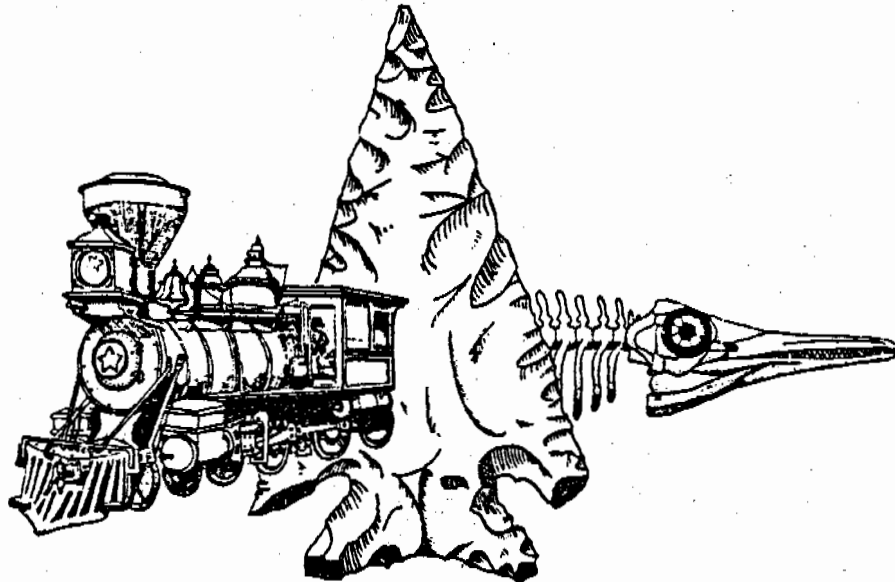


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BUREAU OF LAND MANAGEMENT
NEVADA

CONTRIBUTIONS TO THE STUDY OF CULTURAL RESOURCES



ARTIFACT ASSEMBLAGES FROM THE PAHRANAGAT
LINCOLN COUNTY, NEVADA

TECHNICAL REPORT NO. 4

RENO, NEVADA



JANUARY, 1980

ARTIFACT ASSEMBLAGES
FROM
THE PAHRANAGAT UNINTENTIONAL TRESPASS ACT
LAND SALES PARCELS
LINCOLN COUNTY, NEVADA

Compiled for

The United States Department of the Interior
Bureau of Land Management
Las Vegas District Office
Las Vegas, Nevada

Under Contract Number NV950-CT9-0008

by

Robert H. Crabtree and David D. Ferraro
Archaeological Research Center
Museum of Natural History
University of Nevada, Las Vegas

BLM NV Technical Report #4 (Pahranagat)

ERRATA

- p. 48 line 21 should be Figures 9 and 10.
- p. 56 Figure 6 should be labeled Figure 9
- p. 57 " 9 " " " " " 10
- p. 70 Baldwin (1950) should be
"The Pottery of the Southern Paiute".
American Antiquity 16(1): 50-56.
- p. 71 Euler and Dobyns (1956) should be
Henry F. Dobyns, and Robert C. Euler
1958 "Pottery Types of the Southwest:
Tizon Brown Ware". Museum of Northern
Arizona, Ceramic Series No. 3D.

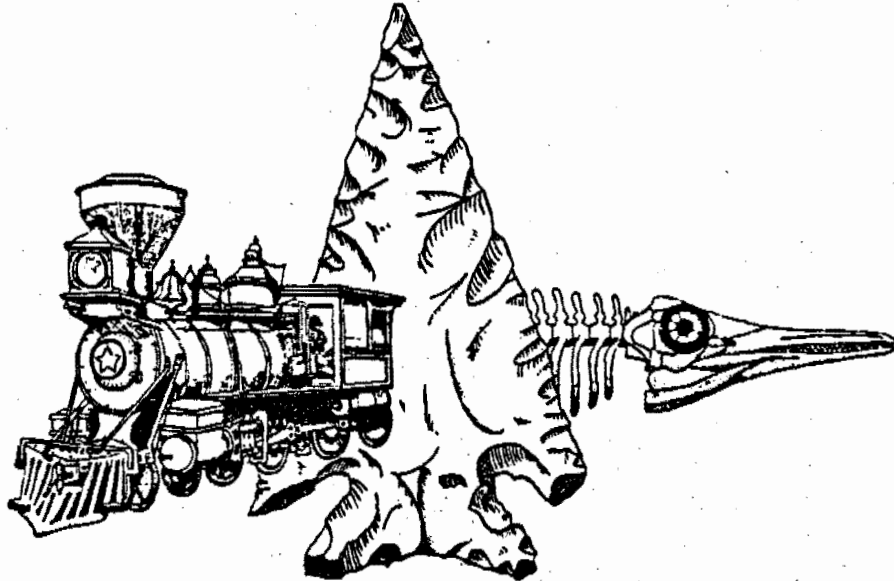
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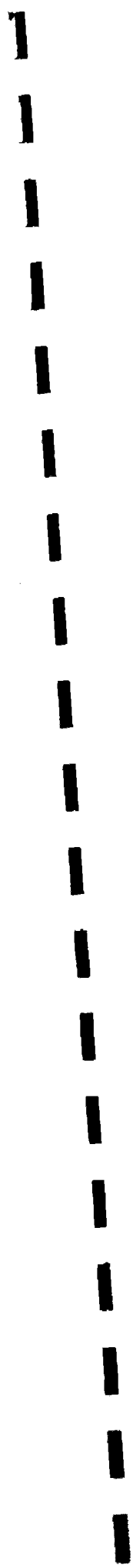
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Forward

A major reason for protecting cultural resources is the preservation of a variety of archaeological materials and features representative of the full range of activities of the former inhabitants of an area. A field design to preserve a representative sample of the resource should, therefore, contribute toward a regional inventory from which extrapolation of past cultural patterns may be eventually delineated.

In January, 1979, mitigation procedures were implemented to provide protection for cultural resources located on lands destined to be transferred from public to private ownership. The subject lands consisted of five closely situated parcels located in Pahrnagat Valley of southern Nevada. Of the 130 acres, approximately a 25% sample of the surface area was systematically surface collected of all identified cultural materials. The mitigation effort was designed such that information contributing toward the reconstruction of aboriginal land use patterns in the valley could be obtained.

Nearly 9,000 archaeological specimens, including pottery sherds and lithic items, were collected. The variation in occurrence of material categories with associated natural features suggested a broad array of activities by the aboriginal occupants. Possible activities included quarrying of locally available materials and initial reduction in workshop areas, processing of readily available food resources, and general maintenance activities indicative of habitation. Temporally diagnostic materials strongly suggested a later Southern Paiute occupation and failed to disclose evidence for earlier occupation.

Richard C. Hanes
BLM, Nevada State Office
January 1980

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INTRODUCTION

The Bureau of Land Management (BLM), responding to applications made by residents of the Pahrnagat Valley, plans to sell parcels of land on which Unintentional Trespass Acts (UTA) have occurred. These UTA lands have been used during the last 100 or more years for various agricultural purposes including irrigation, agriculture and livestock operations. Cultural material was recorded on these parcels by Brian Hattoff, then archaeologist for the Las Vegas District, BLM. Mitigation of the adverse effects that might occur to cultural resources as a result of the land transfer from federal to private ownership was recommended. In response to a request made by the current BLM Las Vegas District archaeologist, Stanton Rolf, the Archaeological Research Center (ARC) of the Museum of Natural History, University of Nevada, Las Vegas (UNLV) submitted a mitigation proposal that recommended the collection of cultural material from 25 percent of the surface area of the UTA land sales. If budgetary constraints allowed, some limited test excavations were to be made to determine the presence of cultural materials beneath the surface.

The research orientation of the mitigation proposal required that an attempt be made to understand aboriginal land use patterns along the margins of Pahrnagat Valley by comparing artifacts associated with different physiographic types. Pahrnagat Valley is considered to have had a rich riparian environment that could have provided

to a human population subsistence resources and raw material for various artifacts. The fan, upper terrace, and flood-plain portions of the UTA parcels appear to have been sites of varied aboriginal activities geared to the exploitation of the resources specific to them. Twenty-five percent of the surface area was thought to provide an adequate sample that would represent the artifacts generated by these activities.

Fieldwork commenced during January 1979, and was completed by February 1979, requiring a total of 35 man-days. Surveying the collection grid proved to be more difficult and costly than originally anticipated, and 12 extra man-days were required to finish staking the parcels. Twenty-one man-days were needed to complete the surface collection. A total of 8,728 items, consisting mostly of quarry debris, were recovered. Forty-five man-days were used to catalog and analyze the surface collection. The authors donated fifty man-days to complete the project report. Test excavation was not attempted because of the difficulty encountered accomplishing the surface collection.

Personnel participating in the fieldwork included Lynda Brennan, Scott Crownover, David Ferraro (project supervisor), Dennis Jenkins, Stanton Rolf (BLM), Sheila Vaughan (crew foreman). Robert H. Crabtree analyzed the collection and the final report was written by Crabtree and Ferraro. Permission to collect archaeological materials has been granted the Museum of Natural History under the supervision of Richard H. Brooks by the Department of

Interior Antiquities Permit Number 77NY096 and Nevada State Museum Antiquity Permit Number 138. Cultural material, notes, photographs and other records generated as part of this project will be curated by the University of Nevada, Las Vegas Museum of Natural History.

PREVIOUS ARCHAEOLOGICAL STUDY

The archaeology of the study area is not well known; however, several substantive investigations have been undertaken. S.M. Wheeler (1942) published an excavation report on Etna Cave located in Meadow Valley Wash just south of Caliente, Nevada. Fowler, Madsen and Hattori (1973) and Fowler and Sharrock (1973) conducted surveys and excavation in the Meadow Valley Wash Drainage, Beaver Dam Wash, Delamar Valley, Pahrnagat Valley, and Muleshoe Valley. Dan Larson and Richard Brooks (Brooks, Larson and Olson 1977) surveyed a Nevada State Highway right-of-way along portions of the White River Drainage from Hiko to Sunnyside and excavated the Mariah Site (26LN618) located at the upper narrows of Pahrnagat Valley.

Etna Cave was excavated under the supervision of S.M. Wheeler between 1935 and 1937. He divided the stratified cave deposit into successive Gypsum Cave, Basketmaker, and Pueblo occupations. In light of what is now known about Great Basin archaeology, the Gypsum Cave and Basketmaker designation of the earlier levels is probably erroneous since they contain Elko, Gypsum and

Humbolt series projectile points that are now considered to be affiliated with Archaic populations (Aikens 1970 and Fowler et al. 1973).

Fowler and Sharrock (1973:97-135) identified 151 sites during reconnaissance surveys of a large area of Lincoln County. Forty-six of these sites were found in the vicinity of the Pahrnagat Valley, and two of these were partially excavated. They report recovering Shoshone, Anasazi, and Fremont pottery from a badly vandalized rockshelter (26LN204) located 21.5 km north of Alamo near Hiko Lake. They also recorded the occurrence of Shoshone pottery, and Rose Spring and Elko series projectile points in another rockshelter (26LN241) located on the east side of Mt. Irish at 2045 feet above sea level.

In 1969 and 1970, Fowler, Madsen, and Hattori (1973: 7-67) excavated two large ~~rockshelters~~ located in the Meadow Valley Wash drainage that contain thick well-stratified cultural deposits. The larger, O'Malley rockshelter, is located 135 km east of Ash Springs and contains a midden deposit more than five meters thick that produced evidence of human occupation from 5150 B.C. until the modern times. The authors claim three hiatuses in the occupation of the site. The shelter yielded 371 analyzable projectile points and Anasazi, Fremont and Shoshone pottery in the upper levels. The O'Malley site has the best developed stratigraphy and thickest deposit of any site excavated in this region and hence contains the best data concerning

regional cultural chronology. The authors have divided the deposit into seven cultural units that have the following associations:

Cultural stratigraphy is described in units... rather than strata to prevent confusion with the natural stratigraphy. Boundaries between natural strata are maintained for the cultural units. By defining the cultural units within the natural stratigraphic framework, culturally significant differences are summarized while maintaining stratigraphic integrity. Each cultural unit is differentiated by the presence of one or more characteristic artifact types.

Unit I (Strata 1 and 2; Desert Archaic). This is the oldest cultural unit at the site and contained few artifacts. It contained two ash basins and a hard, charcoal-stained use surface. Diagnostic artifacts include the only basin-type metate and bison bones recovered from the site, and Elko Series projectile points.

Unit II (Strata 3-6; Desert Archaic). Unit II is the largest cultural unit within the site, containing numerous artifacts, including a large number of ground stone implements. Diagnostic artifacts include Pinto and Humboldt Series projectile points, large scoop or trough metates, and distinctively formed manos.

Unit III (Strata 7-11; Desert Archaic). Unit III is characterized by a large number of ash basins, ash lenses, and use areas. Distinctive artifacts are primarily Gypsum Series points.

Unit IV (Strata 12-14; Desert Archaic). This unit appears to be transitional because of the presence of artifact types characteristic of units above and below it. Both Elko and Gypsum Series points were found in high percentages.

Unit V (Strata 15-18; Fremont-Anasazi). Unit V is characterized by the appearance of pottery, including Snake Valley and North Creek Gray types. Rose Springs Series projectile points are most common.

Unit VI (Strata 19-21; Fremont-Anasazi-Southern Paiute). This unit is characterized by the appearance of Shoshonean pottery and Eastgate Series points.

Unit VII (Surface; Historical). Unit VII includes surface material and four historic intrusive pits. Diagnostic artifacts include a bullet mold, beer bottle fragments, and a wire brassiere strap adjuster. Deposition was primarily the result of occupancy by cowboys and railroad section crews (Fowler, Madsen, and Hattori 1973:13-14).

Seven radiocarbon dates obtained from charcoal suggest an absolute cultural chronology for the region. The Desert Archaic level has a "minimum time range of ca. 7150 to 3020 B.P. The Parowan Fremont peoples entered the area about 950 A.D. and disappeared between 1200 and 1300 years A.D. The "Shoshonean" culture appeared in the area sometime after A.D. 1000 with a potential joint use of the region with Fremont people for approximately 300 years (Fowler, Madsen, and Hattori 1973:55).

The O'Malley deposit also produced a pollen sequence that suggests some minor climatic change may have occurred in the area. Fluctuations in the relative frequency of Graminae and Pinus pollen types from samples collected from a stratigraphic column suggest that initially the area was a sagebrush-juniper woodland. By approximately 3900 BP, the frequency of grass increases and the environment was hypothetically dominated by a grass-sagebrush vegetation with some oak and juniper. At 900 BP, Pinus appears and begins to become more frequent suggesting expansion of the pinyon-juniper woodland into the area, possibly caused by an increase in precipitation.

Pollen sequences collected from archaeological sites must be used with caution in climatic reconstruction,

because they are possibly influenced by the subsistence activities of their human inhabitants. It is possible that the changes in the pollen record from the O'Malley site may represent no real change in the frequency and distribution of plant taxa but rather a change in the subsistence patterns of the shelter's occupants. The increase of the Pinus type might represent increased importation of pine pitch associated with increased use of pinyon by Numic populations which appear about 900 years B.P.

In 1975, the Nevada Archaeological Survey (NAS) excavated a small rockshelter in the upper end of Pahranaagat Valley. This site contained a one meter thick cultural deposit that dates from prior to 825 A.D. (Uga 1474) until the modern period. Elko series projectile points were recovered from the earliest levels of this site and were replaced by Rose Springs series followed by Cottonwood and Desert Side-notched series points. The ceramics recovered from this site were predominantly Fremont ceramics including Sevier and Snake Valley Wares (Brooks, Larson and Olson 1977).

ETHNOGRAPHY

The ethnographic data concerned with the Southern Paiutes occupying the Pahranaagat Valley is limited. Julian Steward (1938) had an informant that recalled conflicts between the Southern Paiutes in the Valley and their Shoshone neighbors to the north involving fishing rights in a Pahranaagat stream. Euler (1966:108) had an informant that recalled, on two occasions, the Pahranaagat group sharing pinyon groves with their Shoshone neighbors. Abundant historical documentation is probably available concerning the period of contact between the Pahranaagat Southern Paiute

and European Settlers that began before the founding of Hiko in 1866 (Higgs 1976) and the removal of the Paiutes to the Moapa Reservation after 1875 (Fowler and Fowler 1971). For example Fowler et al. (1973) report that a letter written by James M. Day states that the Paiute band living there numbered "400 strong" and cultivated wheat, corn, and pumpkins. However, in 1873, Powell and Ingals (Fowler and Fowler 1971:116) report a population of only 171 people in Pahrnagat Valley. Funding constraints prevented further pursuit of this potential research.

THE STUDY AREA

The Pahrnagat UTA land sale parcels are located in the Pahrnagat Valley, Lincoln County, Nevada between Alamo and Ash Springs. The valley is a segment of the White River Stream System beginning at the southern narrows 14 kilometers south of the sale parcels at Maynard Lake and it extends 32 kilometers north of the sale area to the White River Narrows. The floodplain at Maynard Lake is 230 meters lower than at the White River Narrows. The valley is bound on the east and west by parallel mountain ranges forming a narrow basin that is a maximum of 20 kilometers between mountain crests. The East Pahrnagat Range and the North Pahrnagat Range are on the valley's east-western margins, Mount Irish in the North Pahrnagat Range rises to an elevation of 2664 meters above sea level. The Hiko Range forms the valley's eastern margin and rises to an altitude of 1583 meters above sea level.

At the base of these ranges, thick alluvial fans have been deposited whose surfaces have been dissected by ephemeral

streams flowing out of the mountains perpendicular to the axis of the valley. They have cut stream channels that are as much as five to ten meters deep and 200 meters wide near the valley floodplain. In the study area fans have a maximum altitude of 1525 meters and a minimum altitude of 1075 meters above sea level.

A broad valley floodplain has been enclosed in a deeply incised stream channel that lies along the axis of the valley and is a section of the White River Stream System. The topography of the western margin of the floodplain is dominated by an abrupt stream terrace that is as much as eight meters high. Portions of the western terrace are weathered colluvial slopes, while it is a vertical rock face in other areas. The terrace has also been removed for as much as 200 meters by stream action originating in the mountains. These streams have deposited small alluvial fans onto the floodplain. These fans vary from only a few meters to 250 meters from apex to toe.

The upper terrace on the east side of the valley is either not as strongly developed or absent. Lobes of the valley alluvial fan, which in the study area were finer in texture than those located on the western side of the floodplain have been deposited on the eastern margin of the floodplain. In several locations along the valley axis where fans are deposited on either side of the floodplain shallow basins are formed by coalescing sediments.

HYDROLOGY

Water is unusually abundant in the Pahranaagat Valley which annually discharges 25,000 acre feet. "In addition, potential hydrological gradients, geologic environments, and water quality data also indicate that ground water recharge to Pahranaagat Valley is derived from adjacent valleys; these include Garden and Coal Valleys to the northwest, White River and Cave Valleys to the north and Dry Lake and Delamar Valleys to the northeast and east and possibly others" (Eaken 1965:1).

The annual discharge from Hiko, Crystal, Ash and Alamo Springs currently maintains four shallow lakes with inter-connecting streams as well as supplies water for agricultural purposes. Two lakes are located north of the study area and two are located to the south of the study area. Other lakes may have existed in the past in shallow basins formed by clastic debris dams. The water table lies at or near the surface along the valley floodplain saturating the lower lying area, creating mesic, often marshy, environments with occasional ponding.

After the founding of the town of Hiko in 1866 in the upper part of Pahranaagat Valley, Euro-american land use patterns began to transform the post Pleistocene environment of Pahranaagat Valley into the present one. These environmental alterations are not clearly understood but they probably include increased removal of trees and shrubs to create fields and pastures and drainage improvement that reduced the marshes.

BIOTIC COMMUNITIES

The study area lies on the northern periphery of the Mojave Desert and contains elements of the Great Basin Desert. The flora and fauna of this area has been classified by Bradley and Deacon (1968:201-295) into biotic communities. These are an idealized model based on the frequency of distribution of certain botanical elements and can vary a great deal from area to area. This community model provides a general biotic structure for the Pahrnagat Valley. Botanic data collected by BLM, faunal information available through U.S. Fish and Wildlife Service pamphlets, and observations made during field work were used to compile the species listed in the community description.

The Saltbush, Desert Springs and Marshes, Stream, Lake, Creosote Bush, Blackbrush, and Juniper-Pinyon Communities occur in the Pahrnagat Valley. The creosote bush/blackbrush ecotone occurs extensively on the alluvial fans above the floodplain so they are described below together.

Creosote Bush-Blackbrush Community

These communities occur together in a 12 kilometer broad ecotone that lies between 1100 meters and 1370 meters above sea level on the large alluvial fans deposited at the base of the mountain ranges that bound the Valley. The dominant shrubs of these communities, Larrea tridentata and Coleogyne ramosissima occur in a mosaic of varying densities with higher frequencies of L. tridentata near the valley floor and higher frequencies of Coleogyne ramosissima

at the base of the mountain ranges. Other plant species occurring in this community include Artimisia spinescens, Astragalus sps., Atriplex canescens, Atriplex confertifolia, Atriplex spinescens, Bromus tectorum, Dalea fremontii, Encelia sps., Ephedra nevadensis, Eriogonum sps., Eurotia lanata, Grayia spinosa, Hilaria jamesii, Hilaria rigida, Hymenoclea salsola, Lycium andersonii, Mendora spinescens, Oryzopsis hymenoides, Salvia sps., Sphaeralcea sps., Tetradymia spinosa, Tridens pulchellus, Yucca bacata, and Yucca brevifolia (BLM Range Survey 1979).

Reptiles associated with this ecotone include snakes, lizards, and possibly the desert tortoise (Gopherus agassizi). More than 33 bird species are associated with this community. Of these Gambel's quail (Lophortyx gambelii), the horned lark (Eremophila alpestris), the raven (Corvus corax), wrens (Troglodytidae), LeConte's thrasher (Toxostoma lecontei), sparrows (Amphispiza bilineata and A. belli) and the ladder-backed woodpecker (Dendrocopos scalaris) are listed by Bradley and Deacon as permanent residents of this community. Mammals associated with this ecotone include 11 rodent species, the desert jack rabbit (Lepus sps.), the desert cottontail (Sylvilagus audubonii), the coyote (Canis latrans), the kit fox (Vulpes macrotis), badger (Taxidea taxus), and the bobcat (Lynx rufus). Large herbivores probably occur rarely through this ecotone except in the upper part of the blackbrush zone which is heavily used by desert bighorn sheep (Ovis canadensis). Although the herbivores

did not use these zones extensively they might occasionally be present in transit to the riparian floodplain.

Saltbush Community

This community occurs in disjunct areas associated with saline soils within the Blackbrush/Creosote community. It occurs in greatest densities along the margin of the valley floodplain where halophytic species include Atriplex confertifolia, Atriplex canescens, Distichilis stricta, and Lycium andersonii and compose as much as 50 percent of the total vegetation. Here salts are deposited by evaporation of ground water in a zone extending from the floodplain up the fans for several meters. Salt grass (Distichilis stricta) grows in the moist parts of the floodplain margins and is gradually replaced as the elevation increases by Lycium andersonii and Atriplex confertifolia. In this saline transition zone between the floodplain and the fans, these species grow to over two meters in height and comprise all of the vegetation. Since both these species provide edible seeds this community was probably important to aboriginal populations. With increasing elevation above the floodplain, the salt content of the soils decreases and the Creosote Bush Community vegetation becomes dominant. Saltbush vegetation also occurs on the broad valley alluvial fans where the soils are poorly drained. The fauna associated with this community is the same as that found in adjacent communities.

Hydric and Aquatic Communities

Several mesic biotic communities are found on the floodplain in the Pahranaġat Valley including Desert Springs and Marshes, Stream Riparian, Stream and Lake Communities. A small spring-fed stream flows along the floodplain where it is impounded by several clastic dams forming four shallow lakes. Other lakes may have existed in Pahranaġat Valley in the past that were silted in. On the floodplain near the parcel area, dark gray silty clay sediments, that contain Typha pollen and ostracods, which are indicative of an aquatic environment, were collected at about 1.5 meters below the surface of the floodplain with a soil auger. Silting would cause the habitat to change from open water to restricted marsh and eventually disappear. The wetland habitat has probably diminished through the efforts of the modern inhabitants of the valley who probably have improved drainage on the floodplain thereby decreasing the amount of surface water and marsh habitat.

Aquatic plant species, including algae, Chara, Naias, Potomongeton, and Ruppia thrive within streams, marshes and lakes of Pahranaġat Valley. In the shallow periphery of these bodies of water sedges (Carex and Scirpus sps.), rushes (Juncus sps.) and cattail (Typha sps.) grow abundantly. Willows (Salix sps.), and cottonwoods (Populus fremontii) are found along the shoreline. Reptiles found in this area are the same as those found in the surrounding desert communities. The rodent species are similar too, except that

the muskrat (Ondatra zibethica) occurs in the aquatic environment. Amphibians including toads (Bufo microscaphus, Bufo punctatus and Bufo woodhousei) and a frog (Rana pipiens) occur commonly. The fish species, Rhinichthys osculus, Lepidomeda lativeles, and Crenichthys baileyi are thought to be native to Pahrnagat Valley. Avifauna associated with this area is abundant and diverse.

ETHNOBOTANY

Several dominant plant species observed on the Pahrnagat UTA land sale parcels are known to have been important to Numic speaking peoples occupying the Great Basin in pre-historic and ethnographic periods. The aboriginal uses for several of these plant species and for other economically important plant species occurring in the Pahrnagat Valley is described by Julian Steward (1938:21-32). Additional data for the Cahuilla is published by Bean and Saubel (1972) concerning the Indians who lived on the western fringe of the Mojave Desert. The environment to which the Cahuilla are adapted is somewhat less arid than the Pahrnagat Valley and contains somewhat more mesic vegetation; however, many economically important plant species share a common distribution. Glottochronological data suggest the possible spread of the Numic-speaking Southern Paiute from an area in the vicinity of Cahuilla territory into the Great Basin (Lamb 1959). The Cahuilla language, Takic, is classified into the same language family, Shoshonean, as the Numic

speakers. This suggests that the protonomic and prototakic populations are the same (Fowler 1972), and if this is true, then their subsistence style may be historically related. Downs (1966:45) has suggested caution when the use of ethnographic records gathered in the Great Basin must be considered.

"However, when one returns to the minute detail of the Culture Element lists, one is struck by the immense variation to be found within the Basin...certainly not variations in kind, but variations on the primary hunting and gathering theme. While the general view of the Basin life presents a picture of remarkable sameness, the details of the activities of each group give us a picture of infinite variety. Thus, while we can say all Basin peoples gathered grass seeds, and describe in a general way the techniques of such gathering, we find that a statement of exactly what grass seeds, when, and where, differs from group to group. For example, of the forty-four species of grasses and other seed plants listed by Steward, only seven were gathered by all the groups included in his study. Even the pine nut was not listed for two groups, and the acorn was listed for only a few. Such differences may, of course, be explained by the absence of a certain plant in a particular area, and this indeed must be the explanation for some of the recorded absences. But, we find the same variation in animal foods and taboos. Of the twenty classes of food, people, or circumstances listed under taboos, not one was universal among the groups Steward examined (Steward 1941:278). Similarly, insects were eaten by all, but no single insect species was eaten by all. In the less tangible aspects of Basin culture we see the same pattern of variation in detail. It would be difficult to credit minor environmental differences as causing minor differences in the girls' puberty ceremony, for example."

The only reliable way to understand the dietary specifics of the Pahrnagat peoples is to excavate cultural deposits, such as the shelter site, 26LN649, and collect ethnobotanical data such as seeds. The following plant species occur in the

Pahranagat Valley, and while there is no direct evidence suggesting their aboriginal use, their uses are described here to provide some estimate of the dietary potential of the "strata" used in this study.

Artemesia tridentata (Big sagebrush)

Steward (1938:22) reports the seeds of this species were consumed during periods of food shortages even though they have a bitter taste. Also the bark from the sagebrush was used for bags and clothing. The Cahuilla gathered large quantities of the seeds and ground them into flour for a piñole-like mush. They also used the leaves and stems for air purification and as a disinfectant (Bean and Saubel 1972:43). This species is not found on the sale lands but occurs in the higher elevations of the Valley.

Atriplex canescens (Four Wing Saltbush)

The seeds from this species were occasionally used for food (Steward 1938:22). It is found commonly in the study area at lower altitudes on the eastern side of Pahranagat Valley and occurs abundantly on parcel five.

Atriplex confertifolia (Two-Winged Saltbush)

The seeds of this species were an important food resource for the Gosiute (Steward 1938:22). It is a dominant shrub on the alluvial fan area of all the sale parcels.

Chrysothamus sps. (Rabbitbush)

Steward (1938:23) reports, "The bark of the lower stems and roots was chewed until gum was formed." A species of

rabbitbush, C. viscidiflora, grows abundantly on the sale area at the toe of the alluvial fans and along irrigation ditches.

Ephedra sps. (Mormon Tea)

Steward (1938:24) lists the use of stems from E. viridis and E. nevadensis for a tea and the seeds of E. viridis for food in Death Valley.

Distichlis stricta (Salt Grass)

Bean and Saubel (1972:66) report this species was used as a source of salt by the Cahuilla. It is found along the saline margins of the Pahrnagat Valley floodplain.

Juncus sps. (Rushes)

The seed of two species of this genus, J. parous and J. baliticus were used for food by Great Basin Indians. Juncus sps. was also used for basketry mats and as a source of dye by the Cahuilla (Bean and Saubel 1972:80). Rushes are found in semi-aquatic environments at the edge of marshes, streams and lakes of Pahrnagat Valley (Steward 1938:25).

Lycium andersonii

This species produces a small red berry that was used for food in the Great Basin. The berry was collected and beaten into baskets for storage (Steward 1938:26). Bean and Saubel (1972:87) state that this species along with L. fremontii was used for food by the Cahuilla. L. andersonii is the co-dominant shrub on the alluvial fans of the sale area.

Opuntia sps. (Cacti)

Steward reports that "various species seem to have been used in different places, the stems and sometimes the fruit being eaten" (1938:26). The seeds of O. basilaris "were ground into an eatable mush" (Bean and Saubel 1972:95).

Opuntia species are found abundantly in the valley and occur in all strata on all of the sale parcels.

Oryzopsis hymenoides (Indian Rice Grass)

This grass provided an important seed in the southern Great Basin which was gathered in considerable quantities in late spring or early summer and stored for subsequent use (Steward 1938:26). This grass occurs commonly throughout the sale areas.

Phragmites communis (Arrow Cane)

Steward (1938:26) reports that this species was used commonly as a source of sugar. The Cahuilla also used this species as a source of cordage fiber and used the long stem for arrow shafts (Bean and Saubel 1972:101-102). It has a limited distribution in the Pahrnagat Valley today and does not occur on any of the sale parcels. However, it probably had a wider distribution prehistorically since stem fragments were present on parcel one in 26LN649.

Pinus monophylla (Pinyon Pine)

According to Steward (1938:27), this species, where it occurred, is the most important seed plant used in the Great Basin. The nuts were gathered in great quantities and stored for winter consumption. The distribution of

this species is limited to the higher elevations of Mount Irish.

Salvia columbariae (Chia)

The seeds of this species were used from Owens Valley south for food (Steward 1938:29). The Cahuilla ground the seeds into meal from which cakes of a mush could be made, or the seeds could be mixed with water to make a beverage. This species occurs on the western slopes and adjacent fans of the Hiko Range.

Scirpus sps. (Tule)

The seeds and lower stems of this species were gathered and eaten (Steward 1938:29). The Cahuilla are known to have gathered the pollen and made it into cakes and to have used the stems and leaves for bedding, mats, weaving materials, and roofing (Bean and Saubel 1972:139). This genus is found mostly on the Pahrnagat lake margins today and probably in the past occurred at many locations on the floodplain.

Typha sps. (Cattail)

The seeds and roots of this species were used widely in the Great Basin for food (Steward 1938:30). The Cahuilla also made cattail pollen into cake and used the stalks for matting and bedding (Bean and Saubel 1972:143). This species occurs abundantly today in the shallow area of the Pahrnagat lakes and in irrigation and stream channels. It probably had a wider distribution prehistorically.

Yucca brevifolia (Joshua Tree)

The buds and flowers of this species were used for food (Steward 1938:24). The Cahuilla also used fiber obtained from the leaves for cordage. Yucca brevifolia occurs on the alluvial fans and upper terrace of the sale area and extends up slope to the base of the Pahrnagat Range.

Yucca baccata

Steward lists no uses for this species and Bean and Saubel say that its use among the Cahuilla is not documented; however, the neighboring Serrano and other California Indian groups used the flowers and fruit of this species for food (Palmer 1891). It occurs on the fan strata portions of the sale area.

SOILS

The soils of Pahrnagat Valley have been classified into soils series by Rooke, Langan, and Bagley (1968) of the Soil Conservation Service. The following excerpts are applicalbe to the soils found in the UTA land sale parcels.

Alko Series

"The Alko series consists of moderately coarse textured soils that contain a hardpan cemented with silica and lime. These soils formed in alluvium derived mainly from ignimbrite, granodiorite, and basalt. They occupy long, broad, nearly level to moderate sloping alluvial fans along the western side of Pahrnagat Valley and in the northwestern part of Penoyer Valley.

Representative profile of an Alko soil, located in an unsurveyed township, about 500 feet south and 5,000 feet west of the northwest

corner of section 7, T. 7 S., R. 61 E. ...

... Alko loamy coarse sand, 0 to 8 percent slopes (AkB).-This soil lies along the western side of Pahrnagat Valley, mostly north of Maynard Lake. It is the most extensive Alko soil in the Pahrnagat Area. ...

... In all parts of the profile, coarse fragments make up less than 15 percent of the volume. These fragments are mostly pebbles, but there are a few cobblestones or stones on the surface. Erosion is a slight or moderate hazard.

Included with this soil are short, steep, cobbly and gravelly terrace escarpments that occupy about 3 percent of the total acreage. Also included, in a few drainage channels, are areas of very gravelly, coarse-textured Carrizo soils that make up 5 percent of the acreage.

This soil is in range that provides limited grazing for livestock. On range managed for cattle, bush muhly and galleta are the most important plants. The airstrip at Alamo is located on this soil" (Rooke et al. 1968:12).

Ash Springs Series

"The Ash Springs series consists of somewhat stratified, medium-textured and moderately coarse textured soils that are slightly affected by salts. These soils developed in sediments deposited on nearly level floodplains throughout the Pahrnagat Valley. The sediments were derived from various igneous and sedimentary rocks, and they have been modified by lime that was precipitated from upward moving ground water,...

... Ash Springs silt loam (Ao).-This nearly level, poorly drained soil occurs mostly in the northern half of the Hiko and Ash Springs watershed, where the natural drainage downstream has been partially blocked by the encroachment of alluvial fans. It has a high water table that fluctuates between the depths of 18 and 36 inches most of the year.

Included with this soil are small, depressional, very poor drained areas in which water accumulates on the surface and causes the uppermost 18 inches of the soil to be wet most of the year. In these areas peat or muck occurs either as a thin layer on the surface or as thin strata in the profile. Also included are fairly large areas where the soil is free of salts to a depth of 6 to 8 inches but where the salt concentration increases abruptly below that depth. These inclusions make up about 20 percent of the total acreage.

This soil is used for unimproved meadow of native plants that are cut for hay or grazed. It also is used as habitat for wildlife. To improve irrigation in pastured areas, leveling or smoothing is needed, and shallow drains may be required for removing excess water" (Rooke et al. 1968:13).

Carrizo Series

"The Carrizo series consists of very gravelly and cobbly, coarse-textured soils that occupy nearly level to strongly sloping flood plains and small alluvial fans. These soils developed in alluvium derived from various kinds of rocks, principally limestone and rhyolite. They occur in numerous washes throughout Pahranaagat Valley...

... Carrizo gravelly sand, 0 to 12 percent slopes. This nearly level to strongly sloping soil occurs in many narrow washes and on small alluvial fans adjacent to the Pahranaagat Valley flood plain. It has an A1 horizon of gravelly sand, but in other respects its profile is similar to the one described for the series. The profile is gravelly throughout. In addition, stones and cobblestones occupy as much as 10 percent of the volume in the C. horizon, though they make up less than 5 percent of the A horizon.

Included are large areas of Carrizo gravelly loamy sand that occupy as much as 30 percent of areas mapped as this soil. Also included are two small areas of Carrizo gravelly sand and stony loamy sand that are slightly or moderately affected by excess salts. These saline inclusions, which make up less than 10 percent of the total acreage, lie on toe slopes of alluvial fans just above the flood plain. Here, they accumulate soluble salts through the rise and evaporation of saline water from adjoining wet soils" (Rooke et al. 1968:18-19).

Lahontan Series, Water Table Variants

These variants from the normal Lahontan soils are nearly level or gently sloping, moderately fine textured, and somewhat stratified. They have a high water table and are affected by salts and alkali. These soils occupy flood plains and the adjacent toe slopes of alluvial fans in the southern part of Pahranaagat Valley. They developed in material derived from various kinds of rock, including ignimbrite and limestone, and in eroded alluvial sediments of the Quaternary geologic period...

... Lahontan silt loam, water table variant, 2 to 4 percent slopes (LhB).-This somewhat poorly drained soil is on gently sloping alluvial fans between Alamo and Pahranaagat Lakes. In this soil

the water table fluctuates between the depths of 30 and 42 inches. The upper horizons are strongly alkaline and contain a slight concentration of soluble salts. The average slope is about 3 percent.

Included with this soil are areas in which the A1 horizon is free of salts. Also included, in nonirrigated areas, are hummocks that contain a strong concentration of salts. These inclusions account for less than 10 percent of the total acreage" (Rooke et al. 1968:29-30).

Maynard Lake Series

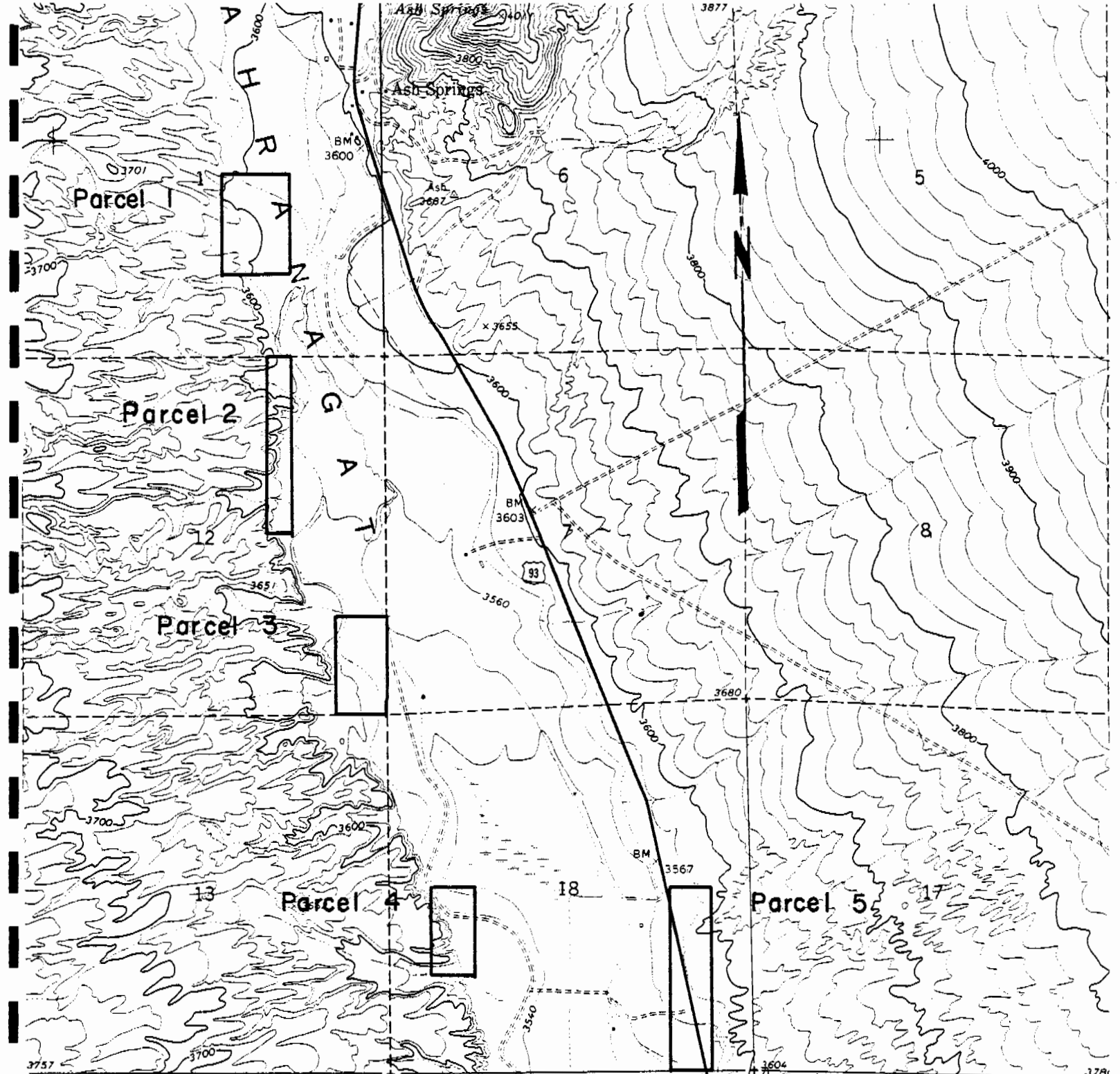
The Maynard Lake series consists of coarse-textured soils that formed in alluvium derived mainly from ignimbrite but partly from dolomite, limestone, quartzite, and basalt. These nearly level to strongly sloping soils are on recent, small alluvial fans and narrow flood plains in Pahrnagat Valley...

... Maynard Lake gravelly soils, 4 to 12 percent slopes (MkC).-These are the most extensive Maynard Lake soils in Pahrnagat Valley. They occur on many small alluvial fans and narrow flood plains. Their average slope is about 7 percent. The upper part of the profile is 6 to 14 inches of gravelly loamy sand or gravelly sandy loam, but in other respects the soils are similar to the one described as representative of the series. In the upper 6- to 14-inch layer, the gravel content ranges from 20 to 40 percent. ...

... Included with this soil are small areas having slopes of 0 to 4 percent. These areas lie near the ends of alluvial fans, where the fans merge with the flood plain, and some of them are slightly or moderately affected by salts. Also included, along channels of intermittent streams at the higher elevations, are areas that are cobbly or stony. Inclusions account for about 5 percent of the total acreage...

... Maynard Lake loamy sand, 4 to 12 percent slopes (MIC).-This soil occupies many small alluvial fans and flood plains, and most of it lies between Alamo and Ash Springs. The average slope is about 7 percent.

Included with this soil are areas in which the surface is gravelly or is covered with scattered cobblestones. Also included are a few small areas having slopes of less than 4 percent. These inclusions make up about 10 percent of the total acreage" (Rooke et al. 1968:31-32).



ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route



QUADRANGLE LOCATION

ASH SPRINGS, NEV.
N3722.5—W11507.5/7.5

1969

AMS 2958 I NW—SERIES, V896

FIGURE I

... Seaman sandy loam, water table, strongly saline, 0 to 2 percent slopes (SeA). This soil is on the flood plain seeps into the lower horizons. As a result, drainage is somewhat poor. The water table fluctuates between the depths of 36 and 72 inches most of the year, but it is highest in winter. The upper part of the soil, to a depth of 4 to 9 inches, is strongly affected by salts. Except after a heavy rain, the surface is covered with a crust of white salt. Erosion is a slight hazard. Quailbush, four-wing saltbush, and rubber rabbitbush are the principal plants.

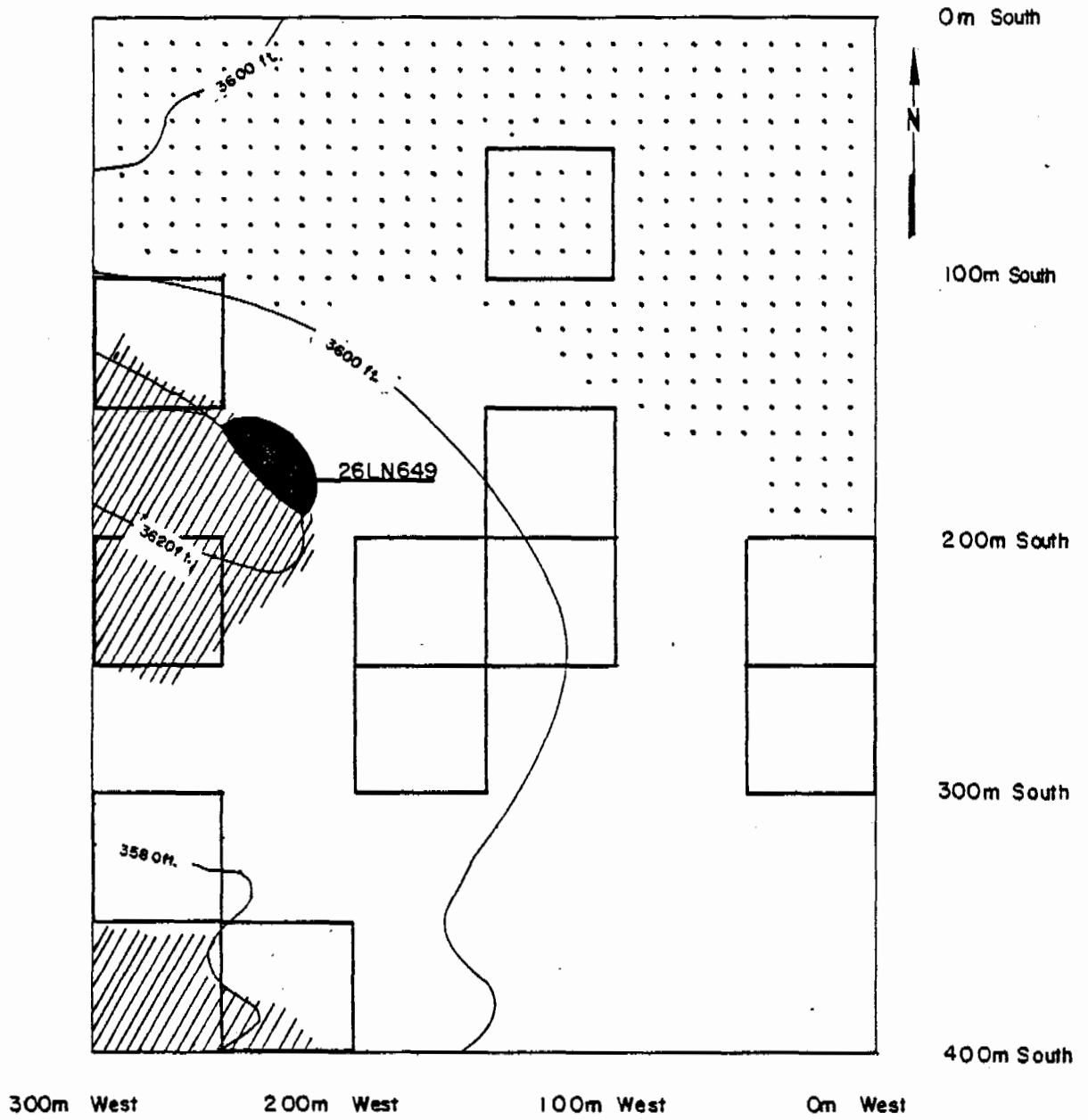
Included with this soil, along the lower edge of alluvial fans, are small areas of Lahontan fine sandy loam water table variant. These inclusions make up about 10 percent of the total acreage (Rooke et al, 1968:43-44).

The UTA land sale parcels (Figure 1) are located on the upper terrace, the floodplain alluvial fans and the floodplain. They are located in an area beginning just south of Ash Springs and extending four kilometers to the south. Four of them are located on the western side of the valley axis and the fifth is located on the eastern side of the valley axis. Three of the parcels are on the upper terrace, fan and the floodplain, one is located on the fan and floodplain only, and one of them is located on the fan only.

Parcel 1

This parcel (Figure 2) is the E $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ W $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section, Township 6 south, 65 Range 60E, Mount Diablo Meridian (MDM), and is located 350 meters southwest of Ash Springs on the western side of the valley floodplain. It is 400 meters north to south and 300 meters east to west. The area sampled encompasses 120,000 square meters of which 27,500 square meters were collected.

FIGURE 2



1 inch = 50meters

PARANAGAT UTA LAND SALE PARCEL I

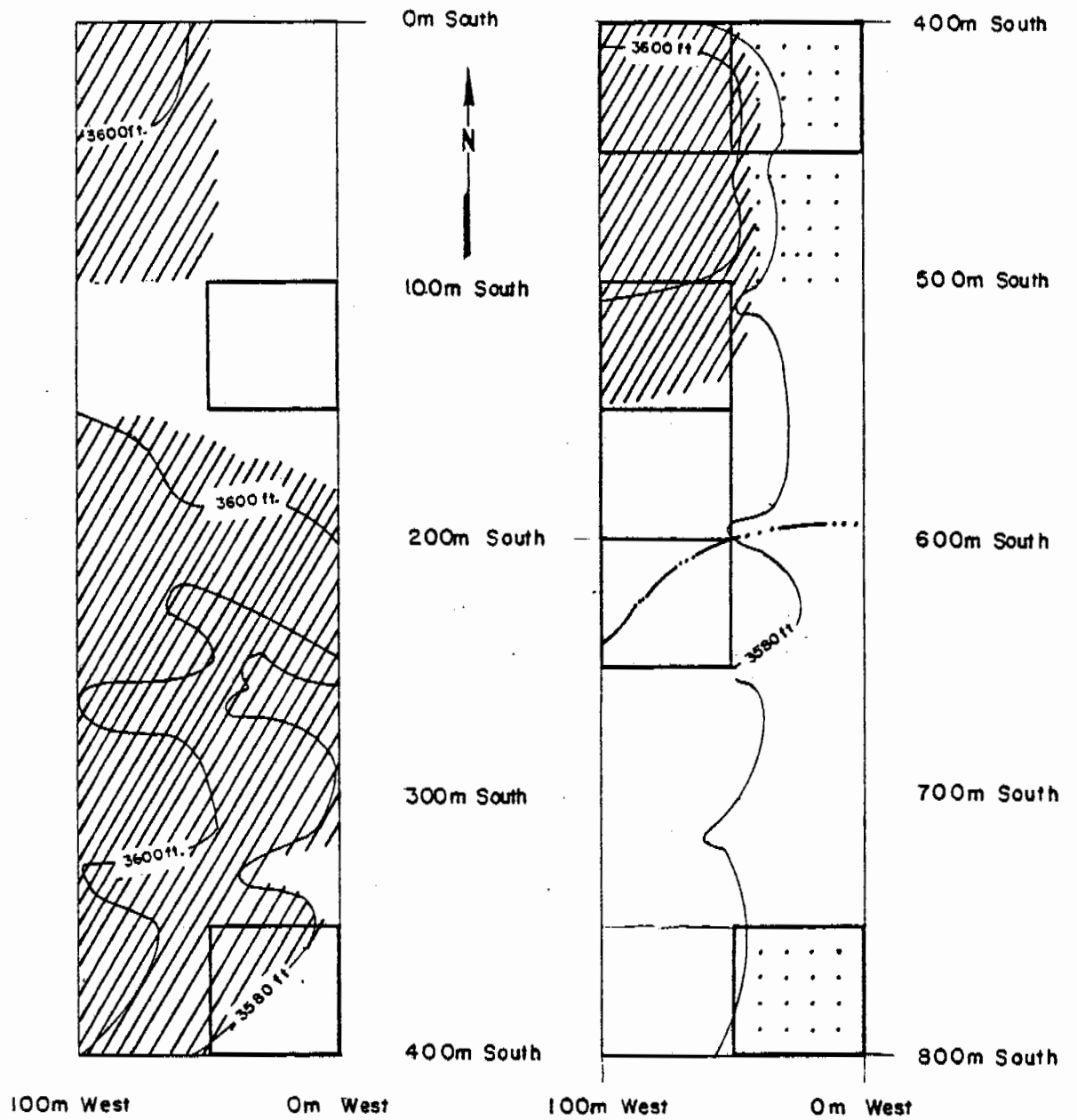
-  Upper Terrace
-  Floodplain
-  Fan

A substantial rockshelter (26LN649) is located in the cut bank of the upper terrace at zone 11; 4146640 north; 659280 east, Universal transverse Mercator (UTM). A substantial cultural deposit, that is 25 meters north to south, 30 meters from east to west, and unknown thickness, is associated with this shelter. It was weathered into a vertical rock face on the edge of the upper terrace four meters above the fan at the terrace base. The shelter is 15 meters wide and five meters high at the dripline, and the ceiling slopes down to the midden for a horizontal distance of five meters from the dripline. Colluvium is being deposited at the base of the rock face in a triangular wedge that slopes away from the shelter five to seven horizontal meters. The maximum depth of occurrence for cultural material in this deposit is unknown. The deposits on the surface of the interior of the shelter are dry and contain artifacts such as sandal and basketry fragments that are not ordinarily preserved in archaeological sites. Much of the organic debris in the interior of the shelter is the result of Neotoma (packrat) activities.

The surface of the upper terrace above the shelter is littered with lithic debitage and artifacts. A 50 by 50 meter sample unit above the shelter was to be collected completely; however, only an area five meters wide and 50 meters long was collected since time was limited and the 1421 items collected from this smaller area was thought to be of sufficient size to provide a representative sample

of the activities occurring above the shelter. Also, use of a 50 meter provenience interval on this site seemed ill-advised since horizontal patterning in the distribution of the material on this surface cannot be recognized using such a large provenience interval.

The alluvial fan in this parcel is being deposited by a wash which has cut a five meter deep and 150 meter wide gap through the upper terrace. The fan extends out 350 meters onto the floodplain from the upper terrace and is 600 meters at its broadest point. It is composed of gravel to sand sized limestone clasts with occasional nodules of fossiliferous cryptocrystalline quartz. The toe of this fan is less than 100 meters from the toe of another fan that is being deposited on the opposite side of the floodplain making possible the formation of a debris dam in the past. The sediments of the alluvial fan are primarily sand and silt sized particles that are saturated with water near the surface, have a high salt content, and are classified as Carrizo gravelly sand. The upper terrace is composed of stream deposited conglomerate and is covered with soil classified as Alko loamy coarse sand. Associated flora and fauna belong to the creosote bush community. The floodplain is covered by a fine grained soil classified as saline Seaman sandy loam on which Atriplex confertifolia and Lycium andersonii and Distichlis stricta are abundant.



PAHRANAGAT UTA LAND SALE PARCEL 2 FIGURE 3



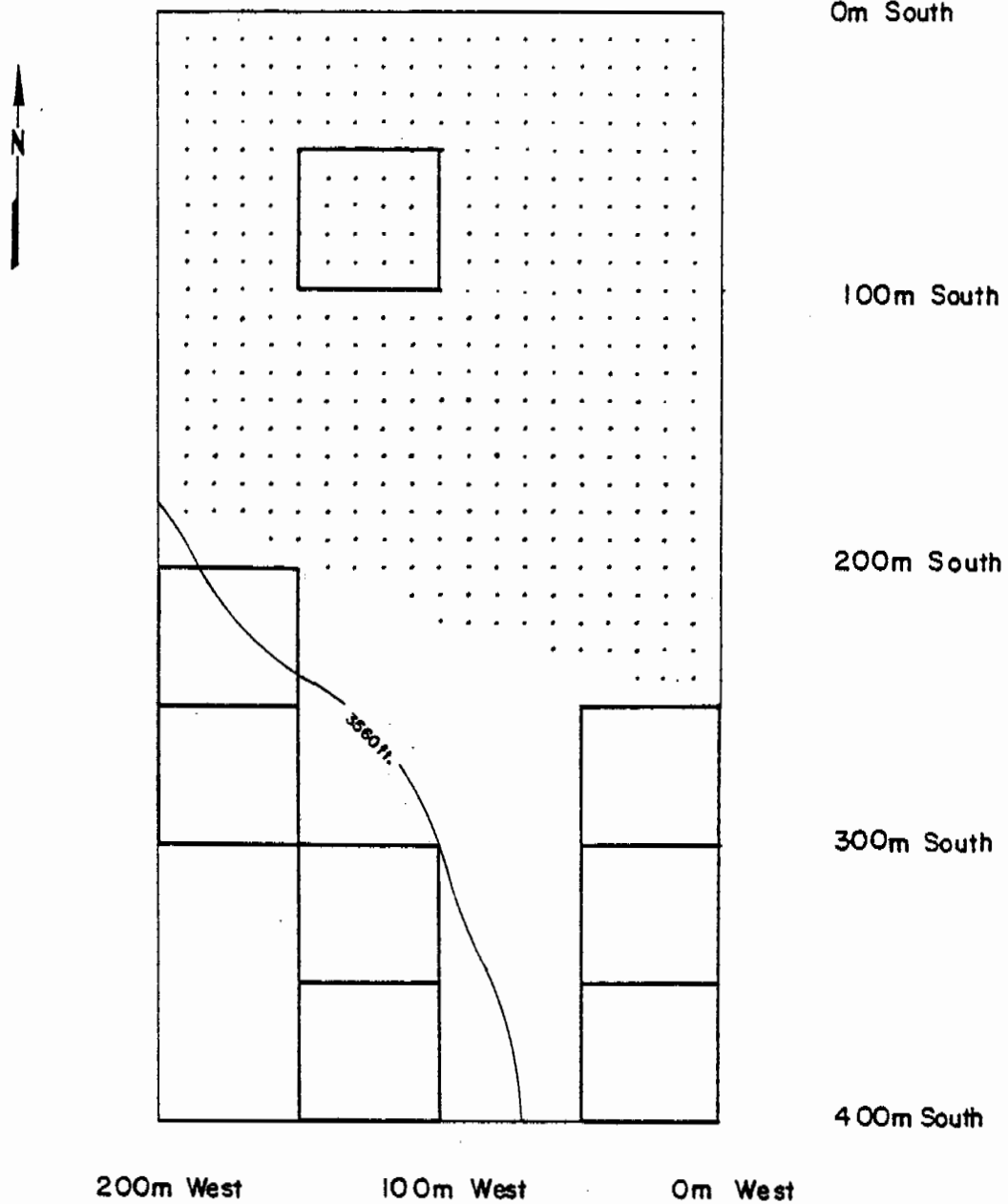
Parcel 2.

This parcel (Figure 3) is E $\frac{1}{2}$, E $\frac{1}{2}$, E $\frac{1}{2}$, W $\frac{1}{2}$, NE $\frac{1}{2}$ of Section 12, Township 6 south Range 60 east MDM and is located one kilometer southeast of Ash Springs on the western side of the floodplain. This parcel is 100 meters east to west by 300 meters north to south and is 80,000 square meters in area of which 20,000 square meters were intensively collected.

The upper terrace dominated the northern one-half of this parcel and in places extends all the way across it. The creosote biotic community is found on the upper terrace which is covered by Carrizo gravelly sandy soils. In the southern one-half of the parcel, a wash deposited alluvial fan extends 250 meters onto the floodplain and is 500 meters at its widest point. It is composed primarily of gravel and sand sized clasts that are classified as Maynard Lake gravelly soils and is covered by heavy growths of Lycium andersonii and Atriplex confertifolia. The floodplain strata occurs on the lower elevations of this parcel and is classified as saline Seaman sandy loam.

Parcel 3

This parcel (Figure 4) is E $\frac{1}{2}$ of SE $\frac{1}{4}$ of SE $\frac{1}{4}$ of Section 12 Township 6 south Range 60 east MDM and is located two kilometers south of Ash Springs on the western side of the valley axis. It is 400 meters north to south and 200 meters east to west and is 80,000 square meters in area of which 91,250 square meters were collected. The upper terrace stratum



PAHRANAGAT UTA LAND SALE PARCEL 3

1 inch = 50 meters

Floodplain
 FAN

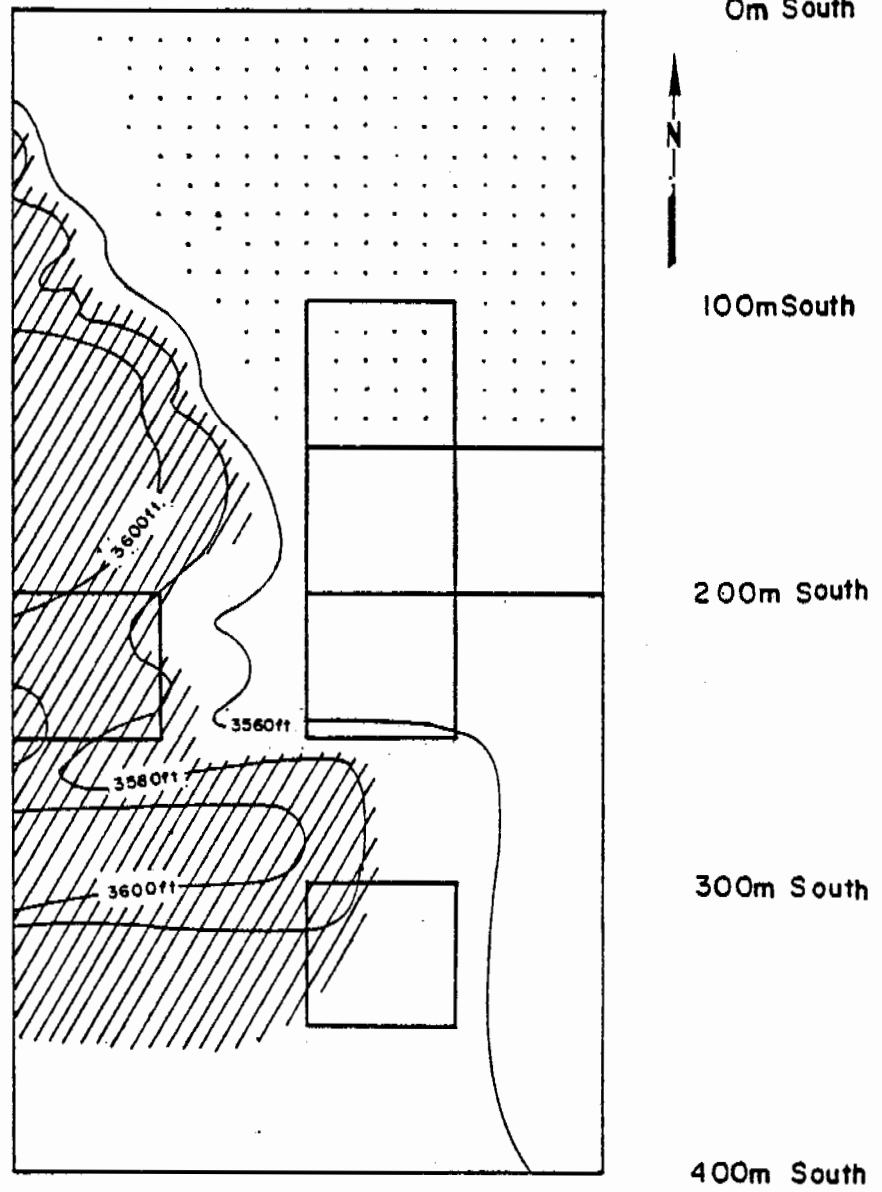
FIGURE 4

does not occur in this parcel.

An alluvial fan is being deposited by an ephemeral stream through a 100 meter wide gap in the upper terrace. It is 400 meters from apex to toe and 400 meters at its widest point and covered by soils classified as Maynard Lake gravelly soil and Lahontan. The sandy silt sized texture of this fan is inconsistent with that of fans found on the other sale parcels. While fine-grained mud flows occur on alluvial fans, it would not seem the case here, because the fine grained deposit ends abruptly at the gap in the upper terrace which lies 25 meters east of the parcels. They may be overbank sediments that have been deposited by flooding in the White River Drainage, although they are over five meters above the current floodplain level. The fan is found on the southern two-thirds of the sale parcel and is covered by heavy growths of Atriplex confertifolia and Lycium andersonii.

The floodplain stratum lies on the northern one-third of the sale parcel and is covered with salt grasses (Distichilis spicata) with an occasional willow and cottonwood. There is little substantial change in the sediment texture between the floodplain and the alluvial fan; however, their soils are classified Seaman sandy loam and Ash Springs silty loam.

FIGURE 5



200m West 100m West 0m West

PAHRANGAT UTA LAND SALE PARCEL 4

1 inch = 50 meters

 Upper Terrace  Floodplain  FAN

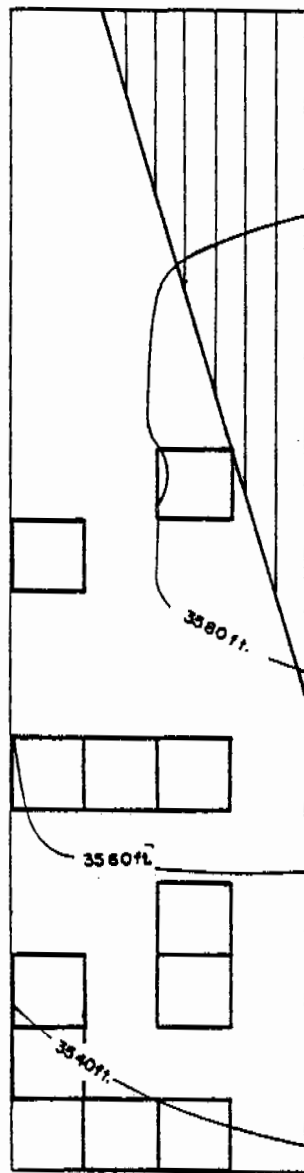
Parcel 4

This parcel (Figure 5) is the E $\frac{1}{2}$ lot three section 18, Township 6 south, Range 61 east, MDM and is located three and one-half kilometers south of Ash Springs east of the valley axis. This parcel measures 375 meters north to south and 200 meters east to west and 70,000 square meters in area of which 15,000 square meters were collected. The northernmost 25 meters of the parcel which is on the relatively artifact-free floodplain was eliminated from the sample.

The upper terrace of this parcel is about 15 meters above the floodplain and lies on the northwestern portion of the sale area. It is composed of a stream laid conglomerate and is covered by soils classified as Alko loamy coarse sand. Creosote bush community vegetation is found on this stratum. The sediments of the alluvial fan contain a high percentage of gravels that grade gradually into the finer grained floodplain. The fan sediments have soils classified as Carrizo gravelly sand. The floodplain has a fine grained texture and is classified Seaman sandy loam. The creosote bush vegetation on the alluvial fan is replaced by saltbush and hydric community vegetation on the floodplain.

Parcel 5

Parcel 5 (Figure 6) is located 3.5 kilometers south of Ash Springs on the eastern side of the floodplain. The parcel is W $\frac{1}{2}$ E $\frac{1}{2}$ SE $\frac{1}{4}$, Section 18, Township 6 south, Range 61 east MDM. It is 800 meters north to south and 200 meters east to west, encompassing 122,500 square meters of which



0m South

100m South

200m South

300m South

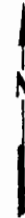
400m South

500m South

600m South

700m South

800m South



200m West 100m West 0m West

PAHRANAGAT UTA LAND SALE PARCEL 5

1 inch = 100 meters



FAN



Right-of-Way
US 95

FIGURE 6

27,500 square meters were collected. The legal description of this parcel includes a portion of the current U.S. 95 right-of-way that was eliminated from the sample. The former U.S. 95 right-of-way also falls within the parcel disturbing a portion of the area studied.

This parcel is an alluvial fan composed of coarse sand classified as Maynard Lake loamy sandy soils. The vegetation is almost solely Lycium andersonii and Atriplex canescens. Unlike the fans on the western side of the floodplain, parcel five does not have clasts composed of cryptocrystalline quartz suitable for manufacture of lithic tools.

SAMPLE DESIGN

The sampling design used in the Pahranaagat UTA land sales was created to recover data that would represent the archaeological manifestations found there. The design evolved as greater understanding about the nature of the cultural remains increased as the project progressed. Initially, observations about the character and diversity of the cultural materials were made during preliminary field visits. The sedimentological context of the cultural material indicated that data would be most efficiently recovered using surface collection techniques. The upper terrace above the rockshelter is covered by desert pavement whose formation probably predates human occupation of this area. The occurrence of cultural materials below it is unlikely and most of the material, with the exception of

small items such as pressure flakes, could be easily collected from the surface. The cultural material on the alluvial fans is probably not confined to the surface; however, recovery through excavation is impractical since the surface density is 0.23 items per square meter and return per cubic meter would probably be low. A surface collection technique was judged to be the most efficient way to recover the material present on the sale areas. No carbon-rich cultural deposit was noted on the sale area except in site 26LN649 which was excluded from sale. No accurate prediction about the occurrence of significant cultural deposits within either the floodplain or fan sediments can be made without extensive systematic test excavations. There has probably been relatively rapid post-Pleistocene sedimentation in the Pahranaagat Valley, and cultural deposits could exist either centimeters or meters under the present surface.

The initial observations also indicated some correlations existed between geomorphic features and variations in the distribution of tool types. The upper terrace portions of the sale area were initially thought to be typified by sites that are the remains of quarry activities, since the cultural material appeared to be predominantly cores and flakes. The fan area seemed to contain a more diverse assemblage that was the result of more complex sets of aboriginal activities. This assemblage included chipped stone artifacts and grinding stones. The low-lying Pahranaagat floodplain was devoid of any cultural materials.

In addition, there seemed to be some correlation between variations in potential aboriginal resources and geomorphic features. The upper terrace has associated vegetation that is dominated by creosote bush community types and contains raw material for chipped stone tools. The fan was dominated by either the Saltbush Community or the Creosote Bush Community. Fossiliferous cryptocrystalline quartz, which occurs with limestone clasts in the alluvial fill on the western side of the valley, is available on the fan portion of parcels 1, 2, 3 and 4. Prehistorically, the floodplain was assumed to have had a high water table and may have been covered by a marsh that was possibly peripheral to a small lake. A marsh would offer a prehistoric population a wide variety of floral and faunal subsistence resources, but the presence of a great deal of cultural material on the surface was not expected. Any artifacts dropped in such an environment would be soon covered by alluvial sediment and any food processing would probably occur on the presumably drier adjacent fan.

The initial observations, although necessarily limited, suggested that the sampling procedure employed in the sale area should gather data in a manner that would represent the variation of the aboriginal manifestations. The surface collection universe was therefore stratified on a geomorphic basis. The strata selected were the upper terrace, fan, and floodplain. A random selection technique was used to determine the collection units within each stratum since the strata were not contiguous enough to

allow use of a select sample. The amount of area collected in each stratum was variable. Most of the floodplain was eliminated to avoid wasting limited field time on this relatively artifact-free stratum. Also, a lower percentage of the surface area of the pediment rim was selected, because it had a high artifact density and a representative sample required less collection. The remaining portion of the sample was allocated to the fan area.

After each parcel was gridded, the dominant stratum (+75%) for each sample unit was recorded and mapped. Twenty-five percent of the area of each land sale parcel was selected for collection using a random numbers table. Transitional units were either eliminated from the sample or each stratum within the unit was collected separately.

FIELD TECHNIQUES

The corners of the UTA land sales parcels, except for parcel 5, had been located and marked previously by the BLM. Each parcel was gridded by placing stakes at 50 meter intervals along the cardinal compass directions with a transit and stadia rod. The survey of these parcels was made more complicated by high relief topography and dense vegetation that was often over a meter in height and obscured the stadia rod. The strata of each grid unit was recorded and a sample selected (see sample design). Archaeologists working either singly or as a group walked transects two to three meters apart and collected everything in their path until the entire unit was covered. In sample units that had high artifact density, the process was

repeated at right angles to the original direction to insure a thorough collection. The cultural material was placed into bags which were labeled with the unit and parcel number from which they came and returned to the laboratory for analysis. The sample unit designations used were the grid coordinate number of their northwest corner.

ARTIFACTS

The surface collections from the Pahranaagat parcels have been placed into 11 general categories to facilitate description and discussion, and comprise 8728 specimens. These categories do not represent a refined taxonomic scheme; they are descriptive for the most part, but some stylistic observations have been included to clarify the apparent chronological position of this material.

HISTORIC ARTIFACTS

Eight fragments of pale blue-green transparent bottle glass and one small metal-framed glass mirror were recovered from Parcel 5. These items appear to be less than 50 years old and are of minor significance historically, reflecting the general occupation and use of the Ash Spring vicinity by bearers of Euro-American culture in modern times.

CERAMICS

Seventy-nine pottery sherds were collected from the surface of twelve units in three parcels (#2, 3, and 5). A preliminary inspection of this collection indicated characteristics similar to a small pottery collection from three localities near Hiko, Nevada (UNLV Museum of Natural History #5-824-13, 15, and 16, total 181 sherds), about

ten miles north of the parcels near Ash Spring. Thus, the combined Pahranaagat Valley sample totals 260 sherds. Other collections used for comparison were from Owens Valley, California (200 sherds), near the Tonopah Test Range, Nevada (courtesy of Bill Fox), and the Berger Site (26CK1528) in Paradise Valley near Las Vegas (UNLV Museum of Natural History #5-35). Altogether about 580 sherds were examined. Laboratory procedures and observations followed those recommended by Colton (1953) and Shepard (1956) including use of a binocular microscope (mostly 25X up to 80X) for identification of most aplastic inclusions (temper) and used a five percent solution of hydrochloric acid to test for the presence of carbonate constituents among these inclusions (the results were negative). The results of these and other observations are tabulated in the format in current use in the Museum of Northern Arizona Ceramic Series (cf. Madsen 1977), and follows here.

Pahranaagat Ceramics BLM Parcels 2, 3 and 5 (79) and Hiko (181) T=260

Description

Construction coiled (flat-ribbon coils)

Finishing and thinning paddle and anvil, surface wiped and/or smoothed

Firing uncontrolled, low temperature

Core Clay granular, silty

Color 2.5 YR 5/6 red
7.5 YR 4/4 brown
7.5 YR 7/6 reddish yellow
7.5 YR 4/2 dark brown

2.5 Y 7/2 light gray
5 YR 7/4 pink
5 YR 6/6 reddish yellow

Temper Variety "A" (101), predominantly med-coarse ang-sa quartz (70-80 percent); phlogopite and biotite mica; coarse, angular tuff, sa-rnd; med-hornblende, (occasional) in sparse to moderate amounts (10-30 percent).

Variety "B" (159), fine to medium angular tuff, moderate to abundant; occasional, angular quartz (medium-coarse), mica, hornblende (medium sa-rnd).

Texture Variety "A" medium to coarse (0.14-1.0 m), occasional particle greater than 1 mm (Wentworth)

Variety "B" medium (0.3-0.7 m)

Thickness 5-10 mm

Carbon streak A-21 B-21 T=42

Surface Finish (unslipped), unevenly smoothed (slightly grainy), 15 show exterior smoothing (striations), 15 show striations on the interior

Surface color exterior

10YR 4/3-5/3 brown
7.5 YR 5/4 brown
10 YR 4/2 dark grayish brown
2.5 Y 5/2 grayish brown - 3/1-2/1 very dark gray bl.

interior

2.54 6/2 light grayish brown
10 YR 6/1 gray
2.5 Y N5 gray
10 YR 5/2 grayish brown
10 YR 5/3 brown
10 YR 4/1 dark gray
10 YR 6/4 light yellowish brown - 3/1 very dark gray
2/1 black

Surface pitting is common, larger grains extrude the surface, glitter of mica common. Anvil marks are sometimes present on the interiors.

Rims (4) (III A 3, I A 10 (2), III A 4 Colton)

Walls straight or slightly tapered to flat or slightly rounded rims.

Decoration None at Pahrnagat, one sherd from Hiko is fingernail impressed.

Comparisons "Paiute brown" ware does not usually have tuff temper but has large angular feldspar and quartz chunks (0.5-2.0 mm), and the particles generally range larger (fine to very coarse 0.2-2.0 mm). Fingernail impressions are more common at Moapa and Las Vegas. In a large sample overlapping between varieties "A" and "B" is likely. "Paiute" pottery from the Las Vegas area (Berger Site and the vicinity of Burnt Rock Mound near Eglinton Scarp) - is much more variable in temper size and quantity, surface treatment ranges from smooth to very rough and may include marks left by several smoothing devices, including edgground sherds, flat pebbles, soft yielding material such as wads of grasses or wet fingers. These striations and random groovings may be on either the exterior or interior surfaces. Sherds range thicker from Las Vegas, rim and vessel forms are apparently more variable, but this may be due to a much larger sample (in part excavated) from Las Vegas.

General Remarks

Gordon Baldwin's discussion of Paiute utility ware (Baldwin 1950) has provided a general descriptive background for these crude brown wares. Although some taxonomic problems are as yet unresolved, a more precise descriptive report will soon be available for the collection from the Berger Site,

as well as preliminary notes on comparative material from central Nevada, Owens Valley and other parts of the Mojave Desert in eastern California and southern Nevada (Crabtree ND, 1 & 2).

In summary, the collection of pottery sherds from Pahrnagat does fall within the general range of Paiute brown ware (or utility ware) formed by paddle and anvil and having crumbly silty paste. Low firing temperatures produce a black or dark brown (or occasionally lighter brown or reddish) ware that has medium to coarse aplastic inclusions (including quartz, feldspar, tuff and mica) and with a somewhat uneven surface. This collection is distinctive in the inclusion of varying quantities of tuff as temper Tuff is locally available in only the Pahrnagat Valley and not in the Las Vegas area. Other than the temper, Pahrnagat-Hiko ceramics differ mainly in degree and proportion of several characteristics from other brown ware ceramics, and should be regarded tentatively as a variety until a larger sampler is available for study. Literary sources such as Baldwin 1950, Fowler et al. 1967, Fowler et al. 1973, Brooks et al. 1974 provide only partial (or at least incomplete) descriptions but are useful in other ways particularly when used with other sources such as Riddell 1950, Fenenga 1952; Rogers 1936; Tuohy 1956; Coale 1961; Meighan 1959; Euler 1959 and Hunt 1960. From these sources and personal observations, for about a decade, evidence seems to be available which suggests a number of

regional variations in the so-called Paiute or Shoshone pottery. The significance of such deviations in terms of adaptive and culture historical processes, if any, and the relationships taxonomically, if any, to such other paddle and anvil wares as Prescott gray ware, Alameda brown ware (Colton 1958), Tizon brown ware (Dobyns and Euler 1958), Lower Colorado buff ware (Schroeder 1958) and the Southern California brown wares (May 1978) remains enigmatic.

GROUND, PECKED OR ABRADED STONE

A. Manos

I. Uniface, unshaped. (4 fragments) Ovoid cobbles altered only by use on one facet; laterally and longitudinally convex - 884-1, 884-157, 884-143, 883-27.

II. Biface, unshaped. As above with two parallel facets, one fragment, 884-41.

III. Uniface, partially shaped. 884-5 one edge pecked flat vertically, convex longitudinally. The opposite edge is partially ground, continuous with the ground facet. The facet is slightly convex laterally, asymmetrically convex longitudinally. Both ends are pecked and battered slightly. (Basalt porphyry) L-131 mm. W-65 mm, Th-52 mm. (Parcel 3, 200S/100W).

884-144 one edge pecked flat, the grinding facet is slightly convex longitudinally and laterally - no further shaping (sandstone). L-136 mm, W-78 mm, Th-51 mm (Parcel 3, 350S/0W).

886-27 sides pecked and ground. The facet is longitudinally flat, slightly convex laterally - offset plano-convex in section (sandstone). L-123 mm, W-87 mm, Th-59 mm (Parcel 5 500S/100W).

Groundstone Fragments

#884-96 Unifacial mano fragment, quartzite (Parcel 3, 350S/0W).

#884-156 Opposite surfaces ground, flat and concave. Probably metate fragment, granite. (Parcel 3, 350S/100W).

#886-15 mano fragment, sandstone. (Parcel 5, 300S/50W).

#886-26 unidentified fragment, ground sandstone (Parcel 5, 500S/100W).

#886-55 unidentified ground fragment, quartzite (Parcel 5, 500S/150W).

Metate Fragments

#884-97 shallow basin type, pecking marks on basin surface, edge 37 mm thick (Parcel 3, 50S/100W), sandstone.

#884-158 shallow basin type, edge 64 mm thick, granite (Parcel 3, 350S/100W).

#884-159 flat slab type, pecking marks on ground surface, edge 68 mm thick, sandstone. (Parcel 3, 350S/100W).

Miscellaneous Ground or Abraded Stone

Hammer Grinder

#884-166 percussion flaked tool - ovoid in outline approximately one-half of the perimeter percussion flaked to an edge which was subject to intermittent pecking and grinding along the edge (interface of flake scars) the

unflaked portion opposite the flaked edge exhibits some battering. L-75 mm, W-68 mm, Th-47 MM. Parcel 3, 500S/50W. Quartzite.

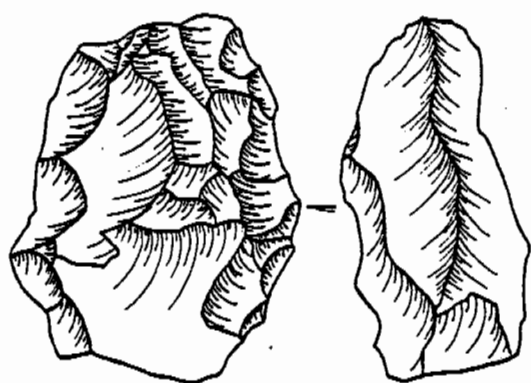
#884-74 percussion flaked implement with intermittent but extensive grinding along flake scar interfaces and perimeters. Quartzite L-111 mm, W-77 mm, Th-65 mm. Parcel 3, 300S/100W.

#884-142 small flat pebble with slight smoothing by grinding on one face - otherwise unaltered. L-59 mm, W-45 mm, Th-14 mm. Parcel 3, 350S/0W.

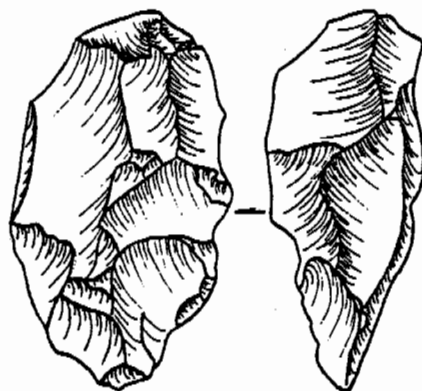
CHIPPED STONE

Flakes and other lithic debitage including core fragments constitute 93.4 percent (8158) of the lithic collections from Pahranaagat. The remainder of the chipped stone consists of cores, preforms/blanks, utilized and/or worked flakes and miscellaneous chipped stone, including bifacial knives, points, drills and graters. The limitations of this study have precluded a detailed functional and morphological study of these specimens. In the sections that follow, basic descriptive categories will be discussed. Frequency by strata and metric observations will be presented in Figures 6 and 9.

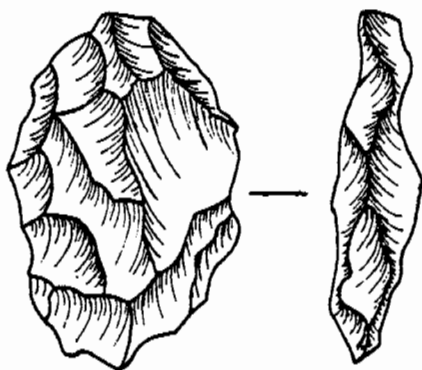
The great majority of the lithic material from the Pahranaagat parcels are a fossiliferous crypto-crystalline quartz variety, probably chert, that is brown to buff red and occasionally white or very dark brown. A few specimens are obsidian or quartzite. The cherts and



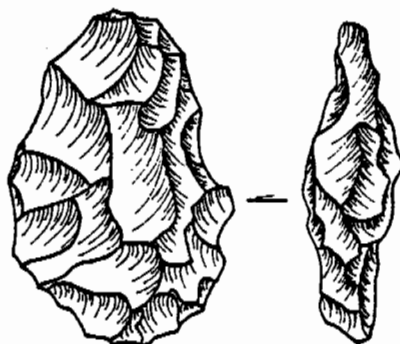
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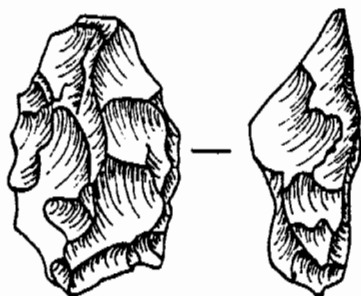
B



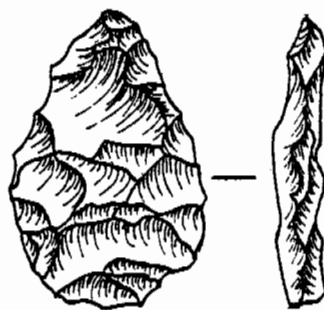
C



D



E



F

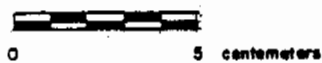


FIGURE 7

quartzite are locally available in alluvial sediment in the fans and washes on the west side of Pahranaagat Valley. Several sources of obsidian are known to occur within 150-250 km of the Ash Spring locality, most notably Kane Springs Wash and the Upper Meadow Wash areas to the east and southeast of the study area.

Specimens which have been categorized as cores represent, basically, early stages in tool manufacture. Many of the items called cores here appear to be actually rejects because the raw cobbles are small and flawed (mean length of 51 cores from Parcel 1 is 82.5 mm, the range is 38-162 mm, T=227). However, an almost equal number of these cores appear to represent stages in the production of flakes or biface preforms. The categories described below reflect these factors.

Cores (Figure 7)

Amorphous

(49 specimens) These are nodules altered only by the direct percussion removal of a few random flakes or chunks, most of the original cortex is intact. They are generally heavily flaked or coarser grained, and larger and heavier than other core forms. It appears that these are a result of casual testing of materials by stoneknappers searching for suitable materials.

Multifacial Cores

(14) These cores have had flakes removed from two or more directions, with no (single prepared) striking platform. Decortication ranges from partial to complete.

Sub-Conical or Plano-Convex Cores

(7) These cores (also called "tortoise back" cores) have a single prepared or natural striking platform. Flakes have been removed around the periphery producing a roughly ovate form, strongly triangular in cross section. Two of these cores, with prepared platforms, show edge damage suggesting either platform abrading or subsequent use as a multi-purpose scraping tool.

Discoidal or Ovate Cores

(18) Discoidal cores have decortication flakes removed from the periphery either unifacially or bifacially. Some specimens have a slight ridge on one face, formed by converging flake scars, and giving the item a plano-convex profile in longitudinal section. Several specimens are apparently rejects with only a few flakes removed. Some original cortex remains on most specimens. These cores are rough proto-forms of the flat-ovate biface preforms discussed below.

Cobble Cores

(2) Cobble cores are stream-worn cobbles from which flakes have been removed. In this instance one specimen is a flat ovate fossiliferous limestone cobble with a series of flakes removed from one margin. The other specimen is

a large, oblong sandstone cobble (length 275 mm, weight 2981.4 grams) from which a large flake was removed from either end, and the resulting flake scars used as a platform from which several smaller flakes were removed. The precise purpose of these items remains enigmatic and it should be noted that no debitage or tools made of either material were recovered by the field team.

Blade Core

(1) One fragment of a blade core was recovered; the striking platform is missing. It is likely that blade (polyhedral) cores were more common than is apparent in this collection. This is suggested by the relatively large numbers of blade flakes in the debitage.

Blanks/Preforms (Figure 7C, D, & F)

The distinction between core, blank and/or preform is often arbitrary, but not necessarily subjective. It has been pointed out that the manufacturing processes of stone tool production is actually a continuum (Muto 1971:47-48), and the Pahrnagat material supports this observation.

The collection from the Pahrnagat parcels consists of 55 items, ranging from rough, minimally modified flakes or cores with a few deep bulbar scars to semi-flattened, ovoid forms with soft-hammer thinning flakes on both faces still unused, and lacking a means of hafting and a final refined (pressure flaked) form. The original cortex is entirely lacking on all but a few specimens. All specimens are bifacially altered, but cannot be likened to known final artifact forms or types.

Utilized And/Or Edge Damaged Flakes

The most significant attribute of this collection of flake tools is the lack of a consistently recurring set of attributes. Lacking in this collection are end and side scrapers, backed blades, denticulate forms, domed or ridged scrapers or any other consistent, distinctive tools. This collection consists of a diverse series of flakes utilized or slightly retouched, apparently as needed. There is no recurring association or clustering of traits such as flake type, wear or retouch locus, edge angle, or edge frequency and number. Any further typological refinement will not be attempted in this report.

Knives (19)

Parcel 1

882-241. Triangular, low convex sides, base complete (Figure 8G).
58 x 31 x 6 mm.

Parcel 2

883-39. Tip missing, convex base, concave sides
N.B. #884-128 (fragment has concave sides similar to 884-40 and 140; 883-39.

Parcel 3

884-32. Convex base portion only
40. Tip missing, asymmetric convex base, concave sides
58. Convex basal portion only
79. Corner fragment, straight and convex sides converge
132. Basal fragment, convex side, convex base
140. Tip missing, convex (asymmetrical) base, concave sides

FIGURE 8



A



B



C



D



E



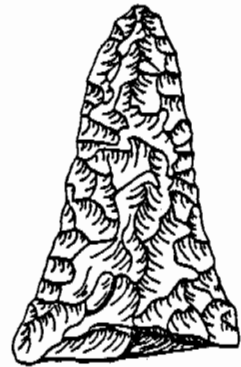
F



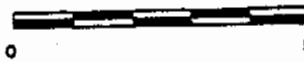
G



H



I



5 centimeters

151. Basal fragment, convex base and sides

149. Basal fragment, convex base

Parcel 4

885-24. Tip fragment (knife) well controlled pressure flaking, convex sides

Parcel 5

886-28. Tip fragment, convex sides well controlled soft-hammer (thinning flakes) and pressure flaked finish

886-30. Tip fragment, fine grain basalt (unique), well controlled flaking

62. Corner fragment, convex base, straight (?) side

886.85. Basal fragment, convex base, straight side (plano-convex)

103. Basal fragment, convex base, straight side

110. Base missing, long "pile", concave sided, converging to a blunt tip. Basal portion appears to have been straight sided, well controlled, with soft-hammer (thinning) and pressure (edge finishing) flaking (Figure 8I).

104. Tip missing, convex base, long slightly convex tapering sides (Figure 8H).

107. Basal portion, convex base, straight sides

Small Bifacially Worked Points (7)

Parcel 1 (1)

882-242. Triangular obsidian, convex base, straight sides, tip missing (Figure 8D).

Parcel 3 (3)

884-39. Obsidian concave base, convex sides (tip of corner missing) 21 x 11 x 3 mm (Figure 8E).

38. Triangular, low side notches, concave base, straight sides. 18 x 10 x 2 mm.

66 Convex sides, corner notches. 35 x 18 x 4 mm (Figure 8A).

Parcel 4 (1)

885-21. Triangular, stemmed, square shouldered. 23 x 16, 3 mm
(Figure 8B).

Parcel 5 (2)

886-70. Triangular obsidian, slightly asymmetrical, curved longitudinally, tip missing, straight base and sides

87. Triangular, straight base and sides, tip missing (Figure 8C)

Drills

Parcel 3 (1)

884-141. Flake, bifacially pressure flaked to an elongate pile (tip missing), on the proximal flake end - the distal portion of the flake, a hinge fracture, is unaltered (Figure 8F).

Parcel 5 (1)

386-86. Triangular, flared at base, pile elongate, tapered, completely pressure flaked. 20 x 10 x 3 mm.

Gravers (2) both unit #200S/250W, Parcel 1

882-190. A thick, tabular side struck flake with one end trimmed by removing two small adjacent flakes to form a beak-like projection which has been blunted and shows slight crushing and edge damage. L49 mm, W 30 mm, Th 13 mm.

882-191. A thick irregular shatter spall, with a beak on one edge, formed at the intersection of two removed flakes. The beak and adjacent edges are crushed and blunted by use. L63 mm, W 26 mm, Th 14 mm.

Miscellaneous (Worked) Stone

Parcel 1

802-117. (250S/150W fan) Cobble biface 144 x 92 x 51 mm. Limestone. A cobble chopper, bifacially trimmed by direct percussion on one end, subsequently altered by use (battering).

Parcel 2

883-57. (580S/50W fan) Edge battered cobble biface 126 x 98 x 70 mm. A dolomite cobble bifacially flaked (percussion) to an edge along one-half the periphery, battered and crushed unilaterally.

883-28. (400S/50W pediment rim) Quartz crystal. 50 x 35 x 20 mm. A fragmentary quartz crystal, otherwise unaltered. These items have been widely reported in archaeological contexts such as Etna Cave, about 55 kilometers E-NE of Ash Springs (cf. Wheeler 1973:39).

Parcel 3

884-3. (200S/150W fan) Edge battered half cobble (angular chopper) 91 x 87 x 85 mm. Angular split cobble with use wear on one edge (chert).

884-4. (200S/150W fan) Biface, split cobble, limestone. 101 x 73 x 52 mm. A limestone cobble-chopper, split and percussion flaked at one end, there is slight edge damage.

884-6. (200S/150W fan) End and side battered cobble.
 90 x 77 x 44 mm. Sandstone. Hammerstone, a semi-tabular
 fire scorched sandstone cobble with angular corners and
 one edge altered by battering and crushing.

884-7. (200S/150W) End trimmed and utilized half cobble.
 77 x 70 x 43 mm. Chert cobble trimmed by percussion flaking
 on one edge and utilized (slight crushing).

Miscellaneous Stone

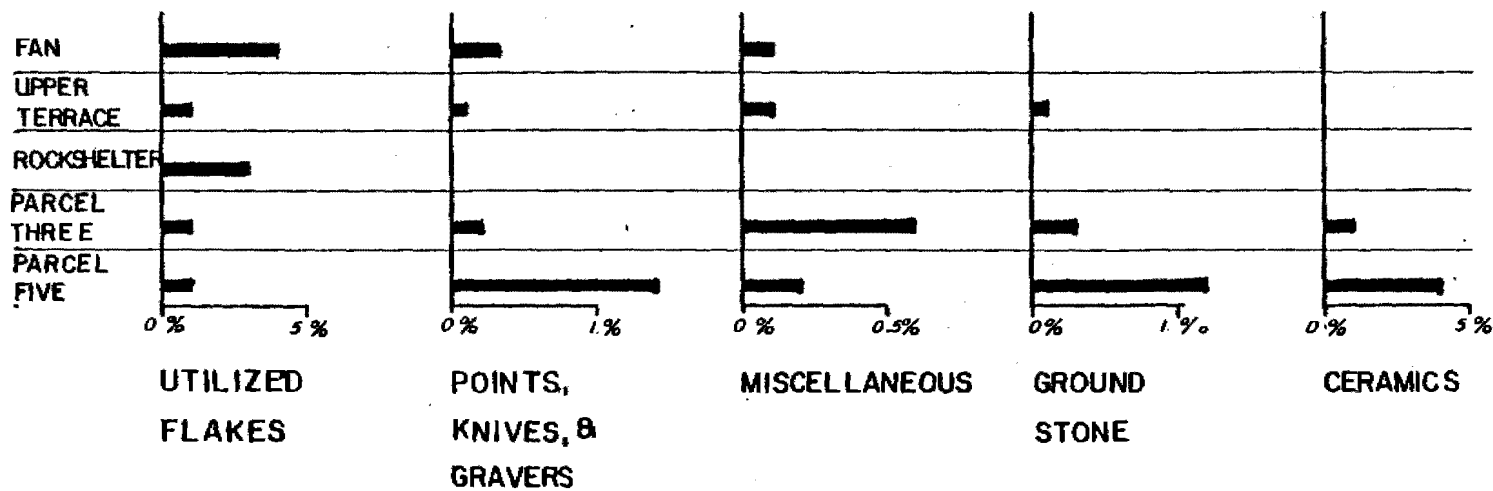
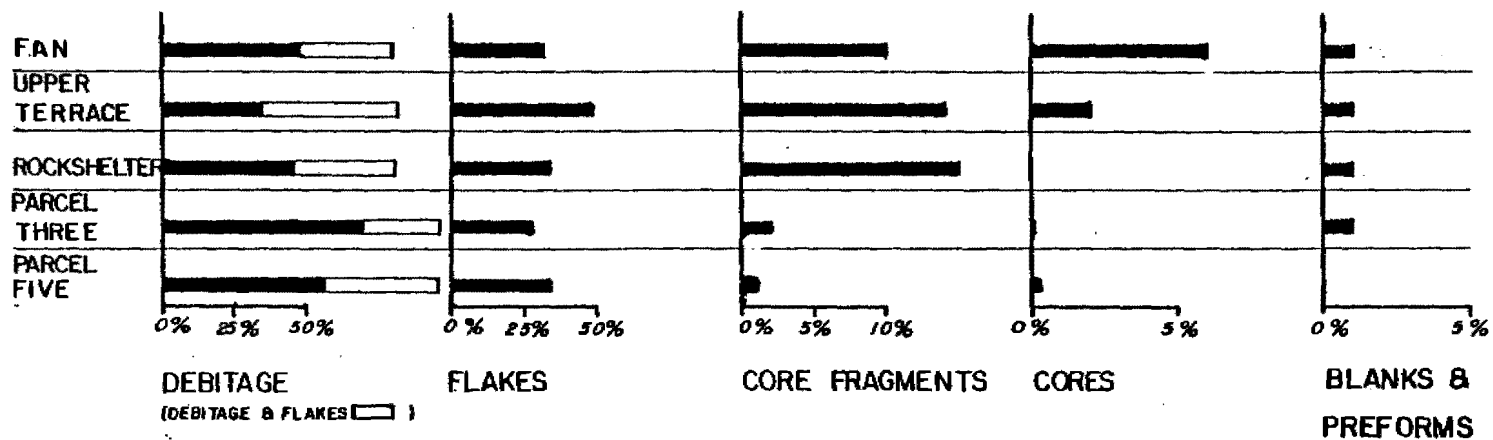
884-95. (300S/0W fan) Quartzite spall, battered. 73 x 61 x
 31 mm. A quartzite spall with unifacial flaking, or
 battering from use, along one edge.

884-104. (250S/150W fan) Shaped flat slate cobble.
 100 x 88 x 33 mm. A flat oval slate cobble with about two-
 thirds of the periphery percussion trimmed (to form an oval).
 Function is unknown.

ARTIFACT DIMENSIONS (MILLIMETERS)						
	Length		Width		Thickness	
	Min	Max	Min	Max	Min	Max
Manos (3)	123	136	65	87	51	59
Multifacial Cores (14)	45	103	42	82	25	52
Sub-Conical Cores (7)	60	80	40	60	32	37
Discoidal Cores (18)	54	102	44	86	19	51
Blanks/ Preforms (55)	29	109	9	66	6	40
Utilized Flakes (126)	13	69	11	52	2	24

Figure 6

FIGURE 9



DISTRIBUTION OF CULTURAL MATERIALS

The following discussion of the cultural materials found on the Pahrana gat UTA land sale parcels is based on the frequency of occurrence of the various artifact types described in the previous section. It assumes that there is cultural validity in the strata that are being compared. The strata used here are unlike those originally proposed. They were developed from observations regarding the similarity of frequency of artifact types in individual units. Other compilations of this data are possible, but the one presented seems to best demonstrate the variability of artifact types and physiographic types.

Strata

The surface collection areas were originally selected to sample three environmental strata: the alluvial fans, upper terrace and floodplain strata. These strata were based on initial observations about the kinds and distributions of artifacts on the sale area. They suggested variations in these materials appeared to correlate with variations in physiographic types. Subsequent observation during the field collection and laboratory work suggested that the variation in cultural material was not completely consistent with the original strata.

The floodplain was not completely artifact free as originally expected. Seven pieces of debitage, 21 cores, and one metate fragment were collected. These 29 artifacts are probably intrusive and do not comprise a significant sample.

The alluvial fan stratum proved to be more complex than

originally expected. The fan in Parcels one and four contain quarriable material while parcels three and five do not. There is also a corresponding difference in the artifact assemblages collected from them. Parcels three, five and the remainder of the fan stratum have therefore been tabulated separately.

Originally, the upper terrace was considered to be a uniform stratum; however, when the sample was drawn, one collection unit (200S/250W) was located just above site 26LN649. Although not considered significant initially, the distribution of cultural material in Parcel one is affected by the presence of this large rockshelter which was probably used as a dwelling. A more complex set of activities would probably be associated with a dwelling because more time would be spent there than elsewhere. The cultural material here would be less likely to be directly related to any environmental factor but rather represent a general set of activities that occurred in the Pahrnagat environment. Using this reasoning, Unit 200 south 250 west was tabulated separately and referred to as the rockshelter stratum.

Frequency within the assemblage from each stratum was calculated for each of the tool types and the following discussion is based on this particular formulation of the Pahrnagat data. The flexibility of the methods and techniques used in this study allows some changes in the strata employed. The frequency diagram (Figure 9) presented

illustrates the variation in the tool assemblages collected from each stratum. The predominance of lithic manufacture debris in all the assemblages necessitated changes in the scale on several of the artifact assemblages. The following description splits the artifacts into two general categories: lithic manufacture-related cultural material and cultural material not related to lithic manufacture.

MANUFACTURE-RELATED LITHIC CULTURAL MATERIAL

Miscellaneous Debitage

The Miscellaneous Debitage artifact class comprises 35 to 70 percent of the material of each stratum. It is most frequent in the material from Parcel 3 and least frequent in the material from the upper terrace. From the fan, rockshelter, and Parcel 5 strata,debitage frequencies lie between 45 and 53 percent of the assemblage.

End and Side Struck Flakes

The flake artifact class is the second most common from the Pahrana gat collection comprising 25 to 48 percent of the assemblages from each stratum. The assemblages from the fan, rockshelter, Parcel 3, and Parcel 5 have a flake frequency that lies between 30 to 34 percent of the assemblages. The most frequent occurrence of flakes is associated with the upper terrace (48 percent).

Core Fragments

This class of artifacts occurs in the fan, rockshelter, and Parcel 3 assemblages with frequencies of between one and

sixteen percent. The three higher occurrences of this artifact class are associated with the rockshelter (16%), upper terrace (14%) and the fan (10%), and the lower frequencies are associated with the assemblages from Parcel 3 and 5, with a mean variance between the two groups of 12.3 percent.

Cores

Cores occur on four of the strata with frequencies ranging between 0.2 percent and 5 percent. The fan stratum assemblage (5%) had the highest occurrence of cores followed by Parcel 3.

Blanks and Preforms

The blanks and preform class make up one percent of the assemblages from the fan, upper terrace, rockshelter and Parcel 3 strata. This class was not present on Parcel 5.

Discussion

This portion of the artifact assemblages collected from the Pahrnagat UTA sales parcels is the result of various lithic manufacture activities which have produced the greater part of the artifact assemblage in each stratum. Each artifact class does not have the same frequency in each stratum. These variations in frequencies of specific kinds of manufacture related artifacts suggest some variation in the location of the activities that produced them.

The combined debitage and flake frequency ranges from 82 to 95 percent of the assemblages from all five strata exhibiting a bimodal variation. The fan, upper terrace, and rockshelter strata assemblages have flake and debitage

frequencies that fall between 79 and 82 percent while Parcels 3 and 5 fall between 90 and 96 percent with variation of the means of the two groups of 11 percent.

This variation between these two groups of strata is also apparent in the distribution of core fragments. Here the difference between the means of the fan (10%), upper terrace (14%), and rockshelter strata (16%) and the Parcel 5 (2%) and 3 strata (1%) is 11.8 percent. The relative distribution of cores does not follow this pattern. The highest concentration frequency of cores is found in the assemblage collected from the fan stratum and probably reflects the availability of lithic raw materials in this stratum. The core fragment frequency is three percent lower in the upper terrace assemblage and cores are absent from the rockshelter. The difference in core frequency may reflect the relative availability of raw material for lithic tools; however, the higher occurrence of both flakes and core fragments on the terrace suggest an increased core reduction in this stratum over the fan stratum. This inverse relationship between the relative frequency of core and core fragments is more apparent on the rockshelter. No cores were recovered from this stratum. Since there are abundant core fragments found in this assemblage, a larger sample would probably include cores. The sample obtained does establish that this artifact type is not a significant element in the assemblage collected from this stratum. Again since core fragments are a major element in this assemblage, it is likely that cores found in or imported to this area were completely exhausted.

Unlike the upper terrace, flakes are not more common than debitage in the assemblage. The complete exhaustion of cores and the lower flake content may be related to the association of this unit with a site such as the rockshelter where people would probably spend much time and tended to completely consume cores and flakes found near the shelter. The higher frequency of cores on the fan is possibly related to the fan's use as a source of lithic raw material. Here unmodified nodules were probably first broken and, if found to be flawed, discarded. Unflawed material would probably be used up or removed.

CULTURAL MATERIAL NOT RELATED TO LITHIC MANUFACTURE

This group of artifacts are used for subsistence activities or the production of nonlithic artifacts such as clothing and basketry.

Utilized Flakes

Utilized flakes occur with higher frequencies in the fan (4%) and rockshelter (3%) assemblages and lower frequencies in the upper terrace (1%), Parcel 3 (1%), and Parcel 5 (1%).

Points, Knives, and Gravers

The highest frequency of occurrence in this artifact class is in the assemblage from Parcel 5 (1%), followed by the fan (0.3%), Parcel 3 (0.2%) and the upper terrace (0.1%).

Ground Stone

The ground stone artifact class comprises 0.5% of the assemblage from Parcel 3 and 1.3% of the assemblage from

Parcel 5. Ground stone did not occur in assemblages from the fan, upper terrace, or rockshelter strata.

Ceramics

Ceramics occur in the assemblages collected from Parcels 3 and 5 and do not occur in the other strata.

Discussion

The similarity of the assemblages collected from the fan, upper terrace, and rockshelter strata and the assemblages from Parcels 3 and 5, apparent in the manufacture related artifact classes, is also apparent in this division of the cultural material collected from Pahranaagat, except the higher occurrence of these artifact classes is associated with the latter group. Utilized flakes are the exception. Here, the higher occurrence is associated with the rockshelter and fan. Their presence on the fan may be related to exploitation of natural resources while their presence on the rockshelter terrace may be related to manufacture activities as well as resources exploitation.

Points, knives and graters; ground stone; and ceramics are more common in the assemblages from Parcels 3 and 5 and have mean variations of 0.4%, 0.85% and 3%. The diversity of these artifacts suggests that more universal activities such as those associated with campsites occur in these strata.

CONCLUSION

The Artifact Assemblage: Functional and Historical Interpretations

The Pahrnagat collection clearly reflects a strong emphasis on certain stages of lithic manufacture. The presence of some 8158 items classed as chunks, shatter, flakes and core fragments, and constituting 93.4 percent of the total collection, strongly supports this statement. Frequencies and distributions of the several gross artifact categories have been reviewed and summarized above, and it is clear that several different kinds of activity areas are represented here. Among these activities are numerous stages of reduction of raw lithic material to finished artifacts. This material was quarried locally from the fans and terraces and subsequent procedures carried out at specific loci. It is also apparent that other activities not specifically or directly involved with lithic tool manufacture also are represented here, in part overlapping spatially with loci of greater concentration of lithic workshop material. All of Parcel 5, Unit 200S/250W (rockshelter), and the alluvial fan of Parcel 3 have small samples of tools associated with food procurement and processing, but the rockshelter and OW/350S of Parcel 3 also have a heavy concentration of lithic workshop material.

The lithic workshop material has a number of attributes which indicate the focus of lithic technology in this section of Pahrnagat Valley. The process of lithic reduction and artifact production is apparent in this collection.

Although the process from start to finish should be regarded as continuous, basically, it is useful to specify a series of stages in the manufacturing process:

1. Initial testing of the parent mass or cobble, producing core fragments, shatter and miscellaneous debitage.

2. Prepared cores - tabular, flat and multidirectional cores, bi-directional blade cores and sub-conical cores worked with soft-hammer technique producing miscellaneous shatter, truncated flakes, end and side struck flakes, prepared bifacial blanks and/or preforms, exhausted cores and artifacts. The latter by direct use of flakes.

3. Bifaces and end and side struck flakes reduced by a combination of soft hammer and pressure techniques to finished bifacial tools, such as knives, points, and drills. Further debitage is also a by-product of this stage of the process.

The total lack of hammerstones and scarcity of other percussion implements suggests the use of soft hammer or baton. This interpretation is further strengthened by the presence of large numbers of end and side struck flakes, and the frequent occurrence of thin, wide "thinning" flakes on both preforms and finished tools. These techniques are well controlled and skillfully applied as are the final finishing work with pressure flaking observed on the finished and fragmentary knives.

The finished artifact assemblage on the Pahrnagat parcels reflects both subsistence and maintenance or related

domestic activities, and provides comparative data for placing these materials culturally and temporally. Subsistence and related food preparation activities are reflected by the presence of the milling complex (mano and metate) and pottery. Game procurement by the small projectile points and a variety of maintenance and tool manufacturing activities are reflected by the presence of small wood working tools such as utilized flakes, graters, drills, large knives, choppers and hammergrinders. This is a bare outline of the cultural systems which operated here. More detailed analyses leading to descriptions and understandings of these systems will have to await a more far-reaching field investigation than this limited study has been able to undertake.

It is apparent that more than one primary activity took place at several of the larger concentrations; contemporaneity of these activities is not demonstrable, however, with these surface materials. Stylistic features of some of the artifacts give some clues as to the time period relevant to the Pahrana gat collection. The pottery is of two closely similar varieties of the so-called "Shoshone Ware" (cf. Fowler et al. 1967) or "Paiute Utility Ware" (Baldwin 1950) associated with the Uto-Aztecan speaking southern Paiute, of whom the aboriginal inhabitants of Pahrana gat are considered to be a local band (cf. Kelly 1934; Euler 1963) who lived in the area into historic times. Madsen has summarized the dating of pottery similar

to these local varieties from several sites in southeastern Nevada, all within 60 to 100 kilometers of the study locality. These show the earliest presence of this ceramic ware as occurring between A.D. 1050 and 1250 (Madsen 1975:83, Table I), clearly placing these ceramics within the final prehistoric period.

Further support for placing these materials in this late time period comes from small point styles. Two points (#884-66 and #885-21) fall generally within the Rose Springs-Eastgate style. This point style has been dated as early as 680 B.C. (2630 \pm B.P.) and as late as A.D. 1720 (230 \pm 100 B.P.) (Hester and Heizer 1973:7-8). But the main block of dates falls between A.D. 620 (1330 \pm 90 B.P.) and A.D. 1110 (840 \pm 340 B.P.) (Hester and Heizer 1973:7-8). The earlier date may be in error or the association of artifact and dated material spurious. Another consideration in evaluating this supposed early date for the Eastgate-Rose Spring series is in the rather disorderly state of Great Basin point typologies, in which there are no consistent standards, resulting in confusion and misleading application of type names to diverse specimens. Lacking clearly formulated clusters of traits or attributes has led to contradictory assignment of type by different investigators.

Two other groups of points found at Pahrnagat are also named and dated. Both are widespread beyond the Great Basin and the significance of variability within each general type has not been well studied. Cottonwood triangular points (#882-242, #884-34, #886-70, #886-87) are dated

between A.D. 900 (1050 \pm 100 B.P.) and A.D. 1853 (Ferraro n.d.). Desert side-notch points are dated between A.D. 440 (1510 \pm 110 B.P.) and A.D. 1770 (230 \pm 100 B.P.) (Ibid.:9). All of the dates given are from Great Basin sites.

In summary most of the material from the Pahrnagat parcels relates to the late southern Paiute occupation of the area, probably after A.D. 1000. The dominant activity focused on the lithic workshop, utilizing locally available materials. Also represented here are materials relating to domestic and maintenance activities. These collections have provided a small glimpse at an extinct way of life. Much remains to be done before the lifeways of the late prehistoric Pahrnagat Paiute can be discussed with any confidence and familiarity. Nothing found could be attributed to any of the earlier peoples (if indeed they were ethnically separate) known from research in adjacent areas (cf. Fowler et al. 1973). This is a modest beginning, but a contribution to expand the knowledge of the prehistoric peoples of southern Nevada.

BIBLIOGRAPHY

- Aikens, C. Melvin
1970 Hogup Cave. University of Utah Anthropological Papers, No. 93, Salt Lake City.
- Baldwin, Gordon C.
1950 "Archaeological Survey of the Lake Mead Area". In For the Dean: Essays in Anthropology in Honor of Byron Cumming, Erik K. Reed and Dale S. King (eds.), Hohokam Museum Assoc.
- Bean, Lowell John and Katherine Siva Saubel
1972 Temalpakh-Cahuilla Indian Knowledge and Usage of Plants. Malki Museum Press, Morongo Indian Reservation.
- Bradley, W. Glen and James E. Deacon
1967 "The Biotic Communities of Southern Nevada." Nevada State Museum Anthropological Papers No. 13, Carson City, Nevada.
- Brooks, Richard H., Daniel O. Larson, and Kathyryne Olson
1975 Prehistoric and Historic Research Along the Navajo-McCullough Transmission Line. Unpublished Report, Nevada Archaeological Survey, University of Nevada, Las Vegas.
- Brooks, Richard H., Daniel O. Larson, and Kathyryne Olson
1977 The Archaeology of the Mariah Site, 26LN618, White River Narrows, Lincoln County, Nevada. Nevada Archaeological Survey, Southern Division, report number 2-1-23.
- United States Department of Interior, Bureau of Land Management
1978 Data from "Forage Range Survey Type Computation" for Caliente Planning Unit, Pahrnagat West Allotment.
- Coale, George L.
1963 "A Study of Shoshonean Pottery". Tebiwa, Vol. 6, No. 2, Pocatello.
- Colton, Harold S.
1953 Potsherds: An Introduction to the Study of Southwestern Ceramics and Their uses in Historic Reconstructions. Museum of Northern Arizona Bulletin, Glen Canyon Series No. 25, Flagstaff.

Colton, Harold S.

1958 Wares 14, 15, 16, 17, 18. Revised Descriptions In "Pottery Types of the Southwest", Harold S. Colton (ed.), Museum of Northern Arizona-Ceramic Series No. 3D, Flagstaff.

Crabtree, Robert H.

N.D. The Berger Dump Site. Manuscript in preparation.

Crabtree, Robert H.

N.D. Brown Wares of the Mojave Desert. Manuscript in preparation.

Downs, James F.

1966 "The Significance of Environmental Manipulation in Great Basin Cultural Development". In "The Current Status of Anthropological Research in the Great Basin", 1964, Warren, L. d'Azevedo, et al., (eds.), Desert Research Institute, Social Sciences and Humanities Publication No. 1, Reno.

Eakin, Thomas E.

1963 Ground-Water Appraisal of Pahranaagat and Pahroc Valleys Lincoln and Nye Counties, Nevada. Ground Water Resources Reconnaissance Series Report 21, United States Geological Survey and Department of the Interior.

Euler, Robert C. and Henery F. Dobyms

1956 Tentative Correlations of Arizona Upland Yuman Ceramics. Paper Read April 30, 1956, 32nd annual meeting, Southwestern Rocky Mountain Division, American Association for the Advancement of Science.

Euler, Robert C.

1959 "Comparitive Comments on California Pottery." University of California Archaeological Survey, Annual Report 1958-1959, Los Angeles.

Euler, Robert C.

1966 Southern Paiute Ethnohistory. University of Utah Anthropological Papers, No. 78, Salt Lake City.

Fenenga, Franklin

1952 "The Archaeology of Slick Rock Village, Tulare County, California." American Anthropology, Vol. 17, No. 4.

Ferraro, David D.

N.D. The Archaeology of Las Vegas Wash. Manuscript in preparation, Archaeological Research Center, University of Nevada, Las Vegas.

- Fish and Wildlife Service
 1968 "Birds of the Pahranaagat National Wildlife Refuge." United States Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Refuge leaflet 231.
- Fowler, Catherine Louise Sweeny
 1972 Comparitive Numic Ethnobiology. Unpublished Masters Thesis, University of Pittsburg.
- Fowler, Don D. and Catherine S. Fowler
 1971 Anthropology of the Numa: John Wesley Powell's Manuscript on the Numic Peoples of Western North America 1868-1880. Smithsonian Contributions to Anthropology, Number 14.
- Fowler, Don D., David B. Madsen, and Eugene M. Hattori
 1973 "Prehistory of Southeastern Nevada." Desert Research Institute Publications in the Social Sciences No. 6, Reno and Las Vegas, Nevada.
- Fowler, Donald D. and Floyd W. Sharrock
 1973 "Survey and Test Excavations." Desert Research Institute Publications in the Social Sciences No. 6, Reno and Las Vegas, Nevada.
- Hester, Thomas R. and Robert F. Heizer
 1973 Review and Discussion of Great Basin Projectile Points: Forms and Chronology. University of California, Archaeological Research Facility, Berkeley, California.
- Higgs, Gerald B.
 1976 Lost Legends of the Silver State. Western Epics, Salt Lake City, Utah.
- Hunt, Alice
 1960 Archaeology of the Death Valley Salt Pan, California. University of Utah Anthropological Papers No. 47, Salt Lake City.
- Kelly, Isabel T.
 1934 "Southern Paiute Bands." American Antiquity, Vol. 36, No. 4, Mensha, Wis.
- Lamb, Sydney M.
 1958 Linguistic Prehistory in the Great Basin. International Journal of American Linguistics 24.
- Madsen, David B.
 1973 "The Pollen Analysis of the O'Malley Shelter." Desert Research Institute Publications in the Social Sciences, No. 6, Reno and Las Vegas.

- Madsen, David B.
 1975 "Dating Paiute-Shoshone Expansion in the Great Basin." *American Antiquity*, Vol. 40, No. 1.
- Madsen, Rex E.
 1977 Prehistoric Ceramics of the Fremont Museum of Northern Arizona. Ceramic Series, No. 6, Flagstaff, Arizona.
- May, Ronald V.
 1978 "A Southern California Indigenous Ceramic Typology." *Journal of Archaeological Research Association*, Vol. 2, No. 2.
- Meighan, Clement W.
 1959 "Varieties of Prehistoric Cultures in the Great Basin Region." *Masterkey*, Vol. 33, No. 2, Los Angeles.
- Muto, Guy Roger
 1971 A Technological Analysis of the Early Stages in the Manufacture of Lithic Artifacts. Unpublished M.A. Thesis, Department of Anthropology, Idaho State University.
- Palmer, Edward
 1871 Food Products of the North American Indians. United States Department of Agriculture.
- Riddell, Harry S.
 1951 "Archaeology of a Paiute Village Site in Owens Valley." University of California, Archaeological Survey Report No. 12, Berkley.
- Rogers, Malcolm J.
 1936 "Yuman Pottery Making." *San Diego Museum Papers* No. 2.
- Rooke, Lloyd, L.N. Langan, and D.G. Bagley
 1968 Soil Survey of the Pahrnagat-Penoyer Areas, Nevada. United States Department of Agriculture Soil Conservation Service Publication.
- Shepard, Anna Osler
 1956 Ceramics for the Archaeologist. Carnegie Institution of Washington, Publication 609.
- Shroeder, Albert
 1958 Lower Colorado Buff Pottery. Museum of Northern Arizona Ceramic Series No. 3D, Harold Colton (ed.).

- Steward, Julian H.
1938 Basin-Plateau Aboriginal Sociopolitical Groups.
Bureau of American Ethnology, No. 120, Washington.
- Tuohy, Donald R.
1956 "Shoshoni Ware from Idaho." Davidson Journal
of Anthropology, Vol. 2, No. 1, Seattle.
- Wheeler, S.M.
1973 "The Archeology of Etna Cave, Lincoln County,
Nevada." Desert Institute Publications in the
Social Sciences, No. 6, Reno and Las Vegas.