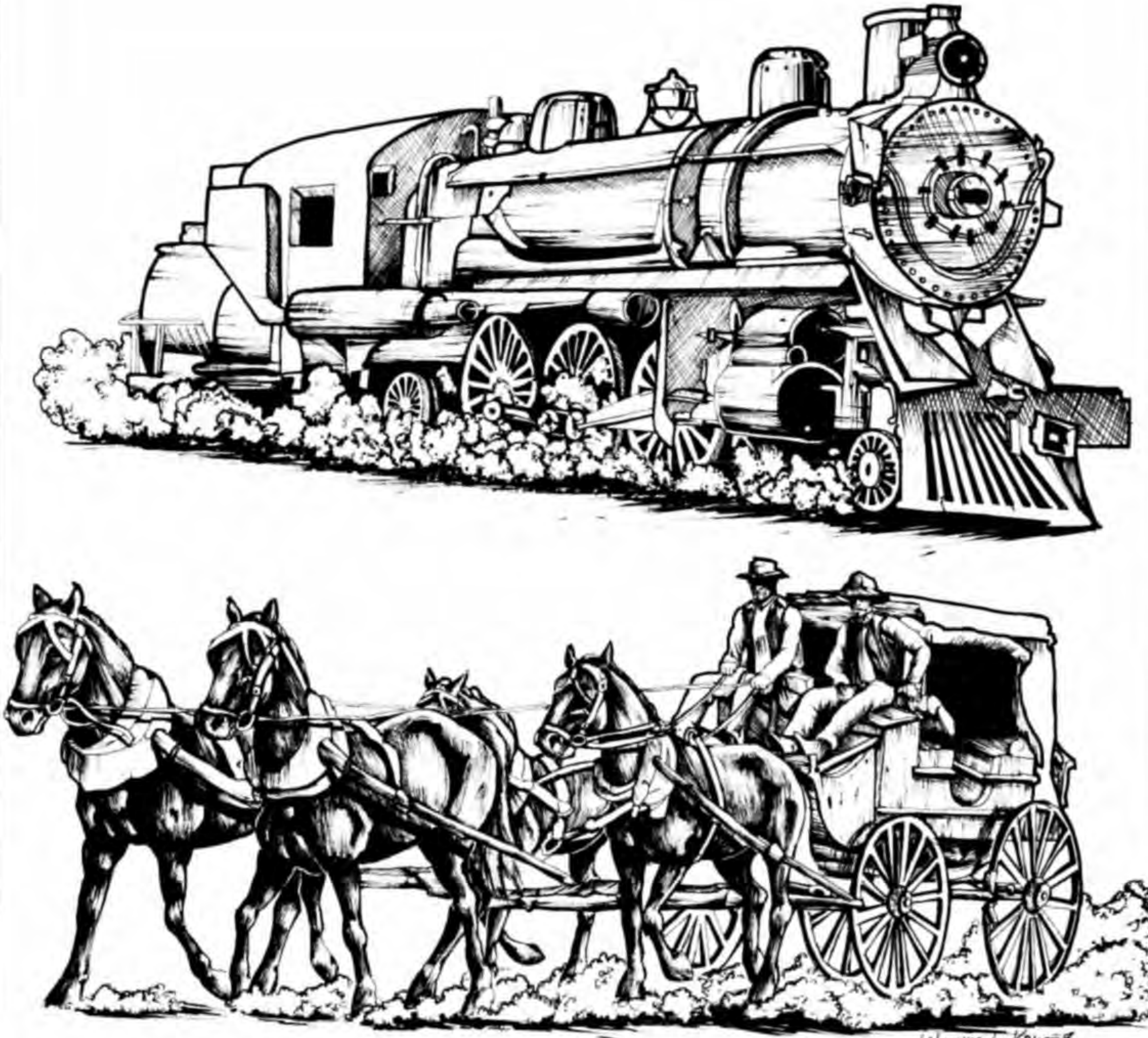

NEVADA ARCHAEOLOGIST

VOLUME 11 1993

NEVADA ARCHAEOLOGICAL ASSOCIATION

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Manuscripts submitted for publication in the *Nevada Archaeologist* should follow the style guide of the January 1979 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. Submissions from avocational as well as professionals are encouraged.

Manuscripts should be submitted to *Nevada Archaeologist*, c/o David S. Johnson, Post Office Box 704, Carson City, Nevada 89702-0704.

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EDITOR'S CORNER

In American history, one learns that much of the inter-mountain West was passed over during the initial rush to occupy California and other coastal states. The territory between the Wasatch Range of Utah and the Sierra Nevada Range of California was envisioned as a vast expanse of hostile desert to be avoided at all costs or traversed as quickly as possible. It was not until the gold fields of California were nearing exhaustion that America's attention was redirected to those wilderness landscapes that had been overlooked. As Western pioneers poured back into this overlooked frontier in search of mineral wealth and economic prosperity, they left evidence of their passing in the form of wagon roads, mining claims, homesteads, and later, railroad alignments, townsites, cemeteries, and tin can trash scatters. These cultural resources represent tangible manifestations of a valiant effort by common people, representing both genders and ethnic diversity, to claim and exploit the natural resources as well as adapt to, survive, and settle what is now the state of Nevada.

Of topical interest, this volume is dedicated to Nevada's archaeological resources of the historic period and to those of us whose interests are consumed by "tin can" or historical archaeology. Four of the papers presented in this volume deal with the contextual theme of late 19th and early 20th century transportation; two papers discuss theoretical models to account for historic resource manifestations and two papers deal with descriptive analysis of railroad and wagon road related resources. The final paper is placed in the contextual theme of mining in one of Nevada's last frontier mining districts. This paper clearly demonstrates that archival research is an integral and valid component of historical archaeological investigations which contributes to and enhances the interpretation of historic sites as an independent source of data.

I would like to thank the authors who contributed to this volume. The final responsibility of compiling and editing of this volume rests with me, my unfamiliarity with the computer program, computer anxiety, and not that of the authors. One final note which deserves attention, the cover illustration was rendered by LaLainya Kruger, a struggling young illustrator in southern Nevada capable and eager to do archaeological illustrations. So with that as an introduction to this volume, please enjoy one of my favorite subjects, Nevada's historical archaeology.

William G. White
Historical Archaeologist

Contents

Viewing Transportation Features in Time and Space: A Regional Historic Transportation Systems Model

Keith Myhrer, Stateline Resource Area Archeologist, Bureau of Land Management

Nevada Archaeologist Volume 11 1993

Abstract

The remains of construction camps and several road alignments lie along a relatively narrow corridor in southern Nevada. Previous historic evaluations emphasized a descriptive focus. This model emphasizes placement of features and linear segments within a regional context, focusing on interweaving activities from an existing system to one that is under construction, and comparing properties with similar contemporaneous features to develop a classification scheme for future research.

Introduction

Evaluating a linear archaeological feature is challenging in comparison to recording a non-linear site with a manageable boundary. For example, the length of an historic road may possess varying states of preservation and integrity, and because portions of the alignment may cross federal, state, county and private lands, recording its areal extent is a monumental task. In association are discrete sites and temporary beds, such as camps and shoo-fly lines from the 1904 construction of the San Pedro, Los Angeles and Salt Lake Railroad (SP,LA&SL RR). While these linear and non-linear features are easily identified by archaeologists, especially during compliance-driven cultural resource management (CRM) field inventories, evaluations are often conceptually coarse and incomplete. Partly due to the piecemeal nature of CRM conducted on Federal lands, including those managed by the Bureau of Land Management (BLM), in which each action is processed separately, the recorded alignments and features are typically treated in reports as isolated entities, unrelated to an historic sequence or contemporary sites in the region.

The following model is offered as a method to classify and evaluate portions of linear alignments and associated properties, in particular, those created and used within a corridor in Clark County, Nevada, connecting Salt Lake City, Utah to Los Angeles, California.

Its purpose is to identify a diachronic relationship between one transportation system and its predecessor, and emphasize functional comparisons of site types on a synchronic level. The model may be used to develop propositions by deductive reasoning, and create specific field and primary research expectations to evaluate sites on a regional scale.

The Framework

A *transportation system* is defined as the total of the linear alignment and transportation components. The *linear alignment* is defined as the physical path followed by its users, who include supply and mail carriers, emigrants, businesspersons and tourists. *Transportation components* include railroad tracks/ties, railroad beds, highway pavement, artifact clusters, features from construction or maintenance camps, and other spatially delineated remains of human activities considered associated with the construction, use and abandonment of the linear alignment.

Assumptions

Acceptance of the model relies on three assumptions. First, a transportation system is considered the result of a planned, large-scale, financed project. The complexity of financing and planning progressed through time. While 19th century merchants only contracted exploration parties led by individuals such as Jedediah Smith to locate and map safe routes from east to west (Smith 1977), later systems invested small fortunes into merely the planning stages. In reference to long-range plans by railroad financiers, Buckles (1983:220) notes, *Many of the railroads that were ill-adapted to the environment were conceived and constructed, apparently as consequences of the energies and imaginations of individuals driven by goals more important than pragmatism.* Myrick (1963:623-644) chronicles a 15-year period in which a railroad between Salt Lake City and Los Angeles was repeatedly devised by political and industry giants. Second, a transportation system tends to follow a *corridor*, considered the path of least resistance through a selected topography. In portions of Clark County, the *Salt Lake to Los Angeles corridor* measures less than a mile wide and contains the remnants of a horse and mule trail, a wagon road, a railroad, two paved highways and one superhighway. Because corridors exist on both regional and local scales, complexity is variable. While the Salt Lake to Los Angeles corridor shows a continuum of several transportation systems, the Las Vegas to Pahrump Valley corridor consists of only wagon and paved motor roads. Third, a regional transportation system designates points of *origin* and *destination*. They are interchangeable, depending on the direction a user is heading. For example, on historic regional maps the *Mormon Road* was simultaneously referred to as the *California Road* and *Road to Las Vegas*.

Examining Synchronic and Diachronic Changes

While questions concerning through time are common topics of investigation, regional similarities and differences on a contemporary plane are seldom identified. Diachronic changes may be researched by comparing one system with another or examining changes within a system. The model, shown in Figure 1, outlines time and space relationships. Major systems are classified as *footpaths, horse and mule trails, wagon roads, motor roads (unpaved and paved)*, and *superhighways*. Phases of an individual system include *exploration, construction, use/maintenance*, and *abandonment/re-use*. The examples with this document focus on systems within the Salt Lake to Los Angeles transportation corridor. Location of the corridor and referenced settlements, system and alignments are shown in Figure 2.

The synchronic focus includes interactions between *Supply Centers*, generally the regional points of origin and destinations, and *subcenters*, acting as temporary storage and distribution points for goods and labor. Subcenters include construction camps, sidings and maintenance stations, and are located in predictable intervals along the proposed alignment. The planned distance between each subcenter and its size and complexity are dominated by independent variables. Evaluation of the variables is conducted in an *economic analysis*, a study involving the amount of working capital and kinds of available technology for transporting supplies and labor, funded and sometimes conducted by the promoter/ financier. Factors in the economic analysis include an exploration of the geology, geography, topography, availability of water and the types of natural or human-made obstacles that could inhibit routine construction techniques.

Phases of change. A transportation system begins with an ***exploration phase***. Nineteenth century trailblazers initially explored western territories. Railroad surveyors followed in the latter part of that century. Locating such features should be rare, because most camps and survey markers were likely obliterated by construction or use activities, or the sites may be located in topography never chosen and yet minimally explored. For example, Jedediah Smith, on an exploration expedition for a route that eventually became the *Old Spanish Trail* along the Virgin River, noted in his 1826 journal (Smith 1977:65-66) he encamped a few miles south of Salt Cave, west of Las Vegas. Locating the camp would be extremely difficult due to more than a century of subsequent trail uses and the fact this location is presently beneath Lake Mead.

A ***construction phase*** may be lengthy, during which a trail or road is steadily embedded or widened, such as continued use of the ***Old Spanish Trail/Mormon Road***, or it may be quite short, consumed with intensive activity

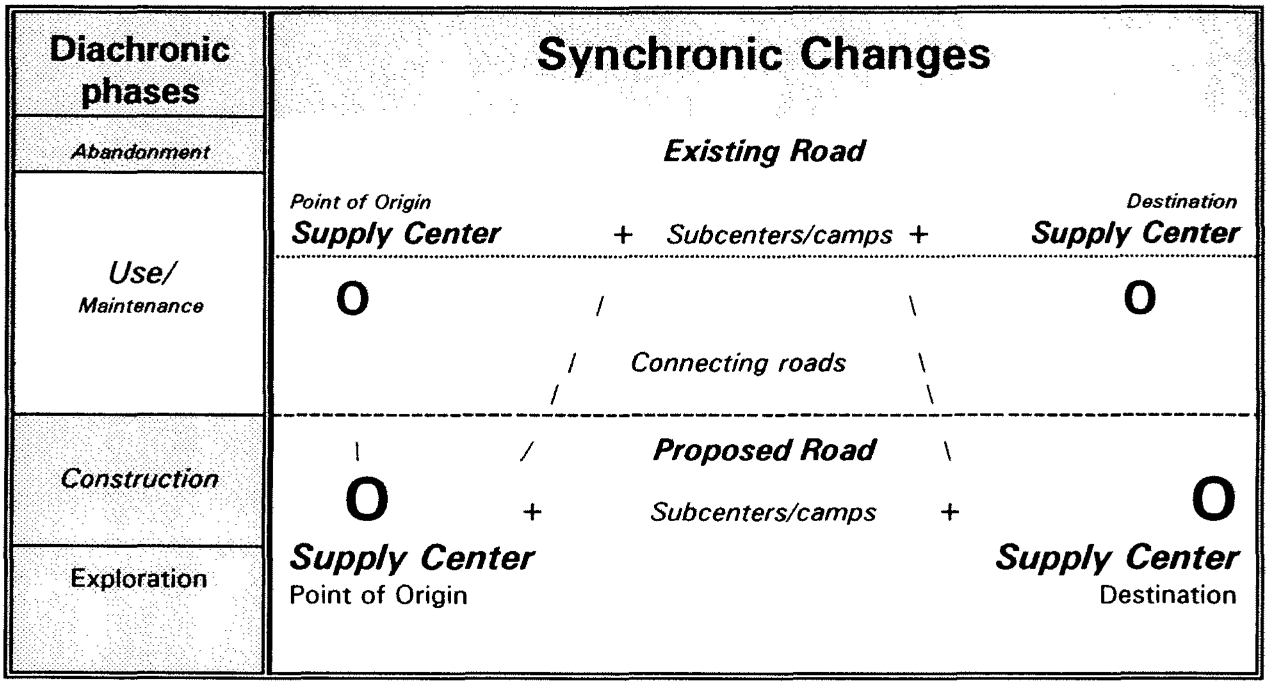


Figure 1. A model depicting diachronic and synchronic changes and interrelationships for southern Nevada historic transportation systems.

during railroad and motor road construction. Portions may be constructed as individual segments and, as completed, sequentially hooked to those in operation. Or construction may consist of groups of specialists working at measured distances from another, one group grading and another finishing the roadbed.

A system originates at supply centers that function as headquarters for supply and labor distribution. As construction proceeds, often simultaneously heading in direction from one center to another, subcenters are temporarily erected for storage. The existing alignment is used to access, via connecting trails, the proposed alignment, and as a staging area for supplies and labor for the construction camps.

The ***use/maintenance phase*** of a system should ideally fulfill the dreams of the planners. It is used by supply carriers, emigrants, merchants and tourists. During this phase, the previous system begins decline in use and the construction-related connecting roads are abandoned. Service and maintenance centers develop to ensure continued operation of the people and their machines. Las Vegas became a subcenter for several systems. Based on its location at the south end of a 55-mile waterless stretch and an availability of a sufficient supply of water for continual farming, the *Las Vegas Ranch* along Las Vegas Creek evolved as a supply depot and a rest-and-repair stop on the Mormon Road. A town grew around the designate maintenance station for the SP,LA &SL RR. Vegas became a city in the 1920s as a food, lodging and automobile service center on the motor highway network.

Connecting roads. The final part of the model involves a relationship between the existing and proposed alignment. Trails or roads are established to carry supplies and labor from the currently used system to staging points on the alignment under construction.

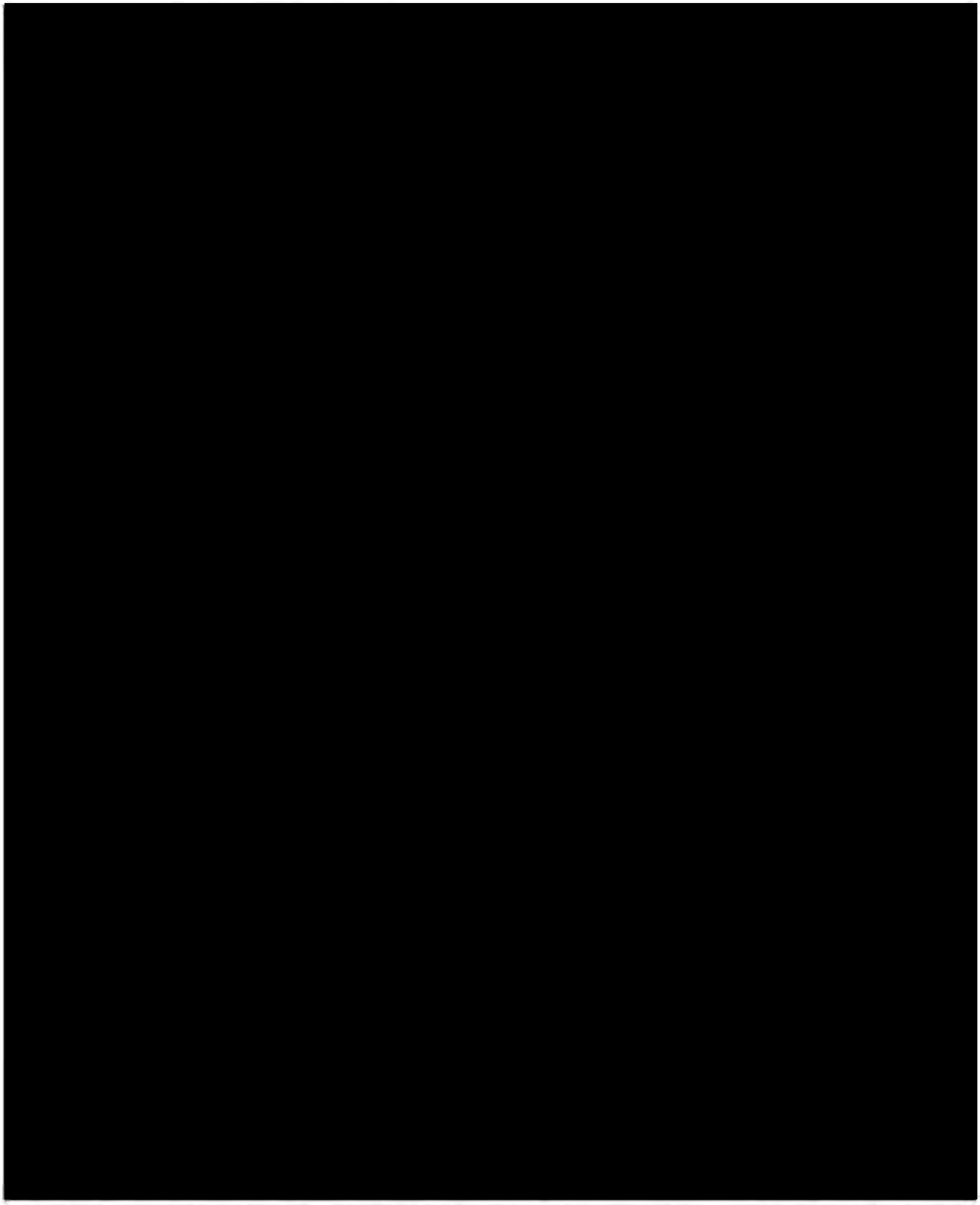


Figure 2. Locations of transportation systems, alignments and towns along the *Salt Lake to Los Angeles* corridor in southern Nevada.

Practical Uses for the Model

If the model will be used in historic transportation research, it must be adaptable and relatively simple to implement. The following six steps describe implementation of the model following identification of an historic feature. The first step is a general recordation and preliminary evaluation. If a site is considered *significant*, the second step, examination of historic sources and known similar sites, follows. Third, a research theme is selected, and specific assumptions, questions and propositions formulated. Fourth, the physical features and artifacts are placed into classificatory schemes. Fifth, the research questions and propositions are addressed and the historic property is evaluated for nomination to the *National Register of Historic Places* (NRHP). Sixth, the results of the research are summarized and the next level of research is identified.

First Step: Conduct a General Recordation and Preliminary Evaluation

Numerous historic sites lack habitation or special-use features, and consist of a few artifacts. In terms of the responsibilities and efficiency of most CRM projects, complete recordation can be easily completed. But, if the property is spatially complex, possesses one or more linear features, has a large quantity of artifact types that could require a sampling strategy, or exhibits *unusual* features, then recordation and evaluation should proceed in steps. A sketch map should be drafted, including an appraisal of the number and kinds of features, and a broad estimate of the quantity of artifacts taken.

Second Step: Examine Historic Sources and Similar Sites

When possible, primary research is the priority. Information can generally be procured from selected publications, local museums, libraries, and county records. Hardesty (1988:5-9) and Adkins (1991:8-50 to 8-57) list the kinds of sources available to the historian/archaeologist. Use of the model emphasizes a level of dependence on the local historian's methods. For example, efforts should be taken to obtain copies of the 1881 and 1935 GLO survey plats, and historic military and United States Geological Survey (USGS) maps. Regional archaeologists should obtain familiarity of recorded sites similar to those in the transportation system under study. Historic features such as tent platforms, slag heaps, rock/boulder ovens, and linear features at comparative sites should be field examined.

Third Step: Select a Research Theme and Formulate Propositions

The evaluation of linear features and associated components involves the development of specific research questions. Hardesty (1988:1-5) wove Wallerstein's *world system* model into a methodology for evaluating Nevada historic mining town activities. Although this approach appears applicable for mining town research, the nature of trail- and road-associated sites and isolated features linked along linear threads poses a database problem for such a model. Because such sites are commonly recorded and evaluated as separate units for CRM projects, the small quantity of artifacts from most isolated features makes the utility of such relatively large-scale research a questionable, or at least premature endeavor for this region.

In contrast, the *transportation systems* model emphasizes interactions between local origin-destination supply centers and construction/ maintenance subcenters, and between the existing and proposed transportation systems. Each project should add information to an expanding database. The culmination of such locally-focused research should eventually result in compilation of a sufficient quantity of regional information for research on the scale of *world system* models. The development of specialized research questions should begin with examination of the *Archaeological Element*

(Lyneis 1982), the *Nevada State Comprehensive Plan* (White *et al.* 1991), and primary and secondary research at local and regional libraries and educational institutions.

Examination of library materials for the selection of a research theme should interface with the field research. Although questions may focus on ethnicity of the laborers, technological development, and demographic and political changes resulting from the introduction of transportation systems, the first step to select a research domain is the study of how a system was created.

Function, Financing and Labor/Supply Sources. Research into the creation of a system may be guided by the following questions concerning the financial and political philosophy on a regional or national scale. 1) *What was the initial purpose or function of the transportation system?* Assuming the system is the result of planned efforts uniting points of origin and destination, information on purpose or function could reveal associations between the planners and regional financial or political issues? For example, Myrick indicates that developments surrounding the financing of the *Las Vegas and Tonopah Railroad* were linked to the economic situations prior and during the 1907 *banking crash.* 2) *What was its financing source?* The initial planners may not have been those who funded the mission. Information concerning compromises taken to procure financing may reveal changes in the initial purpose, the original destination points, or construction timetables. 3) *Where was the source of the construction-related supplies, and labor pool? What was the demographic mix of the labor?* Do local records, such as the source newspaper articles, identify the sources of labor or supplies? Hattori (1991:38-8) references documents that indicate Japanese, stationed in Caliente and Las Vegas, worked on the SP,LA&SL RR. Were they recruited at the cities of origin or at regional centers? During research of contemporaneous articles on supply sources, what information can be found concerning use of the existing system to carry goods and labor to distribution points?

Generating Propositions and Expectations. After a general level of field recordation and local research efforts, propositions should be developed for cultural interpretations within a regional transportation system context. They should utilize information gathered from library and primary research to formulate expectations concerning the archaeological manifestations. Adkins (1991:8-49) recommends use of research questions about demographic changes associated with railroad installation. The present paucity of comparative information requires emphasis first be placed on developing a database on sizes of features and kinds and percentages of artifacts. As the quality and quantity of information increases, the level of importance on questions directly linked to demographics will subsequently be increased.

Fourth Step: Field and Library Methods - Classification of the Features and Artifacts

Although classification systems are considered artifacts created by the archaeologist, they have utility in comparison research and aid the preservationist in selection of representative samples. The field researcher should select classification schemes for consistency in comparative data examination. The physical features from construction, maintenance and use include debris tossed from travelers, surveyor's camps loci that reflect construction activities like grading, tracklaying, blasting, paving, and habitation features created by field laborers. Buckles (1983:213) notes that *Railroad construction related camps can be classified arbitrarily by railroad building activities described in historical sources. These are (1) activities ahead of the tracks; (2) activities relating to actual track laying; and (3) activities conducted following track laying.* Anderson (1983) classified domestic railroad worker's winter-structures created and used on Promontory Summit in 1868 and 1869 as pit structures, masonry foundations, leveled platforms, dugouts and a miscellaneous category. Primary source documents should be examined. Attempts should be made to interview old-timers *who were there* or who recall stories by a previous generation, and to locate experts or professionals who work in occupations represented at historic properties under study. For example, a demolition expert could be questioned on features found at a presumed railroad blasting camp.

Determination of Historic Authenticity. Linear alignments are unique in terms of recordation and evaluation. Based on five years of field research on trails in Clark County, Nevada, I developed a method to determine whether an identified trail may be historic in origin. The three criteria were applied in two CRM projects, for portions of the *Road to Ivanpah* (Blair 1992) and the *Old Spanish Trail/Mormon Road* (Myhrer 1992). 1) *Is the general alignment present on historic maps such as GLO plats, USGS and military maps?* 2)*Does the road or trail possess artifacts of the presumed period?* Technical artifact analysis is necessary. 3) *Does the alignment possess physical characteristics similar to identified historic trails or roads?* Field examinations of similar alignments are needed.

Fifth Step: Address the Research Questions and Propositions, and Evaluate the Property

The author should discuss theory and models, and describe the methods. Discuss efforts taken to locate primary documents and any reasons why secondary research was chosen, such as time and energy costs.

Sixth Step: Summarize and Identify the Next Level for Future Research

The field and library research should provide data and a conclusion. Baseline data, new or revised descriptions, dimensions on artifacts, tents, structures, rock features, water reservoirs or unusual features should be provided in tables and appendices. Data generated as a result of CRM actions must be available for future research. Provide conclusions and a summary. Determine whether the propositions were supported, and if not, offer reasons for the unexpected. Discuss the importance of the research in a regional context, offer professional advice on the utility of examining similar sites, and list new or altered questions to guide the next phase of research in this domain.

Transportation Systems in Nevada's *Salt Lake to Los Angeles* Corridor

The evolution of southern Nevada's transportation systems involved exploration, wagon roads, the railroad, and several stages of motor highways. The following describes the transportation systems in the Salt Lake to Los Angeles corridor.

Trails. The *Old Spanish Trial* (OST) is considered the original transportation route through southern Nevada. A research assumption states that in 1844 Fremont followed a major cattle drive trail, initially explored by Antonio Armijo in 1829, through Las Vegas Valley and north to Utah (Lawrence 1931; Hafen and Hafen 1954; Paher 1971). Warren (1974) read topographic descriptions from applicable diaries to argue Armijo did not cross Las Vegas Valley by way of Cottonwood Springs but through southeast Las Vegas Valley to the Interstate 15 corridor. A reading of Fremont's diary (Fremont 1845) suggests he followed a *trail*, but there is a lack of primary evidence from documents written prior to 1844 to substantiate the assumption.

The OST was primarily used by horses, mules and cattle (Lawrence 1930) and the remains of physical alignments may vary from narrow, embedded paths to a wide swath. Due to the scarcity of canned and bottled products at that time and the concept that older artifacts have higher value for collectors, few artifacts should be found from this period. The remains of camps with hearths and temporary storage structures may be present.

During OST days, regional Native Americans were displaced from water and food sources near the trail. Mexican traders also enslaved women and children for sale in New Mexico (Intertribal Council of Nevada 1976:36). Such practices forced local aborigines to alter their cultural and subsistence patterns, and they likely imitated the Utes in horse raiding to replace traditional foods. According to Fremont's diary (1845), the Native Americans were encamped in large numbers at water sources such as the Muddy River. Although it would be a difficult proposition to examine, there may be sites in which traditional aboriginal artifacts are mixed with skeletal materials of horses and historic period tools taken during raids.

Wagon Roads. Fremont is credited with documenting and mapping a route in 1844 that assuredly crossed Las Vegas Creek (Fremont 1845). The alignment through southern Nevada is considered a continuation of the OST.

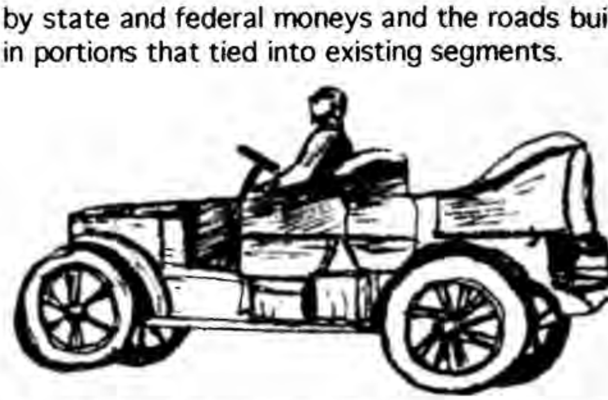
Although traveled by Mexican traders, it received no known Spanish uses. After 1848 and into the first part of the twentieth century the alignment through Nevada became part of a trail known as the *Mormon Road, California and Salt Lake Road* and the *Fremont Trail*, and served American emigration and trade interests to transport people and supplies via horse teams and wagons. Remaining road segments not recently used as off-highway routes appear as two-track, rutted trails measuring about four feet wide. Vegetation commonly grows in the ruts. In rare stretches of terrain minor road improvements occurred, such as moving boulders from the road or using a blade to cut a lane on a slope. Road-associated artifacts are glass, cans, wood and metal parts from wagons. Features consist of temporary camp remnants with cans and broken glass containers. Subregional wagon roads that emanated from Las Vegas include the *Road to Eldorado* and *Road to Ivanpah* (GLO 1881 plats).

Las Vegas was first settled as a mission in 1855, but abandoned in 1857. During this period the military followed the *Mormon Road* with intentions to improve portions of the road. Diaries from the period indicate there were non-Natives at the mission after abandonment, at the Mormon Fort. *This is an Indian settlement and they got them to hold the horses for two or three biscuits. There are two or three white men living here, a Mr. Jones from Shelby* (Shackleford 1990:146). In 1865, O.D. Gass settled at the Fort and in 1878 purchased the adjacent 120-acre Las Vegas Ranch. In 1879, he lost the ranch to Archibald Stewart for nonpayment of a loan. In 1881, the property was settled by the Stewarts. Archibald was killed in 1884 and Helen continued ranch management.

Railroads. In 1902, acreage and water rights at the Las Vegas Ranch were sold by Stewart to the SP,LA&SL RR. The proposed route through Nevada was designed to connect lines in California and Utah. Las Vegas was selected as a major maintenance site. Railroad construction began simultaneously from the northeast and southwest borders in Clark County, reaching Las Vegas in October, 1904. The adjoining spike was embedded in January, 1905 at a point a few miles north of Jean, Nevada (Myrick 1963). The railroad began running in May, 1905. The initial grade followed topography, consequently the temporary roadbeds, or *shoo-flys*, were constructed in areas with high flood potential. Once trains were running from Salt Lake to Los Angeles crews were recruited to painstakenly engineer a better route, blasting portions of mountain ranges. The shoo-flys were then abandoned (Myrick 1963).

Archaeological features that remain from the period of historic construction and initial use include camps consisting of tent pads, stone ovens and artifact debris, blasting camps with rock-constructed storage structures, shoo-fly beds, and associated scatters of railroad-related and domestic trash. Smaller railroad systems, such as the Arden Plaster Quarry line in southwest Las Vegas Valley, used a narrow-guage train with relatively narrow railroad beds. Use and maintenance of the railroad included construction of sidings spaced at designated intervals. Water reservoirs, structural platforms, loading features, and domestic artifacts discarded by occupants are present at some siding sites.

Automobile Highways. Motorized vehicles were introduced into the region as early as 1904 (Paher 1970:386). A chronology of historic motor roads along the Salt Lake to Los Angeles corridor is discussed in Leavitt *et al.* (1993:18-19). In contrast to the relatively single-source nature of the financing of the railroad, the highway construction was funded by state and federal moneys and the roads built in portions that tied into existing segments.



The unpaved *Arrowhead Trail*, located several miles east of the *Mormon Road*, is considered the first planned motor highway in southern Nevada. The route was designed by local residents beginning in 1914 and it was graded by 1916. Its width is approximately 10 feet. In 1975, 50 years after abandonment, the narrow road was adopted as part of the Mint 400 off-highway buggy course.

Although Moapa Valley residents favored the circuitous route that wound through the Valley of Fire and to Overton, Clark County adopted a different course to connect California with Utah. This paved highway, within the Salt Lake to Los Angeles corridor, was constructed in the 1920s as State Route (SR) 6, or the *Arrowhead Highway*.

In the 1930s, the winding route of SR 6 was reconstructed and upgraded, leaving a relatively straight highway called US 91, present on the 1935 GLO plats. The width of the oiled, gravel surface of SR 6 was 20 ft. wide. Artifacts and features along the historic roads consist of automobile parts, cans and glass, and construction camps consisting of tent pads and temporary structural foundations. The remains of gas stops and motels, such as the Byron foundations along US 91 south of Glendale, of which the locations are discussed in applicable newspaper accounts and shown on historic maps, are also present.

Air Travel. Regional air transportation began as early as 1925. Because aircraft often followed road corridors, airway beacons were constructed. Two features located west of the corridor are noted on the 1952 USGS 15' *Dry Lake* topographic map. Emergency runways were also cut into the surface. One is located on Mormon Mesa (Leavitt *et al.* 1993:20). Other air travel-associated sites near road corridors are remnants of planes that crashed.

Implementation of the Model

The utility of the model to guide historic transportation research is contingent on viewing archaeological features within a context that includes both time and spatial elements. Reconnaissance and surface recordation activities should be followed by efforts to study local or regional documents written during the period in question. Research should attempt to classify the expected so that subsequent archaeologists may isolate the unusual. The final phase of each research project should include the identification of questions for the next level of research or create revisions to the model.

Several previous CRM investigations at shoo-fly railroad construction camps were supplemented with a minimal level of library and comparative field research activities. Brooks *et al.* (1977) describes data recovery efforts at a presumed camp and temporary railroad siding south of a possible saloon near the abandoned Bard siding south of Las Vegas, and Drews (1992) recorded a shoo-fly construction camp near Sloan. Although the field methods were professional in scope, the sites seem to *hang in space*, unrelated to prior or contemporary events.

Three later railroad-related archaeological CRM projects, all located between Las Vegas and Moapa, are discussed in the context of the transportation systems model. The second project involved investigation of a railroad-related camp using a methodology interlacing a minimal level of library research with field propositions. The data suggested the need for a regional model that emphasized comparative research. The final project, an intensive recordation effort at a construction camp and shoo-fly bed, was completed under the guidance of a draft version of the transportation systems model.

The Setting

The following historic properties are located within the Salt Lake to Los Angeles corridor between Moapa and Las Vegas, Nevada (Figure 2). Due to a lack of springs, this stretch of the route was known during the *Old Spanish Trail/ Mormon Road* use days as a *jornada del muerto* (journey of death). The corridor crosses the Muddy River near Moapa, cut through the alluvial Dry Lake Valley basin, enters a pass between the limestone formations of the Dry Lake and Las Vegas Ranges, and ends at Las Vegas Creek.

Summers are long, hot and arid, and winters are mild. The average temperature in Las Vegas Valley is 46 degrees F in winter and 87 degrees in summer. Average relative humidity is 20 percent, and normal annual precipitation is four inches (USDA 1985:3). The corridor between Moapa and Las Vegas is within the *Creosote Bush Community* as defined in Bradley and Deacon (1967). Vegetation is relatively sparse with salt-tolerant species and varieties of yucca. Desert-abapted animals such as rabbits, lizards and desert tortoises are present.

Research at Railroad Camp 26CK1505

Field inventories for two competing gas pipeline rights-of-way were conducted by archaeologists from Brigham Young University (BYU) (Talbot *et al.* 1991). In Clark County, the right-of-way paralleled the Salt Lake to Los Angeles corridor. Site 26CK1505/53-4653, a previously identified railroad-related construction camp, was subjected to a data recovery scheme (York *et al.* 1992:81-89, 219-239).

The site, located adjacent to the present railroad line, consists of five tent pads, a slag area and associated artifacts. Numerous construction-related items and food and beverage containers were found. A diagnostic examination links the site with the 1904 to 1907 construction of the SP, LA&SL RR. DuBarton and Edwards (1993)(see this volume) subsequently applied the data to Hardesty's (1988) concept of the materials interaction sphere of the *world system* model. Their analysis indicates that at the camp a national trade network predominated over local trade networks, and the presence of numerous alcoholic bottle fragments and tobacco cans and a lack of *status* goods implies non-Victorian behavior was common. They concluded that despite the remoteness of the camp, its function was related to far-reaching interaction spheres.

Research at Vendorville

The rapid growth of the city of Las Vegas in the 1980s required access to sand-and-gravel sources for urban development. Under provisions of the *Mining Law of 1872*, minerals on public lands may be mined. BLM designated several community gravel pits near Las Vegas Valley. In 1992, during an intensive surface inventory by BLM archaeologists of 2200 acres of land north of the Valley, a segment of the historic *Mormon Road*, an early twentieth century camp (26CK4874/53-5900) named *Vendorville* by the recording archaeologist, a network of roads (26CK2932/53-3477), and a unique linear feature were located. The portion of the *Mormon Road* (26CK3848/53-4969) was evaluated as eligible for nomination to the NRHP under criterion (a), the association with a transportation event that caused significant changes to the region. The camp was recorded and evaluated as eligible under criterion (d), the potential to yield data important in the history of the region. The eligible properties were placed within an avoidance and preservation zone.

Vendorville, situated on the *Mormon Road*, consists of four tent pads, several slag areas, two outhouse depressions, an earthen platform, a network of roads emanating from the platform, a packed-surface area that may have been used for corralling wagons or horse teams, and associated artifacts. Visual comparison of the three-mile segment of the *Mormon Road* with previously surveyed 60 miles in southern Nevada emphasized a unique feature. A single, 12-inch wide, embedded rut is parallel on the northwest side of the main trail. Several pipe fragments and fittings are associated. The morphology of the rut contrasts with the subtle bends of the road by exhibiting a straight alignment, even when crossing washes. The rut was visually traced on a aerial photo south of Vendorville for four miles where it was consumed by urbanization, implying the depression cut into or through the present site of Nellis Air Force Base.

A reconnaissance visit to Camp 26CK1505 indicated Vendorville represented different uses. Following a review of selected publications, three propositions concerning the relatively unusual railroad-related functions of Vendorville and its related linear features were formulated, and the site recorded (Myhrer 1992). *Proposition 1: In late 1904, water was pumped to the site, placed into barrels, loaded on wagons at the earthen platform, and delivered to laborers constructing the SP, LA& SL RR bed one-half mile northwest.* The single rut that ends at the platform represents a depression from a temporary, surface, cast-iron water pipeline. The presence of several pipe fitting segments within one mile and at the site and termination of the single, straight-lined rutted trail at the loading platform suggests that water, the most valuable commodity in the desert, was piped from a source in the northern portion of Las Vegas Valley to the loading platform, poured into barrels on wagons and transported to the railroad workers. Artifactual analysis indicates use of the site was between 1904 to 1907.

Proposition 2: The area east of the platform was used as a holding area for horses, mules, or smaller domesticated animals, and functioned as an outdoor blacksmith shop. Of the two slag areas on the site, one is adjacent to a tent pad. The other, larger slag area is near the platform and the area with the packed, crushed surface. The flattened appearance of the sand is visually similar to ruts or depressions of historic trails that have lacked use for many years. It is possible a relatively large number of hooves or wagon wheels repeatedly crushed the surface. Numerous wire fragments are also present, suggesting they were discarded from bales for animal feed. It is possible this locale functioned as a wagon and animal holding area and an outdoor blacksmith shop.

Proposition 3: The drinking of alcoholic beverages on the site was spatially-linked, associated with a temporary tent saloon. Analysis of the glass distribution indicates the consumption of alcoholic beverages was restricted to areas within or near the tents and one outhouse. There is a relative sparseness of glass artifacts surrounding the corral and blacksmith area or platform. Based on an association of a large number of alcoholic bottle fragments, numerous tent-construction related artifacts, and a metal sign with the logo *Pale*, the largest tent appeared to have been a commercial bar or saloon.

Comparison of Vendorville with Camp 26CK1505

There are several similarities between the two camps. Artifact analysis indicates uses between 1904 and 1907. Both have a few tent pads, and relatively low artifact quantities reflect short-term use durations. Each site shows evidence of one or more connecting roads from the existing alignment to the proposed route. While Camp 26CK1505 is located between the existing *Mormon Road* and the railroad alignment, Vendorville is located on the *Mormon Road* with several wagon roads leading to the rail line. During recordation of 26CK1505 in 1991, BYU archaeologists located a connecting trail originating at the *Mormon Road*, crossing Camp 26CK1505, and ending at the railroad bed.

There are also outstanding differences in the numbers and kinds of artifacts recovered. A total of 730 items, that included fragments of slag, were retrieved from both the surface and subsurface at 26CK1505. While 57 percent are construction-associated metal and hardware items, glass represents only 32 percent of the collection. The Vendorville site possesses more than 2000 glass fragments (175 bottles X an average of 12 fragments per each broken bottle), 150 bottle caps, 272 cans, 75 kitchen artifacts, 40 metal star- and flower-shaped objects, and 200 construction-related items, for an estimated total of at least 2700 surface-recorded artifacts. This is greater than 3.5 times the number of artifacts at 26CK1505. Glass accounts for an estimated 75 percent of the total, and construction artifacts comprise only seven percent. Another difference is the lack of tobacco-related artifacts at Vendorville. Only one tobacco can was found. DuBarton conducted the technical analysis for 26CK1505 and noted *There are a number of tobacco and snuff cans present at the site...* (York *et al.* 1992:228). Also, few food container cans were found at Vendorville. This leads to a proposition that the developers were the primary individuals who consumed meals at the site. The railroad workers presumably ate at the designated kitchen areas at their construction camps. A major purpose of visitors at the site was to drink.

A description of Vendorville was furnished to William White, Lower Colorado Region, Bureau of Reclamation. He suggested the site represents the opportunistic activities of entrepreneurs who set up an independent commercial operation, rather than the camp of railroad construction personnel. Perhaps this was a railroad-contracted operation that not only supplied water, but food, supplies, and other diversions. The primary function of the loading platform may have been to download supply wagons. Based on the plethora of *Salt Lake City Brewing Company* bottle caps, origin of the transport wagons was likely Salt Lake City. Because the railroad had a policy that attempted to restrict and control the sale of booze (*cf.*: Paher 1971:83), and the camp was located within a mile, it likely functioned as an informal alcoholic beverage sales operation.

Research at Camp 26CK2131 and Shoo-fly Bed Using the Transportation Systems Model

Under legislation that allows sale of BLM land north of Las Vegas, archaeologists of Knight and Leavitt, Inc. conducted an inventory of 2200 acres of land. Several sites were identified including a railroad construction camp with three rock igloos, two dugout features, cans, glass, numerous blasting powder tins, and a shoo-fly roadbed segment. After a preliminary surface recordation, research propositions using the transportation systems model were composed.

Proposition 1: The 300-ft roadbed (site 26CK 4786/53-5648) is the remnant of a 1904 five-mile shoo-fly line between Moapa and Apex (Myrick 1963:245). Comparative field checks at two other presumed shoo-fly roadbed segments, projection of the roadbed on aerial photos to connect with a northern portion, and artifact analysis supported the proposition that this was the referenced feature.

Proposition 2: The three rock igloos and two dugout features at Camp 26CK2131/53-4440 are the remains of storage structures for powder cans used for blasting the east ridge of the site for the highline. Recordation techniques indicated the igloo features had been used for cooking functions in which several powder cans were re-used as oven linings. The dugouts lacked charcoal or carbon-staining, but held food containers. Perhaps the igloos were originally used for storage of blasting cans and the site was re-used for habitation and cooking activities.

Investigating the Mormon Road and an early highway using the System model. Remnants of the first paved highway were also located within the Apex legislation sale area and a transportation systems proposition was created. *Proposition: The road site (26CK4958 /53-5927) represents the first paved motor road, SR 6/Arrowhead Highway.* The linear feature was inspected using the criteria for historic trails and roads. Inspection of historic maps and GLO plats support the proposition the road was the remnant of SR 6. Because the *Mormon Road* is located adjacent to the sale lands, a *connecting roads* proposition was devised. *Proposition: A connecting trail between the Mormon Road and the paved road is present.* Field inspection outside the project area located two east-west trail remnants. Using the methodology in Myhrer *et al.* (1990), the trails were followed to the *Mormon Road*. One crossed SR 6 and connected with a larger camp/ siding two miles north of the project area. The other joined the *Mormon Road* at the location of a large glass scatter and the remains of one or more tent pads, presumably the site of a saloon, and headed in the direction of Camp 26CK2131. It likely crossed a pass in the Dry Lake Range to Garnet railroad siding. If the trail was created to transport supplies and laborers to the camp, it may have also functioned as an opportunistic route from a camp or a siding to a temporary saloon, similar to that suggested at Vendorville. Due to a large amount of surface disturbance, it could not be ascertained whether the trail was used during the construction of SR 6.

Summary and Propositions for Future Research

The remains of construction camps, linear trail, road and railroad alignments lie along a relatively narrow corridor in Clark County, Nevada. While archaeologists have located such features for two decades, they generally described the sites as isolated manifestations. The transportation systems model was utilized to assess several features within a narrow portion of the Salt Lake to Los Angeles corridor north of Las Vegas. Figure 3 is a graphic representation of the evaluations. No evidence of an exploration phase was found. The destination/supply centers for each system were Salt Lake and Los Angeles. A subcenter was Las Vegas, a spring and ranch stop for *Mormon Road* use, a maintenance station for the railroad, and a lodging and food services center for the motor highway system. The railroad construction camps were linked with the *Mormon Road* and a presumed saloon by connecting trails.

could be used in comparative studies. Artifact recordation should emphasize the identification of ethnic-associated materials for anthropological data on emigrants to southern California and on the immigrant classes imported as dispensable servants on the railroad.

The proposition concerning the functions at Vendorville leads to an examination of two additional research topics, the accompanying *hell-on-wheels* entourage for large-scale construction activities and the participation of

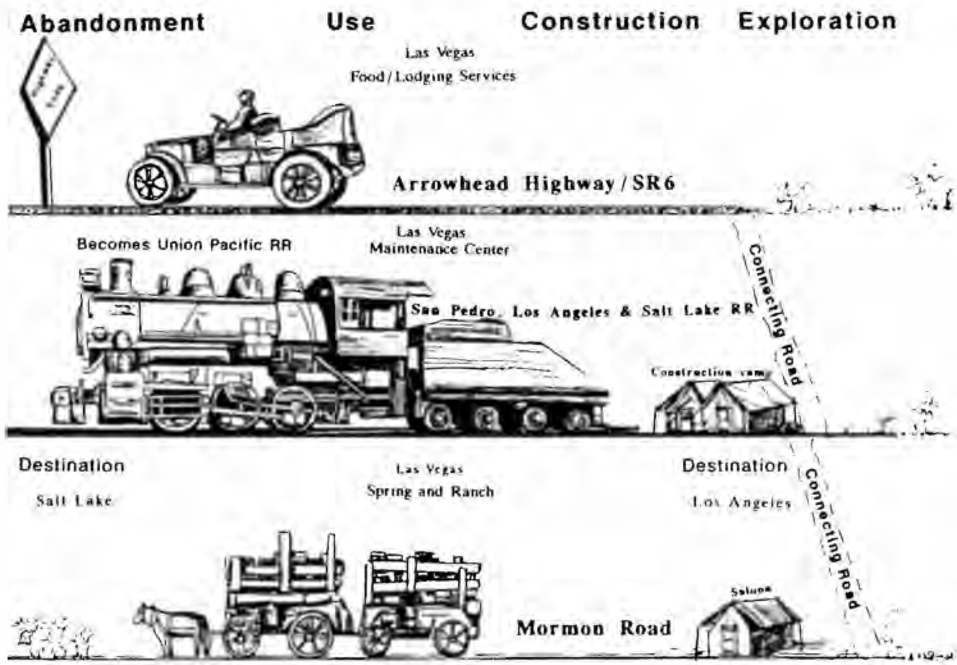


Figure 3. Viewing historic features in the *Salt Lake to Los Angeles* corridor north of Las Vegas.

Priorities for future research. The archaeological priorities for future investigations along the Nevada portion of the Salt Lake to Los Angeles corridor are the study of demographic and ethnic orientations of the workers and research on temporary commercial establishments associated with construction of systems, in particular the railroad. Information on population size, structural measurements, spatial associations of debris scatters and kitchen/cooking areas

local contractors. Like contemporary corporations, the bulk of railroad construction labor was actually accomplished by workers hired by contractors.

Myrick (1963:644) notes that in Caliente in 1903, *Tent cities arose around the headquarters of the various contractors...* It seems probable local individuals or companies were employed to provide direction and expertise. For example, the presumed pipeline at Vendorville may have been installed and pumped by a local resident familiar with the area and its water sources. Primary research in the *Lincoln County Record* by Lynn Hatzenbuehler (Personal Communications, 1993) indicates that Will Stewart, son of Helen of the Las Vegas Ranch, drilled a well for the railroad on Dry Lake, north of Las Vegas. A reconnaissance search by Hatzenbuehler revealed the presence of a large earthen reservoir on the dry lakebed, associated with artifacts of the period. The use of water in construction activities, especially for the immense horse labor pool, appears to be a research question relatively unexplored. *Research proposition: Local individuals and companies in Las Vegas area were used in the early 1900s as contractors to the railroad.*

In 1867, as the Union Pacific Railroad constructed from Nebraska west to the coast, opportunistic merchants keep abreast of the moving laborer population. *As the tracklaying proceeded, the supply bases at end of track sprang magically into bustling, brawling boomtowns...immortalized by some wag with the apt name of "Hell on Wheels"* (Klein 1987:100). The crews completed work to Laramie, and *As the men left behind each Hell on Wheels, the whiskey merchants followed like squatters, throwing up instant saloons in tents known as "whiskey ranches"* (Klein 1987:150). The portable structures were described as *...buildings of thinly painted pine that could be bought in Chicago for $300 and erected in a day with screwdrivers* (Klein 1987:169). The structures were moved on freight wagons.

The scale of construction on the 1860s Union Pacific line was much larger than that of the SP,LA&SL RR, thus the scale of the hell-on-wheels phenomenon should have been lower in size and complexity. Myrick describes the eruption of a temporary supply center at Clover Valley, Nevada, replete with a boarding house and hospital, during construction of the SP,LA&SL RR in 1890. Saloons had also been opened along the line of work. *These places...consist of dug-outs in the steep hillsides...* (Myrick 1963:624). Similar activities should have accompanied the construction of the line through Clark County. The presence of a relatively large percentage of alcoholic beverage glass to other artifacts at Vendorville implies the site was used as a saloon for the railroad laborers. The glass dump area along the *Mormon Road* directly west of Garnet, connected by a trail, also seems to have been used for alcoholic consumption. *Research proposition: The remains of hell-on-wheels activity loci should be present at intervals along the Salt Lake to Los Angels corridor.*

Although the implementation portion of the model focused on the railroad construction period within the Salt Lake to Los Angeles corridor, the most intense construction era in a complex corridor, similar methods could apply to examinations of historic wagon roads and early highways. Most corridors and systems are local in scale, lacking the complexity of the Salt Lake to Los Angeles corridor, and research questions should be less complex. For example, the corridor from Mountain Springs to Pahrump Valley, west of Las Vegas, exhibits only the presence of a wagon road and a paved highway. Although it is unlikely construction of the road was on a level of complexity to have imported hell-on-wheels' businesses, the presence of temporary food consumptive and habitation camps may be present along the highway or possibly at junctions of connecting trails. The ultimate goal for use of the model is to promote a view of transportation-related actions as human-caused events that occurred within a complex cultural web connected in time and space.

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Frontiers as World Systems: A Railroad Construction Camp in Southern Nevada

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Abstract

This paper documents the applicability of World Systems Theory to understanding a variety of frontier settlements, while here it is applied to the analysis of material remains recovered from a railroad construction site.

Our research had three main goals: 1) to understand how the camp occupants fit into materials, information and population spheres; 2) to test whether "Victorian" or "Frontier" ethics and ideals were dominant: and 3) to determine the ethnic identity of the railroad crews. The first two questions were answered through analysis of the artifactual materials, while some light was shed on the third through archival searches. Some of the results are surprising. Our analysis indicates that despite the remote nature of these camps they were tied into far-reaching interaction spheres.

Introduction

As part of the Kern River Project, Dames & Moore surveyed along a pipeline corridor extending from Wyoming to California (York *et al.* 1992). Archaeologists conducted data recovery at numerous sites which yielded information regarding both prehistoric and historic exploitation of the region. The only historic site falling within the Nevada portion of the right-of-way is the railroad construction camp, 26CK1505 (Figure 1). This small camp is associated with the construction of the San Pedro, Los Angeles & Salt Lake Railroad (SP, LA&SL RR), dating to between 1904 and 1908. Located below a series of low bluffs dissected by several washes, the site is found approximately 1 mile southwest of the Moapa Valley.

A number of features comprise the camp (Figure 2). These include a rock cairn,

Figure 1. Overview of site 26CK1505.

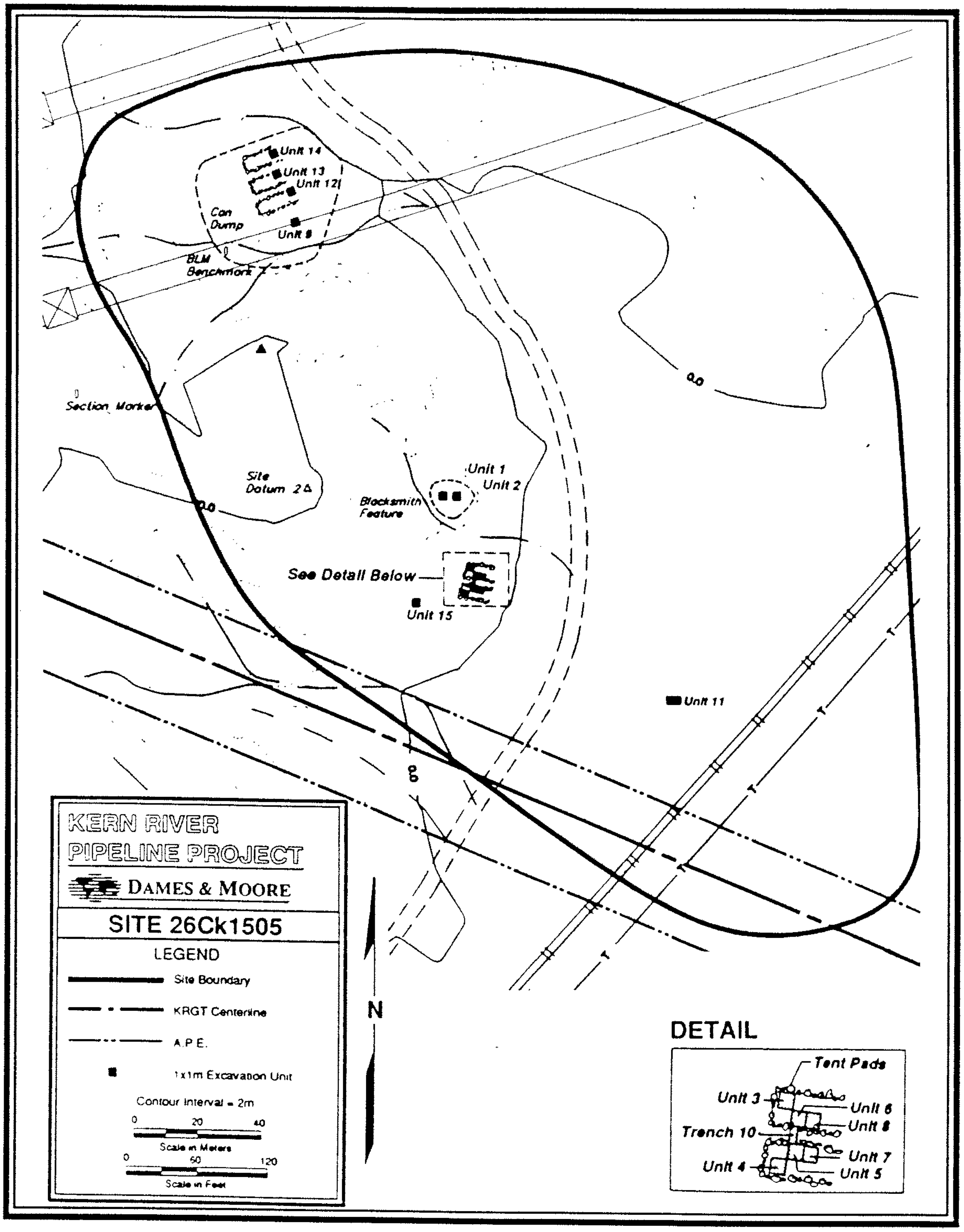


Figure 2. Site map showing architectural features and excavation units (adapted from York *et al.* 1992:84).

possibly the results of clearing rock during construction of tent pads or the railroad grade itself, five C-shaped and one linear rock alignment thought to be tent pads, a possible blacksmith forge area, and several associated trash scatters. Test excavations were conducted at each of these features (Figures 3 & 4). The information recovered as a result of these excavations, along with documentary investigations, was used to address larger social science research questions.

modern day culture. Moreover, the investigation of historic sites, particularly late 19th and early 20th century sites, is of relatively recent interest. As a result, there is not a large body of research data against which new information can be measured, and central research themes have not yet been clearly articulated (Lees and Noble 1990:10-11).

Traditionally, the research orientation of many historic projects has been limited to a

Figure 3. Tent platform rock alignment.

reconstruction of past lifeways at specific sites. Little emphasis has been placed on cultural processes operating at a regional level (Deagan 1982). The current direction of historic studies goes beyond description to test and explain the relationships between material remains and past behavior.

One model that has proved fruitful for exploring frontier processes follows Wallerstein's (1974) "World System" concept (Figure 5). Hardesty (1988) has adapted this theoretical

Our Approach

Archaeologists attempting to interpret historical sites or site components face a number of difficulties. These stem from several factors, including; the differences between databases representing the prehistoric and historic periods; long-standing biases in American archaeology, emphasizing the study of prehistoric remains; the numbers and seeming redundancy of many types of historic sites; and, the recent age and closeness of many sites to

Figure 4. Excavation of tent platforms.

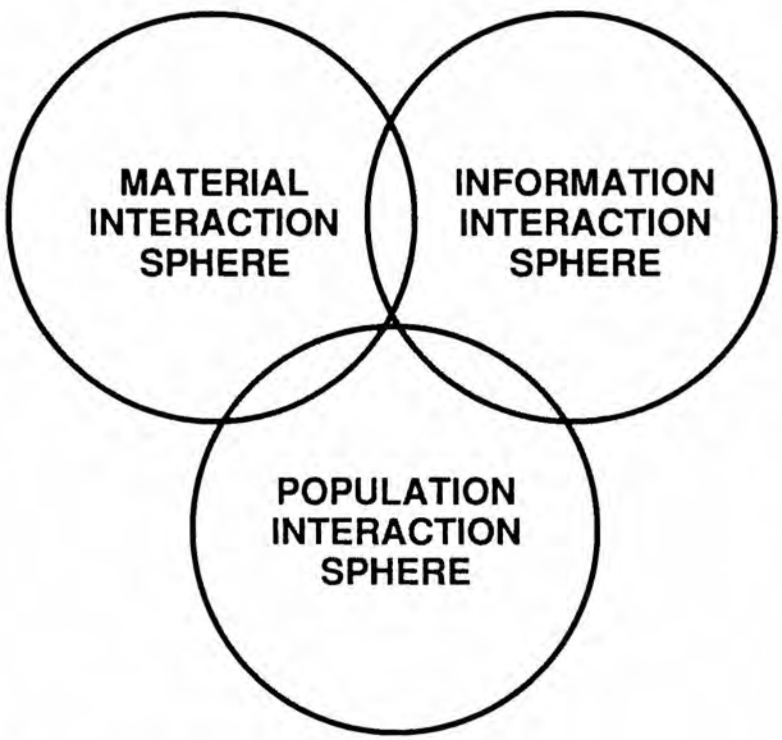


Figure 5. World Systems Model.

framework for interpretation of patterns observed in western mining communities. He defines three major interaction spheres operating between the frontiers and the urban centers of America and Europe. Goods and equipment necessary for development flowed from metropolitan distribution nodes into the border areas while raw materials traveled in the opposite direction. Labor for the developing frontier was obtained from both national and international sources. This population interaction sphere reflects changing immigration patterns linked to global sociopolitical conditions. World system structures are created by the exchange of information, ideas and symbols. This is particularly evident in the late 19th century with the development of the telegraph and nationwide transportation corridors. The information interaction sphere documents the diffusion of ideologies such as Victorianism from urban centers to the frontier.

The term frontier can be defined spatially as a zone separating the settled and uninhabited portions of a territory (Figure 6). It is an area of transition stretching from a population core area to the limits of its expansion. On the

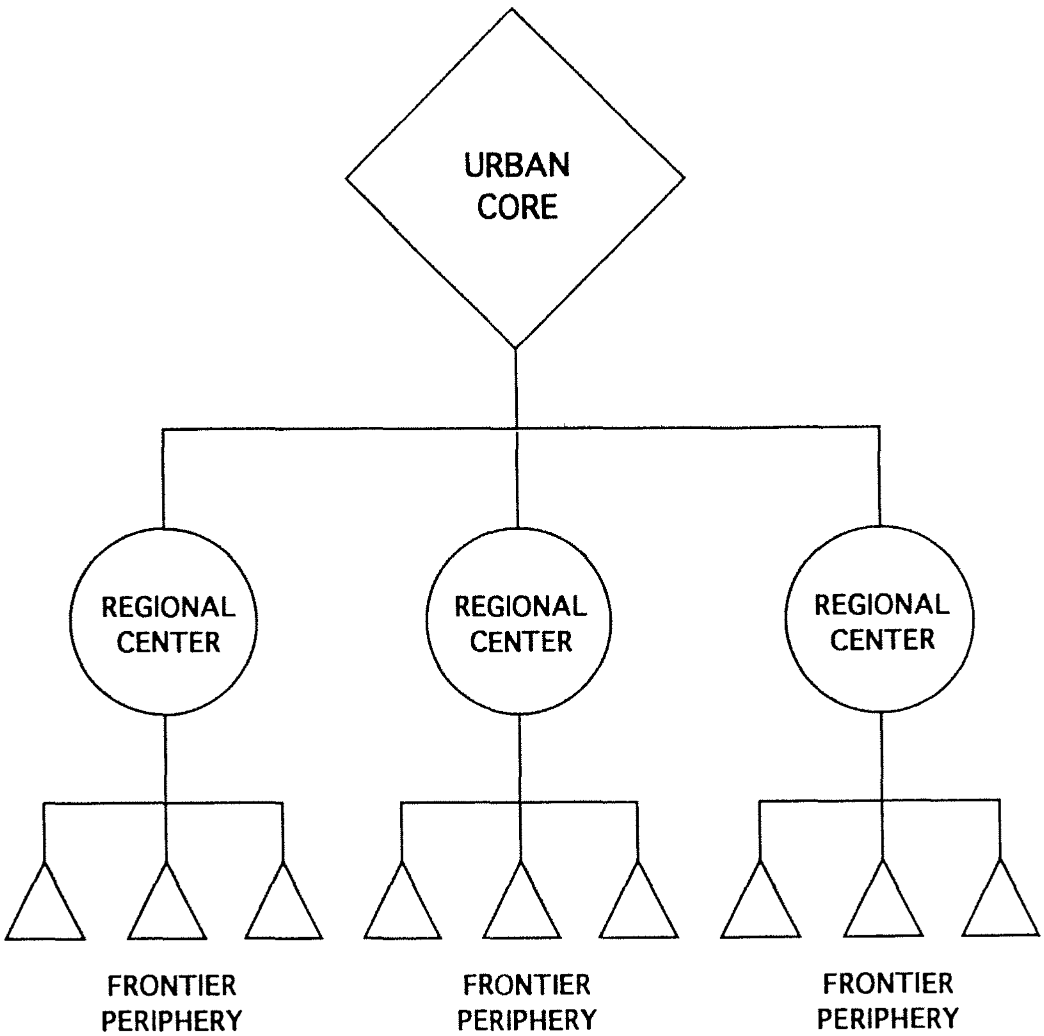


Figure 6. Schematic of core and periphery relationship.

frontier upward social mobility as inherent in the "frontier ethic" met and interacted with the strongly class-conscious Victorian ethic typical of many urban centers. Ultimately, long-lived frontier communities take on the characteristics of the conservative urban core areas.

By the late 19th and early 20th century much of the West was already incorporated into established economic regions. Overlooked in the initial settlement of the West, southern Nevada remained relatively remote and isolated. Archaeological sites found within this region allow researchers an opportunity to study and understand some of the more recent examples of core/periphery relationships.

Research Questions

While the materials recovered from the railroad camp are limited, they can be used to address research questions related to trade networks and transportation/communication corridors. They can also provide data relating to ethnic affiliation and gender of the camp occupants.

Hardesty's (1988) concept of the materials interaction sphere on the mining frontier is of particular relevance to a railroad camp site such as 26CK1505 (Figure 7). Like mining operations, the railroad camp was a product of large-scale capital investment. As with the mining frontier, we could expect goods

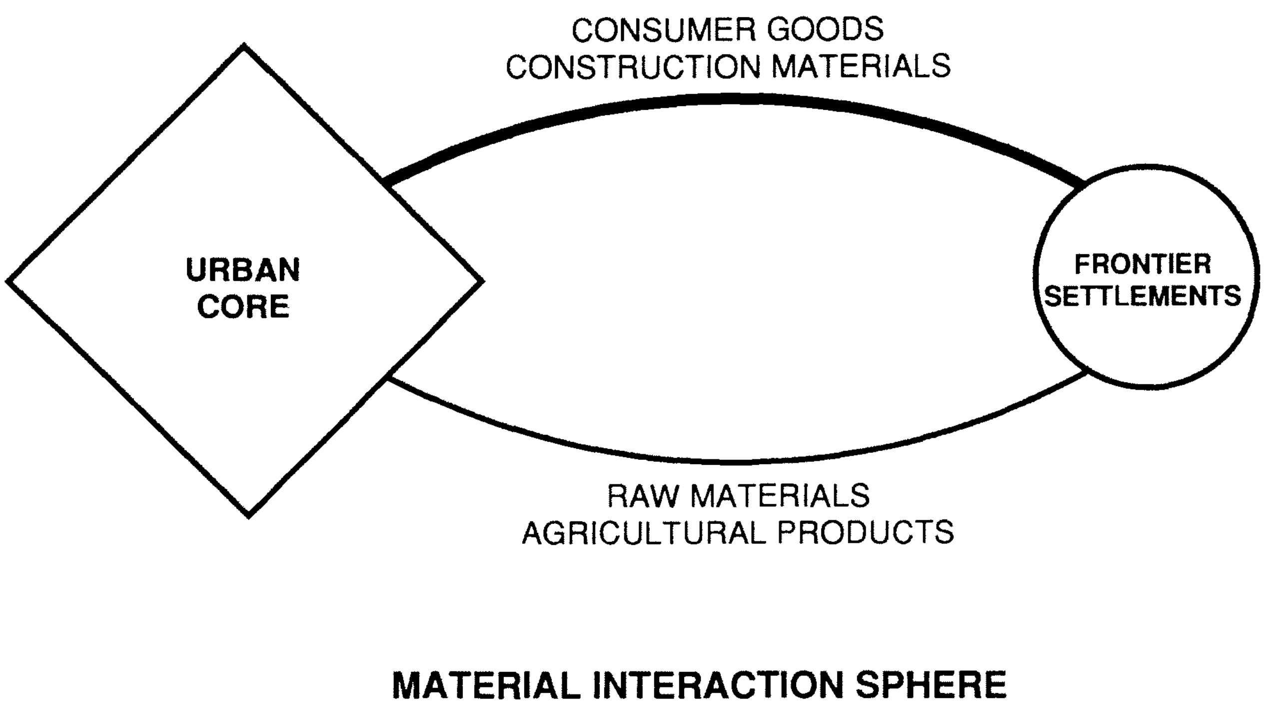


Figure 7. Flow of commodities within the Material Interaction Sphere.

purchased in national and international markets to predominate. Moreover, the degree to which western distribution networks were utilized for the railroad camp could provide an interesting comparison with the typical mining situation as described by Hardesty (1988). The logistics of supplying a relatively short-term operation, such as a construction camp, might be expected to select for different types of distribution networks than would those of a longer-term mining operation. This research attempts to define the degree of dependence upon local, regional, and national markets typical of railroad construction camps and to contrast the identified patterning with that observed at other frontier settlements.

Railroad construction requires both skilled and unskilled labor (Figure 8). Historically, the necessary work force was drawn from a pool of migrant labor. The composition of the labor pool varies with world and national sociopolitical conditions and prevailing immigration patterns. The exception is that the ethnic composition of the workers at the site would reflect contemporary trends. Archaeological remains and historical documentation were combined to investigate this questions.

The information interaction sphere can be difficult to investigate on an archaeological level (Figure 9). Late 19th century industrialization and urbanization gave rise to Victorian cultural values in the heartland of America and Europe. Transcontinental telegraph and railroad corridors made possible the wide dissemination of these ideas to peripheral areas. The ideology and symbolism of "conservative" urban society should be reflected in the presence of status goods such as decorated ceramics and in a lack of alcoholic beverage containers typical of the Victorian temperance orientation. "Non-conservative" thought may be indicated by the presence of such material goods as liquor, tobacco and opium containers. The intensity of information and ideological exchange contributed by urban and local centers should be reflected in the proportion of conservative patterns vs. non-conservative patterns found at the site.

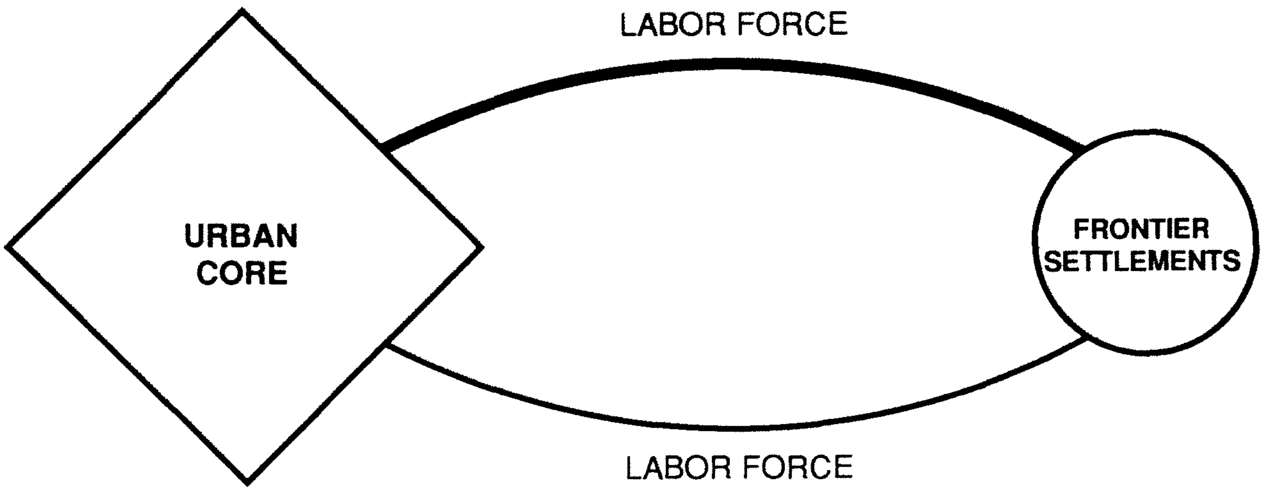
Material Analysis

The artifacts recovered during data recovery efforts at the camp were classified into functional categories which would facilitate the investigation of the previously described interaction spheres. Particular attention was given to the identification of manufacturing sources, goods attributable to Victorian or anti-Victorian behavior, and materials reflective of ethnic affiliation or gender. Maker's marks provided the best information concerning the origins of canned foods and beverages used to feed the railroad workers. The proportions of vice related goods to status related goods was documented so that questions regarding ideology could be addressed. The presence of materials used exclusively by one sex or the other provides data concerning the gender of the site occupants. The material remains recovered at the site did not provide any information relating to the ethnic affiliation of the workers. Documentary sources were consulted to obtain information about the labor force.

What We Found

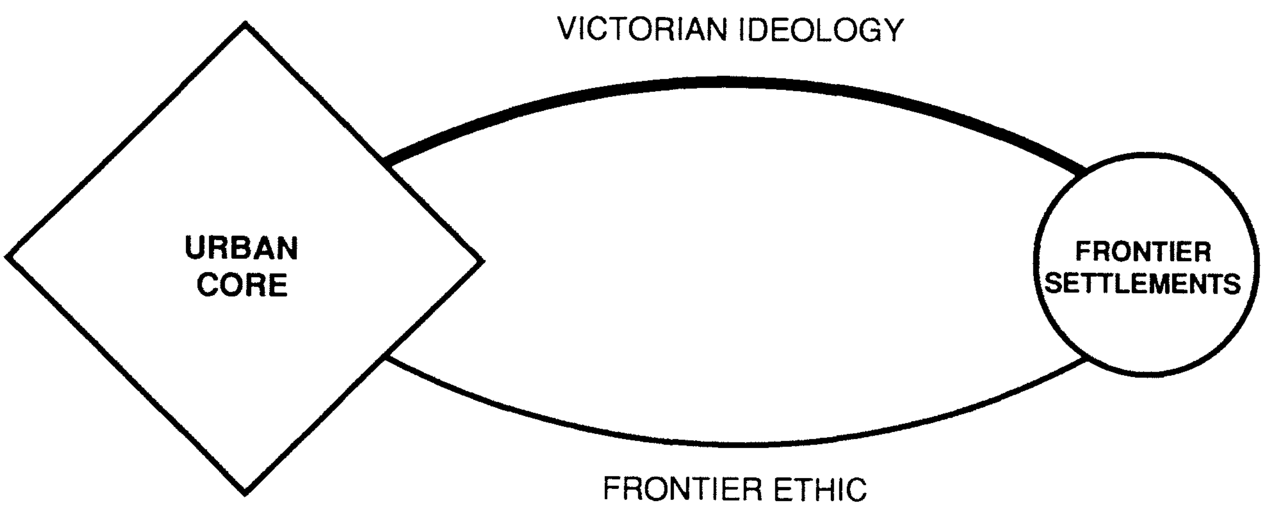
There are ample data relevant to the research questions regarding conflicts between the "frontier ethic" and "Victorian" ideology. A large number of the bottle fragments recovered from the site came from either liquor, beer, or patent medicine bottles (Figure 10). In addition, a substantial number of tobacco and snuff cans were recovered. These vice-related items are considered indicators of anti-Victorian behavior. Status related items such as decorated ceramics were notably lacking from the artifact assemblage. The only ceramics found at the site were a few pieces of utilitarian "hotelware."

As expected, most of the food cans and beverage containers came from more distant distribution



POPULATION INTERACTION SPHERE

Figure 8. Movement of population between frontier and urban areas.



INFORMATION INTERACTION SPHERE

Figure 9. Information flow between frontier and urban areas.

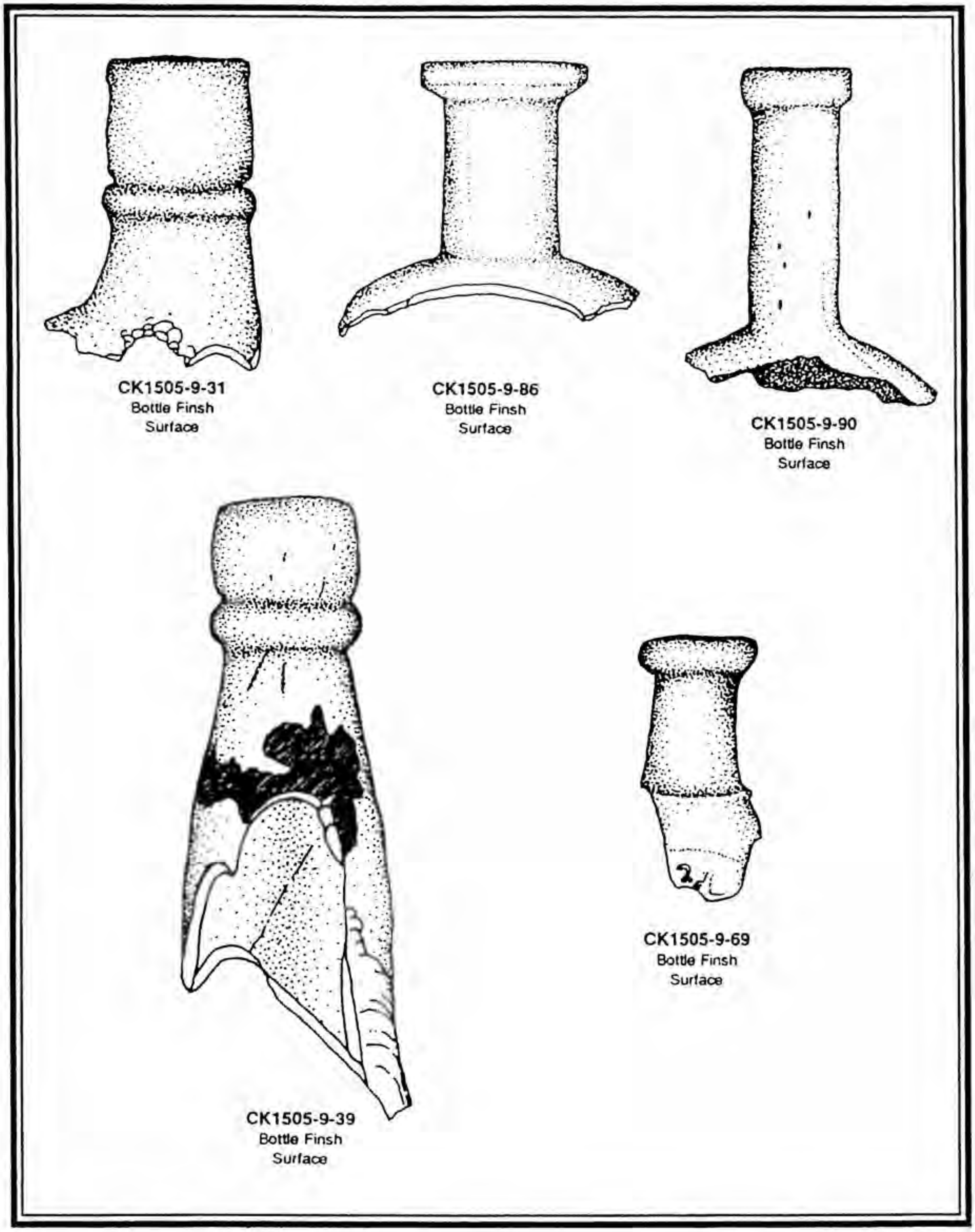
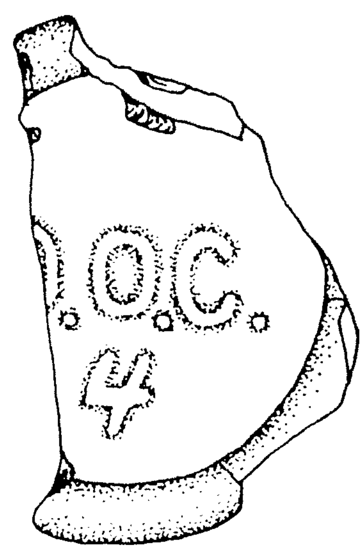


Figure 10. Liquor, beer, and patent medicine bottle fragments from 26CK1505.

centers. One patent medicine bottle was stamped with the word "Chicago," while a maker's mark found on the bottom of another bottle was attributed to the Cunningham Glass Company of Pittsburgh, Pennsylvania (Figure 11). The types of food containers recorded include: condensed milk cans, sardine cans, square meat cans and various sanitary cans. While there was no embossed marks or labels to indicate the source of these foods, they would have had to be imported from major supply centers. Building materials necessary



CK1505-9-58
Bottle Base
Surface

Figure 11. Bottle base with manfacturer's mark.

for the construction of the railroad were not available locally. Wooden ties, steel rails and all the other associated construction hardware had to be imported. Historic documentation shows that many frontier settlements were supplied from San Francisco, Los Angeles, or Salt Lake City, which functioned as major distribution centers during the early 20th century.

The archaeological data did not provide any answers relating to the ethnic affiliations of the railroad workers, but some newspapers dating to the period offer clues. Both the *Lincoln County Record* and the *Las Vegas Age* carry stories mentioning the ethnicity of the construction crews. Greek, Austrian, Italian, Finnish, and Spanish immigrants were employed during the construction of the Nevada portion of the line.

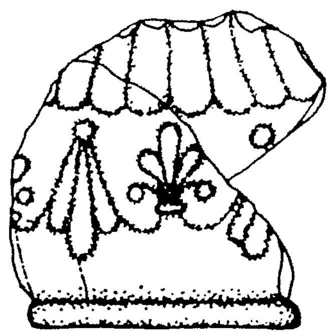
Surprisingly, there was data indicative of the presence of at least one woman at the camp. Artifacts suggestive of a female presence included: an ornate brass skirt buckle with a blue glass jewel, and a fragment of an amethyst, pressed glass perfume bottle (Figure 12).

What It All Means

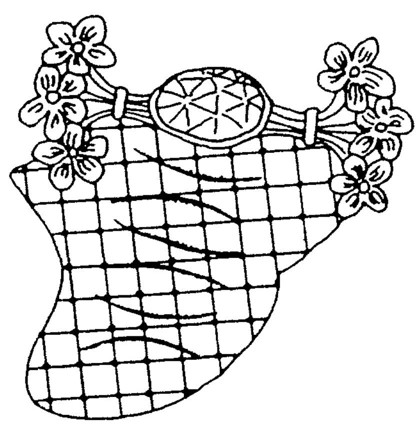
Our first research question concerned the materials interaction sphere. While the site is geographically isolated, because of its role in a large-scale capital investment project, the model predicted that a system of national trade networks would predominate over local trade networks. The archaeological data from the camp suggests that this is a valid assumption. The few bottles and cans with identifiable maker's marks were produced in the eastern cities of Pittsburgh and Chicago. We were somewhat surprised that we found no evidence of supply by local ranchers. Several factors could be responsible for the observed pattern. Differential preservation of organic materials such as bone or eggshell may result in the "invisibility" of locally obtained foodstuffs. The data recovery strategy may also have biased our sample. The outlying can scatters were characterized only in regards to the surface materials; it is possible that locally obtained products were buried at these trash deposits (Figure 13). Finally, it is possible that the observed patterning is a function of the short duration of the site and there was no opportunity to establish ties with local suppliers.

Considerable archaeological data was recovered supporting the idea that non-Victorian behavior was widespread among the railroad workers. These data include a high percentage of alcoholic beverage and patent medicine bottles, tobacco and snuff cans, and the general lack of status related goods recovered at the site. While the so-called Victorian ethic had been widely disseminated throughout the West via information networks controlled by large urban centers, our data reflect the independent nature of many frontier workers. These individuals did not "buy into" the conservative, class-oriented structure promoted by the urban establishment. During the initial stages of their development, pioneer settlements exhibit few orderly Victorian characteristics.

Linked to a global labor force through the population interaction network, the Nevada frontier drew migrant workers for large-scale construction projects. The ethnic mixture indicated by the documentary records reflects sociopolitical factors driving global immigration patterns of the early 20th century. The presence of Italian, Greek, Austrian, and Spanish laborers employed by the railroad is a reflection of a shift away from western and northern European migration towards central and southern European migration. The absence of Chinese railroad workers, so characteristic of the early railroad work in northern Nevada, reflects discriminatory immigration policies of the late 19th and early 20th century. The kinds of evidence relating to ethnicity which have been documented at other sites include: characteristic artifacts, patterning of features



CK1505-9-61
Perfume Bottle Fragment
Surface



CK1505-9-110
Ladies Brass Belt Buckle
Surface

Figure 12. Gender specific artifacts.

Figure 13. Outlying can scatter at 26CK1505.

and associated debris, and the presence of distinctive ovens (Wegers 1991). None of these were found. This lack may reflect the short duration of site occupation.

The two artifacts which suggest feminine presence at the site were not expected. Documentary research describes the work crews as being composed entirely of men. No mention is made of family. Given the temporary nature of the construction camps it is unlikely that spouses would have accompanied the laborers. It is not clear why a woman would visit the camp, but the artifacts recovered do not suggest that she was there as an employee.

It is clear that the short duration of the camp's occupation significantly influenced the composition and spatial patterning of the material remains. Our evidence suggests that short duration railroad construction camps were heavily dependent on distant supply centers. There were no indications of ties to local suppliers. The orderly, conservative patterns typical of more established communities never developed. Although ethnic variability is documented in historical records, it was virtually invisible in the archaeological record.

Directions for Future Research

The question remains whether the patterns observed at 26CK1505 are typical of other railroad construction camps. For much of the Intermountain West, the focus has been on larger, longer duration sites. Small, ephemeral sites have not been adequately characterized so that comparative research can be conducted. To make our data more relevant, additional short-lived settlements need to be investigated. Comparisons should not be limited to railroad-related sites, but should include other industrial pursuits such as mining, logging, construction of utilities such as telegraph lines, and water control facilities. Future research should focus on a regional strategy with more attention paid to the ordinary rather than the extraordinary.

Acknowledgements

The authors wish to thank William Zukowsky and Kathy Callister of Dames & Moore, Inc. for their cooperation in the production of this paper.

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Railroad Waterworks at Argenta, Nevada

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Nevada Archaeologist Volume 11 1993

Abstract

During the course of a cultural resource survey conducted in the vicinity of Argenta, Eureka County, Nevada, for Gold Fields Mining Corporation, an old water works system was recorded in Water Canyon. The system is alluded to in a 1903 survey as supplying the Southern Pacific Railroad which came through the area in November of 1868. The gravity-feed system consists of a water source at a spring in the canyon, a sedimentation box, and associated iron pipe. Archaeological investigation of railroad resources can help us "understand the construction methods and maintenance requirements of railroads operating in Nevada's hostile environment" (Adkins 1991: 8-49). The system represents water works engineering principles adapted to a local situation, and may be the only recorded example of its type from this period of early railroading in Nevada.

Introduction

The discovery of gold in California in 1848 and subsequently of gold and silver in Nevada in the 1860s, coupled with the westward migration of easterners, created the need for a transcontinental railroad. Five likely routes were surveyed between 1853 and 1856 resulting in a comprehensive study of 13 volumes. By 1861, the need became urgent with the advent of the Civil War. The Central Pacific Railroad Company of California was incorporated in June of 1861 and, in November of 1862, only four months after President Lincoln signed the Pacific Railroad Act, a contract was signed between the United States Government and the Central Pacific for the construction of a railroad line over the Sierra Nevada and across the Great Basin (Earl 1991, Myrick 1962).

Railroad service was established between Reno and Sacramento on July 6, 1968. In 1868, stations were established at Winnemucca in October, and at Reese River Station (Battle Mountain), Argenta, and Carlin between November and December. In December of 1868, the Central Pacific established an eating station at Argenta.

Silver was discovered in the vicinity of Argenta about 1867, but a limited amount of mining activities were carried out at the north end of the Shoshone Range where the Argenta mining district is located. With the completion of the Central Pacific to this point, a post office was established at Argenta. A town began to develop at the site (Stager 1977), and the Central Pacific began a overland freight line to Austin (Paher 1984). However, the Reese River siding, located about 5 miles west of Argenta station, proved to be more advantageously located to serve the mining districts of the Reese River Valley and particularly the operations at Austin. In 1870, the entire town of Argenta, buildings and all, were moved to the vicinity of the Reese River siding, to be known thereafter as Battle Mountain. Nevertheless, Argenta remained as a siding on the Southern Pacific Railroad, serving as a loading point for barite ore (Stager 1977).

During the course of a cultural resource survey for the Gold Fields Mining Corporation, the remains of a water works that supplied water to the siding at Argenta was identified and recorded. In the field notes of Henry Turtell's 1903 Survey 229, he commented that the "mountain range is drained by a deep canyon in the western part and a small creek utilized by the S.P. Railroad Company to pipe water to its tank in Section 5" (1903:138).

Site Description and Discussion

The site (CRNV-12-10848 [BLM]) is situated in and along the lower reaches of the main drainage in Water Canyon (Figure 1), and consists of the historic water works, as well as a prospect with associated trash, and a sparse to medium lithic scatter composed of basalt, chert and obsidian debitage, tools, groundstone, and two rock alignment features whose historic or

[redacted]

Figure 1. Topographic location of water works site and Argenta Station. Argenta NV., USGS 7.5', 1985.

prehistoric affiliation is uncertain.

The prospect is located at the lower (north) end of the site and consists of the sampling of a rock outcrop and trash that includes seven tin cans, six fragments of glass, milled lumber fragments, a smashed, gray enamel-ware basin, and bailing or electrical/telegraph wire. One intact condensed milk can be dated to 1915-1930, and a clear glass jar bottom contains the trademark for the American Bottle Co. at Streator, Ill., which used this particular trademark between 1905 and 1916.

At the upper (south) end of the site is Feature 3, a mound constructed of earth and rock (Figures 2 & 3). It is situated on the east side of the stream. There is a 3" diameter iron pipe (Pipe "B") protruding from the mound and pointing downstream. In front of and below the pipe is a horizontal iron grate that measures 21" x 60" and is perforated with 0.5" diameter holes. Beneath the grate is a silted-in "cistern," of unknown depth. A 3" diameter section of pipe (Pipe "A"), which may be connected to the cistern, can be seen rising vertically from the creek about three feet downstream. Pipe "B" rests on a section of 3" diameter pipe (Pipe "C"). Another section of pipe (Pipe "D") lies atop these.

It's placement and the placement of rocks around it suggests that this configuration is intentional. Pipe "C" appears to be part of this configuration serving as a support for Pipe "B". However, Pipe "D" appears not to be *in situ*. Still another pipe, located on the upper part (eastern side) of the mound, has been placed in the ground vertically and is thought to be associated with another feature, Feature 2.

Feature 2 is a fence constructed of used sections of 2.13", 3", and 3.75" diameter pipe strung with barbed wire. Consisting of two parallel rows of pipe, it runs on both sides of the stream. The distance between the two rows is only 6 to 9 feet. It begins just above (south of)

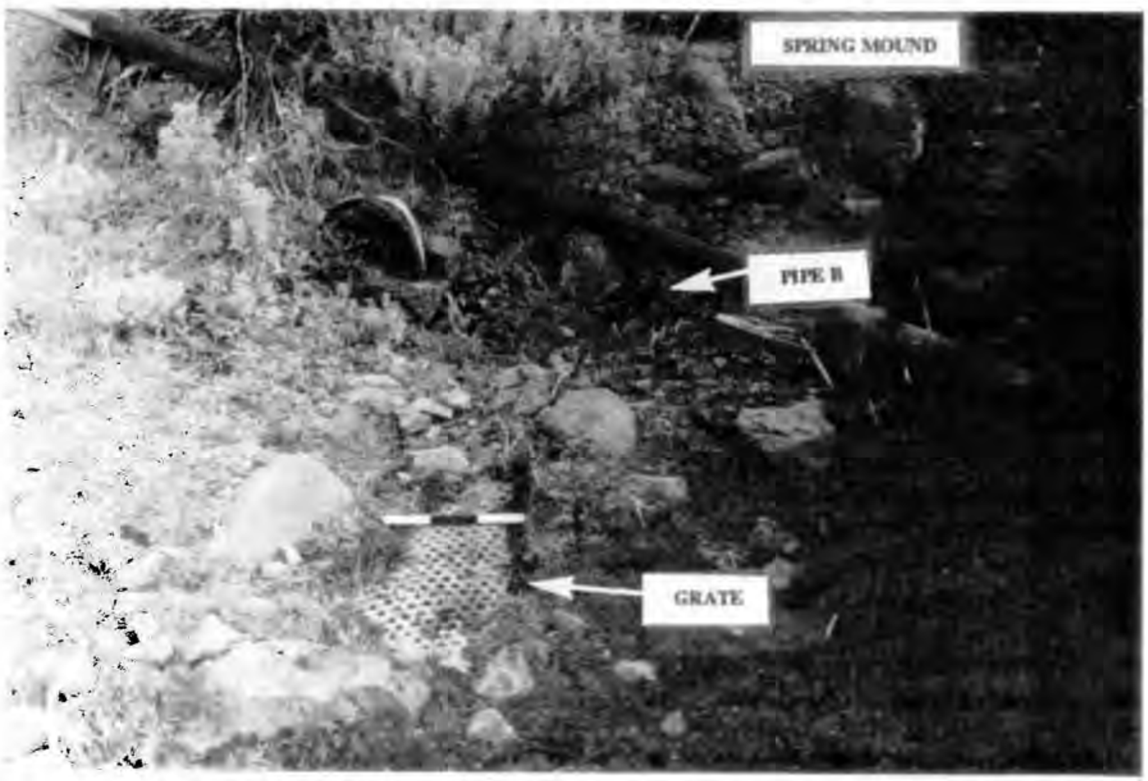

Figure 2. Feature 3, view south showing modified spring with outlet pipe (B) and grate that covers "cistern." Scale: 30 cm.

A trowel probe immediately in back (south) of where Pipe "B" exits the mound revealed that Pipe "B" extends into the mound at least 30".

Feature 3, and continues downstream for about 65 meters. Twenty-one pipe segments are still *in situ*. At the lower end of this feature the

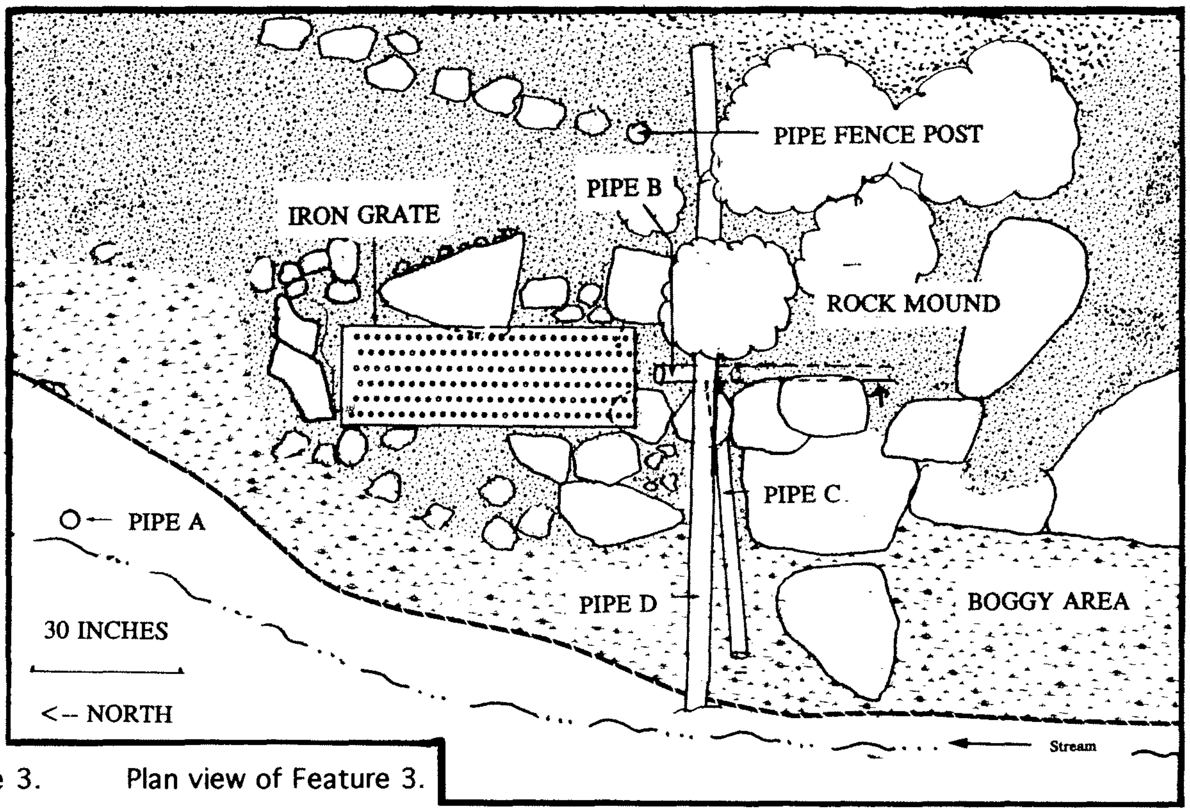

Figure 3. Plan view of Feature 3.

direction of the steam bends slightly to the east, and several such lengths of pipe are scattered along the drainage for another 40 meters. Some of this pipe is 3.75" diameter riveted iron pipe fabricated from 24" segments and coupled with a sleeve, while the majority is threaded iron pipe, using threaded couplings and having a visible longitudinal seam.

Feature 1 is a large wooden box, sections of iron pipe and associated trash located on the west side of the drainage at the point where the stream bends to the east before resuming its north-trending flow. Trash associated with this feature consists of a sieve or filter made from a flattened tin can and measuring 8" x 14" with holes made with a knife; a tar container made from a 10" diameter can with a makeshift bailing wire handle; a modified single lap seam 603x700 (#10) tin can with 0.13" wire handle used for a bucket; milled wood fragments; and sections of iron pipe including one wrapped with rubber and wire. Tar was noted on some of the pipe joints.

The box is built into the cutbank and is constructed from 2" planks having widths of 12", 8.5", and 6.5" (Figures 4 & 5). The planks have been cut with either a longsaw or, more likely, a reciprocating millsaw. The covered box measures 66" x 65" x 24" deep and has an earthen bottom. On the south face, facing up stream towards Feature 3, is a notch cut to accommodate up to a 5" diameter pipe. The base of this pipe would be 10" from the top of the box. A trowel probe revealed a section of iron pipe, probably 3" in diameter, running from the bottom of the interior of the box to somewhere downstream (north) of the box. All nails appear to be 3.38" or 4.5" wire nails. Set around the box is a structure of boulders leading downslope to the level of the stream bed. Included among these boulders is a boulder metate.

Features 1 and 3 are apparently components of an old water works system that is alluded to in the 1903 Turtell survey and which served a water tank at the foot of Water Canyon and the

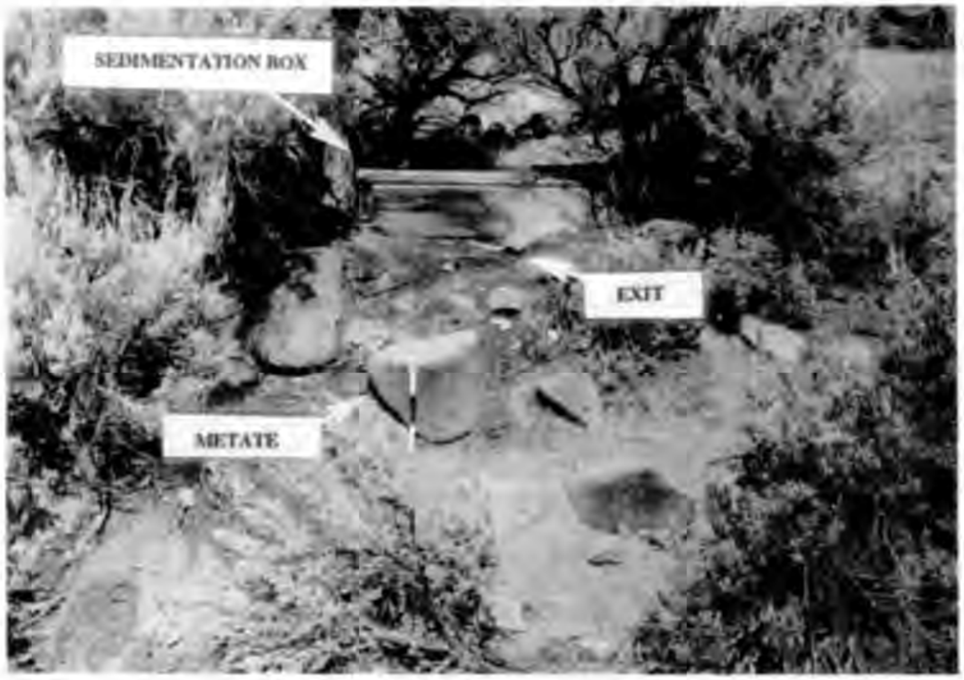

Figure 4. Feature 1, view west showing sedimentation box, exit hole, and stone lined embankment including boulder metate. Scale: 30 cm.

Argenta siding. A map of A.J. Hatch and J.H. Eaton's 1869 Survey 23 & 30 shows a spring in the canyon at the south end of Section 8. The 1903 Turtell survey notes also refer to this spring. The current USGS 7.5' map, which shows several springs in Water Canyon, does not show a spring at this location (refer to Figure 1). However, the location of the spring mapped by Hatch and Eaton and referred to by Turtell is identical with the location of Feature 3. The mound of rock and earth with Pipe "B" protruding from it strongly suggests that the spring referred to in old surveys was tapped and covered over. This would account for it not being seen on more recent maps.

Pipe "B" would be the outlet of the spring, dropping its contents through the iron grate into some kind of cistern. The grate would prevent objects over 0.5" from getting into the cistern. As the grate is no doubt submerged when there is a greater flow in the stream, the stream would be an additional source of water, probably the primary source, with the spring a secondary source. Turtell did say that it was the creek that supplied the water tank. A pipe, perhaps Pipe "A", would carry water collected here to Feature 1, which is a sedimentation tank.

While Feature 3 is situated in the bottom of the drainage, the box at Feature 1 is situated some 80" above the stream bed (Figure 6). The set-up is similar to a water-powered mill whose water supply is delivered by a flume or head race from a source located upstream. Indeed, it was my experience with early water-powered mills that immediately suggested a relationship between the two features (D'Angelo 1982). As the stream bed falls, the "headrace" remains level. The greater the height (the "fall") above the "tailrace" at the mill end of the raceway, the greater the water power delivered to the water wheel (whose diameter, and thus horsepower, is a function of that height) or turbine (whose horsepower is a function of the

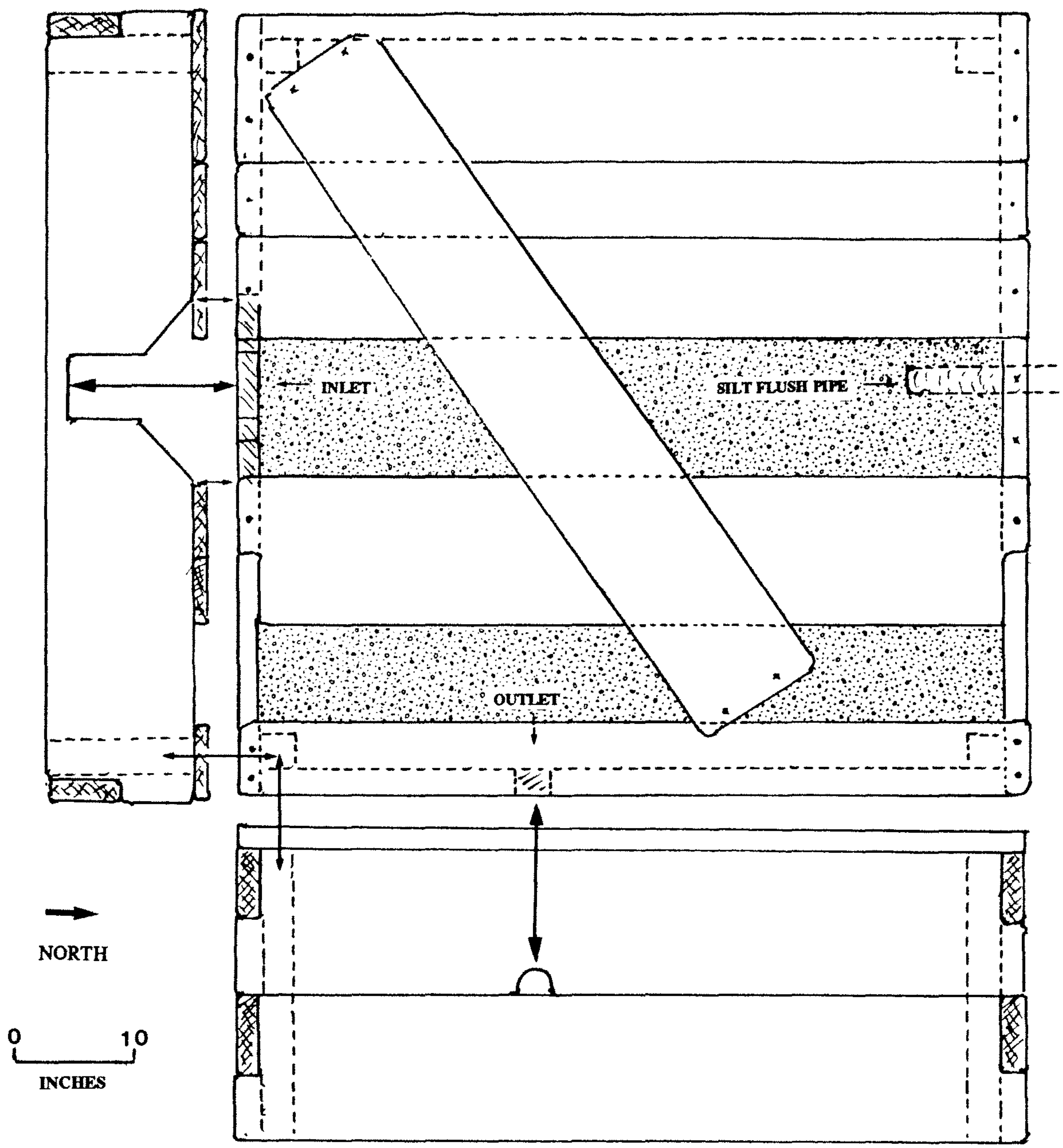

Figure 5. Feature 1, plan view of sedimentation box depicting south (inlet) and east (outlet) facing sides.

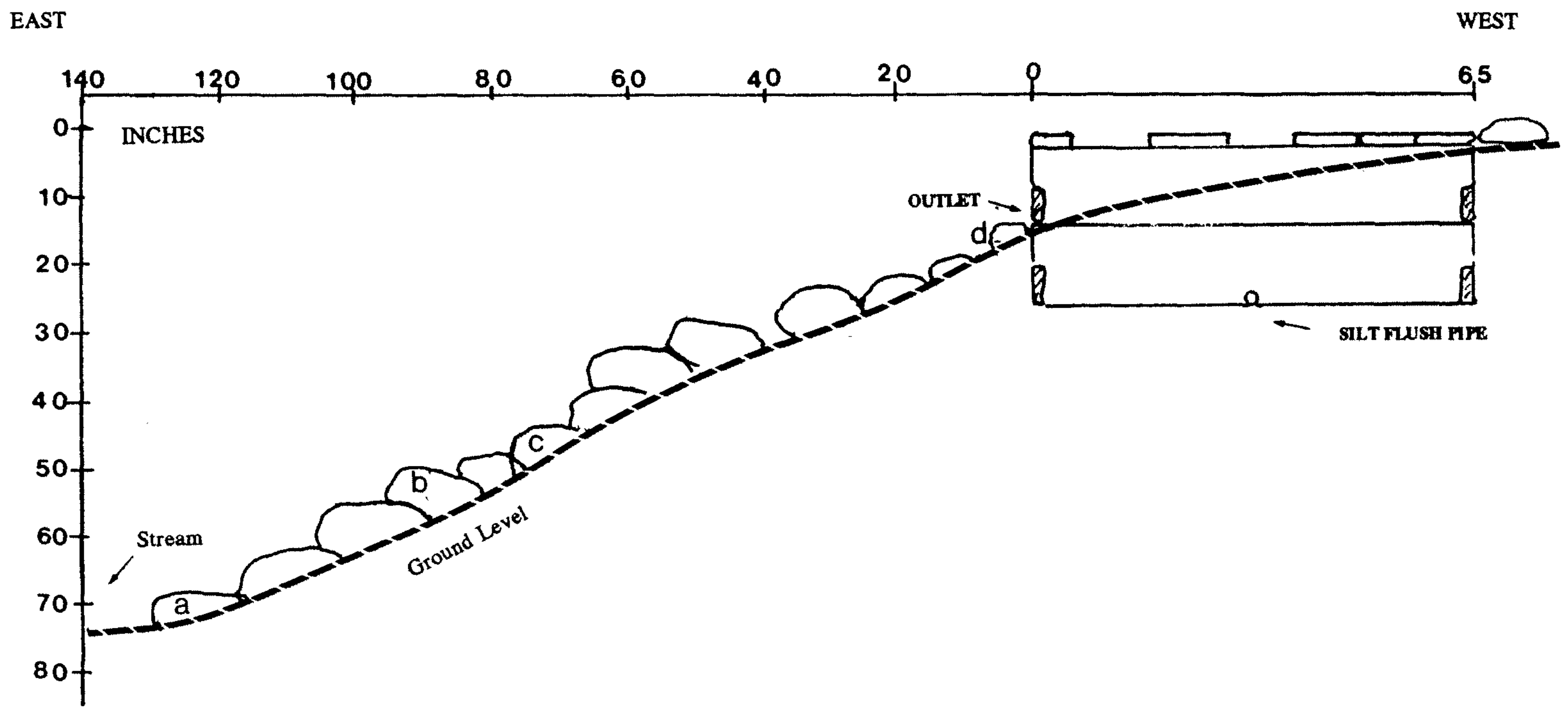

Figure 6. Feature 1, elevation of sedimentation box depicting outlet, flush pipe, and stone-lined embankment.

force of water falling from a given height). However, based on an informal calculation using a contractor's transit and tape measure, the sediment box is 18.04 feet below Feature 3.

The flow of water in a head race is controlled at the mill end with a gate. When the gate is closed there is no appreciable flow because the raceway has a zero-degree grade. When the gate is opened, the water flows at a rate dictated by how much water is allowed to flow through the gate. The gate at the end of a raceway is a hand operated "valve." The water works supplying the Southern Pacific Railroad water tank appears to have been designed to operate continuously, unmanned, except for occasional maintenance. Thus, a grade to the supply pipe of more than zero degrees was necessary in order to ensure continuous flow, but it could not have a pitch equal to the actual fall of the river between those two points, which is about 23 feet.

In order for the box at Feature 1 to function as a sediment settling tank, water flowing into it had to replace water flowing out of it without churning up the sediments which were settling to the bottom. The inlet pipe on the south side of the box would be two inches higher than the outlet pipe coming out of the east side of the box (refer to Figure 5). Apparently it was also significantly larger in diameter. This configuration would guarantee that the water level in the box would be just above the outlet pipe. In fact it would seem, given the 18 foot fall and relatively large diameter of the inlet pipe, that too much water would enter the box. But, since the outlet pipe ran from the box down to the railroad's water tank, a fall of about four hundred feet over approximately 1.3 miles, a siphon effect might have balanced the system. In addition, the pipe located at the bottom of the box on its north face also drew off some water.

Apparently this lower pipe is similar to the arrangement on many mill pond dams which not only have a gate at the top of the dam to supply a flume or head race, but one at the very bottom through which sediments collecting at the bottom of the mill pond can be "blown" out. Again, such a purge gate on a mill dam is operated manually and only occasionally. The lower pipe on the inside of the box had no valve but was just open. Though it passed out of the downstream (north) side of the box underground, it appeared to be more or less level. Such a configuration would guarantee the relatively slow but continuous purging of sediments from the bottom of the box. The exit end of this pipe was not located but would have to be far enough downstream from the box that it would not undermine the embankment near the box or, if near the box, would have to spill down a rock-lined embankment for the same reason. Thus, the whole sediment purging operation would also be automatic.

Streams are notorious for eroding their banks. Most water-powered mills constructed along the banks of streams or rivers make use of rock bulwarks to retard such erosion. The rock structures associated with the sediment box is such a bulwark. Zero-grade earthen head races also have an overflow spillway, similar in principle to the design of bathroom sinks, to ensure that water in the raceway does not overflow and erode its sides. Water from the "silt flush pipe" may have been channeled back to the creek through rocks a-c illustrated in Figure 6. Indeed, the rocks and earth mound at Feature 3 was probably built to protect the spring and pipe against the rampages of the Water Canyon drainage.

The presence of riveted and continuous seam iron pipe point to the likelihood that pipe was replaced during the period this site was in operation. Riveted pipe is common to 19th century sites, while welded, continuous seam, threaded pipe is later. The fence built of discarded pipe sections is curious. The fact that it surrounds and then continues downstream from Feature 3 suggests that it was built to protect the water source, perhaps from the destructive roaming of cattle. It was obviously built later than the original water works, but it is not clear whether it was built to protect the water works while it was in service, or for some other reason.

Except for erosion due to the periodic rampages of the Water Canyon creek, the water works components are surprisingly intact. Only the pipeline, sections of which are strewn all the way down the drainage to the valley floor, has been destroyed. What does remain is two of the three main components of the system, the pipeline being the third. They represent the adaptation of unchanging engineering principles to the ever-changing demands of the local situation. As with mill sites, in terms of these principles, such sites are all the same. But the differences in topography, distances to be covered, available building materials, types of water sources, and so on, no two are the same.

Summary

Adkins (1991:8-49) states that archaeological investigations of railroad resources can help us "understand the construction methods and maintenance requirements of railroads operating in Nevada's hostile environment." As a fairly well preserved example of early water works engineering and construction associated with the Southern Pacific, if not the original Central Pacific Railroad, this site embodies distinctive characteristics of a type, period and method of construction associated with an important moment in Nevada and American history, and can yield information important to an understanding of early water-technology, especially in the context of a hostile environment.

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A Cultural Resource Inventory and Evaluation of the Las Vegas to Bullfrog Stage Road in the Amargosa Valley, Nye County, Nevada

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Nevada Archaeologist Volume 11 1993

Introduction

On June 11, 1991, Dr. Kevin Rafferty of the Community College of Southern Nevada conducted a cultural resource inventory and reassessment of an historic resource, the Las Vegas-Bullfrog Road (26NY7810), in the Amargosa Valley, Nye County, Nevada (Maps 1 & 2). The location of the route was suggested by archival research done in conjunction with a cultural resource inventory conducted by Archaeological Research of Southern Nevada (ARSN) (Rafferty 1991). The land upon which the historic route passes across is managed by the Bureau of Land Management, Las Vegas District, and federal laws and regulations require that an archaeological survey and historic site assessment be conducted prior to the advent of any ground disturbing activity in the area.

The purpose of this paper is to report on the assessment work conducted on a portion of the remains of the historic Las Vegas-Bullfrog Road for integrity and its eligibility for nomination to the National Register of Historic Places (NRHP).

Environmental Setting

The Amargosa Valley area where the road segments are located is dominated by the Creosotebush Community, which includes creosotebush (Larrea tridentata), bursage (Ambrosia dumosa), desert trumpet (Eriogonum inflatum), skeleton weed (Eriogonum deflatum), rice grass (Oryzopsis hymenoides), choola (Opuntia sps.), and various forbs and herbs. Fauna noted included jackrabbit (Lepus californicus), various lizards, and some avifauna.

The soils of the immediate region consist of alluvial silts, sands, and gravels. These have been deposited by erosional action from nearby hills and mountain ranges, and through the action of alluvial flooding in some areas. The majority of the Amargosa Valley is for all intents and purposes flat, with less than a two percent slope in any direction. This makes the subject area an excellent location for a communications and travel route such as is under consideration in this paper.

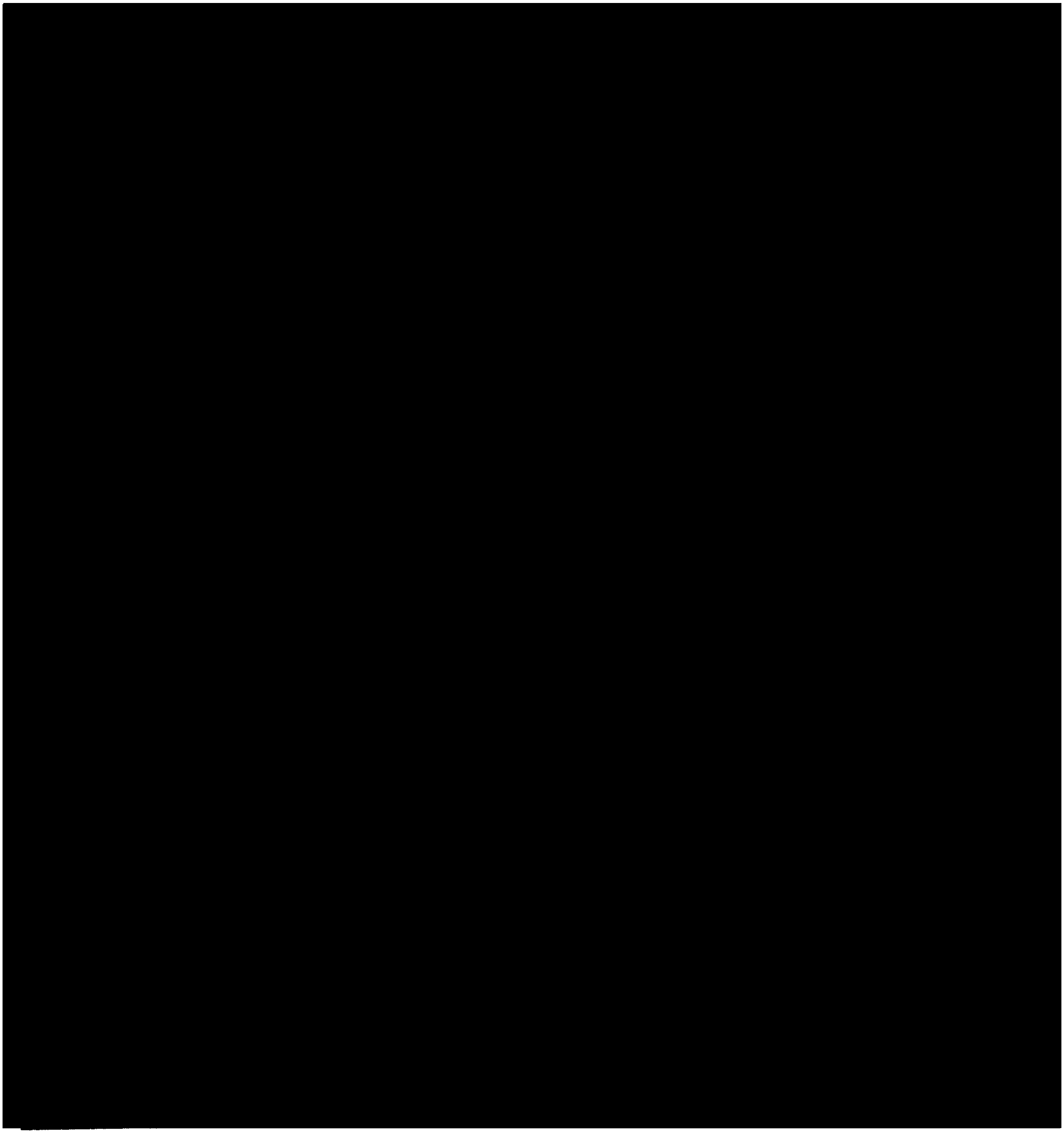
There are no known permanent water sources in the vicinity of any of the road segments. The Amargosa River, an underground stream bed, is several miles to the southwest of the project area. There are also some springs in the mountain ranges to the west and southeast of the parcels. The only water sources are seasonal washes that contain water only under favorable environmental circumstances.

Road Segment Locations

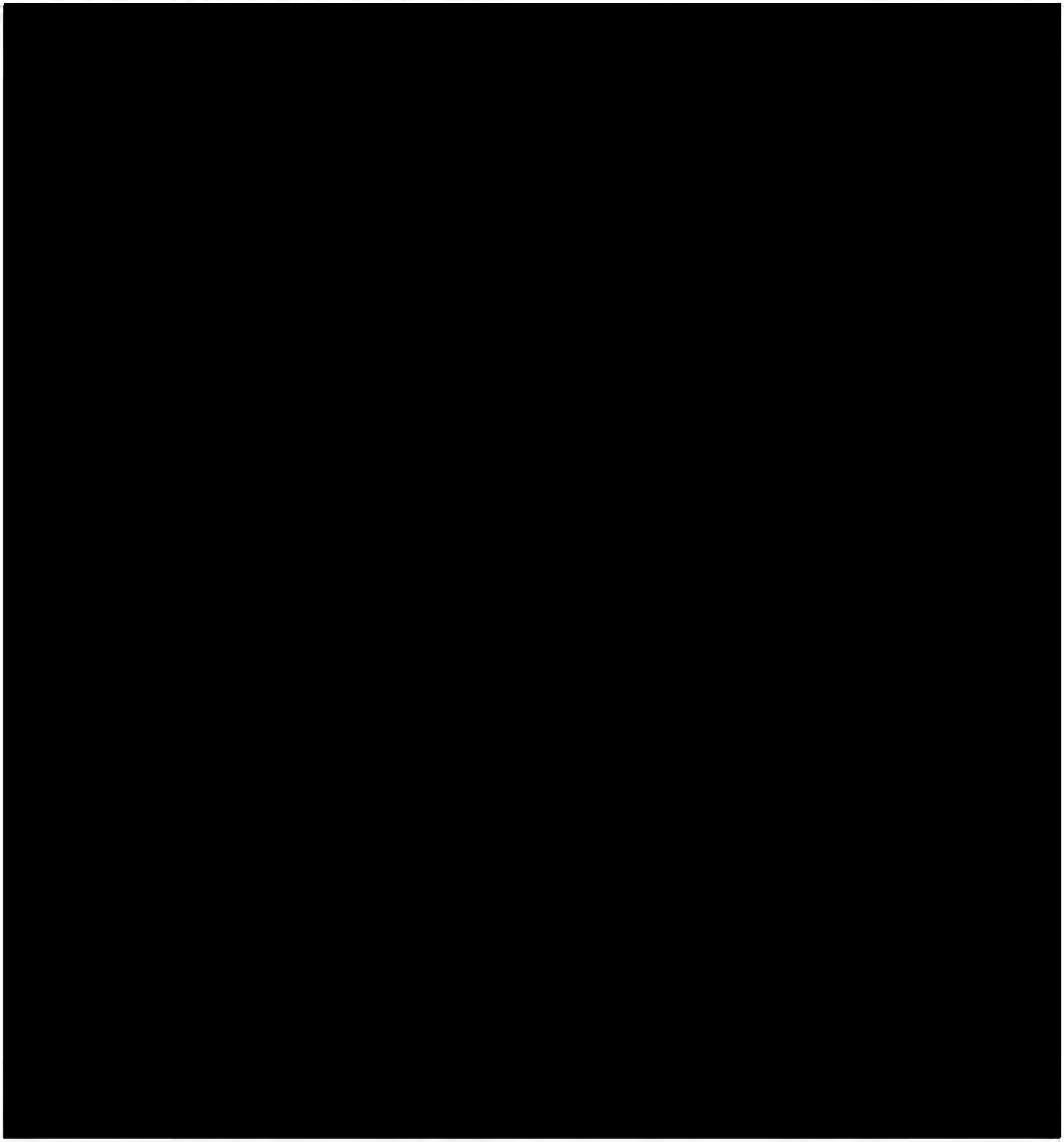
There are three portions of the road (26NY7810) that were reexamined. The first portion, here designated as LVB-1, begins at Miller's Well No. 1, located in the [redacted] LVB-1 extends to the [redacted] (Map 1; Plate 1). It appears on the [redacted] (Map 2).

There is what appears to be an offshoot of the Las Vegas-Bullfrog Road indicated on the [redacted] This associated surviving portion, here designated as LVB-2, originates in the [redacted] (Map 1). From the maps it appears to have terminated at a juncture with the main road somewhere in [redacted] LVB-2 was also reexamined in the course of this project.

There is a third potential route of travel originating at Miller's Well No. 1 which travels in an easterly direction. It is a mapped dirt road that bears to the [redacted] from the well and proceeds through [redacted]



Map 1. LVB survey locations, Amargosa Valley, Nevada. South of Amargosa Valley, NV., USGS, 7.5', 1984.



Map 2. Historic locations of Las Vegas-Bullfrog Road and offshoots, 1910. Furnace Creek, CA-NV., USGS, 30', 1910.

Plate 1. Relatively undisturbed segment of Las Vegas to Bullfrog Road (26NY7810; LVB-1), [redacted], looking northwest.

This route has been designated as LVB-3 (Map 1). There is an historic road that terminates at the Miller's Well [redacted] (Map 2) and the two routes (modern and historic) may correspond. This road may have been an associated portion of the Las Vegas-Bullfrog Road, although this is far from certain. Historic accounts (Merrill 1906) describe the Las Vegas-Bullfrog Road as originating in Bullfrog, curving southeast to pass by Miller's No. 1 and Ash Meadows, and then curving northeast towards Miller's Well No. 2 and Indian Creek. Despite this, LVB-3 was examined in a cursory manner. It was not given a separate site designation, due to the archival uncertainty and other factors discussed below.

Historic Background

The Las Vegas-Bullfrog Road was a result of the establishment of two towns in southern Nevada. The first, in 1904, was the town of Rhyolite, near present-day Beatty which is 120 miles north of Las Vegas. The Bullfrog Mining District was organized around silver strikes in 1904, and the town of Rhyolite soon sprang up around it, attracting thousands of people. One estimate places the population of Rhyolite at approximately 8,000 by 1908 (Hulse 1981).

Due to the demand for supplies for the Bullfrog Mining District, a nearby transshipment location was required. Because of its location on the Old Spanish Trial, abundant water, and the availability of grain and feed, Las Vegas became the logical choice. By the summer of 1904 a small tent settlement sprang up east of the then-extant Las Vegas Ranch, and the San Pedro, Los Angeles, and Salt Lake Railroad (SP,LA&SL RR) was soon running rails southward from Salt Lake City towards the Las Vegas Valley (Paher 1971).

By October 1904, the rails had reached the Las Vegas Valley, and equipment and other necessary goods were transferred onto wagons at this point for shipment to Beatty and Rhyolite, 120 miles away. Because of this trade, the young town of Las Vegas thrived. Material reaching Las Vegas from Los Angeles arrived by train daily, where it was loaded onto large wagons and shipped out to the Bullfrog Mining District (Paher 1971). One advertisement in the *Las Vegas Age* (May 20, 1905) newspaper touted the resources of the "Humphrey and Torrey Corral - Bullfrog Freighting Headquarters - Hay, Grain, and Feed." It was located at the corner of Third Street and Gass Avenue.

Early on, facilities sprang up along the road between Las Vegas and Bullfrog to provide travelers and freighters with water, overnight rests, and feed for horses and other beasts of burden. The Longstreet and Fairbanks Ranches in the Ash Meadows area (southeast of the project area) became popular way stations for travelers at this time (Myrick 1963; Paher 1970; Hattori and McLane 1981). Other facilities included Miller's Well No. 1 (Merril 1906; Map 2). The local newspaper ran advertisements for the facility that read "Water and Feed for Man and Beast at Miller Wells on the Vegas and Bullfrog Road" (*Las Vegas Age* April 7, 1905-June 10, 1905).

These facilities were necessary due to the requirements of water for the teams. The 40 mile trip between Corn Creek (near Las Vegas) and the Fairbanks Ranch area in Ash Meadows was the driest stretch of the route. This required the teamsters to carry an average of 25 gallons of water for each horse of a 16 horse team. Since the trip took two days, the average wagon had to carry 400 gallons of water (*Las Vegas Age* August 12, 1905). The importance of the Ash Meadows-Miller's Well areas on the freighting route cannot be overestimated.

A typical trip from Las Vegas ended its first day at Tule Springs Ranch north of town to obtain water, and the second night ended at Indian Creek. Water, eating, and overnight accommodations were available here. The third night was a dry camp between Indian Creek and Ash Meadows. At Ash Meadows (Fairbanks Ranch), which was reached on the forth night, food, water, and lodging was available. The remaining trip to Beatty took two to three more days, with dry camps made each night (Merrill 1906; Paher 1971). The teams probably topped off their water at Miller's Well before continuing the trip the first day after leaving Ash Meadows.

The amount of traffic on the route was evidently enormous. On June 3, 1905, the *Las Vegas Age* reported that a minimum of 1000 horses were being used to haul freight from Las Vegas to Beatty. The firm of H.D. and D.D. Porter used 120 horses, while J.W. Green and Company employed 102.

One of the biggest complaints regarding the route was its constant state of disrepair. The *Las Vegas Age* (July 15, 1905) complained that the road was in need of upgrading and repair, and failure to conduct the necessary repairs could cost the new town jobs and revenue. The necessary repairs were evidently undertaken, for only a few months later, the *Las Vegas Age* (November 25, 1905) noted that there was an increased demand for wagons to haul freight to Beatty, and that the traffic on the road "looked like the old days."

Prices for hauling services appear to have been fairly reasonable. Charges for hauling goods to Beatty ranged from $3.50-6.00 per 100 pounds, and they reached Beatty between a week and 10 days from departure (*Las Vegas Age*, April 4, 1905: Supplement). Concurrent charges for hauling ore from Beatty to Las Vegas were $25 a ton (*Las Vegas Age*, June 3, 1905: Supplement).

Along with freight, passengers had to move between the two locations. Early on, stage lines sprang up to serve the needs of the two communities, running on the Las Vegas-Bullfrog Road. The one that advertised the most in the *Las Vegas Age* was Kimball's Stage Line, which operated between Las Vegas and Beatty ever day, leaving both towns at 6 A.M. each morning at first. According to the paper, the trip took approximately 34 hours during the first few months of operation (*Las Vegas Age*, September 2, 1905).

Early in its operations, the stage line began making accommodations with modern modes of transportation. Nevada Rapid Transit Company opened an auto stage line between Las Vegas and Indian Creek (Indian Springs), approximately 45 miles northwest of Las Vegas. There connections were made to Kimball's Stage Line for the Beatty run. Travel time was cut down from 34 to 22 hours, and the fare cost approximately $17. The stage left Indian Creek at 3 P.M. every day, stayed overnight in Ash Meadows, and arrived in Beatty at 3 P.M. the following day. The return trip left Beatty at 6 A.M. every day and arrived at Indian Creek at 11 P.M. the same day. From there, transportation was arranged to go on to Las Vegas (*Las Vegas Age*, August 19, September 2, and December 12 [Supplement], 1905).

The end of the freighting companies and the stage lines came almost as quickly as they had started. Competition with mechanical transport (automobiles and trucks) began in late summer of 1905. The advantage of the automobile was speed (two days for the run) and the erasing of the necessity for carrying large amounts of feed and water for animals. Although the automobiles carried less tonnage, their advantage in speed more than made up for the lack of freight capacity (Paher 1971).

The other competitor, the railroads, also had a hand in destroying horse-drawn freight and passenger service. The Las Vegas & Tonopah Railroad was completed in October, 1906, diverting much of the traffic away from the haulers and passenger lines. The Tonopah & Tidewater Railroad from Ludlow, California to Beatty was completed late in 1907, further diverting traffic from the Las Vegas-Bullfrog stage/freighting route (Paher 1971; Lingenfelter 1986).

The last Kimball's Stage Line advertisement noted in the *Las Vegas Age* is dated September 15, 1906, although the line may have continued in service for some time after that. It seems that the coming of the railroad and the automobile finished the short era of horse-drawn long distance transportation between Las Vegas and the Bullfrog Mining District.

On-Ground Inventory and Research Questions

The actual route of the stage line is open to interpretation. Research conducted earlier (Hattori and McLane 1981; Rafferty 1991) places the route possibly along one of two dirt roads or tracks on the USGS maps (LVB-1 and LVB-2). The research conducted in conjunction with this effort supports this possibility and has identified a third potential route that terminates at Miller's Well No. 1 (LVB-3). One purpose of this work was to identify the on-ground presence of these roads and thus support, or reject, the suggestions of the background research.

Based on practical experience and research on trails and routes of travel that ran through southern Nevada (Hardesty 1986; Myhrer *et al.* 1990), identification of the road route/s should be found in two classes of data. The first is the presence of artifacts or other physical objects along the sides of the purported road. Travelers along such roads would indulge in a number of activities en-route to pass the time and thus make the journey seem to go more quickly. Drinking, eating, and chewing tobacco were such favorite pastimes. Once the contents of bottles and cans were consumed, the containers would be discarded along the side of the road to lighten the load and reduce the bulk being carried. Thus, a linear scattering of artifacts should be expected on either side of the road, helping to identify the location of the resource (cf. Myhrer *et al.* 1990:50).

The second class of data is found in the physical remnants of impacts to the environment by the use of the road. Wagon ruts and long linear paths where vegetation is sparse or non-existent due to the impact of vehicles and animals should be in existence where research and the modern topographic maps indicate the presence of some sort of unimproved travel route (cf. Myhrer *et al.* 1990:13).

Based on the historic research and Myhrer's (1990) field research on the Old Spanish Trail/Mormon Road, several research questions were modified for use in examining the results of the on-ground archaeological inventory of LVB-1, -2, and -3.

Question 1) Do any segments of pristine road remain, and if so, what is the nature of the road surface? It was believed that, despite modern use of the area by farmers, travelers, off-road vehicle enthusiasts, and others, that portions of the road would be in nearly undamaged condition.

Question 2) Do the artifacts support an early twentieth century use of these possible segments of the Las Vegas-Bullfrog Road? Based on the literature review, regular use of the roads occurred between 1904 and 1907, and the Furnace Creek USGS indicates that the roads were in physical existence as late as 1910. If the routes that were surveyed are portions of the Las Vegas-Bullfrog Road, the majority of artifacts should fall within this range of dates.

Question 3) What do the artifacts tell us about the eating and drinking habits of the users of the trail? Expectations were that food and drink containers, and possibly wagon or stagecoach parts, would be found along the road segments. These objects are capable of yielding data on the subsistence habits and lifestyles of individuals using the trail.

It was expected that the results of the survey would yield data to support the proposition that LVB-1 and -2 were part of the historic Las Vegas-Bullfrog Road. It was also expected that the condition of the route could be assessed that would allow a determination as to whether the portions of the road examined were eligible for nomination to the NRHP.

Field Techniques

The portions of the purported main and adjunct routes (LVB-1 and LVB-2) of the Las Vegas-Bullfrog Road were surveyed on foot. Transects were walked on both the eastern and the western periphery of the roads. Each transect was located approximately 3 meters (10 feet) away from the road to allow a more thorough location and recordation of artifacts that were physically associated with the roads.

It was discovered that LVB-3 was heavily altered, widened by use of a modern blade or other earth moving equipment at sometime in the recent (less than 50 years) past. As a result, the data potential of the route was severely compromised. Therefore, the portions of the road west of SR 373 were driven in a four-wheel drive vehicle at less than 5 miles per hour. When artifacts and other physical remains were encountered, the vehicle was stopped and the item examined and, if found to be historic, recorded in detail (see below).

All artifacts or concentrations of artifacts encountered were minutely examined and recorded in the field. No artifacts were collected. Data concerning the class of artifacts, its manufacture, state of preservation, and possible chronological information were recorded for transfer to IMACS site forms back in the office of ARSN. The location of each locus in relationship to the road/s were recorded on the appropriate USGS topographic map. Black-and-white photographs were taken of representative artifacts along the road/s, or of concentrations of artifacts. These were processed into proof sheets, and the most representative photographs are included in this report.

Findings

A total of 58 loci of historic artifacts were recorded adjacent to the three routes of travel: 54 along LVB-1, two along LVB-2, and two along LVB-3 (Map 3). The loci along LVB-1 and -2 (#1-54, 57-58; Map 3) were considered to be components of the larger road site designated as 26NY7810. The loci along LVB-3 have been given separate site designations due to the confusion regarding the identity of the road segment and are designated 26NY7811(#55) and 26NY7812(#56).

26NY7810 includes two road segments (LVB-1 and LVB-2) and 56 loci of artifacts. Of the loci, 28 of them are isolated hole-in-top food cans, either intact or crushed by wagons or other man-made agencies (Plate 2). There are also three isolated circular hole-in-top sardine cans, an isolated evaporated milk can, and three concentrations of cans of the hole-in-top variety. These 35 loci (Nos. 1-3, 5-7, 11, 14-15, 17-19, 21, 23, 26, 28, 29, 34-37, 40-48, 50, 57 & 58) contained a total of 39 cans. Hole-in-top cans became common between 1860 and the early 1900s (Rock 1980a), while true vent hole food cans became common about 1900 and dominated the industry in the early portion of the the century (Rock 1987). Regarding evaporated milk cans, companies on the West Coast began mass manufacture of the product after 1885, and these cans became common after the Spanish-American War in 1898 (Rock 1987).

One particular isolated can, Locus 17, was a crushed, rectangular hole-in-top food can opened with a key. This method of can opening was developed in 1895 and became widespread shortly thereafter (Rock 1980a).

The other loci in this group consists mainly of concentrations of bottles, bottle fragments, glass ware, and crockery. Locus 4 consists of a hole-in-top/vent hole can, opened by a knife, accompanied by 7 purple glass fragments, including the base of a rectangular medicinal bottle. There is embossing on the bottle that cannot be read. The color is caused by manganese in the glass, that turns purple upon exposure to the sun. This additive was used between 1880 and 1916. Medicinal bottles with embossing became common after 1867 (Rock 1980b).

Locus 8 contained approximately 25 clear bottle fragments, including the base, in a 1.5 m diameter area adjacent to and west of the road. The base is embossed with *AB* over *H1*. The *B* is slanted and incorporated into the right leg of the *A*, indicating it was manufactured by the Adolphus Busch Manufacturing Company between 1904 - 1907 (Toulouse 1971:26).

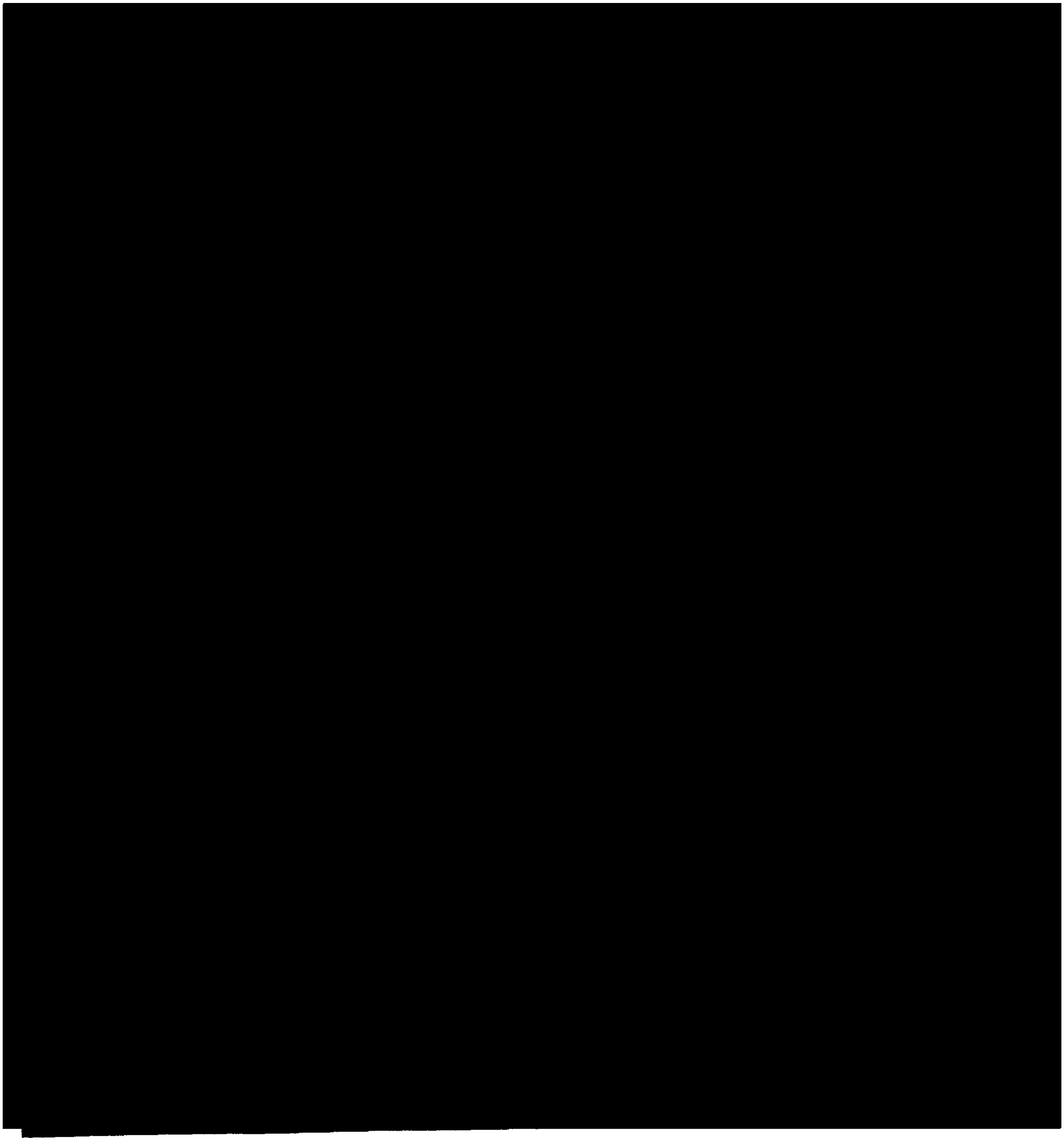
Locus 9 has 25 clear bottle fragments, including the base, in a 2 m diameter area adjacent to and west of the road. The base is embossed *A.B. Co.* over *G8*. Again, this is a maker's mark of the Adolphus Busch Company, common between 1886 - 1928 (Toulouse 1971).

Locus 10 contained approximately 30 pieces of purple glass in a 2 m diameter area adjacent to and west of LVB-1.

Locus 13 is a concentration of 35+ brown beer bottle fragments, including a partial base embossed with *ABGMCO* over *K12*. This was a trademark of the Adolphus Busch Manufacturing Company between 1903 - 1928 (Toulouse 1971; Myhrer *et al.* 1990).

Locus 16 contains a concentration of salt glaze crockery jar fragments in a 3 m diameter area east of and adjacent to LVB-1. There are roughly 50 pieces, all from the same jar. This was a common type of ceramic on the western frontier (Plate 3).

Locus 20 is two partially intact brown alcoholic beverage bottles with machine mold seams up both sides of the bottle, indicative of manufacture after 1900 (Rock 1980b). There are also 7 fragments of the bottles nearby. The



Map 3. Survey results for theLVB reassessment. South of Amargosa Valley, NV., USGS, 7.5', 1984.

Plate 2. Locus 3, hole-in-top meat can located adjacent to the Las Vegas to Bullfrog Road (26NY7810).

Plate 3. Locus 16, salt glaze crockery scatter located adjacent to the Las Vegas to Bullfrog Road (26NY7810).

scatter measures 1 m across.

Locus 22 consists of a scatter of 30+ clear bottle glass fragments in a 2 m diameter area, while Locus 24 contains brown alcoholic beverage bottle fragments, both locations west of and adjacent to LVB-1. The neck remnant, Locus 24, exhibits manufacturing seams, and the base is embossed with *R &Co* over *14*. This could belong to an unidentified manufacturer, ca. 1880 - 1900+ (Toulouse 1971:438-440).

Locus 27 is a base and 22 fragments of clear bottle glass, accompanied by a tobacco tin. All are in a 2 m diameter area located 2 m west of LVB-1. The base of the bottle is embossed with *R&Co.* The tobacco tin is of an upright variety that began being manufactured in the late 1890s to the early 1920s (Rock 1987:62).

Loci 30 - 31 are two concentrations of bottle fragments. Locus 30 has approximately 15 brown alcoholic beverage bottle fragments in a 1 m diameter area located between two slightly separated segments of the road. Locus 31 consists of clear bottle fragments (20+) located between two slightly separated segments of the road. They are concentrated in a 1 m diameter area.

Loci 32 and 33 contain the following artifacts: a solitary clear bottle fragment, between two separated segments of LVB-1 (#32) and two purple glass fragments, 1 m west of the road.

Locus 38 consists of a scatter of approximately 50 clear bottle glass fragments in a 2 m diameter area located 4 m east of the road. A base fragment is embossed with *D* unreadable *A*.

Locus 49 is an artifact scatter consisting of 14 hole-in-top/vent hole cans (circular, rectangular, sardine) and 10 brown glass bottle fragments. They are in a 5 m diameter area situated 8 m west of the road.

Locus 51 consists of 4 clear glass bottle fragments situated 10 m west of the roadway. Locus 54 is a single clear glass bottle fragment east of and adjacent to the road.

Locus 52 consists of 20+ clear bottle fragments west of the roadway, in an area 7 m long by 1 m wide. The next locus (53) is a small glass scatter in an area 2 m in diameter. It consists of 7 clear glass fragments and two partial bottle fragments. One is a brown whiskey bottle body piece embossed with *Louisville, KY.* The other is a rectangular clear medicinal bottle fragment embossed with *H.H.H. Horse Medicine* on its side. This bottle was manufactured ca. 1895 probably by William Gifford & Co. of Chicago (Fike 1987:147).

The last two loci, 55 and 56, have been given individual site designations, as they are located adjacent to LVB-3, which is likely <u>not</u> a portion of the Las Vegas-Bullfrog Road. The first, 26NY7811 (Locus 55), is a small brown glass bottle fragment scatter consisting of 25+ pieces of glass. It is 10 m north of the road. The second, 26NY7812 (Locus 56), is an isolated crushed bucket 5 m south of the road.

A visit was also made to Miller's Well No. 1, one of the stops on the Las Vegas-Bullfrog Road, located in the NE1/4, NE1/4, SW1/4 of Sec. 10, T.16S., R.49E. Given its importance as a rest stop along the road, it was felt that at least a cursory examination of the facility was in order, despite the fact that it is outside the immediate project area. The 1910 Furnace Creek 30' USGS map indicates that there were the remains of four buildings at the location at the time the map was compiled, all on the south side of the road. Examination of the location revealed four depressions in the area, situated adjacent to one another. They appeared to be rectangular in shape, approximately 10 -12 feet (3-3.6 m) in dimension on each side, and had artifacts from the early twentieth century era associated with them, quite similar to those located along LVB-1 and LVB-2. Also associated with the location are large concentrations of fairly modern (1950+) trash, situated both in large mounds and spread across the locations in a thin sheet of debris. This created an incredible mixture of artifacts at the site that would require a major effort to separate into comprehensible and distinct loci.

There also have been modern impacts to the structures and the road as it goes through the location. The road itself has been heavily traveled through this point and appears to have been bladed in some areas, eliminating the structural integrity of the road in this area. Given the general knowledge of the local populace concerning this location the artifact concentrations from the early years of this century would have been examined and picked over by collectors and pot hunters looking for artifacts. There also appears to have been some damage to the structural depressions as well. In all, the location has been badly damaged by neglect, trash dumping, vandalism, and unauthorized artifact collection. There does appear to be sufficient data left at the site that would warrant further investigation at a future date, however.

Findings: Research Questions

Three questions were posed in relationship to the Las Vegas-Bullfrog Road and the data gathered in the field to examine the route. The first was concerned with the actual existence of the road and, if the resources in question were the Las Vegas-Bullfrog Road, in what kind of condition is the resource?

Based on historic research and the on-ground surveys, two basic conclusions can be reached. First, segments LVB-1 and -2 are the Las Vegas-Bullfrog Road and its off-shoot. Travelers along the road in the early twentieth century have described the road and the facilities that existed along the route. Merrill (1906) walked the route in 1905 and described the following facilities along the way: Rose's Well, Miller's Well No. 1, the Longstreet and Fairbank's Ranches, and Miller's Well No. 2. The stretch of existing route from Miller's Well No. 1 that crosses SR 373 (LVB-1) eventually leads to the known historic location of the Fairbanks Ranch and thus supports the idea that this is a portion of the historic road in question.

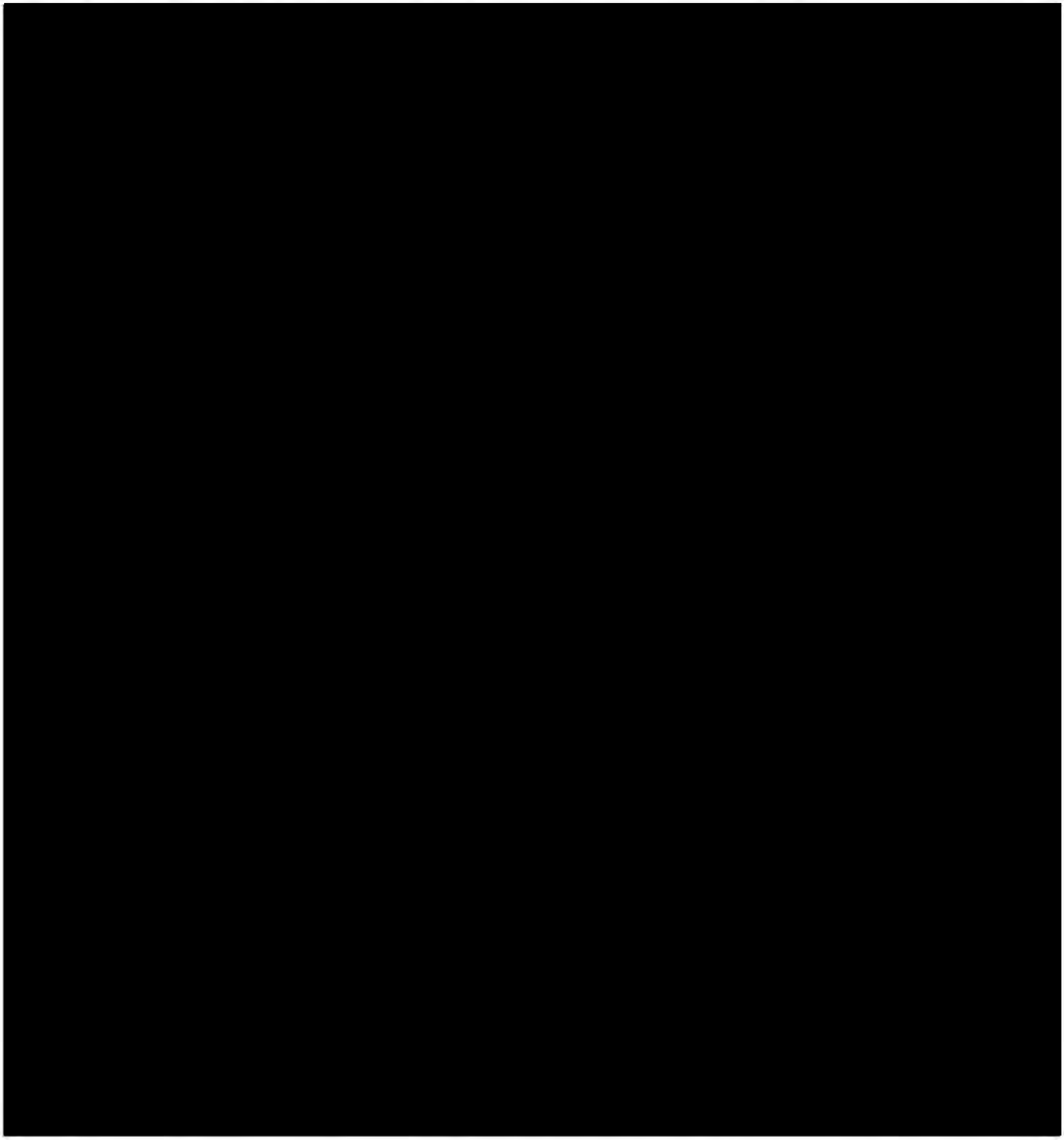
Based on the artifacts recorded along LVB-1 the dates appear to correspond to the earliest heavy use of the route, 1905-1907, further supporting the belief that this is the Las Vegas - Bullfrog Road.

Segment LVB-2 appears, on the basis of its location both on the modern and historic maps, to be an off-shoot of the Las Vegas-Bullfrog Road. The few artifacts recorded adjacent to the road also correspond to the essential dates in question, 1905-1907, supporting this contention.

Given this, LVB-3 does not appear to be a portion of the Las Vegas-Bullfrog Road. Although it appears on the 1910 Furnace Creek USGS map, this particular route has not been found to be described in any of the earliest literature of the area. Thus, it may have been a later additional route through the Amargosa Valley area.

In terms of the condition of the various routes, the following statements may be made about segments of the three resources that have been examined. Based on criteria and definitions used by Myhrer *et al.* (1990), the portion of LVB-1 located within Sec. 23 is *Relatively Undisturbed*, with the exceptions of the roadway immediately adjacent to SR 373 and adjacent to a powerline right-of-way that dissects LVB-1 (Map 4). There appears to be little modern off-road vehicle use of the route and little extraneous modern debris adjacent to the route.

At the southern end of the segment there appears to be two tracks to the resource, existing side-by-side or overlapping. This was evidently created through the natural process of use by wagons and stagecoaches. Vehicles would drift from the route in minor ways, creating



Map 4. Road integrity assessments for the LVB survey. South of Amargosa Valley, NV., USGS, 7.5' 1984.

small alternative tracks that were evidently taken by a succession of vehicles. The width of the resource ranges from 4 m wide to over 10 m wide (Plate 4).

The portion of LVB-1 that is entirely within Sec. 14 is also *Relatively Undisturbed* (Map 4). There is almost no evidence of modern use of the route in the form of off-road vehicle tracks or modern debris. There are two spots that are dissected by agricultural irrigation ditches, but these are minor disturbances. There is also a modern four-wheel drive track that dissects the segment, but again this is a minor problem. For the most part, integrity is excellent along this segment.

As with the portion in Sec. 23, portions of the route in Sec. 14 also exhibits double tracks. There is an approximately 250 m long stretch of LVB-1 situated between Locus 30 and 33 that contains two tracks that are separated by as much as 13 m. The same processes of vehicular drift most likely created these splits in the route as they did in Sec. 23.

The portions of LVB-1 situated within the NE1/4 of Sec. 15 and the SE1/4 are *Totally Disturbed* (Map 4). As the archaeologist surveyed the route as it entered Sec. 15, it became obscured by a morass of other dirt tracks, impacts to the ground surface from construction activities at a nearby school, and modern trash dumping and ORV use. It has no on-ground integrity. The same may be said of the portion in Sec. 10. Its' surface has been completely altered by modern ORV use and what appears to be blading of the roadway by modern equipment (Plate 5). A portion of the road in Sec. 10 has been completely destroyed by farming activity. Therefore, it has no on-ground integrity.

The adjunct segment of the Las Vegas-Bullfrog Road (LVB-2) in [redacted] is *Partially Disturbed*. There is a .4 mile long segment that

Plate 4. Side by side alignment of Las Vegas to Bullfrog Road (26NY7810), looking northwest.

Plate 5. Totally disturbed road segment, LVB-3, looking east.

commences at the junction of [redacted] At this point the route disappears under a series of other off-road vehicle tracks, a wash, what appears to be a flood control levee, and other disturbances. There are not even historic artifacts strung along in any linear fashion that allows the researcher to begin to reconstruct the actual route. From this juncture on it is assumed that the route has been either partially or totally disturbed and retains little or no on-ground integrity.

There is also a broad dirt track of road bladed across the route that traverses the area in a north-south direction along the boundary of Secs. 13 and 14. This also disrupts the overall integrity of the on-ground resource, further supporting the *Partially Disturbed* categorization of the road segment.

In the course of the survey, it was discovered that LVB-3 has been heavily altered, widened by use of a modern blade or other earth moving equipment at sometime in the recent past. As a result, the data potential of the route was severely compromised. It is determined that the course is *Totally Disturbed* with no on-ground integrity and no data potential. This holds true for the route as it passes east of [redacted]

In terms of dating the routes, the artifacts recorded adjacent to the routes support an early 1900s use date for the resources. The vent hole cans are common after 1900 while hole-in-top cans are common between the late 1860s and the early 1900s. The circular sardine cans are a post-1900 phenomenon, while key opened cans and the tobacco tins in question post-date 1895 (Rock 1980a, 1987). In terms of the glassware, maker's marks on some of the bottles pin down the manufacturer and dates of manufacture between 1903 and 1928 in at least one instance (Locus 13), and more specifically between 1904 and 1907 in another location (Locus 9). In conjunction with the historic research, the identification of the major use dates for the resource as being between 1904 and 1907 seems to be fairly secure.

The third research question asks about the eating and drinking habits of the users of the trail. It seems fairly obvious that food in the form of tinned vegetables and meats (beef, fish) were consumed along the way between rest stops or watering holes. There appears to have been the inclination of eating the foods on the way, without stopping to cook the items, and discarding the containers on the side of the trail to reduce both weight and bulk.

The same processes occurred in terms of beverages and medicines. Once the contents of the containers were emptied they were not saved and transported for discard in a landfill. They too were discarded enroute to save weight and bulk.

There are analogies to similar behaviors in modern American life. The ubiquitous presence of discarded food and beverage containers along modern transportation and travel routes testifies to the long term hold such patterns of discard have on the American psyche. In this manner Americans are merely carrying on older cultural habits that appear to be ingrained in the American way of conducting the processes of traveling and eating (Myhrer *et al.* 1990:50).

Significance and Research Potential of the Route

In any cultural resource management project, one of the goals of the work is to assess any resources encountered for their eligibility for nomination to the NRHP. The criteria used to evaluate the eligibility of any site for nomination to the NRHP are delineated in 36 CFR 60.4, and will not be repeated here.

Given these criteria, only one portion of the Las Vegas-Bullfrog Road as recently investigated is eligible for nomination to the NRHP. The portion of LVB-1 that traverses [redacted] meets the criteria necessary for nomination. It has integrity of location, in that the road itself has not been altered from its original path since 1907. The segment also meets the other criteria of integrity. Although there has been some disturbance to the road from being dissected by a modern four wheel drive trail and two small irrigation ditches, and there is evidence of some other modern development in the area, this is not considered significant enough a disturbance to disrupt the overall integrity of this road segment.

This segment of the road is not the only portion of the road in existence. As noted above, portions of it pass through Miller's Well No. 1, and continue onward towards the northwest along the projected route of the road, as discerned by the historic references consulted and visual inspection of the direction of the road as noted by the archaeologist. The road also continues towards the southeast east of the point where it is dissected by SR 373. It is recorded on the most recent USGS maps as a jeep trail or dirt road (as was segment LVB-1), and visual inspection of the road by the archaeologist noted the linear road feature continuing towards the southeast. It is quite likely that more segments of this road exist in a *Relatively Undisturbed* state elsewhere, further supporting the nomination of this portion of the route to the NRHP.

In addition, the segment fulfills the criterion (a) that deals with association with historic events. The road is associated with two important events in the history of southern Nevada, the Bullfrog silver strike and the founding and economic survival of the early town of Las Vegas. Without the freighting traffic to and from the silver camps of Bullfrog and Rhyolite, the long-term survival of Las Vegas might have been much more difficult, if not impossible. The road made possible the movement of goods and people between the two areas, led to the development of several facilities along the way (ranches and wells), and helped to open up the southern Nevada area for American settlement. Thus, it was a resource important to the development of an entire geographic region (southern Nevada) that cross-cut a large expanse of territory, compelling arguments for the significance of this particular feature.

In this way, the Las Vegas-Bullfrog Road is similar to the Old Spanish Trail/Mormon Road (Myhrer *et al.* 1990), a route of historic significance in the early history of the Las Vegas Valley/southern Nevada region. Portions of this route have received severe impacts from modern development. But when the trail was considered as being a resource significant for the historic development of a whole region, and being a surficial linear feature that stretched over a long distance, there were sufficient reasons for nominating the *Relatively Undisturbed* portions of the route to the NRHP.

Segments LVB-2 and LVB-3 are not eligible for nomination to the NRHP. LVB-2 has been severely disturbed in some areas, preserving integrity of location but destroying the other integrity criteria. The same argument can be made for LVB-3. It has been so severely disturbed that it lacks any sense of integrity at all. Therefore, neither is eligible for nomination to the NRHP, even as portions of the Las Vegas-Bullfrog Road.

The other sites, 26NY7811 and 26NY7812, are not eligible for nomination to the NRHP. The former consists of broken and scattered bottle glass, probably from the same bottle, which destroys the integrity of feeling, design, and workmanship. Even had the original bottle survived intact, it would likely have been recorded as an isolated artifact, which by definition are not eligible for nomination to the NRHP. The latter is an isolated artifact and thus is not eligible by definition. Isolated artifacts are not even considered cultural properties by the BLM (BLM 1990).

Given its importance, further research should be undertaken in association with the road and other facilities to flesh out the picture of the exact role this and other routes played in the development and survival of southern Nevada. Suggested approaches include the following:

1) Further tracing out and on-ground examination of the Las Vegas-Bullfrog Road to determine its exact location, and locate any variants or offshoots to the road.

2) Examination and investigation (including mapping, excavation, and archival research) of any facilities, like Miller's Well No. 1, associated with the route.

3) Historic research on personages important in southern Nevada history who may have been associated with the route or the facilities along the way, or at either end of the road.

4) Photographic documentation of important features, and typical features (tracks, road ruts, artifact concentrations), located with the route.

Other questions will suggest themselves as research proceeds. One important component of any program should be preservation and interpretation of portions of the route and facilities by federal agencies upon whose land the road traverses. This would preserve segments of the resource for future research, and educate the public as to the importance of such resources to our comprehension of the local and regional history of southern Nevada. One model that could be employed in structuring this effort are the guidebooks and educational signing employed by the California Desert District along the Mojave Road, an important route of communication and travel that ran through extreme southern Nevada and the Mojave Desert region of southern California.

Although not directly involved in the project area or impacts, some consideration must be given to the historic resource represented at Miller's Well No. 1. Being associated with an important historic resource such as the Las Vegas-Bullfrog Road as a way station gives the site potential significance as an NRHP eligible property. The remains at the location also lend themselves to asking several questions. What were the actual dates of use of the facilities at Miller's Well No. 1? What activities were conducted at Miller's Well (feeding and stabling of horses; food and/or shelter; wagon or equipment repair; other services)? What facilities or structures can be identified in association with Miller's Well No. 1? Can specific individuals be identified in association with Miller's Well? If so, what was their importance as historic personages in the development of the Las Vegas-Bullfrog Road?

Cultural resource management (CRM) projects can contribute in a significant way to our understanding of not only the regional prehistory, but to elucidating aspects of historical events as well. Archaeological resources tell us what actually happened on a day-to-day basis, filling in the gaps between the recounting of the historical sweep of major events and the "folk wisdom" of memory and hollywood depictions of the past. CRM projects can and will provide the basic data set for these investigations, furthering our understanding of our own roots.

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"...Dust to Dust": Bio-Cultural Factors Contributing to Morbidity and Morality in the Ferguson District, Lincoln County, Nevada, 1892-1909

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Introduction

Mining lore crosscuts the pages of Nevada's history like veins of rich ore in country rock. Volumes have been written to chronicle this important economic and social phenomenon. Yet few of these accounts have analyzed the human costs associated with the extraction of the earth's mineral wealth. Biological factors such as disease patterns, as well as morbidity and mortality rates, are rarely included in the study of Nevada mining districts. Without a synthesis of the biological and cultural components of human behavior, any historical reconstruction is incomplete.

This paper will summarize the results of bio-cultural research which focuses on events in the Ferguson District during the boom period from 1892-1909. A late 19th and early 20th century gold mining region, the Ferguson District was considered particularly appropriate for this study since it is reputed to have been one of Nevada's most hazardous mining areas. Contemporary and later popular accounts have cited high rates of mortality at DeLamar, the most important camp of the District. Murbarger (1956:195-196) alleged, for example, that miner's consumption (silicosis) killed workers after only "three or four months in the DeLamar mill" and that "women and children who never went near the mines succumbed to the dread silicosis." Little hard evidence has been offered to support these claims, yet the myth of DeLamar as "The Widowmaker" persists in the literature and local folklore.

The objectives of this research are 1) to compile a more complete account of health and living conditions in the Ferguson District between 1892-1909; and 2) to test the hypothesis that miner's consumption (silicosis) was the leading cause of death in the District, affecting all age groups and both sexes in the study area. Complimentary lines of evidence, including primary and secondary archival sources, informant's recollections, and limited archaeological data are integrated in this investigation.

Environmental Setting

The Ferguson District is located in east-central Lincoln County, approximately 30 miles southwest of Caliente, Nevada (Figure 1). The principle mining camps of the District include Golden City (Ferguson), Helene, and DeLamar (Reeves). These are situated on the west side of the DeLamar Mountains, a precipitous north/south trending range located in the Basin and Range Province. Elevations rise above 7,200 feet along the central cordillera, and the range is subject to extreme weather conditions, including high winds, temperature fluctuations, and episodes of intense precipitation. The regional climate is generally arid, characterized by hot summers and cold winters. Springs and seeps are common in the Delamar Mountains, yet many are intermittent and the rates of flow for these sources average only 4 gallons per minute. Meadow Valley Wash, a perennial stream located 12 mountainous miles to the east, ultimately became the primary water source for the Ferguson District.

The most productive ore bodies of the Delamar Mountains were contained in the Prospect Mountain Quartzite, a white to pink or reddish brown quartzite with a silica content of from 50 to 70 percent. Mineral deposits within this quartzite were difficult to mine and process, requiring crushing, roasting, and chemical precipitation to release the values.

Historical Reconstruction

Gold was first discovered in the Delamar Mountains by two young ranchers. Twenty-three year old John Ferguson and his friend, Joe Sharp, often combined mustang trapping with prospecting (Townley 1972:3). During the summer of 1889, the two tested an outcrop of quartzite and struck gold.

Ferguson and Sharp continued to prospect and

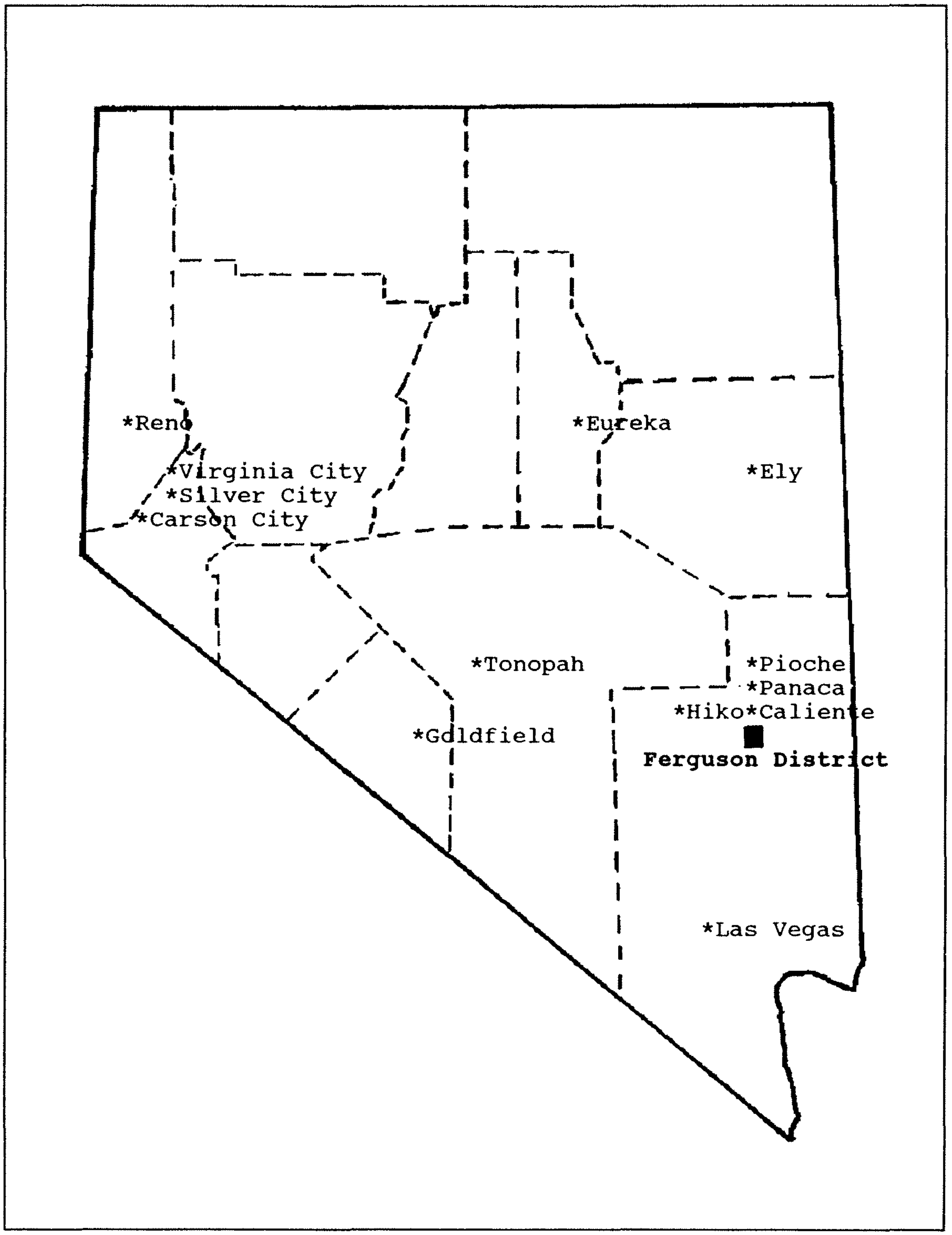

Figure 1. Location of the study area in Lincoln County, Nevada, with county boundaries as delineated in 1880.

stake claims for nearly 2 years. Since neither of the partners had the capital to support their mining ventures, they looked for a grubstake from outside sources. Ferguson forwarded ore samples to known mining investors and struck paydirt when Hartwig Cohen, a central Nevada mining engineer of means, agreed to finance further explorations (*Pioche Weekly Record* 2/25/1892:1). In the summer of 1891, Joe Sharp sold his interests in the first claims to Ferguson for "two old gray horses and a broken down wagon" (Joseph Higbee 1990, personal communication).

A few months later, Ferguson located what he believed was the "Mother Lode", in the vicinity of his original discoveries. Word of his find spread quickly; prospectors and businessmen flocked to the Delamar Mountains between December, 1891 and January, 1982. On February 20, 1892, the new district was officially organized and named Ferguson in honor of its discoverer (*Pioche Weekly Record* 2/25/1982:1)(Figure 2). The first tent camp was established and aptly named Golden City. By June of 1892, a majority of the miners from Golden City had relocated a half mile south to a townsite called Helene. That settlement continued to grow, acquiring all the trappings of a boom town; Golden City was eventually abandoned. By September, the Lode Publishing Company began publication of the *Ferguson Lode*. A third tent camp, named Reeves, soon sprang up, in the vicinity of the promising Jim Crow-Monitor claims.

From 1892 until the spring of 1894, the mine owners waged an uphill battle to develop the area. Most were shoe-string operators, who could not afford to construct on-site mills. The high costs of freighting ores to Salt Lake City, Utah for processing prevented many owners from extensive developments of their claims. The water available from local spring sources was insufficient for industrial purposes and only marginally adequate for the approximately 250 residents of Golden City, Helene, and Reeves.

In April of 1894, John De La Mar of New York City visited the Ferguson District with several of his mining engineers. De La Mar was a self-made millionaire, whose fortune had been made from Colorado mining claims, after a brief career as a ship's captain (Johnson and Malone 1930). "The Captain" (as he was called) preferred to acquire properties with low-grade ores and then apply advanced technology to turn a quick profit. In May, De La Mar purchased the Jim Crow and Monitor claims and launched an expensive campaign to develop his properties. His company immediately constructed an extensive pipe network to convey water from all nearby springs to the mines and into the now-burgeoning tent camp at Reeves. In June of 1894, the grateful residents of Reeves renamed the settlement "DeLamar" in honor of it new benefactor.

DeLamar quickly grew from just a few tents to over 250 residents, with a mass exodus of miners, businessmen, and hucksters from all over Nevada augmenting its population. Main Street was soon lined with saloons, restaurants, hotels, and shops. Native stone structures, wood frame houses, and tents dotted the streets and alleys which ran along any nearly level portion of the townsite. The DeLamar Company installed telegraph and telephone lines, connecting the town to the outside world. In 1895, electric street lights were installed along Main Street, at Company expense. Company-run boarding and lodging houses were provided for workers, as well as small apartment-type housing for its supervisory and managerial staff. Medical care became readily available and quite sophisticated, as doctors and dentists flocked to the burgeoning town. A hospital was completed in 1896, supported by medical subscriptions of $2.00 per month paid by all miners and mill workers (*De Lamar Lode* 8/3/1896:1). These subscriptions guaranteed professional nursing care, medicines, and a choice of physicians.

Construction on the DeLamar Company Mill had begun in early 1895, providing jobs for

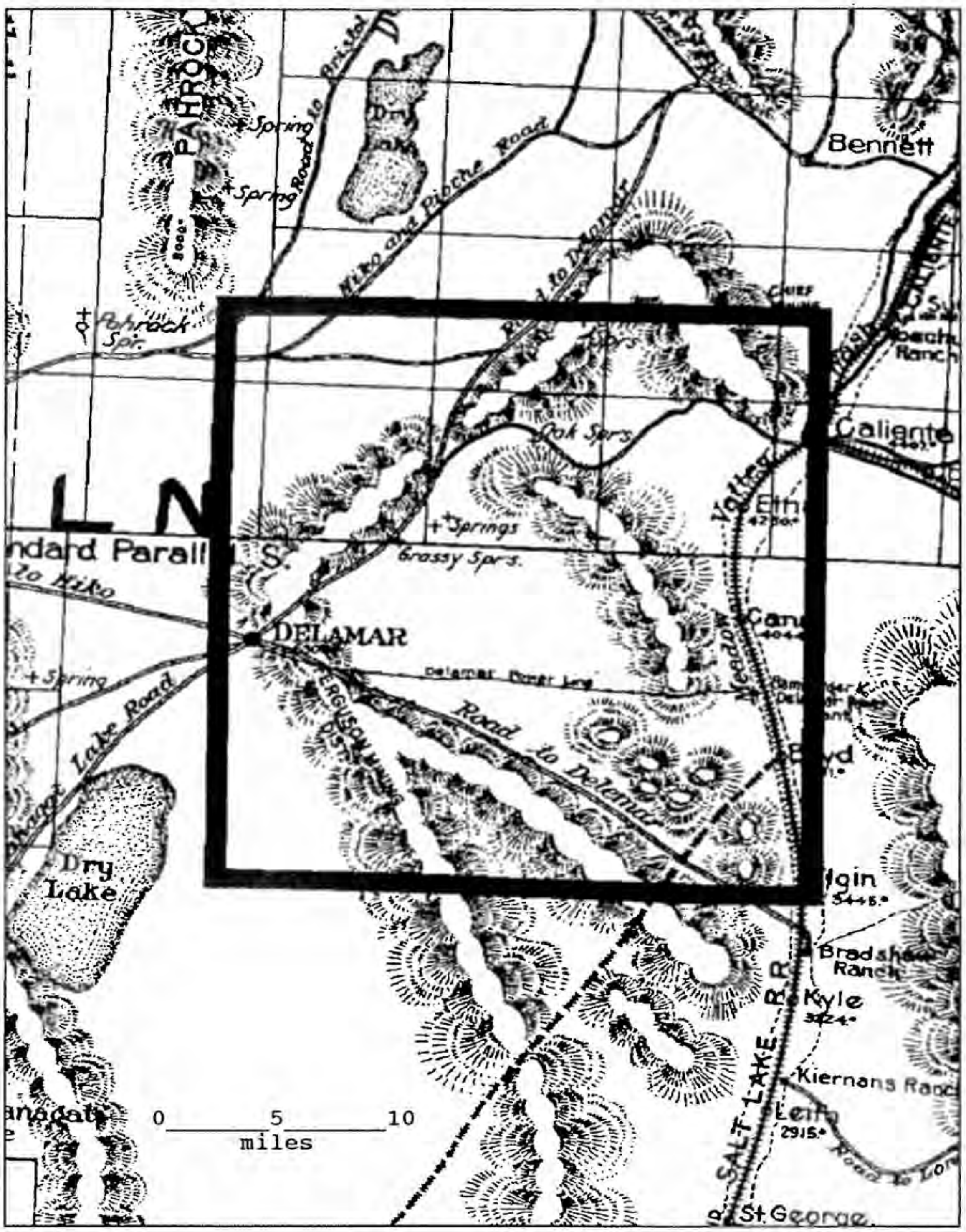

Figure 2. Partial 1908 map of Lincoln County with boundaries of the Ferguson District, as filed in 1892, indicated (adapted after Freudenthal 1908).

hundreds of men from all over eastern Nevada and southern Utah. Available water supplies dictated that dry crushing Griffin mills be used. Clouds of dust permeated the rooms of the mill and diffused through the smoke stacks of the mill to settle on the townsite below. Within the first year, production exceeded over $650,000 in ore values and Captain De La Mar made plans to enlarge the mill's capacity (*De Lamar Lode* 1/6/1896:1). In order to augment the Company's water supplies, he constructed a steam powered pumping system with three booster stations. Water was piped 12 miles from Meadow Valley Wash over the Delamar Mountains into two storage tanks, each holding over 25,000 gallons. This water supplied the municipal needs of the town, which had grown to over 1,000 residents by 1896. Within weeks after the switch from spring water to Meadow Valley Wash water, the first outbreak of typhoid fever was reported. Sixty cases of fever were documented, resulting in 8 fatalities among the men, women, and children. Contaminated water was alleged to have been the cause of the outbreak and residents were encouraged to boil all water obtained from the Company tanks.

Other causes must also be implicated in this first serious disease outbreak in the Ferguson District. DeLamar's boom had created a helter-skelter community with unsanitary conditions. As workers (mostly single or solitary men) flocked to the town, they set up bachelor quarters, generally with two or more roommates, lived in rooming houses, or crowded hotels. Shallow, often neglected, privies were dug adjacent to the houses or tents. The editor of the local newspaper commented that, [*a*]*n inspection of the back yards and outhouses presents pig pens, chicken coops, rubbish, decayed vegetables, spoiled merchandise with rotten meats, in short... a complete stink pot of destruction* (*De Lamar Lode* 10/7/1895:1). Such unsanitary conditions facilitated the spread of typhoid fever.

Water for home use, priced at 5 cents per gallon, was sold by the DeLamar Company and delivered by cart. Despite the relatively low prices, local residents were reported to have often re-used their water supplies, increasing the chances for water contamination. Further, the rapid influx of people from all over the West may have introduced typhoid carriers (i.e. "Typhoid Mary") into the Ferguson District population. From 1895-1899, epidemics of typhoid fever were common throughout the summer and fall months in DeLamar (Figure 3). Over 63 percent of the 14 total fatalities were young adults between the ages of 22 and 43. After 1899, the fatality rates from this infectious disease gradually declined, as the enforcement of health ordinances and the installation of indoor water pipes in most residences improved sanitary conditions (Figure 4).

Between 1892 and 1909, the DeLamar-Nevada Company and its successor, the Bamberger-DeLamar Syndicate, continued to expand production at the mines and mills. An estimated $13-15 million dollars in gold values were extracted from the Ferguson District during this period. Workers enjoyed steady employment, comparatively high wages and the best of times. The only dark cloud on the District's horizon during this period was the persistent rumor of poor health and untimely deaths among local residents. Numerous cases of pneumonia, for example, were diagnosed during the winter months from 1892-1909. A total of 22 fatalities, in all segments of the population, resulted in pneumonia. The local doctors could provide only the most rudimentary medical intervention in pneumonia cases, since antibiotics had not been developed at the turn of the century. As a result, pneumonia was the second leading cause of death nationwide in the early 1900s. Other infectious respiratory diseases, including influenza, and whooping cough, also exacted a high toll, especially among the children. In total, infectious diseases accounted for over 40 percent of the totality mortality in the Ferguson

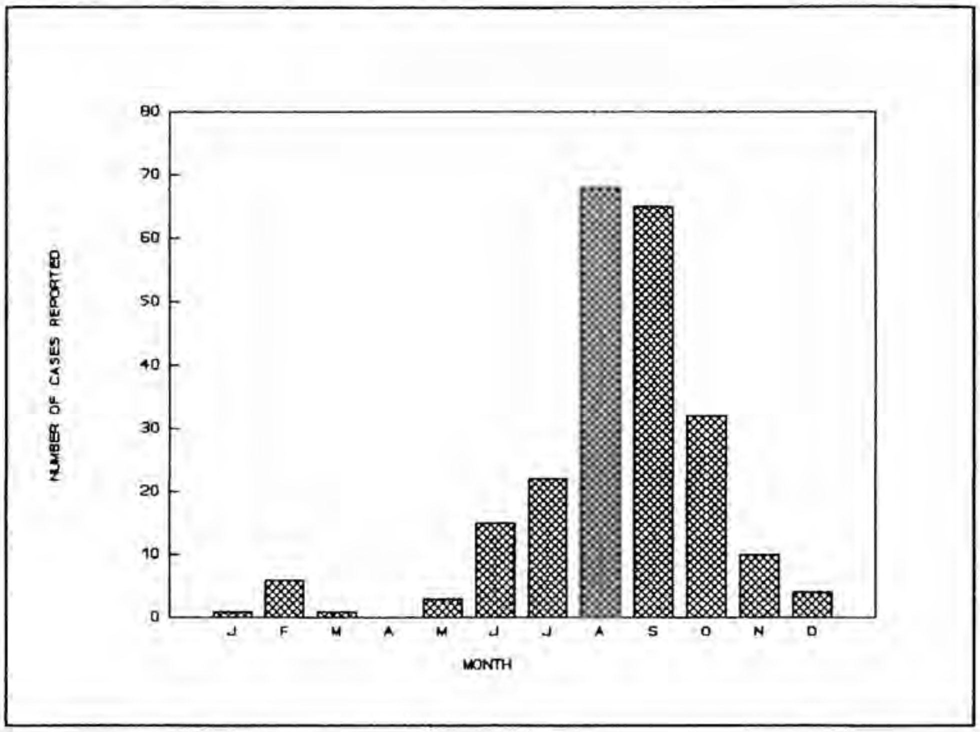

Figure 3. Monthly totals of reported typhoid cases in the Ferguson District from 1892 to 1909.

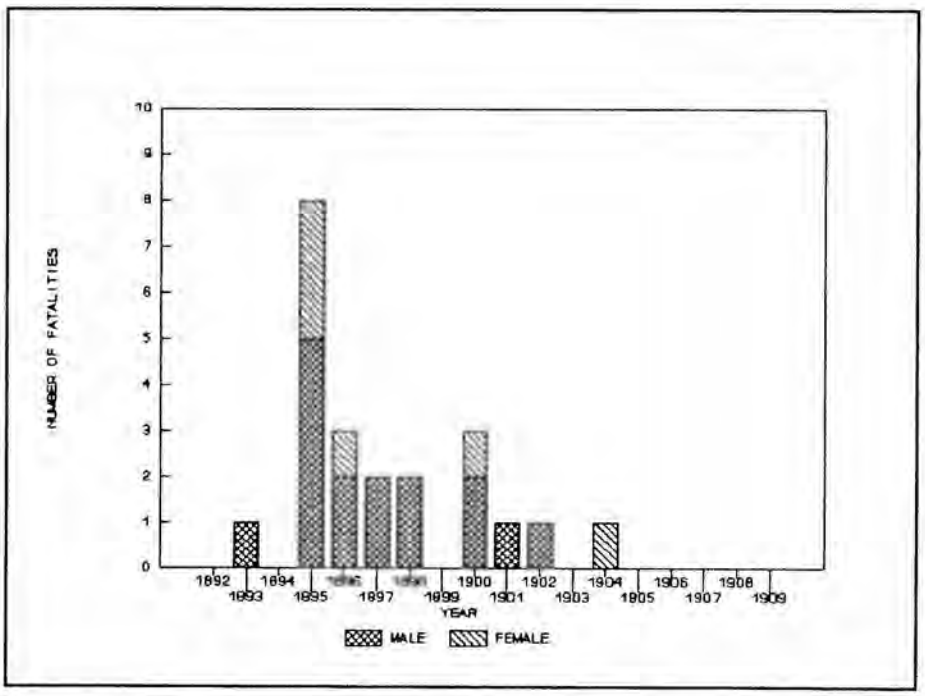

Figure 4. Ferguson District typhoid fever fatalities from 1892 to 1909.

District during the subject period (Figure 5).

During the winter of 1898, the first direct allegations of health hazards associated with work in the DeLamar mill (and mines to a lesser extent) appeared in the regional newspapers. The *Salt Lake Tribune* of March 9, 1898 reported that the recent deaths of as many as 18 DeLamar mill employees had been caused by silicosis or dust in the lungs acquired during work in the mill. Articles continued to appear during the summer of 1899 which alleged that as many as 200 workers had died as a result of mill conditions. The DeLamar Company began an aggressive program to improve working conditions in the mill, and by the fall had dramatically reduced the dust levels.

Accurate assessments of mortality rates from silicosis are more difficult to obtain. The condition was caused by long-term inhalation of the fine, silica-rich dust produced during the mining and milling of ores like the Prospect Mountain Quartzite of the Ferguson District. In the lungs (and stomach to a lesser extent), the angular dust particles irritated the tissues. Fibrous nodules eventually enclosed the irritants and fluids collected in the lungs, ultimately impairing lung function (Lingenfelter 1974). The racking cough, which developed as the individual's condition worsened, resembled that of tuberculosis, hence the name "miner's consumption." The relationship between the inhalation of silica dust and the debilitating condition of mining employees was not understood, even by medical personnel (Lingenfelter 1974:16). Solidification of the lung tissues and fluid accumulations left silicosis victims particularly susceptible to other forms of respiratory diseases. The common cold, influenza or pneumonia would kill the individual long before silicosis had exacted its toll. Typhoid fever or other infectious disease

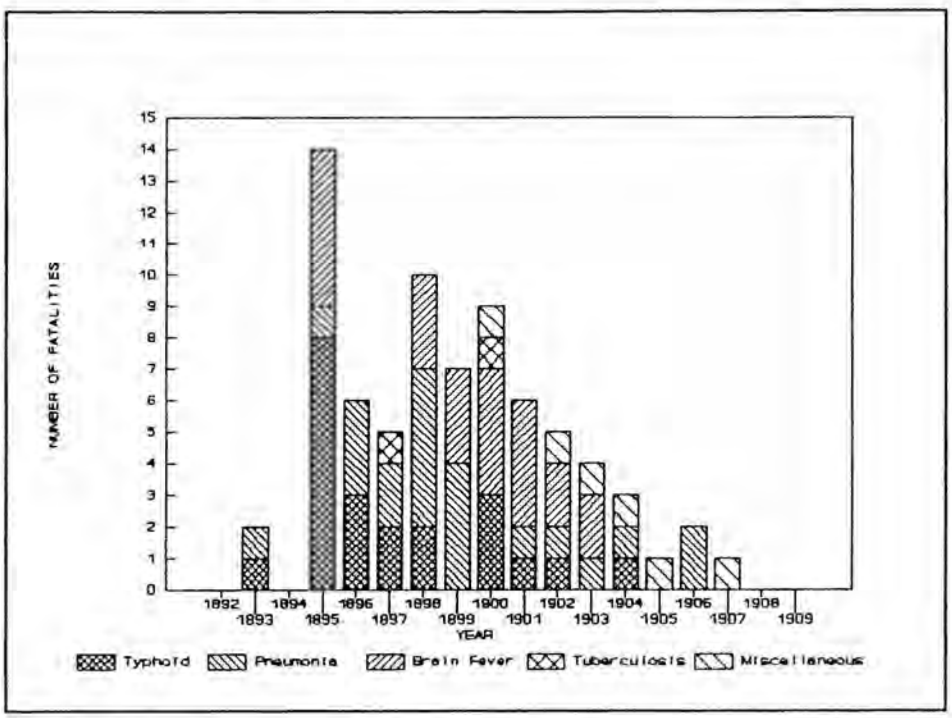

Figure 5. Fatalities from all infectious diseases in the Ferguson District, 1892-1909.

could also prove fatal for the silicosis sufferer, whose resistance was already weakened by his chronic condition. For this reason, other diseases were often listed as the primary causes of death for mining camp residents who suffered from silicosis.

Mortality from silicosis also went unreported when the individuals did not die in the mining settlement where the condition was contracted. As the disease progressed, most employees were forced to quit work. In aggravated cases, such as those reported in the Ferguson District, debilitation could occur within 2 years after the onset of the disease. Many employees were reported by the local newspaper to have returned home, gone to live with friends or relatives who could care for them, or sought cures in other areas. They remain untallied in the mortality rates developed for that chronic condition in this analysis.

From 1892-1909, 24 deaths in the Ferguson District were attributed to "lung congestion" or "dust accumulations in the lungs." All of the victims were male, with a median age at death of 42 years. Deaths attributed to silicosis occurred during nearly every month of the year throughout the study period, as would be predicted for a chronic condition (Figure 6). These fatalities comprise 13 percent of the total District's mortality. It is probable that this chronic condition precipitated some of the pneumonia and typhoid fever fatalities as well.

Occupational accidents also contributed to the mortality rates documented in this research. Miners were the single largest group to sustain mortalities from accidental traumas. Nine miners were killed between 1892-1909, with a total of 61 mining accidents reported for that period. Mill workers in the District sustained fewer injuries and fatalities from occupational

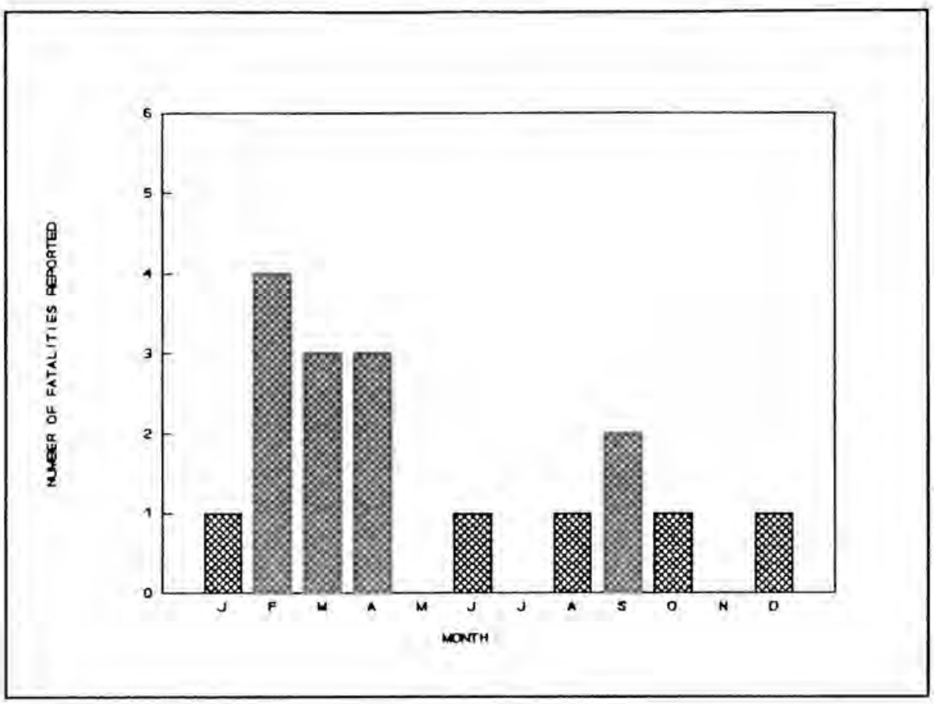

Figure 6. Monthly totals of reported silicosis fatalities in the Ferguson Mining District, 1982-1909.

accidents. From 1892-1909, four deaths resulted from a total of 39 reported mill accidents. All of the victims were male, with a median age at death of 29 years.

A total of 182 individuals are reported to have died in the Ferguson District between the subject years. The principle causes of death are displayed in Figure 7 and can be summarized as follows. Infectious and chronic diseases of the respiratory system (including silicosis) accounted for 26.3 percent of the total mortality. Other systemic infectious diseases, especially typhoid fever, claimed the lives of nearly 16 percent of the District's population. Chronic conditions accounted for only 15.3 percent of the reported mortality, occupational and non-occupational traumas, suicides, and homicides, comprised the remaining percentages.

Data from the two Ferguson District cemeteries were compiled to supplement and substantiate the archival sources. Topographic maps were generated for the Public Cemetery, located west of Helene, and the Catholic Cemetery, situated approximately 1 mile west of DeLamar (Figures 8 and 9). All known and suspected grave features were mapped and available tombstone data recorded.

Confirmed and potential grave features totaled 109 for the two cemeteries, with 50 located at the Public Cemetery and 59 at the Catholic Cemetery. Of the 182 reported deaths in the Ferguson District between 1892-1909, 60 individuals were buried at other locations, generally their hometowns in southern Utah. Archival records indicate that a total of 124 graves should have been present at the two Ferguson District cemeteries. The observed total of 109 grave features does not account for 15 graves. The discrepancies may be related to subsequent vandalism and disturbance at these sites. The archaeological and tombstone data obtained from the cemeteries do, however, generally support the mortality rates developed from archival sources.

Summary and Conclusions

Biological and cultural data were synthesized in order to compile a more complete account of health and living conditions in the Ferguson District during the boom period between 1892-1909. The hypothesis that silicosis was the leading cause of death, affecting all age groups and both sexes in the District, was tested by examining the principle causes of death, as percentages of the total mortality. The results of the analysis have indicated that silicosis was a serious health hazard in the study area, but could not confirm that it was the leading cause of death among all residents. Infectious diseases, especially typhoid fever and pneumonia, accounted for over 40 percent of the total mortality in the Ferguson District between the boom years. From all accounts, the lax sanitary practices and unsafe water supplies which typified many Nevada mining camps encouraged the spread of these communicable diseases. As Zanjani (1990:47) has observed, while these environmental conditions persisted, epidemics and disease were part of the "boomtown way of life."

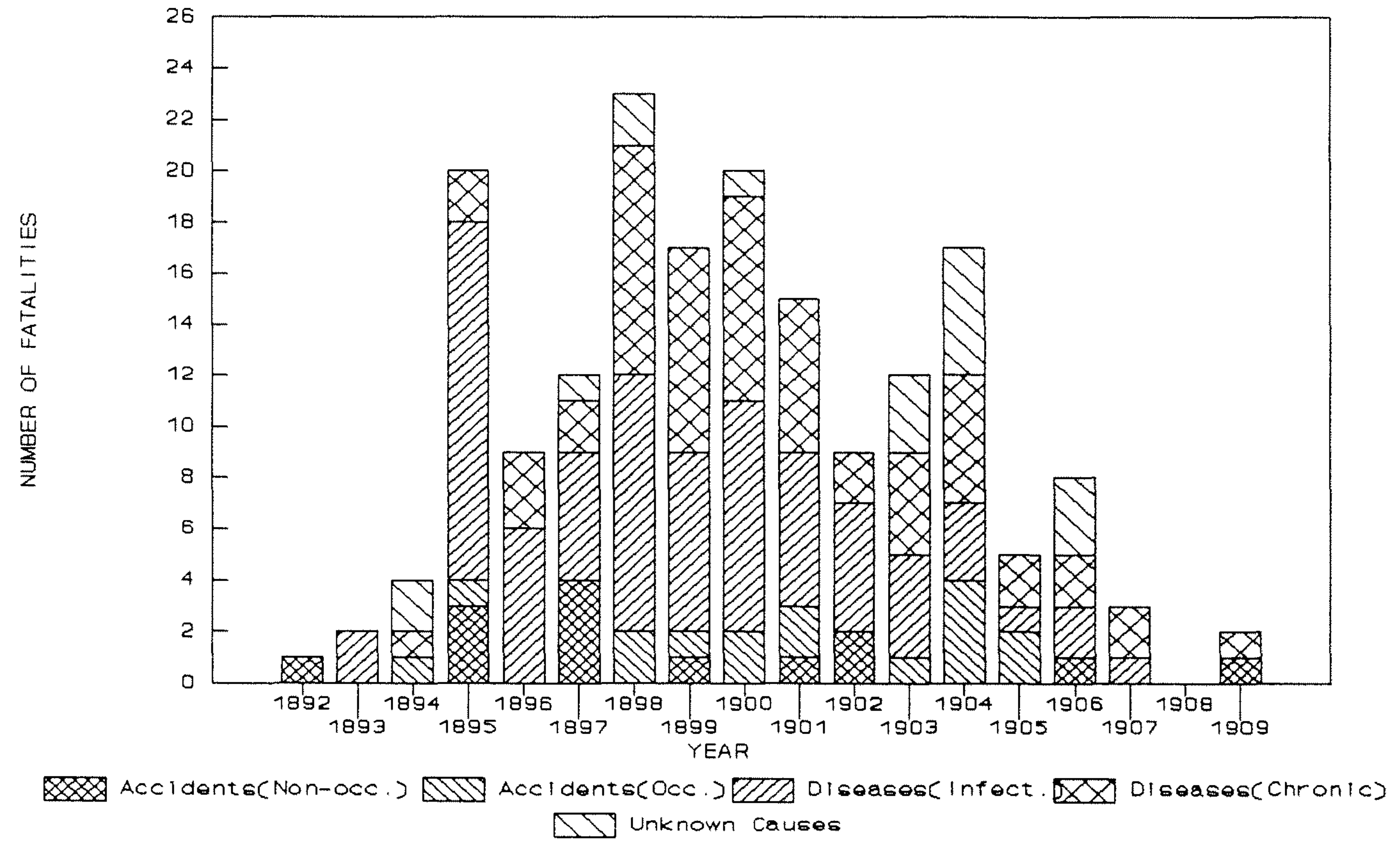

Figure 7. Principal causes of death in the Ferguson Mining District, 1892-1909.

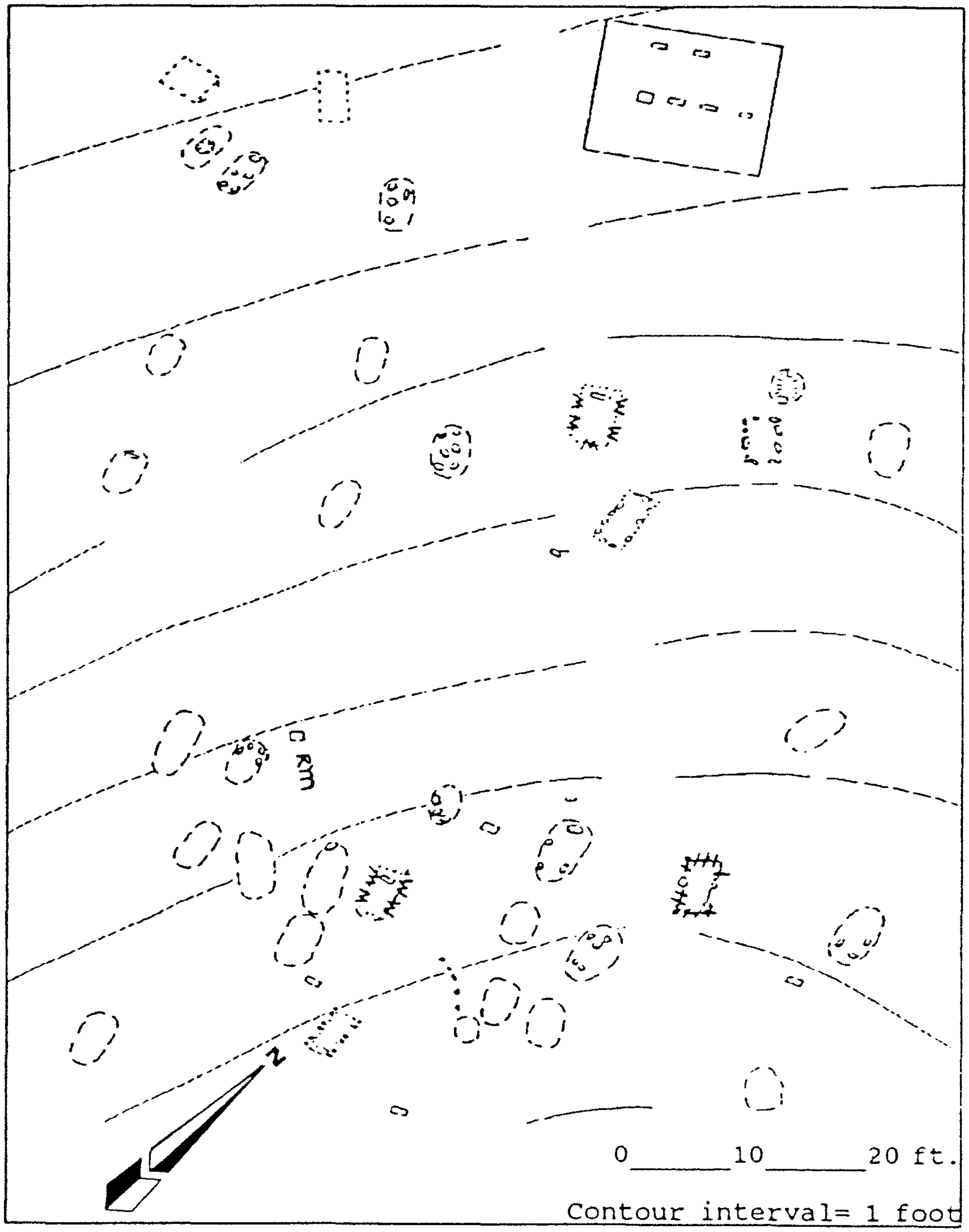

Figure 8. Topographic map of Helene (Public) Cemetery, Ferguson Mining District.

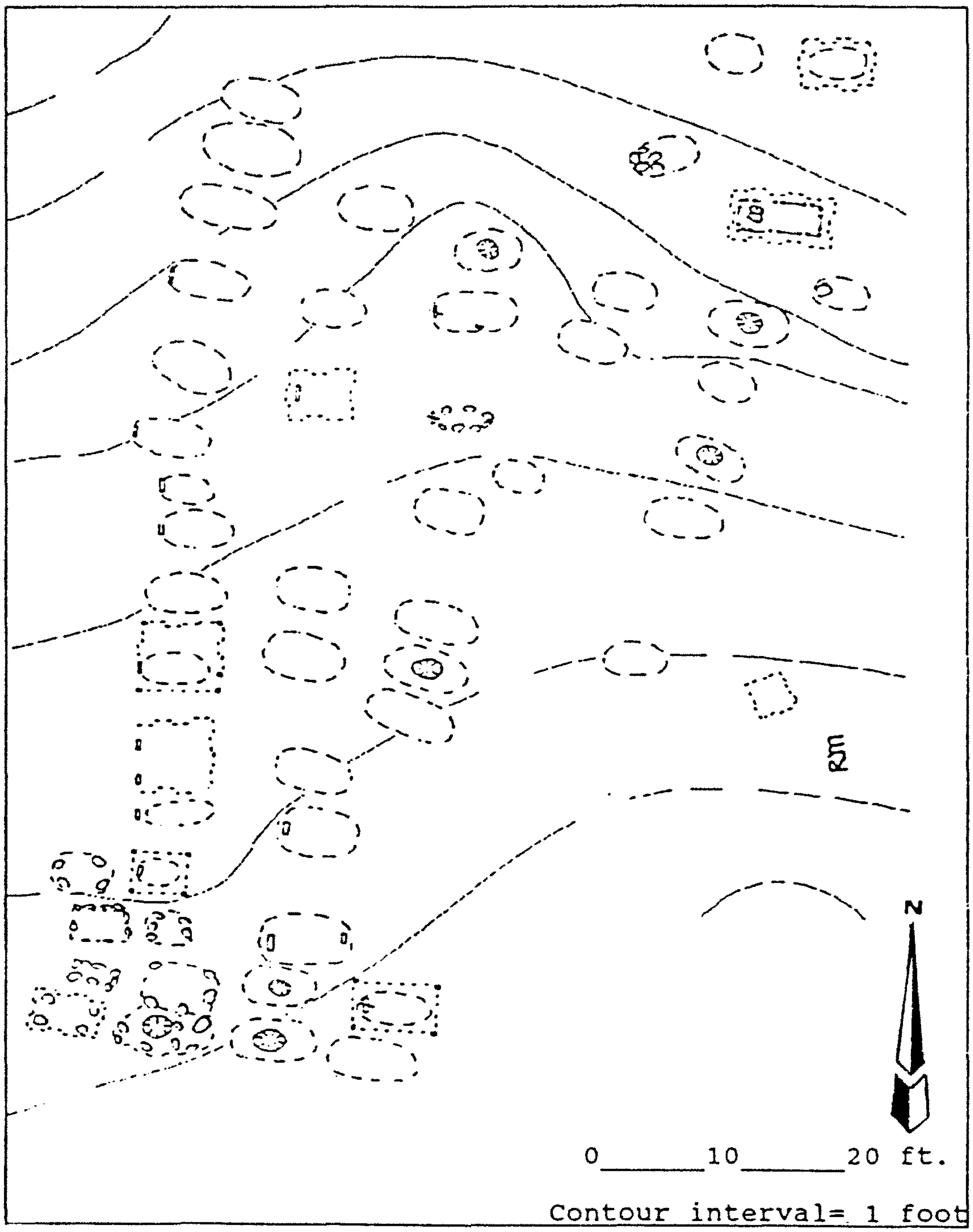

Figure 9. Topographic map of DeLamar (Catholic) Cemetery, Ferguson Mining District.

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