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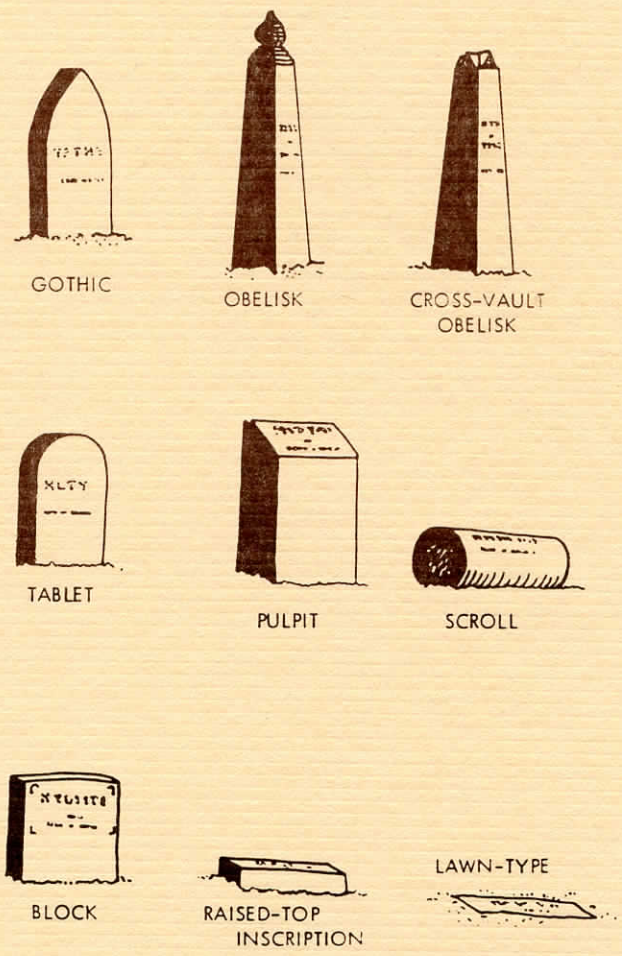

Traditional types of grave-markers (from Francaviglia 1971), (see article by Reno and Reno, page 14).

Nevada Archaeological Association

Nevada Archaeological Association

The design for the NAA logo was adapted by Robert Elston from a Garfield Flat petroglyph.

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FUTURE ISSUES

Manuscripts submitted to the *Nevada Archaeologist* should follow the style guide of the April, 1983 issue of *American Antiquity*. Manuscripts should be typed and double spaced throughout, including notes and bibliography, and illustrations should be camera-ready with a caption typed on a separate sheet of paper, also double-spaced. Something less than these standards will be accepted reluctantly if what you have to say is more important than the format expressed above.

More manuscripts relating to Nevada archaeology and anthropology are solicited.

NEVADA Archaeologist

Volume 7, Number 1 1989

EDITOR'S PAGE

The *Nevada Archeologist* (once again) must apologize to Thomas Stafford. In Volume 6, number 1, his name was left out of the acknowledgements in an article and in Volume 6, number 2, his name was misspelled due to a typographical error. In another printing error in the last issue, the scale bar was erased from the photograph on page 27.

This issue includes a diverse selection of papers covering prehistoric as well as historic archeology, and one article that discusses archeological method and interpretation. I hope to keep a balance in subject matter and I will be trying to find ways to improve our printing quality and the journal's overall attractiveness.

Special thanks go to Janis Klimowicz, editorial assistant, who singlehandedly creates the *Nevada Archeologist* by re-typing every submission in proper format, proofreading all pages, and ensuring that the illustrations, text, and tables are correctly arranged.

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ARCHEOLOGICAL RESEARCH ALONG THE COLORADO RIVER IN SOUTHERN NEVADA

Kevin Rafferty
Division of Anthropological Studies
Environmental Research Center
University of Nevada - Las Vegas

Introduction

Despite the relatively early advent of archeological fieldwork along the Colorado River (Rogers 1929, 1939, 1945), little is known concerning the prehistory of the region. In July, 1986, the Division of Anthropological Studies conducted a mitigation project at two archeological sites on the west bank of the river along its terraces. The sites in question -- 26Ck1405 and 26Ck1407 -- were investigated via mapping, photography, and the surface collection of artifacts. The nature of these sites has provided valuable data and insights into patterns of lithic procurement in the upper portion of the Lower Colorado River area. The procurement patterns are probably age-old ones that held over many thousands of years (see Rafferty 1986a).

Site Descriptions and Environmental Setting

The sites in question are located on an alluvial terrace overlooking the Colorado River south of Laughlin, in Clark County, Nevada (Figure 1). Both were recorded by earlier surveys (Brooks et al. 1976; Rafferty 1986a), but a decision to conduct data recovery activities on these sites was made only after the Bureau of Reclamation decided to conduct open pit gravel-mining in the subject area.

Site 26Ck1405 (Figure 2) is a lithic scatter accompanied by four fragile circular or oval pattern features (that is, rock rings and/or circular depressions). The artifact scatter measured 17.5 m (N-S) by 20 m (E-W) at its largest dimensions. The first feature, A, is on the western edge of the site and is a 2.5 m long linear arrangement of cobbles. A previous report (Brooks et al. 1976) described the feature as a semicircle with an opening on the western side, but recent bulldozer blading that occurred west of the site destroyed a portion of this feature. Feature B is an oval depression or ring that is bordered by basalt and quartzite cobbles, and that measures 1.5 m (N-S) by 1.75 m (E-W) on the eastern edge of the alluvial terrace (which is also the eastern edge of the site). Feature C, 1 m north of B, is an oval depression with the desert pavement removed from the interior. The cobbles and gravels from this pavement were placed as a border around the depression. The feature measures 1.75 m (N-S) by 2 m (E-W). The fourth feature, D, an oval ring of basalt cobbles and low gravel walls, measures 1 m (N-S) by 3 m (E-W) at its maximum dimensions.

The second site, 26Ck1407 (Figure 3), was originally described as a 15 m^2 lithic scatter situated on a small gravel bench or finger of the alluvial terrace (Brooks et al. 1976). Redefinition of the site indicated a larger

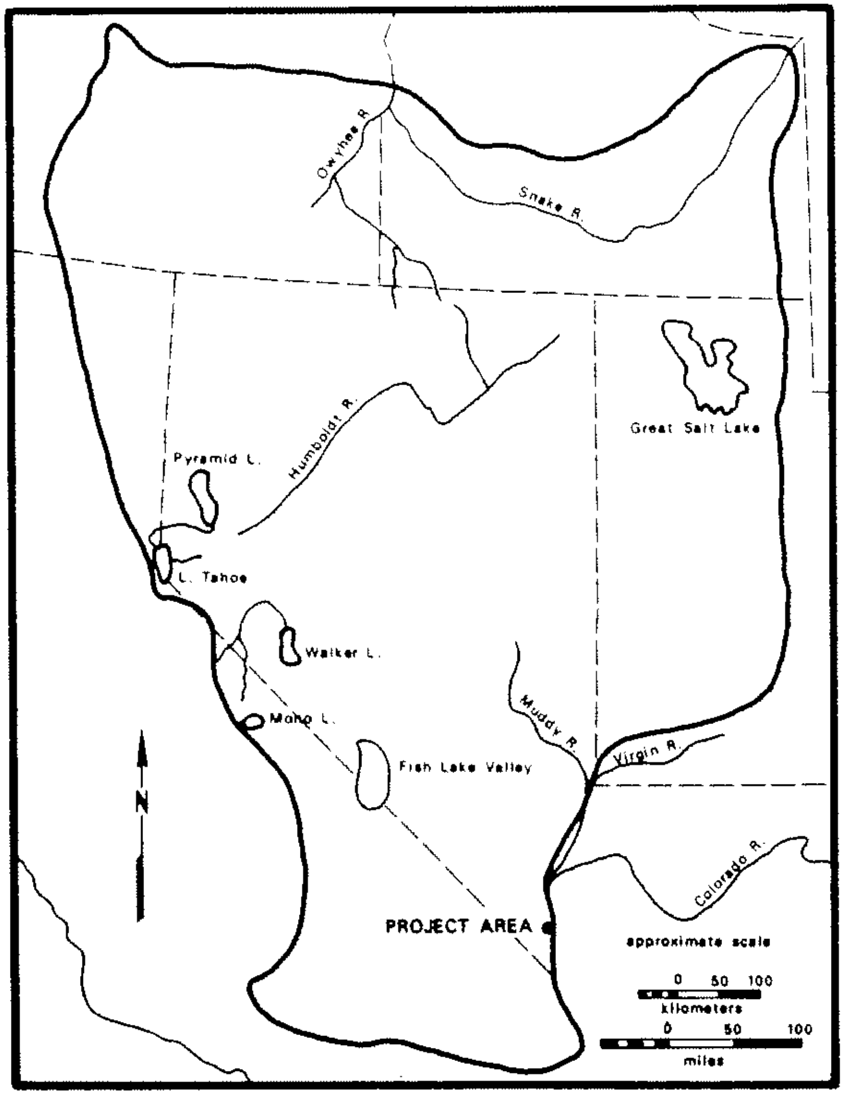

FIGURE 1

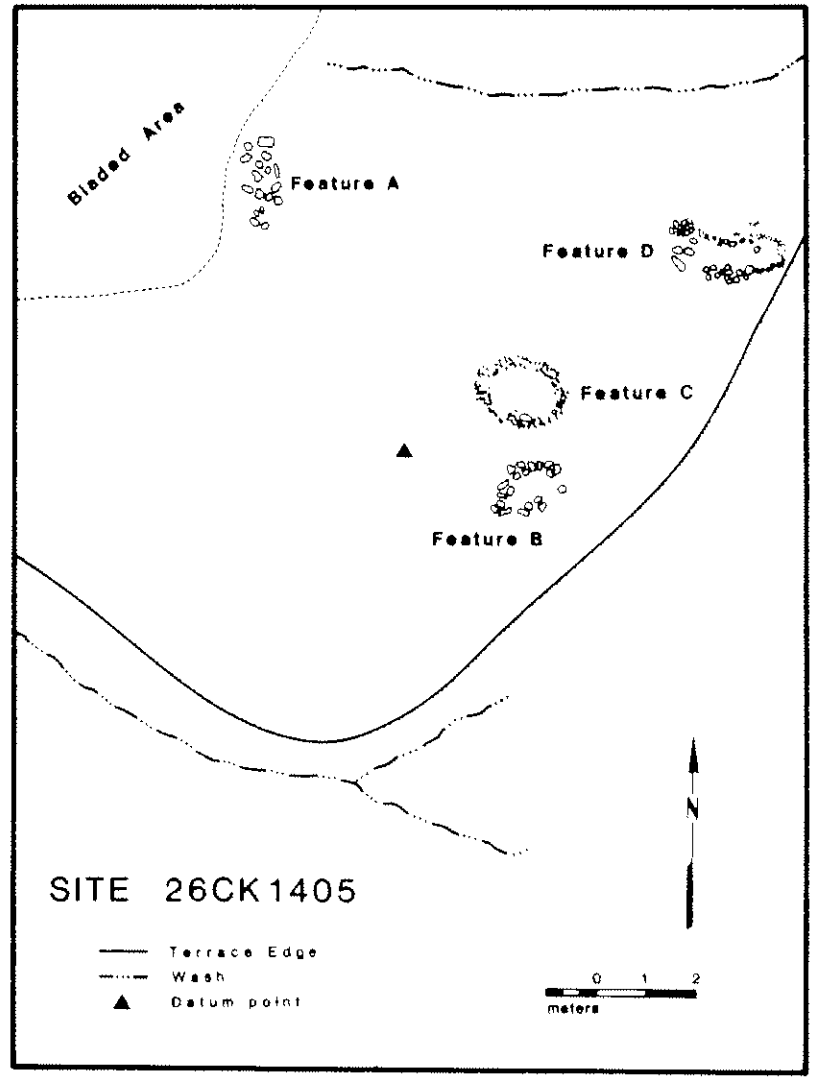

FIGURE 2

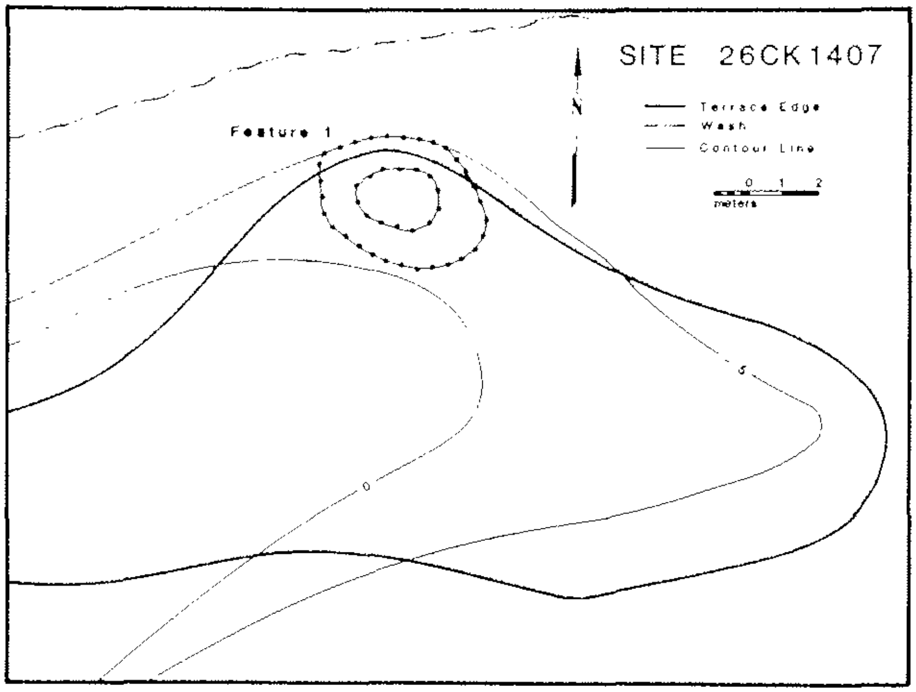

Figure 3
Site 26Ck1407

lithic scatter that measured 17 m (N-S) by 25 m (E-W). Contained within it is a single circular depression with low gravel walls, 2 m in diameter, at the northern end of the site, along the terrace edge.

As indicated, the sites are situated on the second alluvial terrace on the west bank of the Colorado River. This terrace is at the base of an alluvial fan that originates in the Newberry Mountains west of the project area. The alluvium ranges in age from Pliocene to Recent, underlain by lenticular lenses or beds of gravel, silt, and clay. The soils of the terraces are coarse-grained and are derived from the granitic deposits located in the Newberry Mountains. The terrace substrates consist of gravel to cobble-sized cryptocrystalline materials, mainly quartzites, along with basalts, all of which are heavily rolled and patinated. The surface materials are cemented into a weak desert pavement typical of this portion of the Mojave Desert (Brooks et al. 1976, 1977; Longwell et al. 1965).

The most common native plants along the river floodplain and the first terrace below the sites are arrowweed (Pluchea sericea), mesquite (Prosopis juliflora and P. pubescens), and the introduced salt cedar (Tamarix pendantra). The terrace upon which the sites are located is dominated by creosote (Larrea tridentata) and burrobush (Franseria dumosa), accompanied by saltbush (Atriplex sps.), catclaw (Acacia greggii), snakeweed (Gutierrezia sarothae), Jimson weed (Datura meteloides), and desert spiny herb (Oxytheca sps.). Various cacti also live on the terrace, including buckthorn cholla

(Opuntia acanthocarpa), jumping cholla (Opuntia bigelovii) and beavertail (Opuntia basilaris) (Brooks et al. 1976, 1977).

Faunal resources include shrews (Soricidae), jackrabbit (Lepus californicus), desert cottontail (Sylvilagus audobonii), and a variety of small rodent and lizard species. Bighorn sheep (Ovis canadensis) live on the upper alluvial fan and in the nearby Newberry Mountains (Brooks et al. 1977).

Previous Research

Little work has been conducted in the immediate project area: a single off-road race-course survey (Hatoff 1975) and two surveys in conjunction with a proposed land transfer between the Bureau of Land Management and the State of Nevada (Brooks et al. 1976, 1977). The latter two surveys covered 13 square miles of land and recorded 31 archeological sites and 19 artifactual loci. However, reports from these surveys were mainly descriptive in nature, and made little attempt to analyze the data within the larger perspective of cultural history and settlement/subsistence patterns within the region.

The most recent fieldwork (Rafferty 1986b) involved a survey of a 40 acre gravel pit for the Bureau of Reclamation. This project recorded six sites, including two discussed here.

Swarthout (1981) and King and Casebier (1981) attempted to summarize the regional prehistoric record based on sketchy data:

1. Paleo-Indian Period: No known sites or artifacts in the region.
2. Lake Mojave Period: ca. 9000-7500 B.P. Characterized by circular depressions or rock rings along extinct or greatly reduced water courses, on desert pavement. Artifact assemblages include Lake Mohave and Silver Lake points; crude, bifacially worked cores, choppers, scrapers, and macroflakes of basalt; crescents; and other large flake tools. This type of assemblage was first defined by Rogers (1929) as Malpais culture (Rafferty 1985a; Warren et al. 1980).
3. Archaic Period: ca. 5500-2000 B.P. Also called the Pinto-Gypsum Period (Warren et al. 1980). Characterized by Pinto and Gypsum points, a generalized flake tool assemblage, grinding stones, and oriented towards seasonal exploitation of a wide spectrum of floral and faunal resources.
4. Puebloan Period: ca. 2000-850 B.P. Characterized by use of the Mojave Desert by Virgin Anasazi peoples, who employed greyware ceramics, pursued agriculture as a main subsistence mode, and employed the bow-and-arrow.
5. Patayan Period: ca. 1150-100 B.P. A poorly known period when peoples from below the Laughlin area along the Colorado River exploited the area. Buffware ceramics and a mixed agricultural-hunter/gatherer lifestyle characterize the adaptation of groups ancestral to ethnographic Mojave people.

Theoretical Orientation and Hypotheses

Given the scant data base and the lack of detail concerning the culture history of the region, the data recovery project focused on culture history and settlement/ subsistence patterns. Several questions were asked of the data from the two sites:

1) What were the relative ages of the sites?
2) What period of prehistory could the sites be assigned to?
3) What functions did these sites serve in the local or regional settlement/subsistence systems over the years?

Based on site morphology, location, and initial assessment of the surface artifact assemblage recovered during the survey, the sites appeared to date to the Lake Mojave period (ca. 9000-7500 B.P.) or the early Archaic period (ca. 5500-2000 B.P.), times when rock rings were expectably built on terraces covered with desert pavement. Given the number of "tested" cobbles and cores of basalt, rhyolite, andesite, quartzite, and chert at the sites, the sites might have functioned as quarries for the procurement, testing, and initial reduction of tool stone. In the Lake Mead area, Kamp and Whittaker (1986) examined similar loci that they called low quality lithic sources that nonetheless seemed to form the backbone of regional lithic procurement patterns. Kamp and Whittaker (1986) identified four possible activity patterns from such sites: In Pattern I, small cores were briefly tested and then abandoned at the site. In Pattern II, large cores were also tested but more flakes were removed before abandoning the cores; in Pattern III, actual core reduction was carried out, resulting in large assemblages or corticated and non-corticated flakes and debris, although some usable flakes or core fragments were removed from the site; and in Pattern IV, core-reduction terminated after removal of decortication flakes, so that while debitage is abundant there are few usable cores present.

The rock rings in the study area might have served as caches, special purpose task sites where resources were stored pending their transportation to the main body of consumers, usually the local band or residence group (Binford 1980). Smaller circular features used as food caches would be associated with tools capable of processing plant and/or animal resources, such as projectile points, choppers, scrapers, grinding stones, knives, and other general purpose cutting tools. Such sites should be located in areas containing potentially aggregated and dependable resources (Blair 1984, 1986).

Results of the Investigation

Both sites were subdivided into 10 m by 10 m collection grids for the purpose of collecting artifacts. Every artifact encountered was collected, but no excavations were undertaken, because prior studies in southern Nevada and elsewhere (Ferraro and Ellis 1982; Rafferty 1985a, 1985b; Stone and Dobbin 1982; Teague 1981) have repeatedly indicated that sites like these are surface manifestations.

The total number of artifacts found in both sites is 729: 387 were from 26Ck1405 and 342 were from 26Ck1407. Included in this count were a number of tested cobbles that were counted but not collected: 86 from 26Ck1405 and 65 from 26Ck1407. Chert was the preferred toolstone. At 26Ck1405, 54% of the artifacts were chert, followed in preference by quartzite (33%), rhyolite (9%), and andesite/basalt. The situation at 26Ck1407 was similar: 58% of the tools were of chert, followed by rhyolite, basalt, andesite, and other materials.

All the lithic raw materials were readily available, eroding out from the gravel matrix of the alluvial fan. No specialized mining or excavation of stone were needed to provide site inhabitants with raw material.

Six categories of flaked tools were recovered from the sites, totaling 481 flaked tools. Composed mostly of chert (62%) and quartzite (28%), the categories included flakes, debitage, drills, preforms/bifaces, scrapers, and projectile points. The flakes, forming the majority of the assemblages, were mostly primary flakes, typical of quarry sites where materials are tested and selected for further reduction elsewhere. There was little secondary debitage, indicating that most formalization of tools was carried out at other locations.

Of the formal tools, two were scrapers from 26Ck1407; 11 were preforms/bifaces (5 from 26Ck1405 and 6 from 26Ck1407); 2 were drills (26Ck1405); and a single Elko side-notched point was recovered from 26Ck1405. Other artifacts included hammerstones (3), choppers/handaxes (3), cores (51), and tested cobbles (191). The cobbles had been struck at only one end or at a few places to test the quality of the material, and were subsequently rejected and left at the site. The majority of these were of quartzite (50%) and chert (32%).

Interpretation

Little can be said concerning the age or cultural affiliation of the sites. Although the Elko point has traditionally been used as a diagnostic marker of the Archaic period, recent research indicates that this point series has a long and well documented use-span in the Great Basin. Some researchers (Aikens 1970; Fowler et al. 1973; Thomas 1981) accept a 7000 year use-span for the series in portions of the Great Basin. It must be noted that reliable radiocarbon dates place this series type between 1000 B.C. and A.D. 1080 (Heizer and Hester 1978). Thus the best age than can be assigned to 26Ck1405 is sometime in the Archaic or subsequent Puebloan periods. No age assignment can be made for 26Ck1407.

In addition, the lack of a specialized tool assemblage from the sites hinders an assessment of the site dating. The assemblages contain fairly generalized, multipurpose tools that were made and used over many thousands of years in southern Nevada. Any (or every) aboriginal group could have employed such tools as part of their repertoire of cultural responses to their environment, making the dating and cultural assignment of these sites impossible at this time.

Site function seems to be a little more apparent, given the number of unmodified flakes, cores, and tested cobbles. Both sites were quarries for the procurement and testing of lithic materials, primarily cryptocrystallines such as chert and quartzite. There is little evidence of formal tool manufacturing occurring at the sites, or that the few bifaces, preforms, or other tools recovered were manufactured at the site. The testing of cobbles for use in the tool-manufacturing process and the possible collection of materials for transport to other sites for further reduction seems to have been the primary function of the sites. The artifactual remains fit Kamp and Whittaker's (1986) Pattern I and II for lithic procurement. Both sites contained cobbles and cores which had a few flakes removed and then were abandoned due to material defects (Pattern I). Both sites also contained large nodules or cores of poor quality material associated with flakes and shatter. The nodules seem to have been abandoned after only a few acceptable flakes could be produced from the cores (Pattern II).

The presence of the rock rings or cleared areas was suggested earlier as possible evidence of resource storage in caches. The few formal tools recovered (hammerstones, choppers, drills, scrapers, the Elko point) might have been associated with the procurement of floral and faunal resources. If so, the effort expended was a minor one, given the scarcity of tools. Thus the possibility that food procurement was a secondary function of these sites must remain at the level of conjecture.

The use of the sites as habitations or as seasonal campsites remains a low possibility since the sites lacked hearths, artifact concentrations, and the variety of artifacts that would be expected from continuous or even seasonal use of the locations as residential areas (Teague and McClellan 1978).

Summary

These sites were used as lithic procurement areas over many hundreds, and perhaps thousands, of years. They may also have been used as storage areas for plant and animal food resources available to aboriginal inhabitants. As such, these sites played an important role in the regional settlement/subsistence system, being a primary source of tool stone. The sites functioned very much like those discussed by Kamp and Whittaker (1986) in the Lake Mead area, forming the backbone of the regional tool procurement systems. Sites such as these are important in helping to flesh out the total picture of cultural response to the environment of the Colorado River Valley and this portion of the Mojave Desert, and are worthy of study for this reason. Such smaller, nondescript sites have the potential for allowing archeologists to examine the full range of human cultural response to marginal desert environments.

Acknowledgements

I would like to thank Lynda Blair, Division of Anthropological Studies, who served as field assistant and did the analysis of the artifacts. Thanks also to Susan Rohde of the Environmental Research Center, UNLV, who executed the maps. All errors of interpretation or in the conclusions remain my exclusive province.

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NOTES ON A CLOVIS POINT FROM THE BLACK ROCK DESERT, NEVADA

Donald R. Tuohy
Nevada State Museum
Carson City, Nevada

During the summers of 1981 and 1982, the Jackson Creek Ranch in Nevada's Black Rock Desert had been the scene of a spectacular find of a mammoth skeleton, referable to the taxon *Mammuthus columbi*. Thirty-two shaped stone tools were found within the Master Grid collection units near the bones, but neither the dating nor the proximity of the bones and stone tools can be accepted as unequivocal proof of the association of Early Man and extinct fauna (Clewlow 1983; Stout 1986). The mammoth bones were originally on exhibit in the Nevada State Museum and Historical Society's Museum in Las Vegas, but beginning in the summer of 1989 will be on display in the refurbished Earth Science gallery at the Nevada State Museum in Carson City.

During August of 1988, staff members from the Desert Research Institute's Social Science Center and the Anthropology Department of the Nevada State Museum viewed the remains of this and other fossil bone-bearing sites near Jackson Creek Ranch, guided by Steve Wallmann, an Oregon logger. The sites were already known to the local ranchers, the Bill DeLong family, and a few others, including one professional archeologist, Dr. C. William Clewlow. B.L.M. archeologists possessed site records and maps, but D.R.I. and State Museum archeologists wanted to assess the geological context of the fossil bones, and see how well they were holding up to prolonged exposure.

All known archeological find-spots were visited on the east side of the Quinn River within five miles of the ranch.

Previous knowledge about Black Rock Desert archeology comes from the research of Clewlow (1968, 1981, 1983), Elston and Davis (1979), Hanes and McGuckian (1987), and Lohse (1980). A Cultural Resources Management Plan was written by Pedrick (1984), and a few other studies have been published, such as one by Cowan

(1972), and an M.A. thesis from the University of Nevada-Reno (Seck 1980). The most recent work done on the Jackson Creek Ranch was the test excavation of Handprint Cave, a joint project of the B.L.M. and the Nevada State Museum (Gruhn and Bryan 1988:1-13). Steve Wallmann, who had collected projectile points and other tools from the area, had also purchased a Clovis point originally found by Salli Morris of Winnemucca (the Morris Collection was donated by Mr. Wallmann to the Nevada State Museum). This point came from the east side of the Black Rock in the area between Jackson Creek and McFarland's bath house, a relatively unstable playa surface.

The fluted point, broken near the tip, weighs 24 grams, and is 6.8 cm in length, 3.6 cm wide, and 0.9 cm thick. It is made of semi-translucent white chert. Part of one margin shows fresh sharpening flake-scars overlying broader flake-scars left by the original knapper. However, the upper two thirds of this margin broke off during the resharpening, leaving a scalloped, irregular edge. This edge is in sharp contrast to the opposite one which shows regular, parallel flaking and a neatly trimmed edge. All in all, the point compares favorably with other fluted points known from Nevada (Ruhstaller and Pendleton 1982; Tuohy 1985, 1986) and Utah (Copeland and Fike 1988:5-28).

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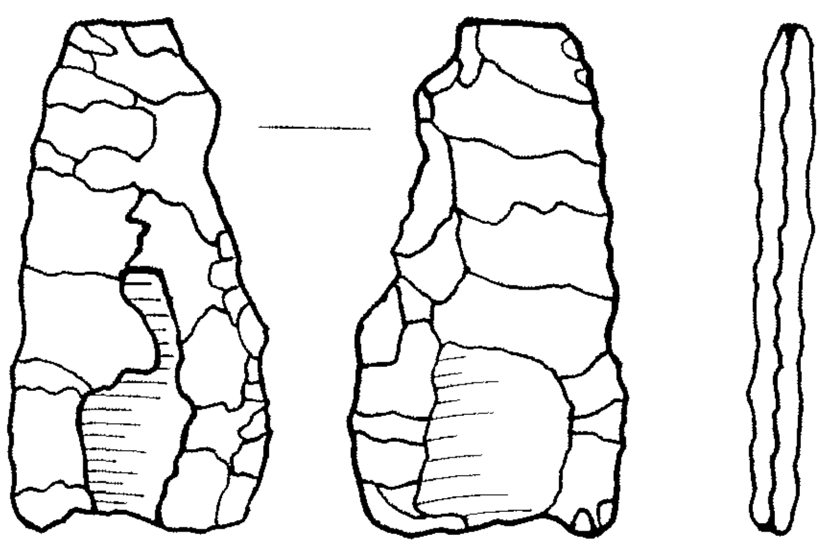

Figure 1
Clovis Point from Black Rock Desert, Nevada
(Actual Size)

THE HISTORIC CEMETERY AT SILVER CITY, NEVADA: RECORDING METHODS AND INITIAL FINDINGS

Ramona L. Reno
and
Ronald L. Reno
Silver City, NV 89428

Introduction

Mining has played a vital role in the economic and social development of Nevada and most of the American West. Mining towns were established overnight, and many survived only a short time -- growing fast -- by retrieving ore, and then leaving their dead behind before abandonment. Silver City, Nevada, is one such mining community that was established approximately 125 years ago, in 1860 (Smith 1943:23). The Comstock mining bonanza began in the Silver City area with discovery of gold by placer miners early in the 1850s.

Because mining is again on the rise in Nevada, many of these abandoned towns are now being destroyed or adversely affected. Conventional techniques of historic archeology have been developed to record townsites, mining structures, and trash dumps, but often little information is retrieved regarding historic cemeteries.

The Silver City cemetery has been recorded using the experiences of preservationists who inventory historic cemeteries in the eastern United States. We obtained information from the Association for Gravestone Studies (Baker and Giesecke n.d.; Farber n.d.), the American Association of State and Local Histories (Jones 1977; Strangstad 1988), and recent work by the Boston Parks and Recreation Department (1988). Our work at the Silver City Cemetery, limited to surface features, is aimed at the conservation of this historic resource.

Today the Silver City Cemetery has 290 identifiable graves. Of these, over half have readable inscriptions on the markers. These inscriptions provide a written record of life and death in this community.

Field Recording of the Cemetery

We started field recording by drafting a sketch map (Figure 1) for designating feature numbers and recorded the following information:

Feature Number
Name (from marker)
Birth Date
Death Date
Marker Type and Condition
Enclosure Type and Condition
Curbing Type and Condition
Collapse
Inscription
Comments and Maker's Marks
Recorders Name

Within the categories listed as "Type and Condition," a coding sheet was made for the variety of materials observed at the cemetery (Reno 1988). The task of coding the diversity of marker types was simplified to a morphology used by Francaviglia (1971) in an article on Oregon cemeteries (Figure 2). He temporarily identifies these

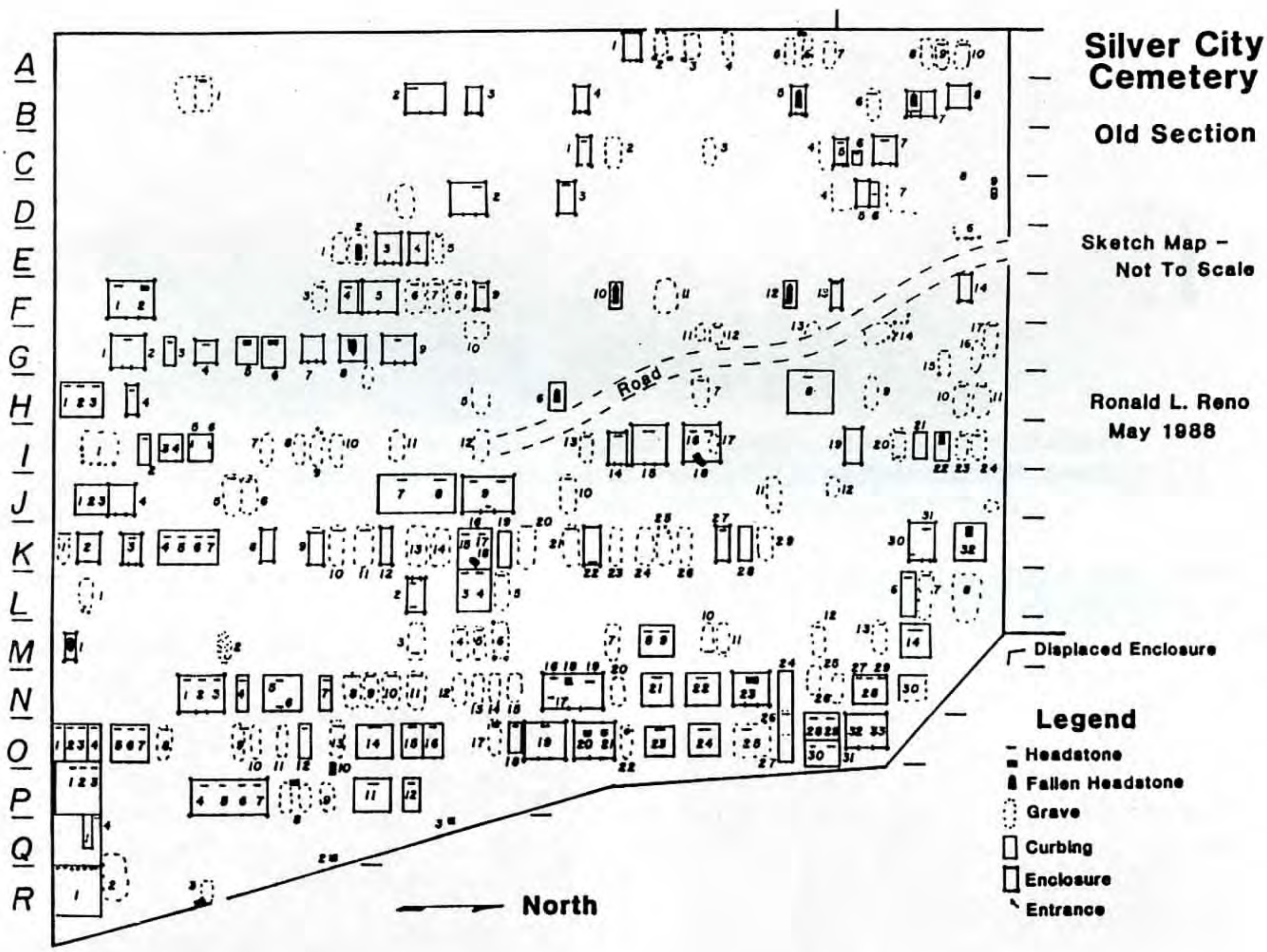

Figure 1
Sketch Map of the Silver City, Nevada, Cemetery

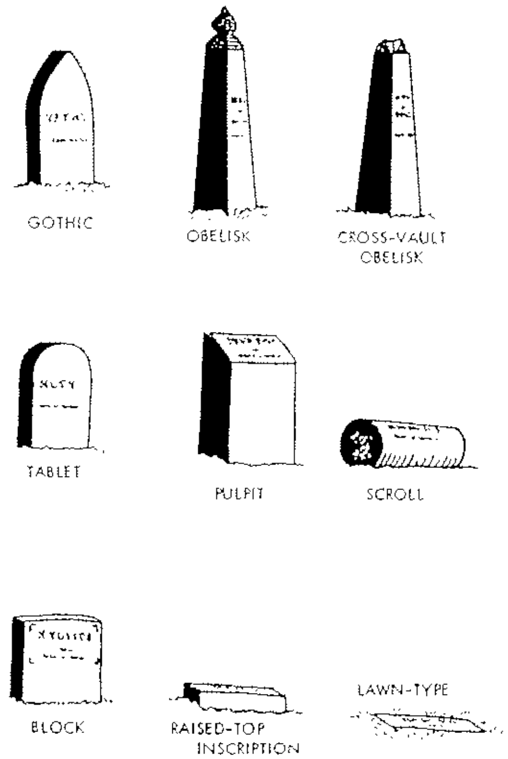

Figure 2
Traditional Marker Types
(from Francaviglia 1971)

through inscriptions as early to recent reading the Figures from upper left to lower right.

All these types are found at the Silver City cemetery and his inferred chronology holds true there. Within each of these morphological types there can exist a wide variety of top and side attributes. We view these individual stylistic traits as a separate category and, for the purpose of field recording, have included them in this traditional morphological scheme. Idiosyncratic types must be treated separately.

Field recording included noting the material type of the markers (stone, metal, or wood). We also noted enclosure materials (iron, wood, or composite); construction (picket, palisade, or horizontal plank); curbing material (concrete, dressed or undressed stone, wood, or brick); and curbing construction (continuous or discontinuous).

We took great care to locate maker's marks on enclosures and markers.

We noted a single non-English inscription in the Silver City cemetery, dated from 1877 and in French -- commemorating an infant's burial.

Photo Documentation

After the initial field sessions, we photographed the cemetery using techniques recommended by the American Association of State and Local Histories. Using black and white film and their recommended method of a black-board with feature identifier and north arrow, and a scale, we took a set of photographs such as illustrated by Figure 3.

We also photographed details of complex features, such as the motifs on the cast iron enclosures. As seen here (Figure 4), by using the barrier to block out the confusion of the background, the detail in this enclosure is more clearly defined.

Photography provides a quick systematic method for recording the inscription, material types, and condition of graves at a specific date. Field workers with limited time to record a cemetery can first make a sketch map, then take at least one photograph of each grave, including a feature identifier and a scale in each photo.

To begin interpretation of this information, the cemetery must be placed in its political and

Figure 3
Example of Recommended Photographic Method for Cemetery Documentation
Note: Feature Identifier, North Arrow, and Scale

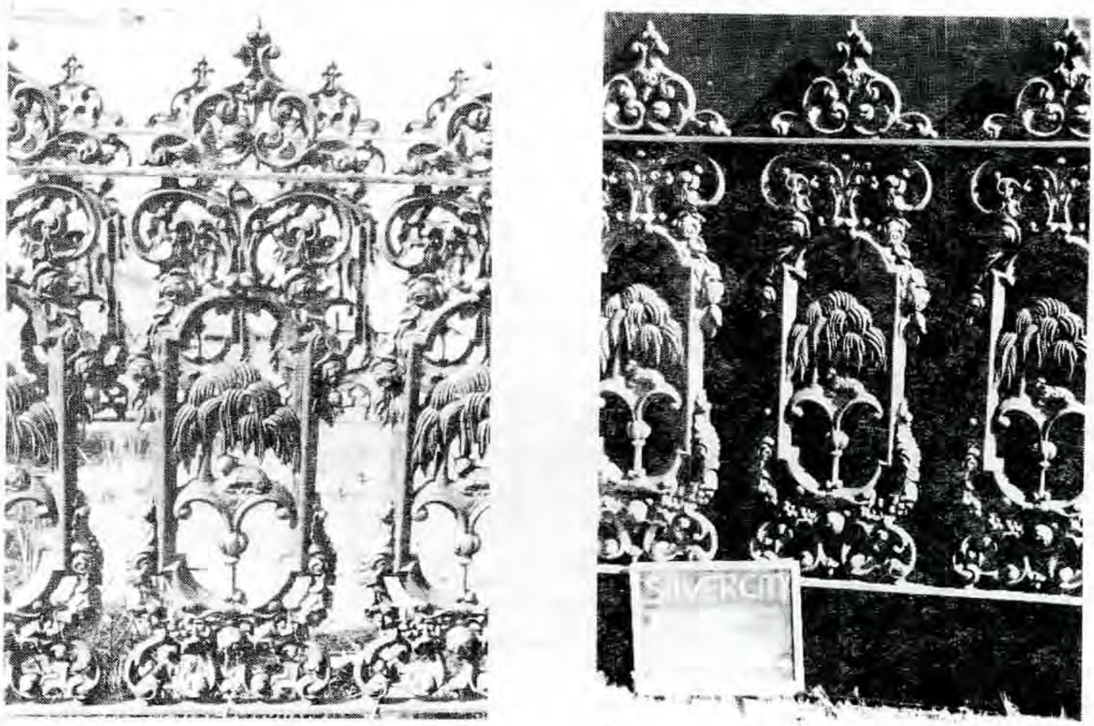

Figure 4
Example of Using Barrier to Block-Out Background Disturbance

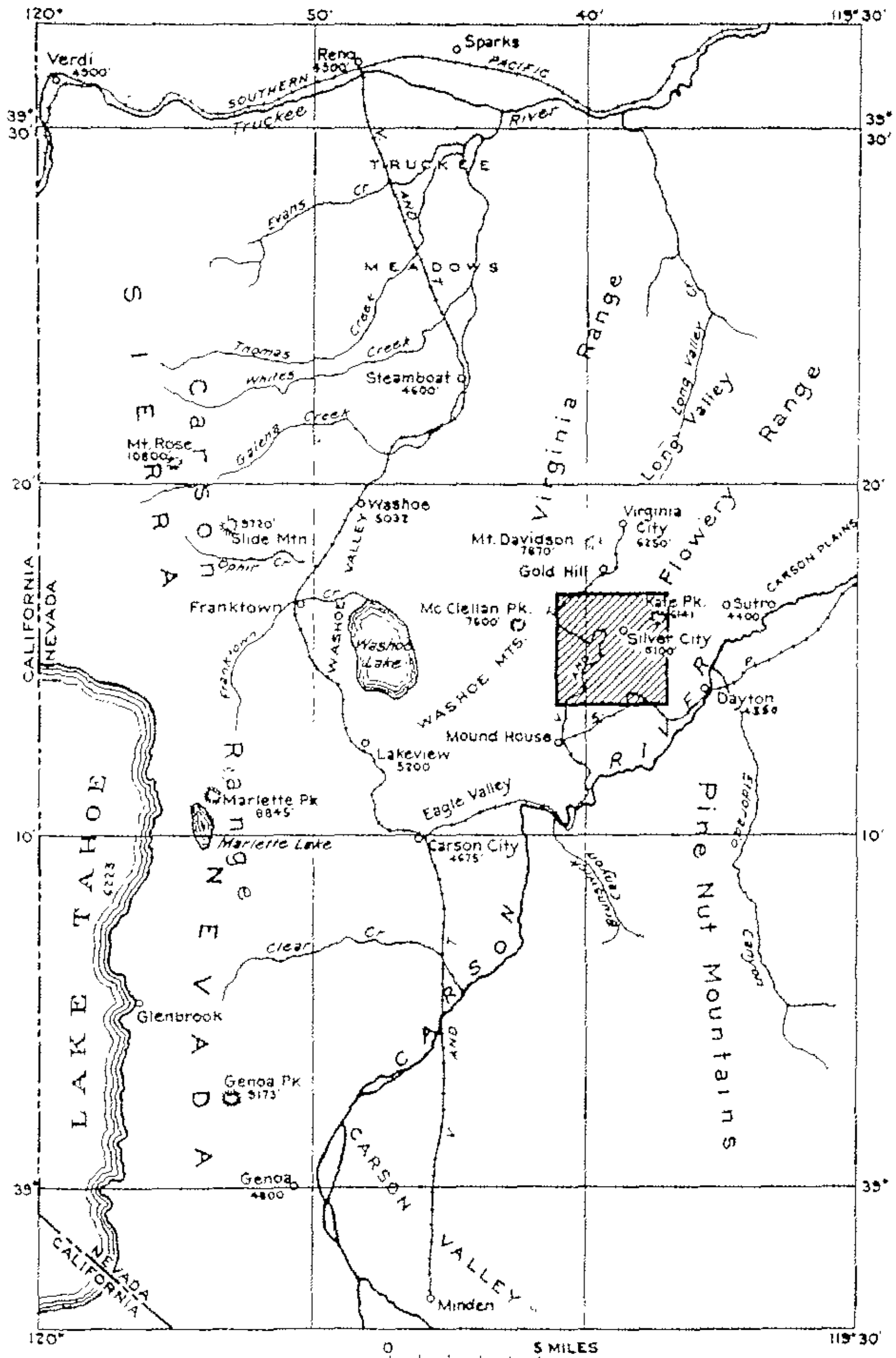

Figure 5
Location of the Silver City Mining District (from Gianella 1936)

economic context. For Silver City this is the developmental cycle for mining communities. Generally, this development has four phases: initial exploration, boom, development of a stable community, and decline (see Zeier 1988).

Silver City fits relatively well into this model. However, Silver City managed to survive its decline and has maintained a modest population continually during the last century. Its stability provides for long-term patterns of growth and decline.

Silver City's Role in the Comstock:

(1) Placer-Mining

Starting in the 1850s a few rugged individuals placer-mined the area just south of Silver City. These miners complained of a "heavy black stuff" that clogged their rockers. A variety of stories surround the first identification of this "black stuff" as silver. Most authors contribute the discovery of silver to the Grosh brothers, Hosea and Edgar. However, the death of both brothers in 1857 ended any possibility of their reaping the rewards of their discovery. There are various legends about the deaths of these brothers, but the consensus is that Hosea Grosh died in Gold Canyon on September 2, 1857, from an infection of a foot injury, and Edgar Grosh died the same winter while crossing the Sierra Nevada in a severe snow storm.

(2) Comstock Boom Days

With the discovery of the Comstock Lode the area was organized into mining districts (Gianella 1936:14) (Figure 5). Silver City is located four miles south of Virginia City and the main concentration of the Comstock Lode. Early in her history, Silver City was the main boarding place for animals used in hauling ore-laden wagons through Gold Canyon. This ended in 1874 when the Virginia and Truckee Railroad was established, eliminating the demand for haul wagons.

Although the Silver City district could never financially compete with its northern neighbor, the Comstock Lode, the stability of Silver City has been a factor of its small but consistent ore-production. The bar graph in Figure 6 was compiled from information on Silver City district's mineral production (primarily gold and silver) from 1870 to 1940 (Couch and Carpenter 1943). "During the period of...1890 to 1920...the small mines and mills in Silver City produced steadily on a small scale from near-surface gold ores, maintaining a quiet well-to-do community not far above the location of the original motley camp of the early placer miners of Gold Canon [sic]" (Smith 1943:288). The mainstay of Silver City has been that "nearly every family had its own mine and developed it only when money was actually needed" (Paher 1970:69).

During the period 1933-1940, this area experienced its highest levels of mineral production. In 1935 Silver City was "the most active mining district in Nevada" (Gianella 1936:24). Most of this activity involves ore-extraction from the shallow levels of old mines and the building of a new mill. It seems that the key to the survival of this district has been to stay involved in the activities of the Comstock, and yet maintain a separate economy of support

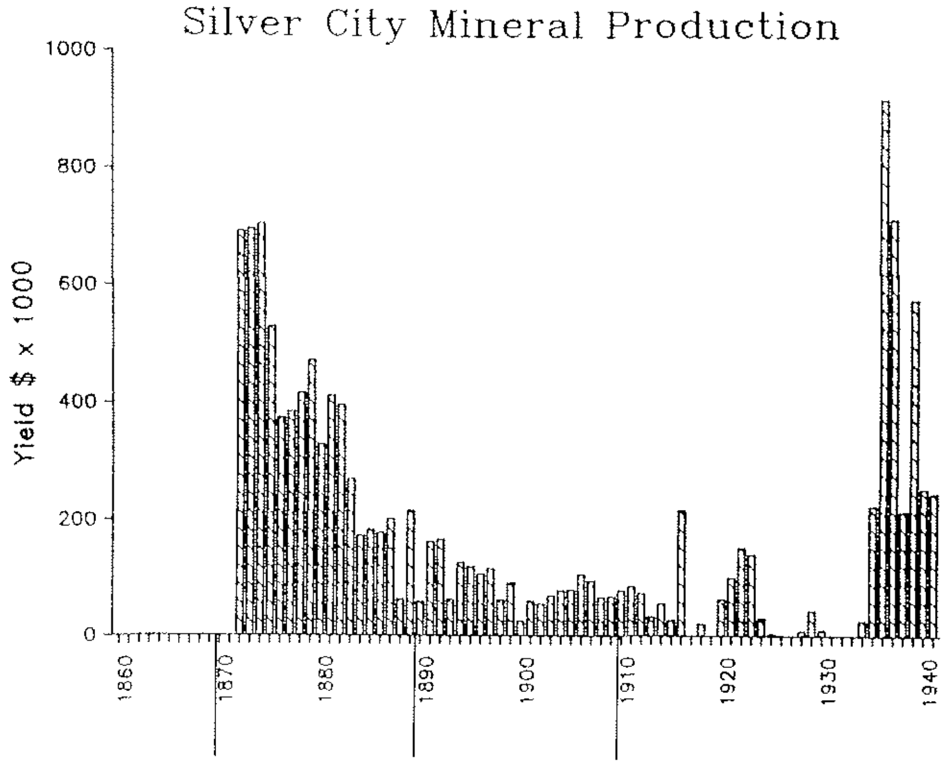

Figure 6

industries, small privately owned mines, and mills.

Today there are approximately 175 people in Silver City, and the town is primarily a residential area. However, the change in mining technology from underground mining and mill-processing to open-pit mining and the reprocessing of tailings piles is threatening to reopen mining and endanger the historic integrity of this area.

The Silver City Cemetery Through Time

Using the cycle of the growth and decline of mining activity in the Silver City area, we have divided the cemetery graves that have readable inscriptions into five periods:

1850-1869 Placer-Mining Phase
1870-1889 Comstock Boom Days
1890-1909 Decline of the Comstock
1910-1939 Silver City as an Independent Mining Community
1940-1986 Silver City as Primarily a Residential Community

The rest of this paper discusses two questions relating specifically to the Silver City cemetery during these five periods. These questions will be addressed by examining the data obtained through our mapping and recording of the cemetery.

Changes in the Use of Landscape at the Silver City Cemetery

The first question involves the change in the use of the landscape at the Silver City cemetery. The cemetery is on an east-facing slope, ending in a ravine on the east border. The entrance to the cemetery is on the north side in the middle of the slope. The vast majority of graves face east with markers at the head of the grave. One grave has two markers facing each other on the north and south.

Keep in mind that the following information is based on those graves with readable inscriptions. Half of the graves identified at the Silver City cemetery are unmarked or unreadable and cannot be temporally placed on these maps.

1850-1869

There are very few graves remaining from the placer time period (Figure 7). All are in the middle of the cemetery and are near the entrance.

1870-1889

The graves from this time period indicate the cemetery grew considerably during the Boom Days of the Comstock Lode (Figure 8). They are scattered over most of the upper slope of the existing cemetery.

1890-1909

The cemetery is filling up on the upper slope, and the lower section near the entrance is beginning to be used (Figure 9).

1910-1939

The majority of new graves during this time period are on the lower slope farthest away from the entrance (Figure 10).

1940-1986

The trend is still toward the lower slope away from the entrance (Figure 11). However, the middle slopes near the entrance are being reused. It has been reported that recently when a new grave was dug, an old one was exposed. During the last few years a new section of the Silver City cemetery has been opened, and the old section that we have been looking at is no longer open for new burials.

From these maps, it is clear that in the early days of the cemetery, graves were placed in the upper slopes, later moving down-slope until reaching the ravine. Finally, areas with unmarked graves were reused.

Changes in Death by Age and Sex

The second question addressed involves the pattern of age-at-death of Silver City residents during the last 140 years.

1850-1869 and 1870-1889

These graphs are compiled from markers with readable inscriptions containing the age, sex, and year at death of the person buried. They are paired bar graphs, with males on the left and females on the right. The x-axis is the percent of the time-period population, with zero in the center. The y-axis is the age at death and ranges from 0 to 100 years.

The first pair of time periods shows that during the placer mining days death came early (Figure 12).

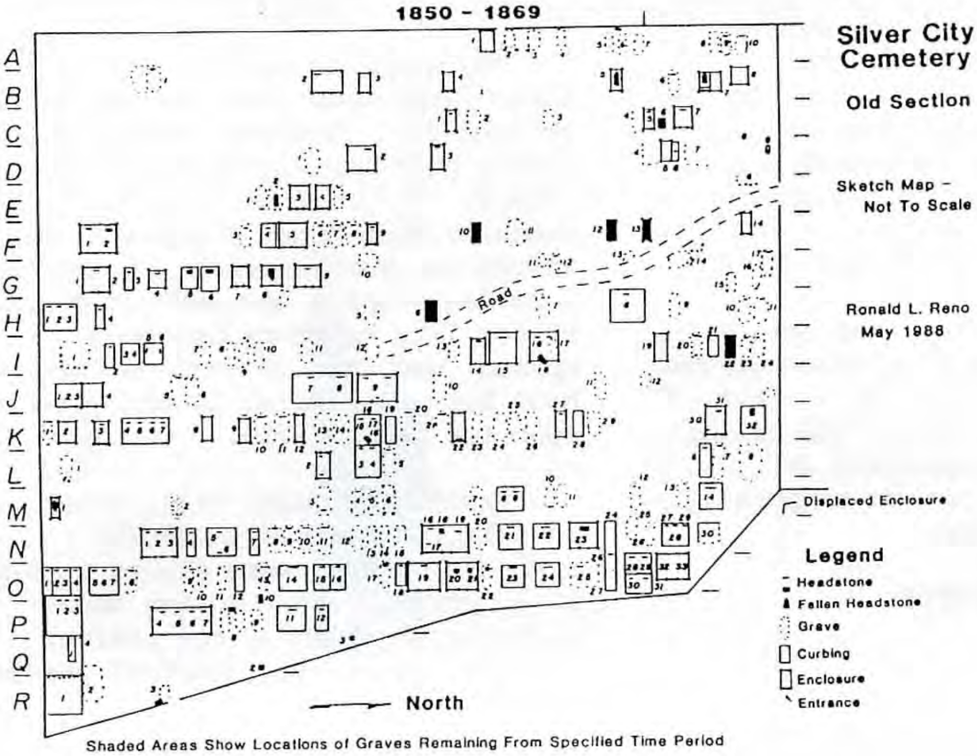

Figure 7
Silver City Cemetery 1850 - 1869

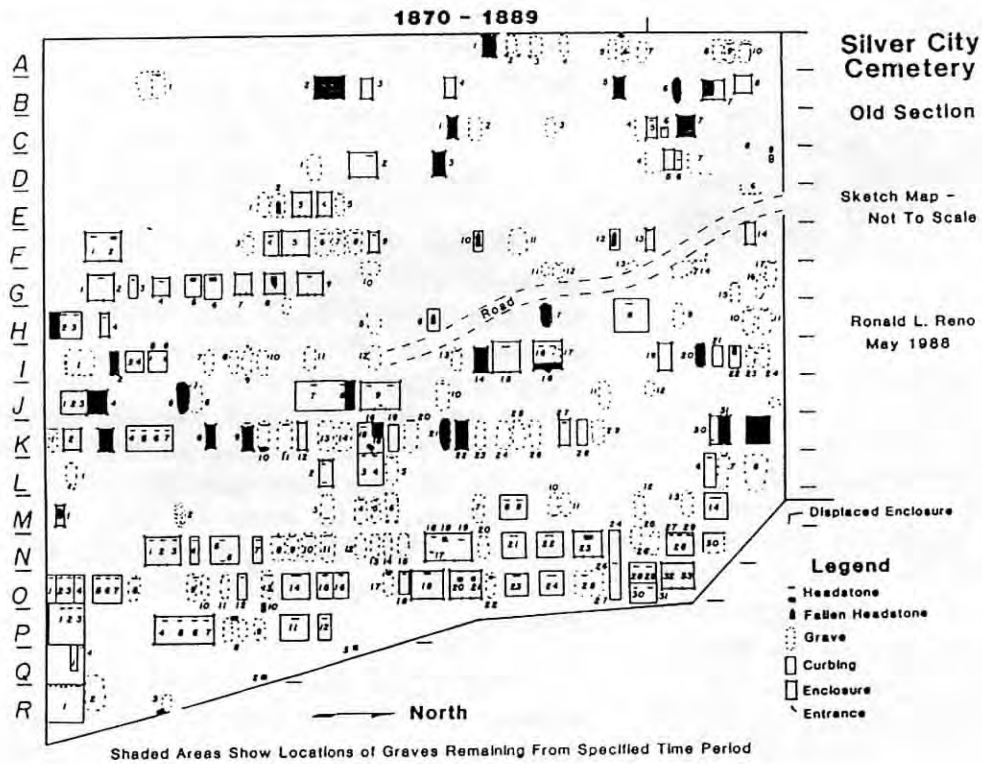

Figure 8
Silver City Cemetery 1870 - 1889

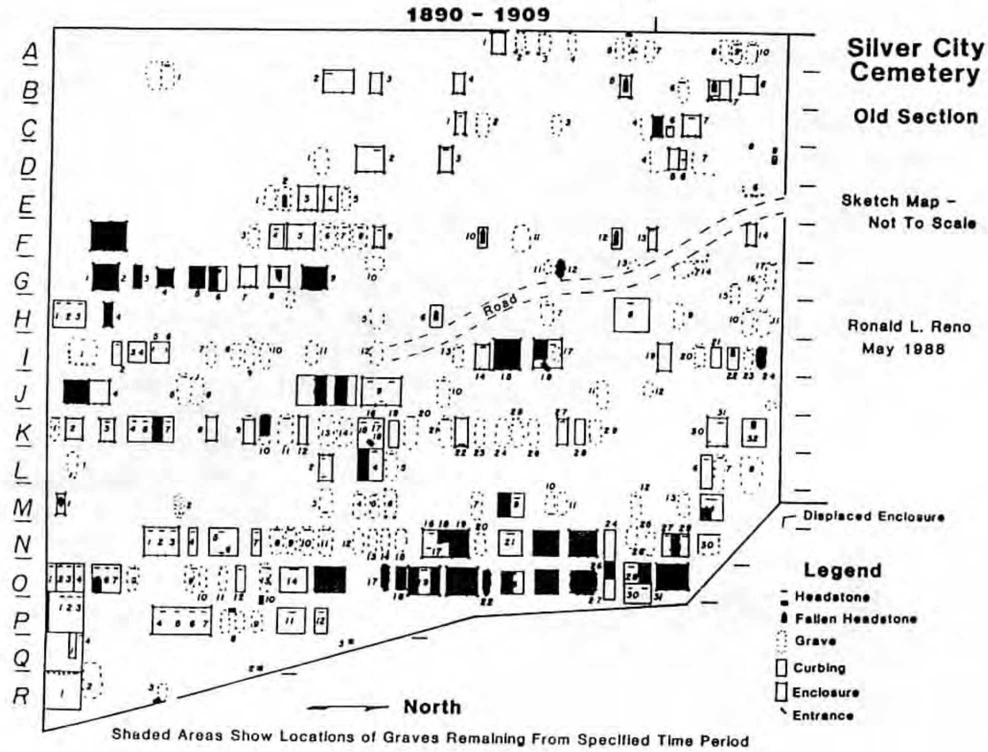

Figure 9
Silver City Cemetery 1890 - 1909

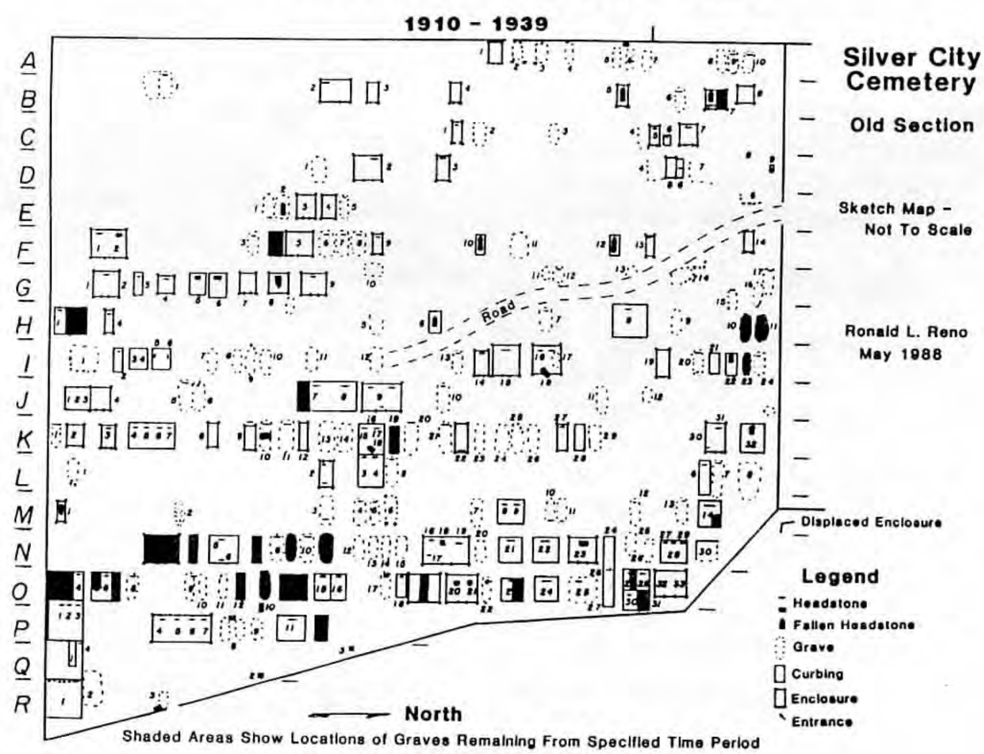

Figure 10
Silver City Cemetery 1910 - 1939

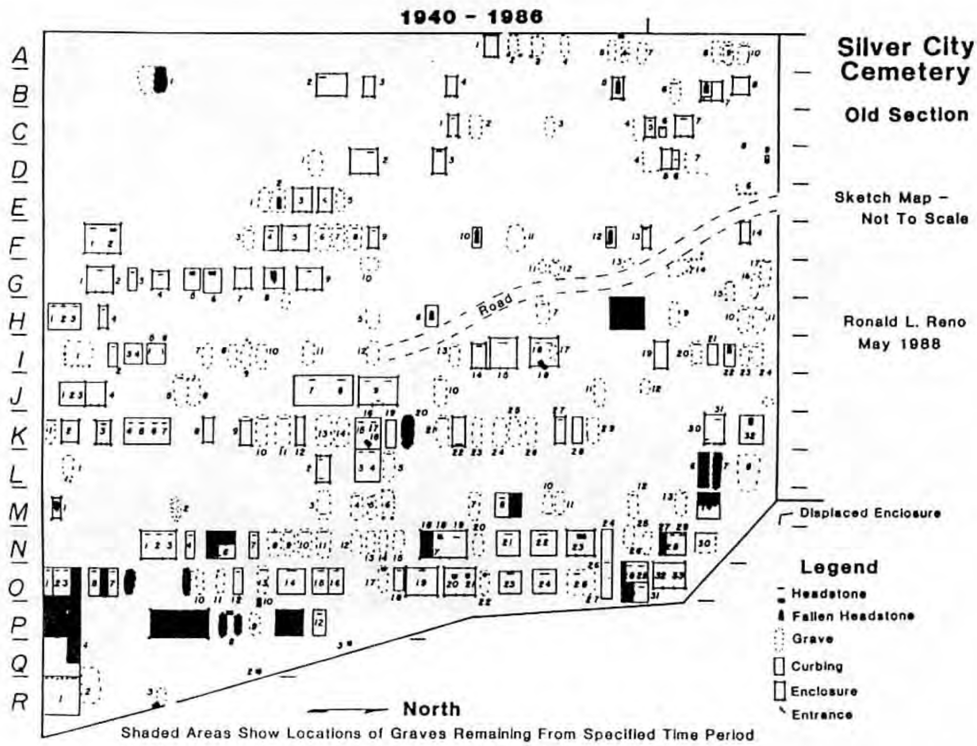

Figure 11
Silver City Cemetery 1940 - 1986

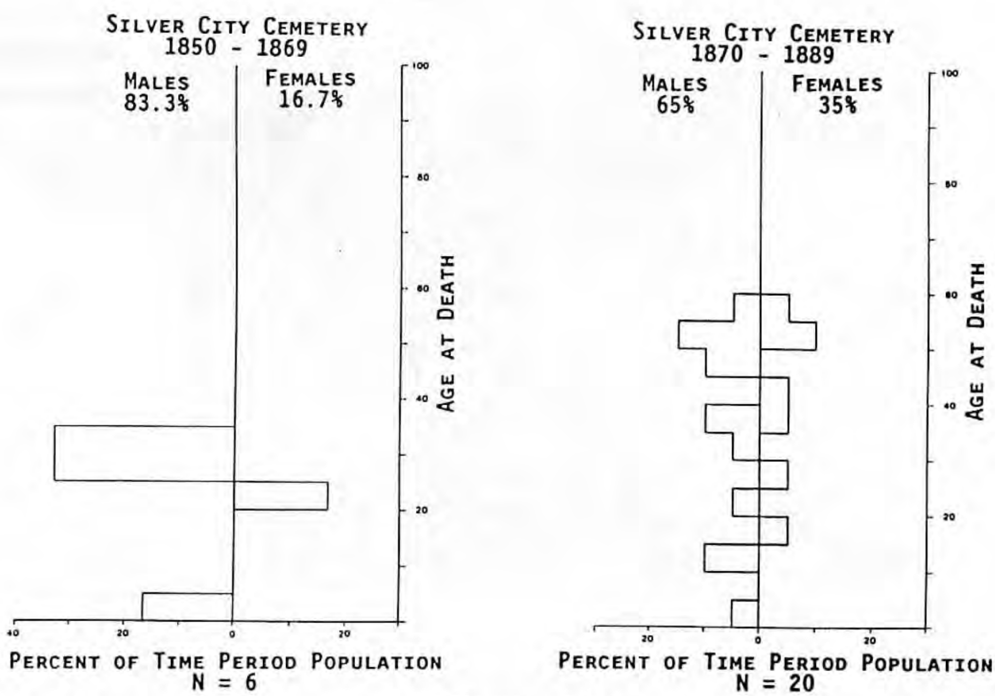

Figure 12
See Text

There are six graves with readable inscriptions during the first two decades (1850-1869). Of these, five (83.3%) are males who died before their 35th year. The one female (16.7% of the sample) died before her 25th year.

During the second two decades (1870-1889), there are 20 graves with readable inscriptions. Of these, 65% are male, and 35% are females; both sexes were living substantially longer, to nearly 60 years. There is a broader age spectrum during this time period, probably indicating that the community was developing a family base.

Another very interesting fact is derived from the inscriptions of these two time periods. Of the six persons who died during 1850-1869, all are listed as being natives of the United States: Pennsylvania, Michigan, Massachusetts, West Virginia, and an infant from Nevada. However, of the twenty graves during the next time period (1870-1889), the only natives of the United States were very young individuals (ages 2-14 years) or were from Silver City itself. The remainder of those listing their birthplaces were from foreign countries: Canada, France, Ireland, England, and Germany.

This indicates that during the placer days the residents of this area were young male U.S. easterners who quickly arrived to seek their fortune. Later, during the early days of the Comstock Boom, males and females of a slightly older age arrived from Europe.

1890-1909 and 1910-1939

During these two time periods, the trend towards longer life continued for both males and females (Figure 13). During 1890-1909 (the decline of the Comstock Boom), the majority of persons lived to be 60, and a few lived to be 80 or 90. There was still a high incidence of death at an early age, primarily in males. During 1910-1939, the ratio of males to females was nearly 1 to 1. This is the only time period when proportions are equal. We also note the very patterned increase in number of elderly persons, as well as the full spectrum of ages at death. There is a distinct rise in lifespan to between 65 and 95 years of age. Figure 13 shows that very few persons died before they were in their mid-twenties, and early deaths by males were almost nonexistent. Only two male deaths occurred prior to the age of 35, which only forty years earlier was the extent of male life expectancy.

Of the few persons who listed their birthplaces during these two time periods, most were from Nevada and a few other states: Tennessee, Iowa, and California. Those listing foreign countries were from Germany, Scotland, England, Ireland, and France.

1940-1986

During this final time period there is again an increase in lifespan. The majority of persons lived to 70-90 years of age (Figure 14). The most significant change in this time period is that almost no one died before his or her 55th year, and there are no infant or teen-age deaths. Apparently Silver City had become a healthy, safe place to live (or perhaps young people moved away).

There currently are no businesses in Silver City, and its

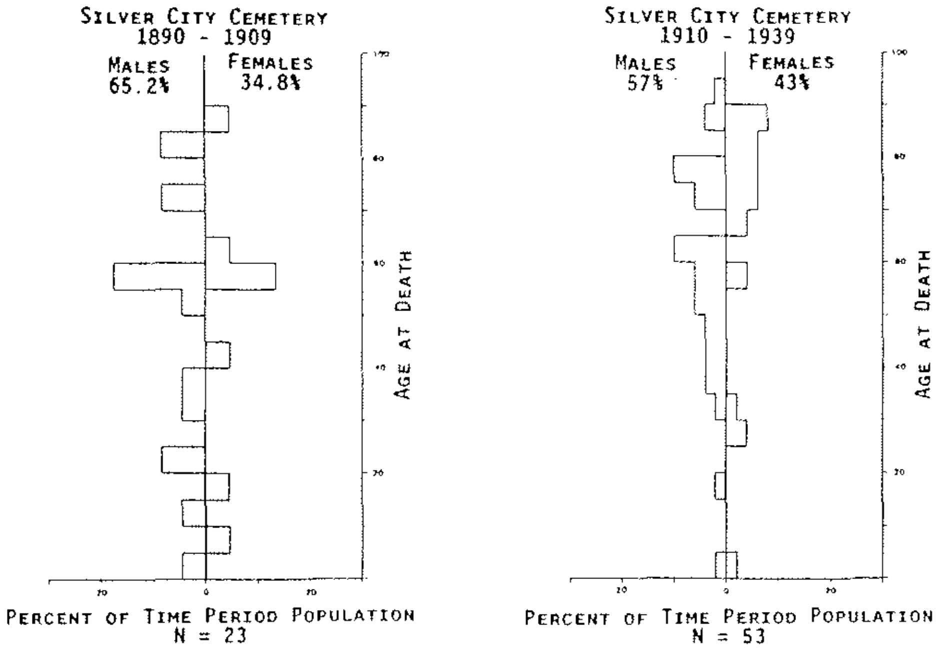

Figure 13
See Text

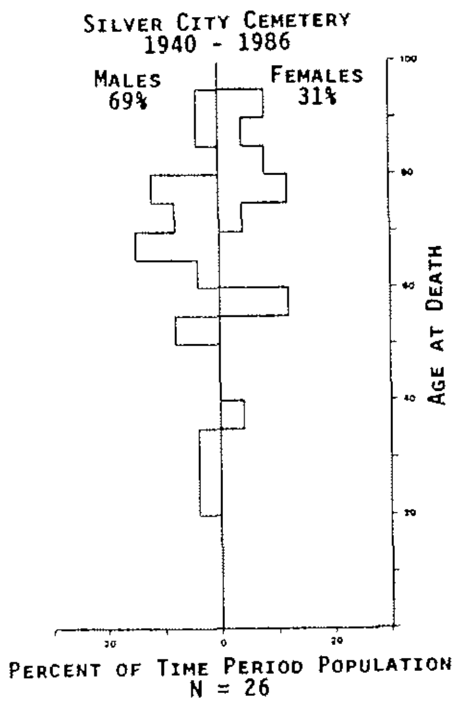

Figure 14
See Text

residents mostly commute to Carson City, Virginia City, and Reno for employment. There are no listings of birthplaces during this time period. The trend is toward males listing their military experience.

Summary

It is evident that the information gained from the Silver City cemetery has clearly defined a pattern of changing land-use and an increased longevity through the development cycle of Silver City.

In our working with the Silver City cemetery, we refer to it as a "living link to a mining community's past". The examination of historic cemeteries is a dynamic area of study with a great potential to yield valuable information regarding the changing in lifeways of historic communities.

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THE CONCEPT OF "CARRYING RANGE": A METHOD FOR DETERMINING THE ROLE PLAYED BY WOODRATS IN CONTRIBUTING BONES TO ARCHEOLOGICAL SITES

Bryan Scott Hockett
University of Nevada - Reno

Abstract

Woodrats (also known as pack rats) may accumulate bones and artifacts in caves, rockshelters, or open-air sites, and may also move objects that were originally deposited by other processes, such as human behavior. This paper describes the concept of Carrying Range, an analytical tool that might discriminate between bones brought to a fossil site by woodrats and those brought by other agents such as humans.

Introduction

Woodrats are known for their ability to construct houses and nests (Finley 1958; Olsen 1973; Warren 1910). The principal material used in construction varies depending upon the debris available within the woodrats' foraging range (Ashley 1971; Linsdale and Trevis 1951). Large sticks, twigs, leaves, cactus joints, and bones are some of the common materials used in construction.

Archeologists and paleoecologists are aware that woodrats may accumulate bones as well as affect the distribution of bones in caves, rockshelters, and open-air sites (Emslie 1988; Heizer and Brooks 1965; Hoffman and Hays 1987; Mead and Philips 1981; Miller 1979). Faunal sites affected by woodrats may also contain bones and other artifacts left behind by prehistoric people.

Accurate interpretations of past human lifeways partially rests with our ability to differentiate between those bones utilized by humans from those bones accumulated by other agents. It is therefore imperative that woodrat bone-collecting behavior be understood in an archeological context.

The Study Area

Large bones collected from six nests of bushytail woodrat (Neotoma cinerea orolestes) (Durrant and Robinson 1962; Finley 1958) in the Gunnison Basin, west-central Colorado. One nest is located inside Haystack Cave, a late Pleistocene-Holocene locale, and the other five are located near the cave.

This paper reports on the bones of deer (Odocoileus hemionus), cottontail (Sylvilagus nuttali), and elk (Cervus canadensis) collected by bushytail woodrats for nest-building and gnawing purposes. Although rodent bones were also present in the nests, these bones were not part of this analysis as it is not possible to determine if they were brought to the nests by woodrats, or if the animals died in the nests.

The deer, cottontail, and elk bones were collected as part of a preliminary study of woodrat bone-collecting tendencies and capabilities in the Haystack Cave area. A more comprehensive study of the bones collected by bushytail woodrats is currently being conducted by the author.

Taphonomy

Forty-two bones other than rodent were collected in the six woodrat nests. Table 1 lists the location, element, element portion, generic identification, and marks on each bone collected.

Deer elements outnumber elements from cottontail and elk. Thirty-two of the thirty-seven identified elements are deer, or

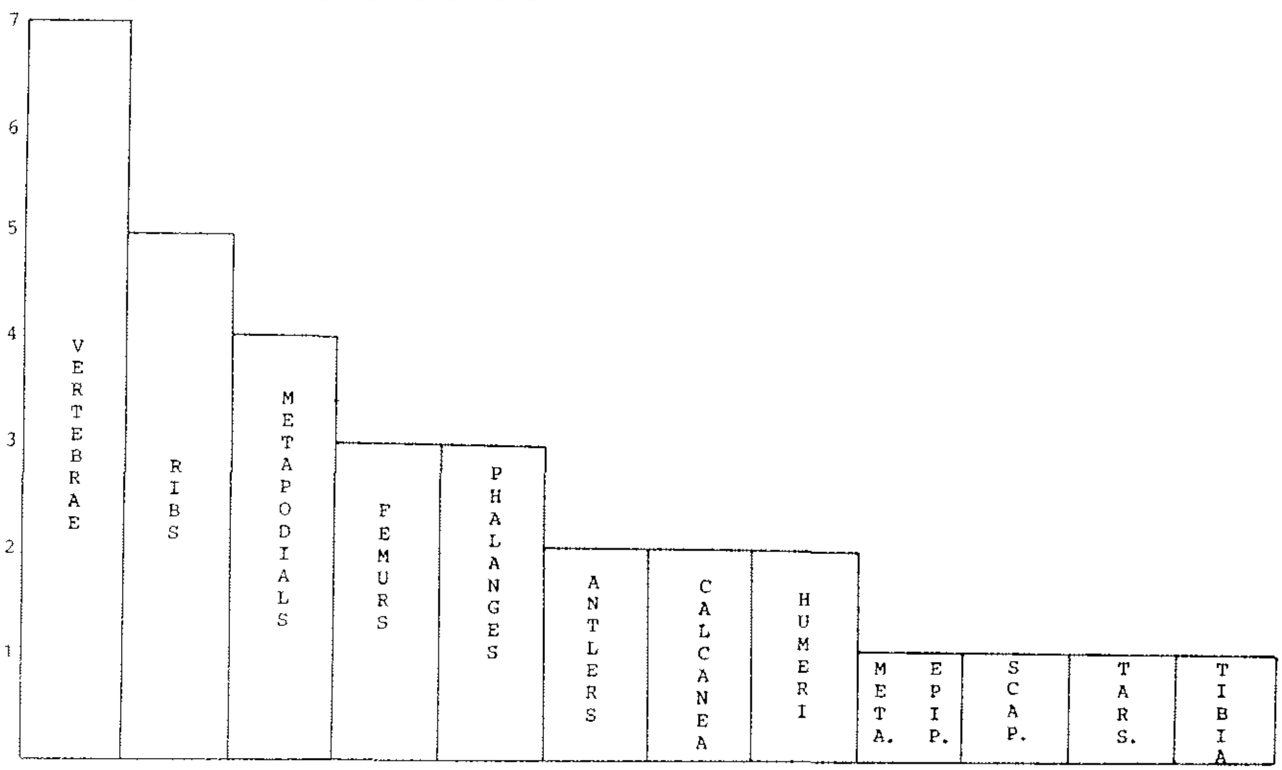

Figure 1
Number of Identified Deer Elements Collected from Six Bushytail Woodrat Nests in Gunnison County, Colorado

TABLE 1
The Initial Data Recorded for Large Bones Collected from Six Bushytail Woodrat Nests in Gunnison County, Colorado

Location	Element	Element Portion	Genus	Attrition Marks
N1-1	vertebra		Odocoileus	poss. gnaw.
N1-2	metapodial		Odocoileus	poss. gnaw. at prox. end; transverse cuts
N1-3	metapodial	proximal	Odocoileus	gnaw.; puncture; spiral fract.
N1-4	rib		Odocoileus	rodent gnaw.?
N1-5	phalange		Odocoileus	poss. gnaw. at dist. end; split longitud.
N1-6	mandible		Sylvilagus	ramus broken/gnaw.*
N1-7	calcaneus		Odocoileus	undamaged**
N2-1	vertebra		Odocoileus	poss. gnaw.
N2-2	femur	proximal	Odocoileus	spiral fract.; head gnaw.; trochant. gnaw.
N2-3	scapula		Odocoileus	blade & glenoid area gnaw.
N2-4	tibia-phalange		Sylvilagus	metapod. & fibula broken; prox. tibia rodent gnaw.
N3-1	metapodial	proximal	Odocoileus	dry-bone break
N3-2	vertebra		Odocoileus	extensive gnaw.
N3-3	humerus	distal	Odocoileus	spiral fract.; gnaw.; rodent gnaw.
N3-4	antler		Odocoileus	poss. gnaw.
N3-5	vertebra		Odocoileus	undamaged
N3-6	rib		Odocoileus	ends broken/gnaw.
N4-1	vertebra			broken/gnaw.
N4-3	tarsal		Odocoileus	poss. gnaw.
N4-4	fragment			damaged
N4-5	femur	distal	Odocoileus	gnaw.; spiral fract.; rodent gnaw.
N4-6	vertebra		Odocoileus	extensive gnaw.; puncture
N4-7	vertebra		Odocoileus	gnaw.
N4-8	humerus	proximal	Odocoileus	dry-bone break; gnaw.
N5-1	vertebra		Cervus	probable gnaw.
N5-2	rib		Odocoileus	gnaw.; puncture; transverse cuts
N5-3	rib		Odocoileus	gnaw. & scoring
N5-4	rib		Cervus	gnaw.; scoring; pitting
N5-5	vertebrae		Sylvilagus	broken
N5-6	vertebra		Odocoileus	extensively gnaw.
N5-7	femur	distal	Odocoileus	gnaw.; furrowing, spiral fract.
N5-8	rib		Odocoileus	dry-bone break; gnaw. & punctures; transverse cuts
N5-9	calcaneus		Odocoileus	undamaged
N5-10	metapodial		Odocoileus	gnaw. at both ends
N5-11	tibia	distal	Odocoileus	spiral fract.; gnaw. & scoring; transverse cuts
N5-12	fragment			damaged
N5-13	antler		Odocoileus	undamaged
N5-14	metapodial epiphyses		Odocoileus	undamaged
N5-15	fragment			gnaw. on ends
N5-16	fragment			gnaw. on ends
N6-1	phalange		Odocoileus	extensive rodent gnaw.
N6-2	phalange		Odocoileus	extensive rodent gnaw.

*refers to a bone in which the agent that caused the damage is unclear
**refers to those bones that display no damage or strictly weathering damage

86.5% of the total identified. Figure 1 illustrates the deer elements collected by the woodrats, and the number of identified specimens per element. The axial skeleton is well represented by twelve (37.5%) of the thirty-two deer elements.

The deer elements collected by the woodrats are probably a reflection of several factors. The vertebrae and ribs may be common simply as a reflection of the fact that they are abundant elements in an ungulate carcass. Another potential reason for their abundance may be the biasing that results from carnivore scavenging of limb bones. The majority of the deer carcasses observed in the study area were represented by the complete pelvic girdle, vertebrae, and ribs, while the entire crania and all or most limb bones were typically absent from the main carcass scatter. If the ungulate death site is outside the woodrats' foraging range, carnivores such as coyote may carry limb elements within the woodrats' foraging range. Many ungulate limb bones were located near mesa bases directly underneath the woodrat nests.

Support for the proposition that carnivore behavior must be understood to understand woodrat bone-collecting behavior comes from the fact that 51.3% of the nonrodent bones collected by the woodrats specifically displays signs of carnivore damage. In addition, nearly all deer limb elements show positive signs of carnivore damage.

Another factor affecting element composition may be the dimensions and weight of particular elements. This will be discussed in the next section.

Woodrats also collect coyote scats for nest-building material. A total of three coyote scats were collected in two of the six nests. Bushytail woodrats in the study area are potential contributors of scats (and thus the microfaunal remains found within these scats) to archeological sites (see Hockett 1988 for further details regarding the scat bones).

Few bones had been gnawed by the woodrats. Although signs of gnawing on bones have been considered in the literature to be a clear indication of the relative contribution that porcupines made to fossil bone assemblages (Binford 1984; Brain 1981; Hendy and Singer 1965), it does not appear that gnawing is as diagnostic a characteristic for woodrats.

The weathering stages of the bones (Behrensmeyer 1978) ranged from Stage 1 (degreased but still fairly fresh) to Stage 4 (extreme weathering). The condition of the bones at the time woodrats first collected them is unknown.

Woodrat bone-collecting behavior is a complex process. For example, both direct and indirect interactions between woodrats and coyotes may accumulate bones in archeological sites. The direct interactions include coyotes feeding on woodrats and defecating microfaunal woodrat remains in archeological assemblages. The indirect interactions include woodrats exploiting bones damaged by carnivores and the scats of coyotes for nest-building material. Coyotes may also utilize archeological sites to feed on rabbit, deer, and elk remains. Therefore, coyotes directly contribute similar bones indirectly collected by woodrats for nest-building and gnawing purposes.

Table 2
Individual CR Measurements for Large Bones Collected from Six Bushytail Woodrat Nests in Gunnison County, Colorado

Location	Minimum Width	Weight	Length
N1-1	2 mm	5.4g	40 mm
N1-2	11 mm	37.6g	176 mm
N1-3	2 mm	23.9g	163 mm
N1-4	4 mm	2.3g	84 mm
N1-5	1 mm	2.9g	41 mm
N1-6	1 mm	1.1g	37 mm
N1-7	5 mm	27.8g	94 mm
N2-1	2 mm	10.4g	53 mm
N2-2	3 mm	18.8g	123 mm
N2-3	.5 mm	17.8g	128 mm
N2-4	3 mm	4.1g	101 mm
N3-1	2 mm	14.2g	59 mm
N3-2	2 mm	6.5g	34 mm
N3-3	3 mm	17.7g	80 mm
N4-1	2 mm	1.4g	37 mm
N4-3	5 mm	3.8g	18 mm
N4-4	4 mm	.9g	20 mm
N4-5	3 mm	54.5g	95 mm
N4-6	3 mm	22.6g	95 mm
N4-7	3 mm	8.9g	44 mm
N4-8	3 mm	49.2g	181 mm
N5-1	5 mm	27.7g	107 mm
N5-2	2 mm	18.1g	295 mm
N5-3	2 mm	7.8g	153 mm
N5-4	2 mm	31.8g	199 mm
N5-5	3 mm	3.6g	117 mm
N5-6	2 mm	2.5g	65 mm
N5-7	3 mm	19.1g	70 mm
N5-8	1 mm	8.0g	182 mm
N5-9	5 mm	27.1g	91 mm
N5-10	7 mm	36.8g	180 mm
N5-11	3 mm	51.1g	179 mm
N5-12	3 mm	12.1g	99 mm
N5-13	3 mm	33.2g	86 mm
N5-14	8 mm	2.7g	20 mm
N5-15	2 mm	7.8g	103 mm
N5-16	2 mm	14.9g	85 mm
N6-1	8 mm	4.9g	30 mm
N6-2	6 mm	8.7g	49 mm

Put another way, woodrat and coyote utilization of a cave or rockshelter may contribute similar faunal remains with few apparent diagnostic attributes to distinguish between them. Nevertheless, deciphering the agents and events responsible for the deposition of all bones at archeological sites is crucial to accurate interpretations.

Development of the Carrying Range

How can archeologists distinguish between bones brought to a site by woodrats from those brought to a site by other agents (including humans)? A Carrying Range (CR) is proposed as an initial step toward answering this question.

The rationale for establishing a CR is that there must be a fixed range to the width, weight, and length of a bone which a woodrat can clasp and carry or drag into archeological sites. These ranges are expected to be much less for woodrats than for coyotes and many other carnivores and humans.

The CR was developed by taking three measurements on each bone collected from the six bushytail woodrat nests. The minimum width of each bone was measured to the nearest millimeter. The minimum width measures how wide a woodrat must have opened its jaws to clasp onto the thinnest portion of each bone. The weight of each bone was recorded to the nearest tenth of a gram. Finally, the length of each bone was measured to the nearest millimeter.

The results of the three measurements taken on each bone are displayed in Table 2. Bones N3-4 through N3-6 were not included since they were not physically in the woodrat nest, but were found on a slope leading up to the nest.

The greatest minimum width of any of the bones is eleven millimeters, measured on a deer metapodial collected from Nest 1. The heaviest bone is a deer femur weighing 54.5 grams. The longest bone is a deer rib which measures 295 millimeters in length. These three measurements may be viewed as individual ranges which comprise a more general Carrying Range. These individual ranges are a maximum minimum width range (MMW), a maximum weight range (MXW), and a maximum length range (MXL). The combination of the three ranges form the CR. The Neotoma cinerea orolestes CR is established at 11mm, 54.5g, 295mm.

It may be that a woodrat cannot carry or drag a bone which has the dimensions and weight equal to the CR into archeological sites. This will be determined as more bones are collected from woodrat nests and measured. Nevertheless, it is proposed that the CR may be a useful tool to separate assemblages in terms of site-formation agents. It is suggested that each bone recovered from archeological sites of known woodrat activity be measured for MMW, MXW, and MXL. If none of the three individual ranges exceed their CR counterpart (11mm for MMW, 54.5g for MXW, 295mm for MXL), then the bone in question may have been deposited at the site by woodrats. Bones whose individual range(s) exceed their CR counterpart were probably deposited at the site by agents other than woodrats.

It is understood that variation between woodrat species and among members of the same species will have an affect on the bones each individual is capable of dragging or carrying. Therefore, a different CR may be needed for each species of woodrat.

The difference between ground-level sites and those sites that require vertical climbing to access them will also affect the CR. The deer metapodial which measured 11mm for MMW was carried or dragged 2.4 meters up a nearly vertical slope into its nest. The deer femur which weighed 54.5g for MXW was carried or dragged 3.5 meters up a nearly vertical slope into its nest. The deer rib which measured 295mm for MXL was carried or dragged 2.8 meters up a nearly vertical slope into its nest. More quantification data are needed to establish if different Carrying Ranges are necessary for variation in vertical access to sites.

The CR must be used with other types of data and an appreciation for all current taphonomic knowledge. For example, the percentage of articular ends present on ungulate limb bones, charring patterns, cut mark data, and the presence of hearths may all be combined to suggest human modification to relatively unambiguous faunal remains. The CR's value lies with bones in deposits whose origins are ambiguous. It is philosophically preferable to discount certain bones as potentially brought to a site by woodrats than to assume they were brought to a site by humans. Finally, one of the CR's greatest assets is that it is not affected by disturbance. Many North American archeological sites have been heavily disturbed, yet disturbance has no affect upon woodrat CRs.

Conclusion

Archeologists are growing more sensitive to the role natural agents play in bone accumulation. Yet, often conclusions about the role of human behavior in depositing bones are drawn based upon spatial associations between bones and artifacts alone. The presence of human artifacts or bones modified by humans does not unequivocally mean that all of the associated bones were deposited by humans as well. Wherever woodrat activity is found, woodrat bone-collecting behavior must be considered.

It is conceivable that woodrats exploited bones from culturally modified carcasses in the past. Sticks and twigs make up the bulk of woodrat nest-building material, and it is possible that woodrats could have brought arrow and spear shafts into archeological sites. Stone artifacts and human feces may also be collected by woodrats. Understanding all facets of woodrat collecting behavior is vital. Woodrat Carrying Ranges may play a role in increasing the accuracy of archeological interpretations of past human lifeways.

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THIN-SECTION ANALYSIS OF MISSION PERIOD POTTERY FROM BAJA CALIFORNIA, MEXICO

Donald R. Tuohy
Nevada State Museum
Carson City, Nevada

Mary B. Strawn
Idaho State University Museum
Pocatello, Idaho

Introduction

This paper summarizes the results of thin-section analysis of a dozen plain brownware potsherds recovered at ten mission sites from an area extending from above the 31st parallel to well below the 25th parallel on the Baja California peninsula, Mexico (Fig. 1). The pottery is here called "Mission Period Brownware" (May 1973). The distance from Mission San Vincente in the north to Mission San Luis Gonzaga in the south is roughly 3/4 the total length of the peninsula itself. The latter is usually given as approximately 700 miles, or as 1,059 road miles.

The sample is made up of twelve potsherds, two each from two missions and eight single sherds from eight other missions. Such a small sample can do little but add impetus for further efforts in this data-gathering stage of the research.

Some of the questions posed by this research are: What constitutes "Mission Period" pottery? How does Mission Period pottery differ from surrounding pottery types of prehistoric, aboriginal, and contemporary Mexican manufacture? Was pottery traded during the Spanish Mission Period? Were ceramics manufactured locally or imported from nearby geographic regions? Can thin-section analysis help answer these questions?

To provide answers to some of these questions, sherd samples must be well controlled and carefully provenienced from the various mission sites. The data reported here represent "grab" samples of sherds from surface deposits found in and near the ruins or still extant chapels of ten missions, San Bruno, San Juan Londó, San Luis Gonzaga, San Borja, Santa Rosalía de Mulegé, San Fernando Velicatá, Calamajué, El Rosario I and El Rosario II, and San Vincente (Fig. 1). Therefore, some mixing of Mission Period pottery with later or contemporary Mexican types may well have taken place. Some care was exercised, however, in the selection of sherds that were collected. Preference was given to sherds found at or near living quarters near church ruins, or those that were partially buried in mission compounds.

Age of the Samples

The temporal range of the sherds begins with the late 20th century and extends to as early as A.D. 1683. This early date represents Father Kino's first Jesuit mission settlement at San Bruno on the gulf coast north of La Paz. The settlement was unsuccessful, however, and was abandoned in 1685.

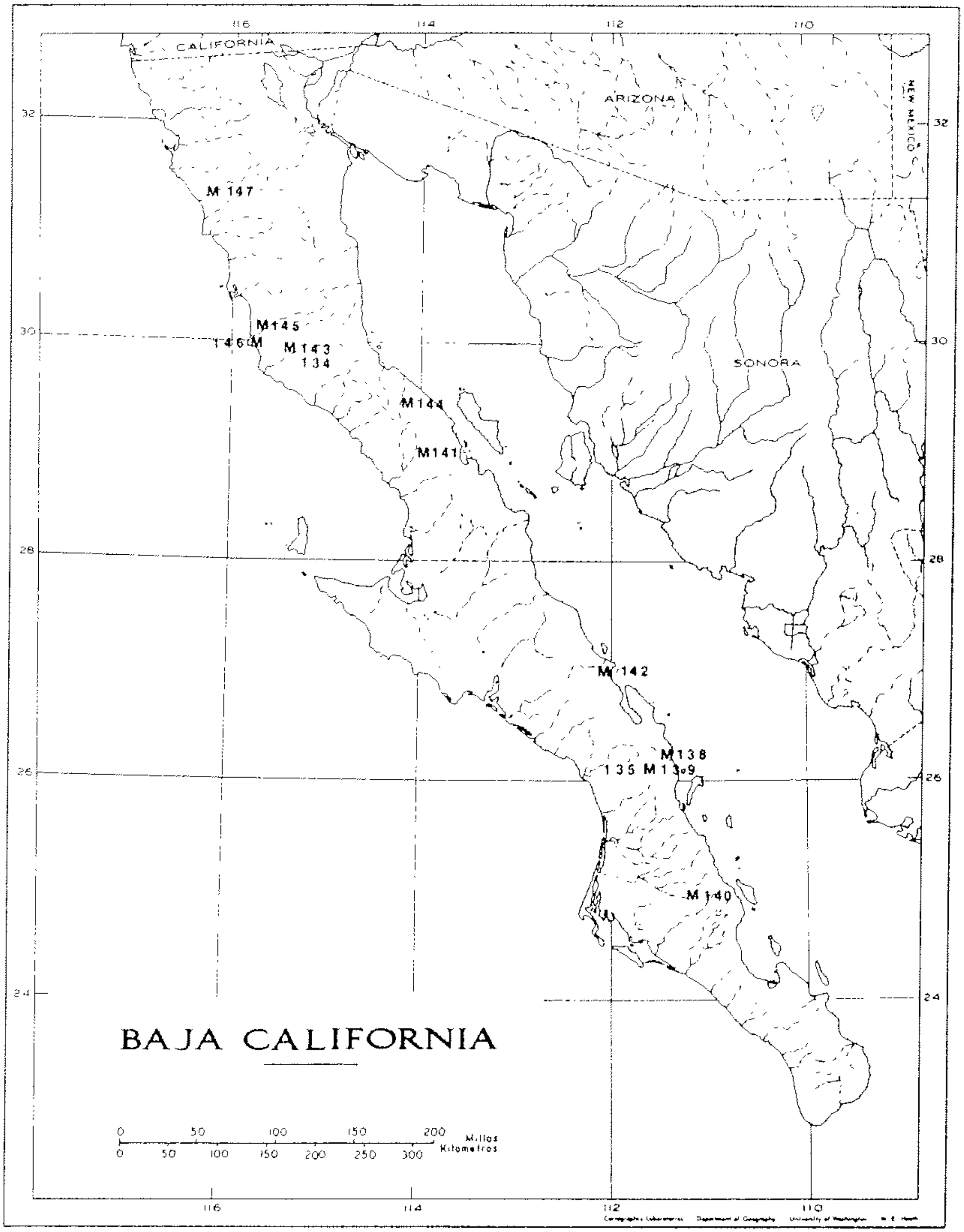

Figure 1
Site Locations

The Jesuits returned after an absence of 12 years, and in 1697 founded the first permanent mission settlement at Loreto, also located on the southern gulf coast. The Jesuits' tenure on the peninsula lasted until 1767 when they were expelled from all of Mexico including Baja California. At the time of their expulsion, they had established a chain of 18 missions extending from the Cape Region to nearly the 30th parallel at Arroyo El Rosario.

The Jesuits were succeeded by the Franciscans, who founded their first peninsular mission in 1768 at Velicatá. The Franciscans were more interested in Alta California, however, and their major efforts were directed there during ensuing years. The Dominicans took over the missions in Baja California in 1773. Their first mission was founded at El Rosario in 1774, and between then and 1797 six additional missions were founded between El Rosario and the border. The Dominican Period on the peninsula lasted until 1854 (Englehardt 1929:555-714). The Augustinians, another of the monastic orders, also entered the mission field on the peninsula, but their influence was negligible.

The dozen potsherds comprising the sample came only from Jesuit, Franciscan, and Dominican missions. Seven sherds came from Jesuit missions, including one from the first Jesuit settlement at San Bruno, and one from the last Jesuit mission at Calamajué. Two sherds were collected from the first Franciscan Mission at Velicatá, and three sherds came from Dominican missions at, and north of, the 30th parallel. Table 1 presents descriptions of the morphological traits of the potsherds.

The Ethnographic Record

From what is known of the ethnographic record south of the 30th parallel in Baja California, all authorities agree that pottery-making was unknown to all aboriginal groups south of El Rosario (Aschmann 1959:59; Clavigero in Lake and Gray 1937:93; Kirchhoff 1942:XXIX; Martinez 1956:39; Massey 1947a:354). According to Clavigero (in Lake and Gray 1937:91):

> "When some indians found among the sands of the Pacific Sea some large earthen jars, left there without doubt by the sailors of some ship from the Philippine Islands, they marveled at them because they had never seen similar vessels. They carried them to a cave a short distance from their usual habitation and placed them there with the mouths turned toward the entrance, so that all might observe them well. Afterward they went frequently to look at them without ever failing to wonder at those great mouths always open; and in their dances, where they imitate the movements and cries of animals, they imitated the mouths of the jars with theirs."

The ethnographic record is clear that aboriginal (pre-mission) pottery was restricted to the area north of the 30th parallel. Yet some of it was being traded into the northern gulf region from the Cocopa (Burrus 1966:81), and the archeological record shows that at least some of this painted and plain pottery from the northern regions reached as far south as Cataviña, located just north of the Central Desert (Chace 1967:50; Green and Brennan 1982).

At the same time as the establishment of the Jesuit missions (1697-1767), pottery containers were introduced to the Indians living south of the 30th parallel. Pottery vessels comprised part of the individual priest's household goods (Baegert in Brandenburg and Baumann 1952:125), and became part of the cooking apparatus used by Indians (Aschmann 1966:81). The usual Spanish household utensils in use during the 18th Century included a brasero, or brasier, which utilized both a large pottery bowl and jar (DiPeso 1953:228). O'Crouley, (Aschmann 1966:81) quoting a manuscript probably written by the Jesuit, Fernando Consag, notes that after contact with the Spanish the Indians "...cooked flour and made mush or cakes of it," and that:

> "The latter type of cooking occurs at the present time since the Indians now possess some pottery cooking vessels, and some women who know how to cook. While they were gentiles the Indians never ate anything boiled because they had no vessels in which to cook; all their foods were either toasted or roasted."

Baja California Containers

Following Massey (1947b), Tuohy (1970:40-51) previously mapped the distribution of various types of bark, turtle shell, skin, basketry, and pottery containers used on the peninsula in ethnohistoric times. The recorded archeological occurrences of plain brown pottery south of Cataviña were summarized in that paper. It had been noted as present on the Gulf Coast at Bahía de Los Ángeles by Massey and Osborn (1961:343) and by E. L. Davis (1968: 184, 190) at the same locality. It also was recorded archeologically by Meighan (1966:372) in Gardner Cave located just below the 28th parallel, and by Massey and Tuohy (1960) from the Sierra de la Giganta in the vicinity of the 26th parallel. Because the potsherds found at Gardner Cave were "tempered with grass," Meighan (1969:40-42) thought the brownware he recovered to be "...more likely of aboriginal origin".

Thin-Section Analyses

In order to check the temper of plain brownware pottery from caves of the Sierra de la Giganta, known to date to the Jesuit Mission Period (1697-1767), a potsherd from Metate Cave was analyzed in thin-section by one of us (M.S., an experienced petrographer at Idaho State University, Pocatello). The analysis of specimen 3-13825 was previously published as follows (Tuohy 1970:42):

> "Core (cross-section)
> Color: light brown on exterior and interior. Dark brown in center of core. Carbon and some Fe_2O_3 present.
> Temper: Amount -- moderate. Texture -- fine to medium, (most fragments less than 0.2 mm). Shape -- angular.
> Temper Material: Plagioclase predominates, also a few sherd fragments, and a few fragments of an igneous rock (silicic)."

Because potsherd fragments were noted as part of the temper in this initial analysis, and because crushed potsherds were commonly used as temper in pre-mission pottery found north of the 30th parallel (Davis 1967:61; Gifford 1931:42; Rogers 1936:22) as well as among the Seri on the eastern Gulf Coast (Bowen and Moser 1968:92), and because one cannot rule out use of crushed potsherds as temper in Mission Period pottery found south of the 30th parallel, further thin-section work became mandatory.

The purpose of recent thin-section studies is to find similarities and differences among amounts, textures, and kinds of rocks and minerals used as temper in potsherds. Such analysis of Baja mission sherds might help distinguish pottery from one region or sub-region from that of another. Accordingly, the twelve additional thin-sections were analyzed by Strawn.

Size

Measurements of rock fragments and mineral grains were taken with a micrometer attached to a petrographic microscope. A hundred power was used and the long dimension of the particles was recorded. Both rock fragments and mineral grains are included in measurements of size ranges given for each thin section. In most cases, at least twenty measurements were made. Rock fragments were consistently larger than mineral grains.

Shape

Shape designations were made using Powers' (1953) roundness scale. The designations were necessarily subjective and the distinction between "subangular" and "subrounded" was difficult to make. Broader categories such as "angular" and "rounded" were more clear-cut. In general, the rock fragments appeared to be more rounded than the mineral grains.

Amount

The percentages of temper in the sherds were determined by comparison with Terry and Chilingar's (1955) chart for estimating percentage composition of rocks and sediments. Six to eight comparisons were made over the section and the percentages of temper averaged.

Composition

Most of the mineral grains identified were silicates, quartz and feldspar with lesser amounts of amphibole (hornblende) and pyroxene (augite). The rocks present in the sherds and their distribution is given in Table 2.

Both rock fragments and mineral grains showed considerable weathering and alteration. The alteration was mainly to clay minerals, but only kaolinite and sericite were identified.

Varying amounts of magnetite grains were present in most of the sections, and so its presence was not considered diagnostic.

Quartzite was abundant in the sections; where sutured contacts between quartz grains indicated some degree of metamorphism the rock was called metaquartzite.

Photographs

Photographs of the sherds were taken with a 35mm camera using VR-100 film. The photos show mineral grains and rock fragments characteristic of all the slides, with the exception of NSM 139b which shows the only observed specimen of welded tuff.

TABLE 1

Provenience and Descriptive Data on Mission Period Pottery from Baja California

Cat. No.	Mission	Vessel Type (?)	Thickness (mm)	Core Color	Ext. Color	Notes
134	Velicatá	bowl	7.3	7.5YR 3/0	2.5YR 5/6	
135	S.J. Londó	jar	10.4	2.5YR 3/0	7.5YR 5/2	Int. color 5YR 6/6
138	San Bruno	bowl	10.0	7.5YR 3/0	5YR 6/4	Coiled
139	S.J. Londó	bowl	8.6	5Y 2.5/1	5YR 2.5/2	No visible temper
140	S.L. Gonzaga	large jar	20.7	2.5Y 4/0	5YR 5/4	
141	San Borja	large jar	14.0	5YR 4/1	5YR 5/4	Pebble-smooth int.
142	S.R. Mulejé	bowl	7.3	5YR 5/4	5YR 4/2	Light colored core
143	Velicatá	bowl	7.3	7.5YR 3/0	7.5YR 3/2	Int. color 5YR 3/4
144	Calamajué	jar	11.6	5YR 4/1	7.5YR 6/2	Int. color 5YR 5/3
145	Rosario I	bowl	8.0	5YR 4/1	10YR 5/3	
146	Rosario II	bowl	12.7	10YR 4/1	2.5YR 5/8	
147	S. Vincente	bowl	8.0	2.5YR 5/0 to 2.5YR 5/2	10YR 4/3	Light colored core

TABLE 2

The Distribution of Rock Types in Thin Sections

NSM No.	Locality	Chert	Granitic Rock Granite	Quartzite Metaqtzite	Siltstone Silty Shale	Basalt	W. Tuff
134	Velicatá	X	X	X			
135	San Juan Londó		X	X			
138	San Bruno		X	X	X		
139	San Juan Londó			X	X		X
140	San Luis Gonzaga		X	X	X		
141	San Borja			X	X	X	
142	Santa Rosalía (Mulegé)			X	X	X	
143	Velicatá		X	X	X		
144	Calamajué		X		X	X	
145	Rosario I		X		X	X	
146	Rosario II		X	X	X		
147	San Vincente		X		X		

Results of the Petrographic Study

Evidence from the petrographic study seems to indicate that sediments were used for temper. Data bearing this out are (1) the wide range of rocks represented in the rock fragments of the sherds; (2) the rounding of the fragments of rock as dissimilar as silty shale and metaquartzite; and (3) the large amounts of clay associated with the rock and mineral particles, sometimes making identification difficult, if not impossible.

However, it is possible that the rounded mineral grains and rock fragments were deposited with the clay that was used for making the pottery, and are autochthonous and not introduced. In other words, the grains and fragments were part of the paste, and were not temper. However, the mineral grains in the sherds are more angular than the rock fragments and consist of quartz and feldspar mainly. The angularity would be consistent with grinding of rocks for temper.

The absence of crushed potsherds in this sherd sample, and the preponderant use of sediments and crushed granitic rock, high in quartz and feldspar, may reflect a particular aspect of ceramic technology rather than anything else. For such a temporally and geographically disparate sample to have a concordance among rock types used as temper was totally unexpected.

On the other hand, when one considers that there was always a paramount need behind the selection of sites for peninsular missions -- the need for adequate sources of water -- then such similarities in rock types became explicable. Nearly all permanent missions, particularly those founded by the Jesuits, are located adjacent to large arroyos where there was a constant and reliable supply of potable water. Sediments in these arroyos presumably match the sediments used as temper in the sherd samples. Future research should test this proposition.

Discussion

Several conclusions are apparent, but because they are derived from such a small sample of tested potsherds, they may be more apparent than real. We do not know, for example, whether the sample truly represents "Mission Period Brownware" pottery. We think it does, but we still do not know how the samples differ from the contemporary pottery made on the peninsula, or imported from the mainland. The absence of welded tuff in all specimens save one from San Juan Londó (No. 139, Table 2) suggests that that particular vessel may have been locally made. This could have been done as early as the late 17th Century since San Juan Londó was a puebla de visita (known as San Isidro), or an outlying mission station of San Bruno, as Father Kino's diary attests (Mathes 1969:15). Another vessel, represented by sherd sample No. 138 (Table 1), came from nearby San Bruno, and it clearly was handmade by the coiling method, but lacked welded tuff in the temper. As nearly as can be determined (because of the small physical size of all sherd samples), all other vessels appeared to have been hand-molded or made on a potters' turntable.

Other practices, such as the inclusion of dung, grass, and crushed rock or potsherds, may have been part and parcel of unglazed earthenware potters' repertoire antedating the Conquest, or brought to the New World from the Old, and first practiced extensively at Spanish tradition pottery kilns in Mexico City. Surely, the potsherds herein called "Mission Period Brownware" are lineal descendants of such Spanish tradition ceramics as were made in 17th - 18th Century Mexico City, and in the 16th Century Seville, Spain, during and after the Spanish Conquest (Foster 1960:92-93; Lister and Lister 1982:61).

Such "Mission Period Brownware" ceramics may readily be distinguished visually from the varieties of Tizon Brownware ceramics of aboriginal manufacture found north of the 30th parallel on the peninsula and in northwestern Arizona and southern California. The several varieties of Tizon Brownware are all coiled, paddle and anvil wares having a temporal range of A.D. 700 to A.D. 1890 (Dobyns and Euler 1958; Euler 1959). Thus, gross sherd morphology is important in distinguishing Tizon Brownware from "Mission Period Brownware". May (1973) has called this pottery the "Mission Series" of Tizon Brown.

Ritter (1979:328-331) has reported on ceramics found during the course of his studies in the Mulejé region on the south-central Gulf coast, and he sees similarities between the brownware found there and a variety of Tizon Brownware, Laguna Series, Santo Tomas Brown, as described by May (1973:59-60) for Santo Tomas Mission, a Franciscan mission in northwestern Baja California.

The largest sample of Ritter's (1979:329) brownware sherds from the Mulejé Region came from one of four sites yielding pottery, the Santa Rosalía de Mulejé Mission founded in A.D. 1705. A minimum of five vessels were represented and most had black cores. They were constructed by coiling, scraped and rubbed by hand, or paddled. They were fired at low temperatures and had a fine temper which included organic materials and possibly some ground shell. Color is given as 57% reddish brown (5YR 5/4) on the interior and exterior; 26% dark or light yellowish brown (10YR 5/6) or (10YR 5/2) on the interior; and 25% red (2.5YR 5/6) to weak red (2.5YR 5/2) exterior color and reddish brown (2.5YR 5/4, 4/4) interior color. Thickness of vessel walls averages about 9 mm, and ranges from 5 mm to 16 mm (Ritter 1979:328-329). Pottery from the other three sites showed some variation, but, in general, was similar in all respects to the potsherds collected near the mission.

As indicated in Table 1, the single Mulejé sherd in our sample, No. 142, had a different exterior color and a lighter colored core than any Mulejé Mission potsherds reported by Ritter (1979). Also, as Table 2 shows, specimen 142 was one of three in the sample which contained basalt as an inclusion or a temper constituent; the other sherds containing basalt were from San Borja and Rosario I, samples 141 and 145.

May's (1973) "Santo Tomas Brown" is concentrated mainly around the non-Jesuit missions north of the 30th parallel and probably dates between A.D. 1770 and 1850. Although such Tizon Brownware variants are similar to Mission Period Brownware found below the 30th parallel, differences probably outweigh similarities.

For example, thin section analysis of 34 sherds of Tizon

Brownware from 20 aboriginal sites representing Gabrieleño, Serraño, Cahuilla, Luiseño, and Diegueño (all southern California groups) has shown that temper was not purposefully added to the paste of this pottery, but was part of the original raw material, and no rock fragments were present in the observed sections (Koerper et al. 1978:52). Further, these authors found that thin section analysis can distinguish pottery having a common regional origin from vessels made outside the same region. Particularly useful for Tizon Brownware studies were "...size and angularity of the grains, the percentage of different minerals in the temper, ...and the dark and opaque minerals" (Koerper et al. 1978:52). Quartz was always present, and hence not particularly useful in these studies, and the same conclusion is relevant to our study of Mission Period Brownware.

Recently at a point just south of the 29th parallel on the northern Gulf Coast, Foster (1984:61-68) explored the Bahía de Los Ángeles region for trans-Gulf contacts by the Seri Indians. He reports six sherds of historic Seri pottery. Each sherd was less than 5 mm in thickness, tempered with organic materials and thinned by scraping, and showed an interior slip, a defining attribute of historic Seri pottery (Bowen 1976:55).

However, the site, Punta La Gringa, is very late, dating between 1700 and 1800 A.D., when historic Seri ceramics replaced Tiburon Plainware on the mainland (Bowen 1976:53-54). This evidence for trans-Gulf contact between the Seri and the mainland of the peninsula mirrors that evidence found by Bowen (1976) on Isla Tiburon and the Sonoran mainland. Thus, potsherds may be used as evidence for visits of an alien group to the shores of Baja California. Although archeologists and ethnologists may have suspected the close relationships between the Seri and the Cochimí, so far there is not one shred of archeological evidence to support that presumed relationship.

Conclusion

In conclusion, thin-section analysis of a small surface sample of potsherds from Baja California missions has provided new knowledge of a heretofore undescribed pottery ware, called "Mission Period Brownware". This name, of course, is tentative and is used herein only to describe the small sample of potsherds analyzed. Clearly conservatism is called for in deriving cultural inferences or taxonomic relationships from such a small sample. Nevertheless, as we have shown, the thin section work done on such plainwares has opened up a useful avenue to explore -- perhaps not the King's Highway, but at least a mule train leading to further knowledge and understanding of the peninsula's priceless prehistoric and historic heritage.

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The Nevada Archaeological Association was organized in 1972 to provide a bond of communication between professionals in the field of archaeology and its allied sciences, members of various amateur organizations, and the people of Nevada towards the furtherance of public education and involvement in responsible preservation of Nevada's finite archaeological and historical resources.

The need for recording these cultural resources of the past for the enlightenment of future generations grows more pressing with each day of development and progress. The goals of the Nevada Archaeological Association are: to provide a focal point for general information and study of non-renewable cultural resources; to provide a central point for recording artifact collections from Nevada and the Great Basin and the verbal knowledge of provenience and associations accompanying these collections; to correlate this knowledge with that information already professionally recorded for the mutual benefit of the amateurs and professionals with research interests; to provide assistance with education towards responsible public participation in archaeology; to assist in the preservation of sites by the establishment and maintenance of a registry of available, capable, and technically skilled amateurs in Nevada who would be able to work with professionals in accordance with the Code of Ethics and Standards of Research Performance as advocated by the Society of Professional Archaeologists, particularly in the immediacy of salvage archaeology; and to provide a bond of communication between professionals, amateurs, and the general public by publishing a journal, *Nevada Archaeologist.*

To these ends the Nevada Archaeological Association was incorporated in 1972, in the State of Nevada, with its organizational and editorial offices as listed on the inside cover. Membership is open to all those interested in the archaeology, ethnology, and history of the human inhabitants and their natural habitats in Nevada, the Great Basin, and adjacent environs.

ARCHAEOLOGICAL SOCIETIES IN NEVADA

NEVADA ARCHAEOLOGICAL ASSOCIATION OFFICERS

NAA President 88	Helen Mortenson
NAA Treasurer 88	Robert Leavitt
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In Fallon: Churchill County Chapter of the NEVADA ARCHAEOLOGICAL ASSN.

President:	Anan Raymond
Vice-President:	Campbell McNair
Secretary-Treasurer:	Maie Nygren 6800 Mission Road Fallon, Nevada 89406
Telephone:	(702) 423-2212

In Reno: AM-ARCS OF NEVADA

President:	Analise Odencrantz
Treasurer:	Lewis White
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In Las Vegas: THE ARCHAEO-NEVADA SOCIETY

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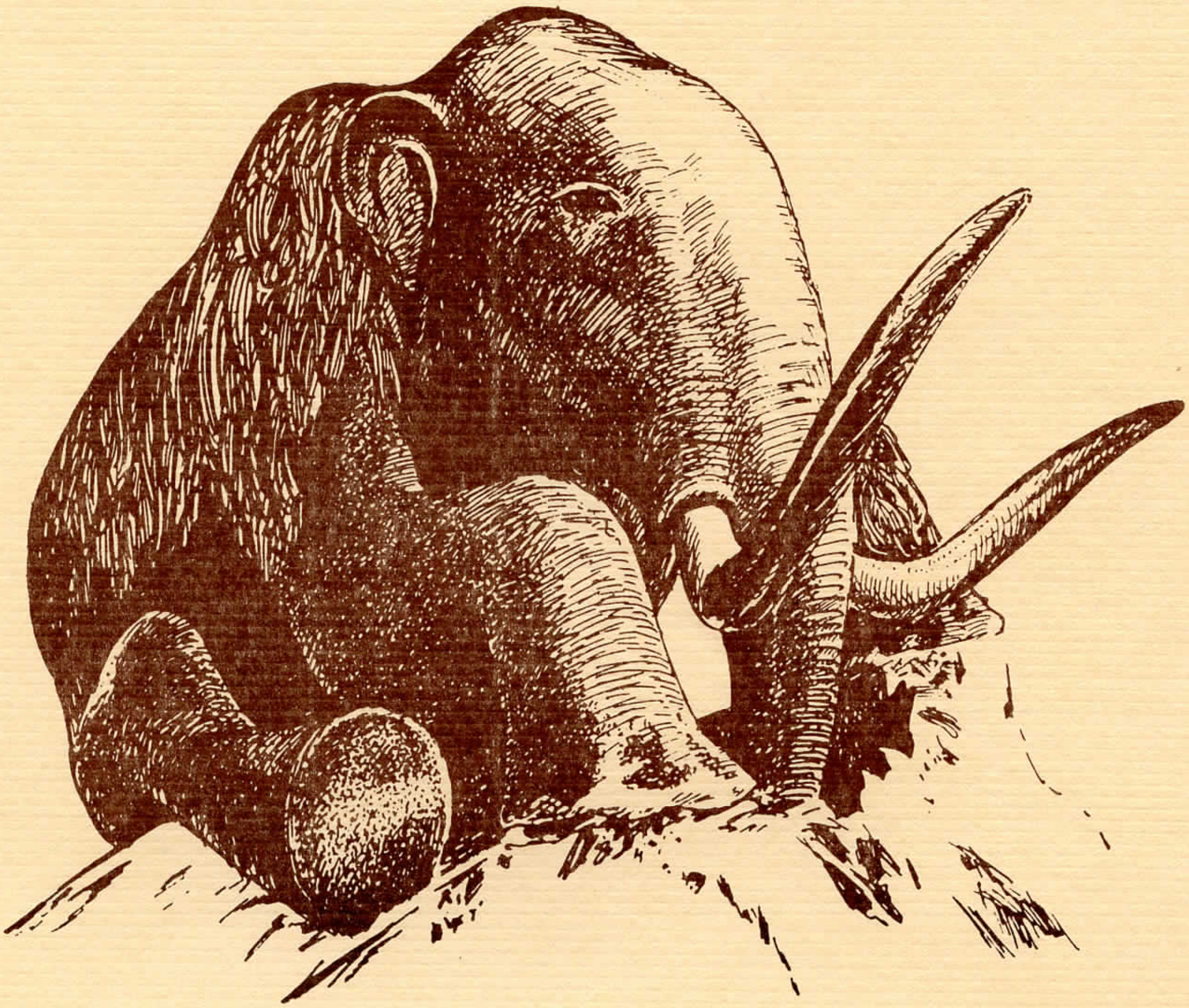
Residents of all other Nevada communities are asked to join the Nevada Archaeological Association until such time as there are sufficient numbers of people willing to form local chapters of the above organization. Information on the Constitutions and By-laws of the above organizations may be obtained at cost from the secretaries of the above organizations.



Reconstruction of a late Pleistocene mammoth, on exhibit at the Zoological Museum in Leningrad, U.S.S.R. (see related article by D. Tuohy, page 11).