north of the wall. Locus 7 is a 900 sq. m. scatter, beginning at 30 m. north of the wall.

No diagnostic artifacts were collected from either locus. One point fragment may possibly be part of a Gatecliff series point; the other point is leaf-shaped.

This assemblage differs in several ways from those previously described. Thirty-eight percent of the tools are basalt, a much higher percentage than found at loci 1 or 3 (11% and 5%). In addition, six of the 10 cores/core tools from the Fort Sage assemblage were found at loci 6 and 7. Of the core tools from these loci, all but one were made from basalt. The high percentage of basalt core tools is not reflected in the chippage (only 16% basalt). Two retouched scrapers were also made from basalt.

The only obsidian artifacts at these loci were two pressure flaked biface fragments, both apparently broken during resharping. Four obsidian flakes were found near the biface fragments, and they all resulted from biface repair.

The assemblage from loci 6 and 7 is relatively homogeneous: five point and biface fragments, six cores/core tools, and six large retouched flakes used primarily for scraping. One large ground stone fragment from this concentration was left in place. Steward (1934, p. 437) notes that temporary camps were occasionally selected because metates had been left there as site furniture. The debitage recovered here could easily have resulted from boredom reduction activities by a lone hunter positioned at a game lookout.

LOCUS 8

Locus 8 comprises artifacts and chippage from the south side of Wall IV: a biface (which may have a manufacturing break), a retouched cortex flake, and another cortex flake with a slight amount of edge damage (possibly used for scraping). In addition, eight pieces of chippage were recovered, two basalt and six chert.

LOCUS 9

Locus 9 is situated in the 290 m. long break (break 8) separating Walls IV and V. This expanse contains a shallow drainage flanked on both sides by low hills, on which the walls are built.

Locus 9 may offer a clue to the function of the surrounding walls. The assemblage consists of five projectile points and fragments, three utilized flakes—two bifacially utilized, perhaps for cutting, and one unifacially utilized, probably for scraping. In addition, one small domed core was found. Two of the points are probably Gatecliff or Elko fragments. The unbroken points are Gatecliff Contracting Stem and leaf shaped.

The chippage consists of 33 pieces of debitage, which constitute only 77 percent of the assemblage. All previously discussed loci, with the exception of locus 4 (another hunting spot), contained well over 90 percent chippage.

It is possible that the area between Walls IV and V was used to channel game toward hunters concealed behind Wall IV. The high percentage of points (50% of the artifacts, 12% of the assemblage) probably resulted from hunting losses. All points had been finished prior to loss, and all of the fractures were apparently from impact.

LOCUS 10

Locus 10 consists of artifacts collected from the comprehensive survey of Wall V, including the breaks. The meager assemblage consists of a point fragment (possibly an Elko or Gatecliff series), and a domed core; 23 pieces of debitage constituted 89 percent of the entire assemblage. No concentrations were noted.

The lack of debitage and artifacts may suggest that this wall was used as a barricade to channel game down the draw to the east where they would run past concealed hunters—possibly positioned at Wall IV to the northeast.

Wall V, 500 m. long, is the longest alignment, yet it contains only two small breaks. It appears to have been built as a solid obstruction to prevent game from running over the flank of the hill down into the open valley. It would have served to funnel the game from the hill toward the draw.

LOCUS 11

Locus 11 is the buried midden site northwest of Wall I. No systematic collection was made at this locale, but we did recover a small obsidian Elko Corner-notched point (fig. 6e), and an obsidian leaf-shaped point (fig. 6k) from the surface near the middle of the midden.

The midden is at least 50 cm. deep, and offers great interpretive potential for the site. However, our comments at this point must be restricted to surface observations.

Chippage and artifacts littered the surface in small concentrations. Several ground stone fragments were observed nearby. It may be that locus 1 is a washout from this midden site directly to the north; but the clustering of artifacts at locus 1 seems to suggest otherwise.

On our second trip to Fort Sage (in the summer of 1982) we noted that the midden had been penetrated by a 1 m. \times 2 m. rectangular pothole. The vandalism appeared to be about six months old. The site is seriously threatened, and protective measures should be taken either to preserve or scientifically excavate the midden.

LOCUS 12

Locus 12 is a rock-shelter, about 1100 m. north of the walls, in an unnamed canyon on the way to Newcombe Lake. The shelter is situated on the east side of the canyon facing southwest.

The rock-shelter once contained about a meter of deposit, apparently stratified, but this site has been completely destroyed by pothunters who screened the deposits, leaving behind a sizable backdirt pile as well as their screens.

Quantities of perishables and bone were observed in the backdirt. Several bone samples were collected and sent to the American Museum for analysis; they have been identified as antelope.

We noted other pothunter "rejects" including 20 or 30 large biface blanks broken in various stages of manufacture. An abundance of chippage and about a dozen ground stone fragments lay about the site.

The rock-shelter might have offered the potential for dating the occupation, and could

probably have provided additional clues about the prehistoric use of the area. Its current scientific value is probably nil. Some data could be gleaned from excavating the back-dirt, but it may not be worth the effort.

LOCUS 13

Locus 13 is a quarry directly across the canyon from the rock-shelter. Literally a hill of chippage, the site seems to have resulted

from reduction of locally available float chert cobbles.

It appears that this "quarry" was used as an extensive rough reduction site; although we noted numerous flakes, the vast majority of debris was simply chert shatter. The area offers an overlook from which the entire valley is visible. We could not see the walls from this spot but had an excellent view up the canyon for several hundred meters and down the canyon to the valley south of the walls.

INTERPRETING THE FORT SAGE ALIGNMENTS

Interpretation of facilities such as Fort Sage is hampered by the lack of precise associations. Although we cannot provide a crisp chronology for the construction of the rock feature, we think the evidence strongly points toward a prehistoric construction date. Simply put, there is ample evidence of prehistoric usage, and a total lack of such evidence for the historic period.

Functional interpretations are also impeded by the poor quality of associational data. We will pursue the only line of investigation presently available: to marshal the relevant mid-range theory, and then offer what we consider to be the most probable interpretation of the Fort Sage facility (for a discussion of the concept of the "most probable interpretation," see Thomas, in press a, chap. 20). The following analysis necessarily de-emphasizes the specific behaviors involved at Fort Sage, emphasizing instead the probable strategy behind the construction of the wall, and the way in which that strategy articulated with the more general, systemic aspects of prehistoric Great Basin hunter-gatherer lifeways.

GREAT BASIN HUNTING PATTERNS

Lewis Binford (especially 1978, p. 169) has distinguished between two fundamentally distinct hunting strategies, a dichotomy that has proved useful in analyzing the archaeological record in other parts of the Great Basin (Thomas, 1983, in press a).

Encounter strategy hunting is best suited for vast areas in which the game is relatively sparse, dispersed, and unpredictable. It is basically a saturation strategy, covering as wide an area as possible, with a relatively low probability of success in any given spot.

By contrast, *intercept strategy hunting* exploits specific areas of biogeographic circumscription, ambushing relatively large numbers of individuals agglomerated in a predictable pattern of seasonal density.

The fundamental contrast is between extensive and intensive coverage, between chance kills and predictable group ambushes.

Because of this difference, the artificial enabling facilities (*sensu* Wagner, 1960) constructed for each strategy are rather different.

An intercept strategy is best implemented at established, commonly reused locales. The successful intercept strategy hunt begins with the monitoring of game movements (both by long-distance observation and on-the-ground tracking); it then channels the agglomerated game toward prearranged areas of intercept, where the ambush actually occurs. Successful intercept strategy hunts produce a high-bulk protein source, in turn requiring the hunters to solve problems of transport and/or storage.

Because of their strategic implications, intercept strategy facilities have certain key characteristics: "ready access to a game lookout, a funneling factor to increase game density temporarily and artificially, and a change of pace factor to assist the hunter in temporarily modifying the herd's ability to flee" (Thomas, 1983; see also Binford, 1978). Sometimes the landscape is so structured that no artificial modifications are required. In other cases, enabling facilities must be constructed.

Although intercept facilities need not always be permanent, the relatively expensive, long-term hunting facilities—rock blinds, stone cairns, rock walls, and corrals—are almost exclusively associated with an intercept strategy.

There is, in fact, a clear-cut and relatively constant relationship between the cost of a given facility and the long-term benefits of its usage: high-cost facilities will be constructed only where game is at least seasonally (1) abundant, (2) predictable, and (3) relatively easy to ambush. The acceptable construction costs of an ambush facility drop off in proportion to (1) lower game densities, (2) lessened game predictability, and (3) increasing difficulty of ambush. This pattern is pervasive among aboriginal inhabitants of the northern two-thirds of North America (Driver and Massey, 1957, p. 191), and throughout temperate and high latitude areas of the world as well.

There can be no question that the Fort Sage Drift Fence is a costly, labor-intensive structure. Assuming that construction occurred prehistorically, we suppose further that the Fort Sage rock alignments produced a sufficiently high bulk, predictable, easy to procure return to justify initial construction (and probable upkeep) costs.

BUT WHAT ANIMALS WERE BEING PROCURED?

It is necessary at this point to examine the relevant biogeographic data to determine the most probable prey species involved at the Fort Sage facility.

Only three primary game animals seem likely for the Holocene period in the Fort Sage area: bighorn sheep (*Ovis canadensis*), pronghorn antelope (*Antilocapra americana*), and mule deer (*Odocoileus hemionus hemionus*). Wapiti (*Cervus canadensis nelsoni*) is an unlikely long-shot (see Grayson, 1982).

BIGHORN SHEEP: Generally considered to be mountain dwellers, bighorn are today restricted to upland habitats with ample escape cover (McQuivey, 1978; see also Thomas, 1983, chap. 4). There is, however, some question as to how much this behavior is an adaptation to (and a result of) historic hunting pressures; it is true, for instance, that John C. Frémont sighted bighorn in the lowlands at Pyramid Lake not far east of the Fort Sage Drift Fence (Nevins, 1956, p. 339). Lacking sufficient evidence to the contrary, we have no choice but to follow the uniformitarian assumption regarding bighorn behavior.

Bighorn behavior varies greatly, even within the Great Basin proper (McQuivey, 1978). Although herd composition and seasonal migration patterns are heavily water-conditioned to the south, water is only minimally involved in determining bighorn movements in the central and western Great Basin.

Higher latitude bighorn groups commonly split into bachelor and nursery herds during the summer months, and these animals drift into the highest portion of the annual range at this time. A single herd generally forms once again in the early fall, prior to the rut. The first heavy snowfall usually forces the bighorn to lower elevations, the herds once

again splitting into bachelor and nursery groups. Because of the spatial circumscription of late fall/winter resources, bighorn sometimes reach rather high local population densities while in winter range.

These biogeographic preconditions suggest something about the hunting strategies available for bighorn procurement. The summer dispersal pattern is best exploited on an individual, low-density intercept strategy, commonly conducted in the higher reaches of bighorn habitat (Thomas, 1982b, 1983).

Conversely, fall and winter is a time of relatively dense bighorn herds in the lower, most restricted portion of their range. McQuivey (personal commun.) suggests that the winter provides the most efficacious time for hunting larger concentrations of bighorn.

Bighorn do not live today in the Fort Sage area, but finds of bighorn bones on Dogskin Mountain, Tule Peak, and Pyramid Lake suggest that mountain sheep may once have been well distributed throughout this area (Jim Jeffries, personal commun.). Bighorn also have been sighted crossing lowland valleys between the major ranges of the area (Nevins, 1956; Jim Jeffries, personal commun.).

If the Fort Sage Drift Fence was used for bighorn procurement, this high density intercept strategy probably would have occurred during the fall/winter, after snow had forced the herds from the higher mountains. The Fort Sage facility would have functioned well in this situation, since it straddles a traditional bighorn migration route (during recent time, at least). Bighorn generally approach the drift fence from the west, heading toward their winter habitat in the Virginia Range, to the east.

Several spring-fed canyons and ample forage are available on the low hills around Fort Sage, increasing the potential of this valley as a bridging zone between the two 2300 m. high ranges to the west and east. Bighorn feed on several plants found in the vicinity of the Fort Sage rock alignments. Sagebrush commonly constitutes 5 to 10 percent of the bighorn diet. Wheat grass comprises another 5 to 10 percent, whereas other species such as needle grass, buckwheat, rice grass, and rabbitbrush are ingested in minor quantities. All of these resources would have been available for bighorn in the Fort Sage area during the

fall and winter months (Martin, Zin, and Nelson, 1961, p. 276).

There is little question that the Fort Sage Drift Fence could have been an effective facility for procuring bighorn, especially after they began to drift down from the higher elevations (i.e., during the late fall and early winter). Both the timing of this movement and the routes of travel are, to some degree, predictable; as noted above, herd densities also tend to be the greatest during this time of year. Fall/winter intercept strategy hunting of bighorn is well-documented for the protohistoric Great Basin (e.g., Muir, 1894, p. 322; Steward, 1938, p. 66; 1941, pp. 272–273; Stewart, 1941, p. 423; see also Thomas, 1983, chap. 4).

Details of such intercept hunting vary, of course, with the local topographic situation, but one common tactic was construction of artificial walls both to funnel herds and to conceal hunters in ambush (e.g., Frison, 1978, pp. 257–260). The Fort Sage feature could readily have operated in this manner; Wall V (fig. 1) is one such guiding structure, generally following the contours of the hillside.

The Fort Sage wing walls (structures II and III) are rather similar to the bighorn facilities observed on Mount Grant, in the Wassuk Range (Muir, 1894, p. 322). In that case, a series of guiding walls channeled game into an ambush enclosure. Despite Steward's (1941, p. 220) often cited argument that enclosures, traps, nets, and snares were ineffective for bighorn, Muir's observations leave little doubt that such facilities could have been, at least on occasion, employed for bighorn procurement in the protohistoric Great Basin.

By contrast, the Fort Sage feature would have been relatively ineffective for hunting bighorn during the spring and summer. Movements during these seasons tend to be short-term and relatively unpredictable; during the summer, bighorn generally follow only diurnal shifts for forage and water. Herd densities are low, bighorn being generally dispersed throughout the higher elevations.

DEER: The contemporary Fort Sage habitat is ideally suited for deer, and a rather large number of deer inhabit the surrounding open country, browsing and grazing on various grasses, forbs, and other plants.

Despite the modern abundance of deer throughout the Great Basin, there is mounting evidence that deer were considerably less common during the prehistoric period (Durrant, 1952; Jennings, 1957; Thomas, 1970, 1983; see also Pippin, 1979). Deer adapt well to the increasingly overgrazed grasslands of the Great Basin (Wagner, 1978, pp. 125–126), and reconstructions of prehistoric hunting behavior based on contemporary deer abundances and migrations must be viewed with considerable suspicion.

As Frison (1978, p. 271) has noted, deer are relatively easy to hunt, sometimes displaying the fatal trait of running only a short distance when frightened then stopping to see what was chasing them. Because of their generally solitary behavior deer are best exploited throughout the year on an encounter basis. Like bighorn, deer tend to spend summers at higher elevations, moving into the lower valleys only after the first snowfall in the high country.

Today, the Fort Sage area is winter range for thousands of deer: "A sizable portion of the deer herd is known to pass into the Fort Sage Mountain and Red Rock areas, thence eastward into Nevada" (Leach, 1956, p. 262). They follow a well-documented "deer corridor" through the immediate Fort Sage area in the late fall and early winter (Jim Jeffries, personal commun.).

Because fall migrations follow rather traditional routes, there is perhaps some advantage to a fall/early winter intercept hunt (although the potential yield is considerably less than for bighorn). Accounts of such protohistoric deer hunting strategies are common in the ethnographic literature of the Great Basin (e.g., Dixon, 1905, pp. 192–193; Steward, 1933, p. 353; 1938, pp. 36, 53, 66; 1943, p. 359).

One of Kelly's (1932, p. 82) Surprise Valley Paiute informants, for instance, described a temporary hunting facility used to procure deer: "Deer have a road; they go south for the winter. My father had a place on a rock butte at the head of Buck Canyon. He made a brush fence running downhill from each side of the butte where he left an open place like a gateway. He hid in a hole about ten feet from the road, and as the deer came

through the gate, he shot. He killed one every night."

Except for the use of perishable construction materials, this description could easily refer to the strategy behind the wing walls at Fort Sage. This account is also useful because it points out how relatively small scale artificial structures could function in encounter strategy hunting. More permanent deer procurement facilities are also described for the High Plains (e.g., Frison, 1978, p. 50; Keyser, 1974).

ANTELOPE: Summer antelope herds in northeastern Nevada commonly number 20 or more individuals (Hall, 1946, p. 629); but during winter, herds can be as large as 200 or 300 individuals. Not strictly migratory, antelope do move *en masse* to lower elevations in the winter, traveling along definite, well-established routes (McLean, 1944, p. 221; Hall, 1946, p. 63).

Although antelope herds have increased in many parts of the Great Basin during recent years, it is probably true that antelope have been abundant in these areas throughout the Holocene (Yoakum, 1980). The archaeological data support this contention, indicating that antelope may have been an important prey species, well represented in the prehistoric archaeological record (e.g., Jennings, 1957; Thomas, 1970; see also Riddell, 1960a, p. 84). Wagner (1978, p. 134) suggests that antelope may have been the most abundant, most important game animal in prehistoric times.

The population density of antelope in the immediate Fort Sage area today may be somewhat lower than in the recent past, but there is reason to believe that the seasonal movements are similar. Migration seems to be restricted to the area between Dry Valley and Newcombe Lake. Today, 12 to 24 antelope occupy this area year round, and their seasonal movement is strictly elevational: valley to hills and back again, always in search of fresh forage.

Steward (1938, p. 33) argues that—with the exception of bison in parts of the eastern Basin—antelope were the only Great Basin game animals that could be profitably hunted on a communal basis (see also Thomas, 1983, chap. 4). Similarly, Frison (1978, p. 252) considers antelope to be among the easiest game

to hunt. They are gregarious, commonly forming large herds. Antelope are creatures of habit, appearing regularly at the same waterholes and, unlike deer, can be observed and stalked throughout the day. Antelope will not ordinarily jump even low fences, so they can be readily contained in rather low corrals and enclosures. Their attraction to strange noises and unfamiliar objects makes them susceptible to "charming" (Nelson, 1925, p. 5; Yoakum, 1980, p. 55).

Antelope can also be procured from time to time on an encounter basis. Antelope disguises were sometimes used for this purpose, and concealed hunters could occasionally wait in ambush at heavily frequented spots (e.g., Lowie, 1909; Kelly, 1932, p. 82; Steward, 1941, p. 219; 1943, p. 360; Gilmore, 1953, p. 149; Patterson, Ulph, and Goodwin, 1969, pp. 6–7; Frison, 1978, p. 252). Encounter hunting required no facilities as such, and could be pursued year round.

We know of no accounts of Great Basin peoples constructing permanent rock wall facilities for communal antelope hunting. During the protohistoric period, it seems that corrals and wing walls were made of only temporary construction materials, such as sagebrush or rabbitbrush, with humans sometimes filling gaps in the walls (e.g., Simpson, 1869, pp. 52–53; Egan, 1917, pp. 238–239; Kelly, 1932, pp. 83–85; Maule, 1938, p. 11; Steward, 1941, pp. 219–220; 1943, p. 359; Stewart, 1941, p. 422; Frison, 1978, pp. 252–255). Riddell (1960b, pp. 55–56) does, however, mention that semicircular corrals constructed by the Honey Lake Paiute—not far from Fort Sage—were made of braided sagebrush with a rock foundation. Similarly, Lowie (1924, p. 303) cites Sarah Winnemucca's account of a brush and rock corral.

But the fact remains that permanent antelope intercept facilities are conspicuously lacking during the historic and protohistoric periods in the Great Basin.

According to Jim Jeffries, Nevada Wildlife Biologist, the Fort Sage Drift Fence is a perfect place to ambush antelope. Drawing on his several years of experience in tracking antelope herds in this area, Jeffries (personal commun.) has observed that antelope commonly congregate during the late winter and

early spring on the lower alluvial fans, not far from the rock alignments. This low sage community offers a variety of forbs that are still green at this season of the year, providing a critical resource since the valley grasses have dried up by this time. Bitterbrush (often called antelope bitterbrush) provides additional winter browse.

Because the primary defense of antelope is their keen eyesight, their diurnal movements are in part conditioned by the nature of escape cover. The lower sage area provides unrestricted vistas of the surrounding terrain, and antelope frequent this area. Animals spooked while browsing in the relatively high bitterbrush tend to flee into the low sage community, relatively open country that offers a better view of potential predators.

Jeffries emphasizes that the Fort Sage Drift Fence is in the transitional zone between bitterbrush and low sage communities, an excellent strategic position for intercept hunting. Antelope in the bitterbrush association could easily be driven toward the walls (located as they are in the low sage country). Likewise, if antelope were grazing in the low sage, they could readily be driven toward the bitterbrush community. In either case, hunters concealed by the Fort Sage walls would have ample opportunity to ambush antelope through the various artificial breaks.

ARCHAEOLOGICAL CONSEQUENCES

Obviously the archaeological visibility of the various artiodactyl procurement strategies varies widely (Thomas, 1983).

Regardless of the prey species, encounter strategy hunting is almost invisible archaeologically, involving only a few hunters stalking relatively isolated game. The archaeological record of such activities can be expected to be little more than isolated hunting losses, and perhaps a few butchering implements discarded at the kill site. The bone assemblage of kills/butchering sites is highly distinctive (Binford, 1978), but these faunal remains rarely are preserved in the archaeological record (for an exception, see Thomas, *in press a*).

Intercept strategy hunting is considerably more visible (and hence subject to overemphasis in the archaeological literature). It var-

ies in scale from the solitary hunter waiting in ambush near a game trail to the concerted efforts of dozens (even hundreds) of people participating in a large-scale antelope drive. Because of this variability, it is useful to distinguish between kinds of intercept strategy hunting.

Low-density intercept hunting (Binford, 1978; Thomas, 1983, chap. 4) leaves evidence in the form of small rock blinds, occasional "boredom reducers" (such as retouch chippage scatters, whittling debris, and cached hobby items), and the occasional repair discard. This debris gradually accumulates as isolated hunters monitor diurnal game movements from the same blinds or natural overlooks.

The effort required to construct such facilities is in direct proportion to the probability of long-term hunting success from that locale. In the unusual case of adequate faunal preservation, one would expect to find almost exclusively low utility items at such sites (Binford, 1978).

Migration intercept hunting is more complex, depending in large measure on the prey species involved. Bighorn living in the northern Great Basin latitudes have more or less predictable seasonal movements, generally along traditional routes: "Because herds annually move from summer range in the high country to winter grounds on the valley floor, migration routes provided first-rate areas for migration intercept hunting. A series of hunting facilities should be located at intermediate elevations, some of which may have required considerable investment of labor: rock walls, blinds, perhaps corrals and even monitoring stations" (Thomas, 1983).

Deer were more commonly procured on an encounter basis, but if an intercept strategy was employed, the facilities would be similar to those used for bighorn. In fact, the same hunting facilities were commonly used to procure both species. Although we expect that bighorn were considerably more important than deer during the prehistoric period, the archaeological expectations are almost identical for both species (except, of course, the faunal remains *per se*).

Judging from protohistoric and ethnographic accounts, intercept procurement of antelope has a relatively low archaeological

visibility since known, documented antelope facilities were constructed of perishable materials.

But if the prehistoric pattern of antelope procurement was sufficiently successful to justify higher cost intercept facilities, then the visibility of antelope procurement would increase accordingly. In addition to game walls, corrals, and traps, one might also encounter one or more relatively large, yet temporary base camps near the kill site. Bones of higher utility parts would be expected at such sites; this may, in fact, be the case at the nearby Karlo site (Riddell, 1960a, p. 77). Game monitoring stations may also occasionally be visible, but there is no distinctive archaeological signature for such sites.

BEHAVIORAL CONTEXT OF THE FORT SAGE DRIFT FENCE

Elsewhere, one of us has considered the nature of subsistence and settlement strategies in the protohistoric Great Basin (Thomas, 1981b, 1983). Even holding the variables of time, environment, language, race, and culture relatively constant, there is a remarkable and unexplained degree of variability in subsistence strategy. That is, nearly the entire range of Binford's (1980) forager-collector continuum is represented in the protohistoric Great Basin—in a radius of less than 100 km.

This surprising variability in subsistence strategy cannot, at present, be explained by extant theories of hunter-gatherer dynamics. Assuming that the task of the contemporary archaeologist is to explain cultural differences and similarities, the study of synchronic variability in ecological strategies would seem to be one of the greatest challenges facing students of non-agricultural societies.

We are a long way from understanding the factors that foster adoption of various subsistence options. But it seems clear that the foraging option (*sensu* Binford, 1980) is commonly used to exploit relatively low-density resources distributed across widely spaced resource patches. Foragers solve problems of spatial incongruity by following a strategy of relatively high residential mobility, what Binford (1980) has termed a mapping-on strategy. In most cases, the costs of con-

structing expensive residential and extractive facilities are generally outweighed by the advantages of simply moving to new resource patches. Forager sites, in general, are characterized by low-cost facilities (Thomas, 1981b, 1983).

By contrast, collecting societies follow a strategy of minimal residential mobility, commonly transporting critical resources to consumers through a logistic network of specialized, short-term task groups. The collecting strategy is generally played out on landscapes with high density, high predictability resources. For the collector, it makes good cost/benefit sense to construct relatively permanent—and archaeologically visible—facilities for residence, maintenance, extraction, and storage.

The Fort Sage Drift Fence is unquestionably an expensive, labor-intensive facility. Given what we know about hunter-gatherer dynamics, one would suspect that this facility was constructed by logistically organized hunters. The obvious manpower investment at Fort Sage clearly implies that a sufficiently predictable and (in the long run) successful hunting strategy was employed there.

This does not mean, necessarily, that the group responsible for the Fort Sage Drift Fence must have been a full-blown collecting society. It is well-documented that single groups can seasonally (and annually) combine the mapping on and logistic options into a single, fission-fusion annual round (Thomas, 1981b, 1983). But if this were the case, the Fort Sage facility almost certainly fell within the logistic (fusion) segment of the annual cycle.

The Fort Sage rock alignments pose something of a problem in interpreting the archaeological record of the Great Basin. Although intercept hunting strategies are amply documented for the protohistoric period, few such hunts involved construction of permanent hunting facilities. This suggests that—at least during protohistoric times—artiodactyl procurement was either insufficiently productive, or insufficiently predictable, to have justified the high labor costs obviously invested in facilities such as the Fort Sage alignments. If this line of reasoning is correct, then it may be that the logistic strategy was more

important in the Great Basin during the prehistoric period than during the protohistoric period.

High-cost hunting facilities seem to be one of the few archaeological signatures distinguishing logistic from mapping-on strategies (Thomas, 1983). Thus, despite the inherent difficulties in interpreting such satellite features, they have excellent potential for shedding light on the strategic behavior of prehistoric hunter-gatherers.

THE CHRONOLOGY OF PERMANENT HUNTING FACILITIES

Previously, we have observed that the use of such high cost procurement facilities seems to diminish through time in the prehistoric Great Basin (Thomas, 1982b, in press b, in press c; Bettinger and Baumhoff, 1982, express a similar conclusion, but from a rather different epistemological perspective). Specifically, rock walls and well-constructed hunting blinds seem to be associated with time-markers diagnostic of the Middle Holocene and Early Neoglacial periods, i.e., between about 3000 and 1000 B.C.

In the attempt to refine and extend this empirical generalization, we have compiled the available data from various documented rock alignments in the central and western Great Basin (table 3). These data derive mainly from Heizer and Baumhoff (1962), Matley and Turner (1967), Thomas (1982b, in press b), and Pendleton, McLane, and Thomas (1982). Although the quality of documentation and reporting varies, these sources unquestionably contain the best information regarding associational contexts between drift fences, corrals, one-man blinds, soldier cairns, and accepted temporal diagnostics.

Despite the associational difficulties that plague analysis of satellite sites, table 3 strongly suggests that high-cost hunting facilities tend to be associated with relatively early point types. Specifically, diagnostics of pre-A.D. 1300 occupations appeared at nearly 95 percent of the sample sites. Perhaps more significantly, these early diagnostics nearly always comprise the bulk (over 75 percent) of the assemblages associated with the rock

alignments. Only eight of 27 sites contained any "late" diagnostics (i.e., Desert Side-notched or Cottonwood points).

In other words, post-A.D. 1300 diagnostics are rare at rock alignments in the central and western Great Basin.

This trend is also evident at the Fort Sage Drift Fence. Although pothunting undoubtedly reduced the number of available diagnostics, fully 90 percent of the point assemblage predates A.D. 1300. Additionally, two of the late appearing points seem not to be directly associated with the walls.

The available data thus strongly support the contention that high-cost, permanent hunting facilities became less important through time (see also Thomas, 1982b).

There is at present no satisfactory explanation for this shift. It may be that bow-and-arrow technology reduced the necessity for permanent hunting facilities. There may have been some (as yet undetected) decrease in available game. Bettinger and Baumhoff (1982) have suggested that a Numic "traveler" strategy diminished the importance of artiodactyl hunting in late prehistoric times. Hypotheses abound, but the entire inquiry suffers from a lack of relevant, adequately digested data and clearly points to an important direction for future study.

FUNCTIONAL INTERPRETATIONS OF GREAT BASIN ROCK ALIGNMENTS

As noted at the beginning of this paper, chronological and functional interpretations of satellite features such as the Fort Sage Drift Fence are plagued by difficulties. The primary problem is to establish valid associations between the facility and the artifacts/ecofacts behaviorally related to that facility. While it may be tempting to assume, *a priori*, that any cultural debris found near the walls has a functional association with those walls, such an assumption would be spurious. One might, for instance, assume that the dense lithic scatters at Fort Sage (loci 1, 3, and 11) can be used to interpret the rock walls. We doubt this "association," and will adopt a much more cautious approach toward analyzing the Fort Sage assemblages.

TABLE 3
Great Basin Rock Alignments with Associated Projectile Points

| Site | Humboldt Series | Gatecliff Series | Elko Series | Large Side- notched | Rosegate Series | Desert Series | % Pre- Desert Series | Reference |
|-----------------------------|---------------------------------|---------------------|----------------|---------------------------|--------------------|------------------|----------------------------|--------------------------------------|
| | | | | | | | | |
| Table Mountain | X | X | X | X | X | — | 100 | Thomas (In press b) |
| Toyabe Summit Drives | — | — | X | — | X | — | 100 | Thomas (In press b) |
| Mt. Jefferson Middle Summit | X | X | X | — | X | X | 94 | Thomas (1982b) |
| Slaughterhouse Drive | — | — | X | — | X | — | 100 | Thomas (1982b) |
| Alta Toquima East | — | — | (X) | — | — | — | 100 | Thomas (1982b) |
| 26Ny2723 | — | X | X | X | X | — | 100 | Thomas (1982b) |
| 26Ny2726 | X | X | X | — | X | X | 75 | Thomas (1982b) |
| 26Ny2727 | — | X | X | — | — | — | 100 | Thomas (1982b) |
| 26Ny2729 | X | X | X | X | X | X | 99 | Thomas (1982b) |
| Anderson Creek | X | X | X | — | X | X | 94 | Thomas (1982b) |
| Whisky Flat | — | — | — | — | — | — | 0 | Heizer and Baumhoff (1962) |
| 26Mn104 | — | X | — | — | — | — | 100 | Heizer and Baumhoff (1962) |
| 26Mn294 | 1400–600 B.P. based on Mono Ash | — | — | — | — | — | 100 | Pippin (personal commun.) |
| 26Wa193/1052 | Atlant darts | — | — | — | — | — | 100 | Pendleton, McLane, and Thomas (1982) |
| 26Wa1028 | X | X | X | — | X | — | 100 | Matley and Turner (1967) |
| 26Wa1029 | X | X | X | — | X | — | 100 | Matley and Turner (1967) |
| 26Wa1030 | X | X | X | — | X | — | 100 | Matley and Turner (1967) |
| 26Wa1612 | — | — | X | — | X | — | 100 | Pendleton, McLane, and Thomas (1982) |
| 26Wa2236 | — | — | — | — | — | X | 0 | Pendleton, McLane, and Thomas (1982) |
| 26Wa3030 (n = 4) | — | X | X | — | X | X | 87 | This volume |
| 26Ch1a | — | X | — | — | — | — | 100 | This volume |
| 26La601 (Bob Scott) | X | X | — | — | ? | — | 100 | Thomas and McKee (1974) |
| 26Do102 | — | — | (X) | — | X | — | 100 | Pendleton, McLane, and Thomas (1982) |
| 26Ly23 | ? | X | X | — | — | X | ? | Pendleton, McLane, and Thomas (1982) |
| 26Ly69 | — | X | — | — | — | — | 100 | Pendleton, McLane, and Thomas (1982) |
| 26Ly70 | — | — | — | — | X | X | ? | Pendleton, McLane, and Thomas (1982) |
| 26Ly72 | X | — | X | — | — | — | 100 | Pendleton, McLane, and Thomas (1982) |

Above, we went to some pains to anticipate the archaeological visibility of an intercept hunting assemblage. The task-specific field camp should contain a relatively sparse artifact inventory, consisting of primarily curated "gear," specialized implements of extraction, and evidence of limited artifact maintenance. That is, we think that intercept strategy assemblages should be manifest primarily by relatively isolated hunting losses, debris from occasional weapon maintenance, a relative lack of exotic debitage, a general paucity of primary artifact fabrication, and perhaps a few *ad hoc* tools manufactured from locally available sources.

Assemblages from the midden sites (loci 1, 3, and 11) seem to reflect a rather different situation. This midden assemblage contains primarily fabricators (tools to make tools, such as gravers, perforators, endscrapers, and drills), general utility tools (scrapers, knives, choppers, and hammerstones), as well as domestic equipment (manos and metates). Additionally, the site matrix consists of a relatively deep organic deposit which one would ordinarily associate with a long-term occupation. The assemblage contains a diverse assortment of male- and female-specific items, and a relatively high proportion of exotic obsidian artifacts and debitage. Furthermore, the surface debris suggests the occurrence of both primary manufacture and secondary tool maintenance.

In other words, the assemblage from loci

1, 3, and 11 is more diverse than expected, reflecting activities more commonly associated with base camps than task sites (Thomas, 1983). The problems of distinguishing the two site types are manifest, especially when one attempts to use assemblage diversity as an analytical tool; as Jones, Grayson, and Beck (1982) have recently demonstrated, assemblage diversity is commonly a function of sample size, and extreme caution must be exercised in this regard. There is no way, for instance, to tell whether such diversity results from a few long-term occupations or several short-term visits (Thomas, 1983).

Nevertheless, we have the impression that the midden site is probably residential rather than logistic. The faunal assemblage would provide a valuable clue in this inquiry. We expect higher proportions of high utility remains at base camps: ribs, vertebrae, pelves, femurs, scapulae, and humeri (Binford, 1978, table 2.7; see also Thomas, in press a). By contrast, the task site should contain mostly low utility items such as phalanges, mandibles, carpals, and the like. This assertion could, of course, only be tested by systematic excavation in loci 1, 3, and 11.

We do, however, feel that some of the sub-assemblages square more closely with the field camp/task site model, especially those of loci 2, 5, 6, 7, 8, 9, and perhaps 10. There is, at present, no way of establishing an indisputable behavioral link between the feature and the assemblages found nearby.

CONCLUSIONS

We have provided the primary field data describing the Fort Sage Drift Fence, and we have attempted to analyze the chronological, functional, and systemic implications of this feature. Arguing by elimination, we think that the massive walls were constructed during prehistoric times, probably by logistically organized hunters conducting intercept strategy hunting. Although artifact/feature associations are tenuous, we think the wall probably was built prior to A.D. 1300, the bulk of the seemingly associated surface materials dating between about 3000 B.C. and A.D. 1000 or so.

Walls II and III are classic wing walls, commonly described in ethnographic accounts of communal artiodactyl hunting. Although we are unable to identify the prey species with certainty, we think that the walls were most likely used for ambushing antelope; it is also entirely possible that bighorn were hunted here, probably in late fall or winter.

The area near Wall I is more complex. Although the rock alignment was almost certainly constructed for artiodactyl procurement, it seems likely that the stratified site on the plateau to the north may have had a function totally unrelated to the hunting feature. There is simply, at present, no way of articulating the two zones into a single behavioral sequence.

It is interesting that ethnographic accounts rarely describe permanent hunting facilities, suggesting that modes of artiodactyl procurement changed between the protohistoric and prehistoric periods. The limited and problematical chronological evidence for rock alignments in the central and western Great Basin supports this suggestion; most of the permanent facilities seem to have been constructed and utilized well before A.D. 1300. This pattern may be due to a general shift away from logistic hunting strategies during the late Holocene period in the Great Basin.

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