A HISTORY OF THE LANDS ADDED
TO DEATH VALLEY NATIONAL MONUMENT
BY THE CALIFORNIA DESERT PROTECTION ACT OF 1994
Special History Study

DEATH VALLEY

National Park • California/Nevada

Cover Photo: Salt Field, Saline Valley, September 1912. Courtesy Richard McCutchan Collection, Diamond Bar, California. Photograph supplied to author by Thomas S. Budlong, Los Angeles.

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September 1997

by
Harlan D. Unrau

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National Park • California/Nevada

United States Department of the Interior • National Park Service

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PREFACE

This special history study has been prepared to satisfy in part the research needs as stated in the project agreement (approved by Richard H. Martin, Superintendent, Death Valley National Park, on November 5, 1996) concerning Death Valley National Park, Special History Study (SHS), under Package DEVA No. 037. The purpose of this study is the collection, presentation, and evaluation of historical research pertaining to the historic events that have occurred in or near the lands added to Death Valley National Monument (hereinafter referred to as the "new lands") by the California Desert Protection Act of 1994. Because many historic events overlap the pre- and post-1994 boundaries of Death Valley National Park, as well as surrounding areas, this study includes material that relates generally to the Death Valley region. It is intended that the study will provide a data base for the national park's historic resources that will enable park administrators to formulate appropriate management policies to preserve, protect, and interpret those resources.

The specific purpose of this study is to provide a historical overview of the new lands to establish historic contexts within which to evaluate the significance of historic properties for their eligibility for listing on the National Register of Historic Places. The principal historic contexts for the historic events that have occurred in the new lands include exploration, mining, and ranching/grazing. As part of this study, Steven R. Whissen, a historian with the Denver Service Center, prepared National Register of Historic Places nomination forms for Panamint City, the Gem Mine and Mill in Jail Canyon, and the Barker Ranch.

A number of persons assisted in the preparation of this report. My special thanks extend to Superintendent Martin and members of his staff, including Linda W. Greene, Chief, Cultural Resources; Caven Clark, Archeologist; Mel Essington, Mining Engineer; Blair Davenport and Marcia Stout, Museum Curators; and Niccole Mortenson, Museum Technician. My thanks also go to Thomas D. Mulhern, Chief, Park Historic Preservation, and Gordon S. Chappell, Senior Historian, Pacific/Great Basin Support Office, for making historical materials available for research purposes and providing guidance on the nature of research and the scope of work required for the project.

My thanks go to the staffs of the Inyo County Library, Recorder's Office in the Inyo County Courthouse, and Eastern California Museum in Independence, California, where I conducted research for this study. In addition my thanks also go to Richard S. (Steve) Smith, Daniel Fowler, Buzz Todd, and Katie Wash, staff members at the Bureau of Land Management, Ridgecrest (California) Resource Area Office, for sharing their historical files and knowledge relating to the project. My thanks also go to David Bybee of Los Angeles and Sophia A. Merk of Ridgecrest for sharing their historical files from the materials collected by the Saline Preservation Association and to Timothy Dahlia of Covina, California, for providing historical information collected by the Saline Organization and Kindred Spirits. Thomas S. Budlong of Los Angeles provided two heretofore unknown historical photographs of the salt works in Saline Valley that he found in the collections of Richard McCutchan of Diamond Bar, California.

My thanks also go to my supervisors at the Denver Service Center for providing encouragement and administrative oversight for the project. These include Cynthia Young, Chief, Resource Planning, and Pat O'Brien, Quality Leader.

Harlan D. Unrau
June 1, 1997

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INTRODUCTION

ESTABLISHMENT

On February 11, 1933, President Herbert Hoover issued Executive Proclamation 2028 (47 Stat. 2554) establishing Death Valley National Monument under the provisions of "An Act For the Preservation of American Antiquities," approved June 8, 1906 (34 Stat. 225). The executive order provided that the national monument, consisting of approximately 1,601,800 acres, would be administered under the "supervision, management, and control" of the National Park Service as provided in the act of Congress, "An Act To Establish a National Park Service, and for other purposes," approved August 25, 1916 (39 Stat. 535-536).

The boundaries of Death Valley National Monument were expanded by President Franklin D. Roosevelt with the issuance of Executive Proclamation 2228 (50 Stat. 1823) on March 26, 1937, and by President Harry S Truman with the issuance of Executive Proclamation 2961 on January 17, 1952. As a result of the two executive orders, the monument's size was increased to about 2,067,793 acres.

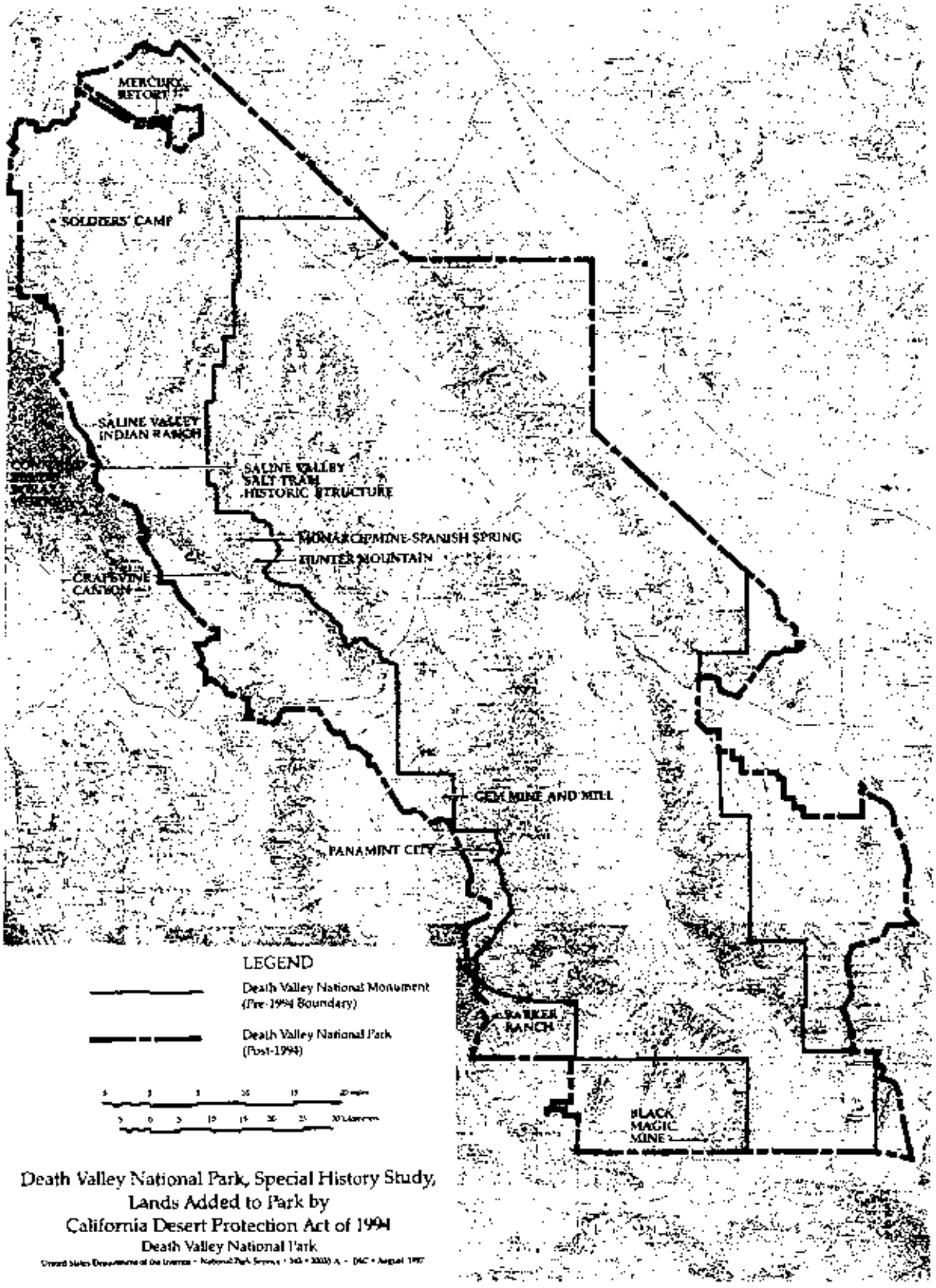
Under the provisions of Title III of the California Desert Protection Act of October 31, 1994 (Public Law No. 103-433; 108 Stat. 4471-4525), Death Valley was designated a national park and acquired jurisdiction over more than 1,200,000 acres of additional lands formerly administered by the Bureau of Land Management. These new lands include all or portions of the following geographic areas: Eureka Valley, Last Chance Range, Last Chance Canyon, Inyo Mountains, Saline Range, Saline Valley, Nelson Range, Lee Flat, Darwin Plateau, Panamint Valley, Panamint Range, Long Valley, Owlshead Mountains, Saddle Peak Hills, Ibex Hills, Black Mountains, Greenwater Range, Greenwater Valley, and Funeral Mountains. The majority of the new lands lie to the west of the former monument's boundaries, although smaller portions lie to its north, south, and east sides. (See the map on the next page showing the pre-1994 boundaries of Death Valley National Monument and the post-1994 boundaries of Death Valley National Park.)

GEOGRAPHIC LOCATION

Death Valley National Park, consisting of some 3,336,000 acres (approximately twice the size of the State of Delaware), is located in the arid Mojave and Colorado desert expanses of Inyo and San Bernardino counties in eastern California and Nye and Esmeralda counties in southwestern Nevada. All of the new lands lie within the State of California, and all, with the exception of the southernmost portion, lie within Inyo County.

PURPOSE

The purpose of Death Valley National Monument was stated in its establishment executive proclamation: to provide "for the preservation of the [valley's] unusual features of scenic, scientific, and educational interest." The new lands were added to the park in 1994 because its previous boundaries excluded, and thus exposed "to incompatible development



Map 1: Death Valley National Park, Special History Study, New Lands Added to Park by California Desert Protection Act of 1994.

and inconsistent management, contiguous Federal lands of essential and superlative natural, ecological, geological, archeological, paleontological, cultural, historical and wilderness values."

SIGNIFICANCE

Death Valley National Park, the largest unit in the National Park System in the contiguous 48 states, is noted as the lowest point in the Western Hemisphere and as one of the hottest places on earth. It is a vast geological museum, containing examples of most of the earth's geologic eras. Plant and animal species, some of which occur nowhere else in the world, have adapted to this harsh desert environment. Humans have also adjusted, as indicated by the extensive archeological sites and continuing use by Native Americans; by historic sites related to the influx of prospectors, miners, homesteaders, and ranchers; and by the current resort developments and active mining and ranching operations. Nearly 1,000,000 people visit Death Valley each year to experience the stark and lonely vastness of the park; the overwhelming silence; the panorama of rugged canyons and mountains; the pleasures of the dry, warm climate; the challenge of the hot, arid summer; the cool relief provided by the mountains; and the reminders of frontier mining, homesteading, and ranching life.

In 1984 Death Valley was designated a part of the Mojave and Colorado Deserts Biosphere Reserve (along with Joshua Tree National Monument [now National Park], Anza Borrego State Park, and Santa Rosa Mountains Wildlife Management Area). Biosphere reserves are designated by the United Nations Educational, Scientific, and Cultural Organization, and they denote areas where ecological communities have been preserved in their natural condition, providing a benchmark for the study of similar ecosystems around the world.

The size of the national park and the diversity of its resources make the area difficult to characterize. The salt pans of the main valley floor, the surrounding canyons and mountains, the unusual plants and animals, and various historical, paleontological, and archeological sites each represent an aspect of the national park, but no single feature typifies the entire park. The assemblage of diverse natural and cultural resources, and the legends and fantasies that have evolved about the pioneers, are all part of the visitors' park experience.[1]

1. Material for the Introduction was collected from U.S. Department of the Interior, National Park Service, *The National Parks: Index 1995 (Washington, 1995), p. 26;* U.S. Department of the Interior, National Park Service, *Draft General Management Plan and Draft Environmental Impact Statement, Death Valley National Monument, Inyo and San Bernardino Counties, California, Esmeralda and Nye Counties, Nevada,* March 1988, pp. 3, 14, 105, 205-09; U.S. Department of the Interior, National Park Service, *Final Environmental Impact Statement for the General Management Plan, Death Valley National Monument, Inyo and San Bernardino Counties, California, Esmeralda and Nye Counties, Nevada,* September 1988; U.S. Department of the Interior, National Park Service, *Death Valley National Park, California/Nevada, Official Map and Guide* [1996]; and U.S. Department of the Interior, National Park Service, *Compilation of National Park Service Laws of the 103rd Congress* ([Washington, 1995]), pp. 49-103.

CHAPTER ONE: EXPLORATION, 1849-1930s

EARLY EXPLORATION, 1849-1870s

The Forty-Niners

The first known Euro-American visitors to the Death Valley region were emigrants on their way to the northern California goldfields during the winter of 1849-50.[2] More than 100 impatient goldseekers, drawn west as part of the great California gold rush, found themselves trying to escape the desolate region after having attempted a "shortcut" from the Old Spanish Trail across Death Valley that they thought would save weeks of time and perhaps as many as 500 miles on their way to the goldfields. Having turned south from Salt Lake City to avoid crossing the Sierra Nevada in winter (an act that had cost some members of the Donner Party their lives three winters before), these gold seekers were nonetheless anxious to arrive in northern California. When a Captain Smith appeared bearing a map depicting a shortcut to Sacramento that would save weeks on their trip, they chose to leave the main trail, going cross-country to the west. The shortcut brought them to the arid and barren expanse of Death Valley.

These visitors split into a number of different groups, each searching for a way across Death Valley and the Panamint Range on the west side of the valley and on to Sacramento or Los Angeles and ultimately the goldfields. During their lengthy wanderings in the desolate region, the various parties explored areas of the Funeral and Black mountains on the east side of Death Valley, the valley itself, the Panamint, Argus, and Slate ranges on the west side of the valley, Panamint Valley, and the Owlshead Mountains to the south of the valley, not only looking for a way of escape but also for water. The emigrants were forced to burn their wagons, slaughter their oxen for food, and jettison everything not essential for survival. Had it not been the middle of winter when they wandered through the region, and had they not possessed a "traveling food supply" in their oxen, it is likely that none of them would have lived to tell the story of their harrowing experiences. Although unanswered questions concerning some of the parties and the details of their

2. For information on the Death Valley region's prehistoric and ethnographic past, see U.S. Department of the Interior, National Park Service, *Death Valley National Monument's Prehistoric Past: An Archaeological Overview*, by William J. Wallace, 1977; William J. Wallace and Edith Wallace, *Desert Foragers and Hunters: Indians of the Death Valley Region* (Ramona, California, Acoma Books, 1979); William J. Wallace and Edith Wallace, *Ancient Peoples and Cultures of Death Valley National Monument* (Ramona, California, Acoma Books, 1991); William C. Sturtevant, ed., *Handbook of North American Indians, Volume 11, Great Basin* (Washington, Smithsonian Institution, 1986), pp. 262-83, 368-97, 412-34; University of California, Berkeley, Department of Anthropology, Archaeological Research Facility, *Contributions of the University of California Archaeological Research Facility: Great Basin Anthropological Papers*, No. 35, April 1977, pp. 109-50; Smithsonian Institution, Bureau of American Ethnology, Bulletin No. 78, *Handbook of the Indians of California*, by A. L. Kroeber (Washington, Government Printing Office, 1925), pp. 574-600; Julian H. Steward, "Ethnography of the Owens Valley Paiute," *University of California Publications in American Archaeology and Ethnology*, XXXIII (September 1933), pp. 233-350; Smithsonian Institution, Bureau of American Ethnology, Bulletin No.120, *Basin-Plateau Aboriginal Sociopolitical Groups*, by Julian H. Steward (Washington, Government Printing Office, 1938), pp. 3-10, 46-49, 68-93; and Catherine S. Fowler, Molly Dufort, Mary Rusco, and the Historic Preservation Committee, Timbisha Tribe, *Residence Without Reservation: Ethnographic Overview and Traditional Land Use Study, Timbisha Shoshone, Death Valley National Monument, California*, Cooperative Agreement CA 8000-92-9003, Cooperative Agreement CA 8011-2-9003, January 15, 1994.

routes remain, a map of the probable routes of the "Forty-Niner" parties may be seen on the next page.[3]

In their search for water and a way out of the region, scouts discovered silver in the Panamints. Jim Martin and an associate named Turner, young silver miners from Georgia, found a chunk of black rock containing silver ore. The exact location of the ore deposit is unknown, but some researchers believe it to be somewhere in the Panamint or Argus ranges. The men told scattered groups whom they met at camps in the Panamints of their find, but none of the frustrated and fearful emigrants cared much about mineral wealth. Martin carried a small but particularly rich sample with him as he followed a Captain Town out of Death Valley via present-day Towne Pass, later taking it to Mariposa where it was found to contain 50 percent silver. After Martin had a gunsight fashioned out of it, this silver ore would capture the imagination of miners throughout the West and send them scurrying into the Death Valley country in search of this "Lost Gunsight Lode." It could never be found — at least not to anyone's satisfaction — but the search would do much to open up and develop the Death Valley region's mineral wealth.[4]

E. Darwin French

Discouraged by his unsuccessful attempts to find gold in the northern goldfields, Turner, along with a party of 14 eager prospectors, returned to the Death Valley region in May 1850 to look for his silver discovery. Unsuccessful, he solicited the financial aid of Dr. Erasmus Darwin French, who had served in California as a hospital steward with Stephen W. Kearney's 1st Dragoons during the Mexican War and was now the prosperous owner of the Tejon Ranch in southern San Joaquin Valley. The two men returned to the Death Valley region, along with an Indian guide, Iguacio, and several prospectors. In the Coso Range they found a Paiute who showed them the trail of the Forty-Niners, leading them to Darwin Canyon in the Argus Range, which French later named for himself using his preferred middle name. There they made a base camp, and three at a time, searched the Panamints to the east in the vicinity of Towne Pass. They found oxen tracks and signs of

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33. Carl I. Wheat, "Trailing the Forty-Niners Through Death Valley," *Sierra Club Bulletin*, XXIV (June, 1939), pp. 74-108. Also see George Koenig, *Beyond This Place There Be Dragons: The Routes of the Tragic Trek of the Death Valley 1849ers through Nevada, Death Valley, and on to Southern California* (Glendale, California, Arthur H. Clark Co., 1984); Richard E. Lingenfelter, *Death Valley & The Amargosa: A Land of Illusion* (Berkeley, Los Angeles, London, University of California Press, 1986, pp. 23-58; and John G. Ellenbecker, *The ... Jayhawkers of Death Valley* (Marysville, Kansas, 1938). Also see U.S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, by Benjamin Levy, April 15, 1948. Current going research by Le Roy and Jean Johnson of Bishop, California, indicates that the 1939 map requires revision. For instance, the Johnsons' research indicates that the Bennett-Arcan families, often referred to as the Manly party, exited Death Valley via Galena Canyon rather than Six Springs Canyon. Most Jayhawkers entered Death Valley via Furnace Creek Wash rather than Hole-in-the-Wall, although some may have entered through Indian Pass. The Jayhawkers traveled north to McLean Spring, paralleled the present route of California State Highway 190, and exited via Towne Pass rather than Jayhawker and Emigrant canyons. The Georgians entered Death Valley via Indian Pass and paralleled 190 from McLean Spring to Towne Pass rather than existing via the vicinities of Tucki Mountain and Skidoo. McLean Spring and Jayhawker Well are two separate (and extant) sites.

4. Lingenfelter, *Death Valley & The Amargosa*, pp. 43-45.

campfires, but not a trace of silver. A third trip was planned by Turner, but aborted after heavy snows fell in the Panamints.[5]

Turner apparently gave up his search shortly thereafter, and Dr. French moved to Oroville in northern California during the early 1850s. Thereafter, the Lost Gunsight Mine was temporarily forgotten, although several Mormon prospecting expeditions to the region may have occurred during the 1850s. While no records have been found concerning these prospecting expeditions that are said to have been made into Death Valley during the period from 1851 to 1858 when the route between Salt Lake City and the colony of "Saints" at San Bernardino was most frequented, it is likely that such expeditions were undertaken.[6] Discovery of silver at the Comstock Lode in western Nevada generated a silver rush throughout the Great Basin in 1859, reviving interest in finding the Lost Gunsight. At the same time, miners from Mexico began exploring the California desert region in an attempt to discover the vein that "surely" extended from the silver mines of Mexico to the Comstock itself. During this period, French returned to Death Valley in March 1860 as a guide for the Butte Mining and Exploring Company. Excited by the chance of discovering a second Comstock, French's expedition crossed the Cosos from Little Lake in Owens Valley to Coso Hot Springs, then traveled by way of Crystal and Granite springs before finding the great aquifer that feeds the falls, which were afterward to bear French's preferred middle name, and the wash that led down to Panamint Springs and Panamint Valley. After crossing the valley the party started up Towne Pass before diverting south to Jayhawker Spring and descending down to Furnace Creek in Death Valley by way of Emigrant Canyon. After roasting in the July heat of the valley the group retreated to the Cosos to continue prospecting. There the diligent prospectors were successful, not in finding the Lost Gunsight Mine, but gold, resulting in a mining rush to the Coso Mountains west of Death Valley.[7]

Railroad Surveyors

While a series of mining rushes would occur in the Death Valley region during the remainder of the 19th and early 20th centuries, other exploration efforts were undertaken to the largely unknown region. In the fall of 1853 a party of 17 surveyors, financed by the San Francisco-based Pacific and Atlantic Railroad Committee to survey a portion of a transcontinental railroad route through eastern California and to find a suitable connecting pass over the Sierra Nevada, was guided to the Death Valley region by "Major" John Ebbetts, who had come to California in 1849 as captain of the Knickerbocker Exploring Company. The chief surveyor of the party was Lieutenant Tredwell Moore, a 28-year-old career army officer, apparently on temporary leave. He was assisted by a British artist, cartographer, and amateur naturalist, George H. Goddard. Taking a wandering course, the

5. Ibid., pp. 59-60. Also see, Carl I. Wheat, *Pioneer Visitors to Death Valley After the Forty-Niners* (San Francisco, California Historical Society, 1939), pp. 3-4, and Joseph E. Doctor, *Dr. E. Darwin French's Exploration of Death Valley: Keepsake No. 22* (Death Valley, The Death Valley Forty-Niners, 1952), pp. 3-10.

6. Wheat, *Pioneer Visitors to Death Valley*, p. 4.

7. Larry M. Vredenburgh, Gary L. Shumway, and Russell D. Hartill, *Desert Fever: An Overview of Mining in the California Desert* (Canoga Park, California, Living West Press, 1981), p. 223, and Doctor, *Dr. E. Darwin French's Exploration of Death Valley*, pp. 11-13.

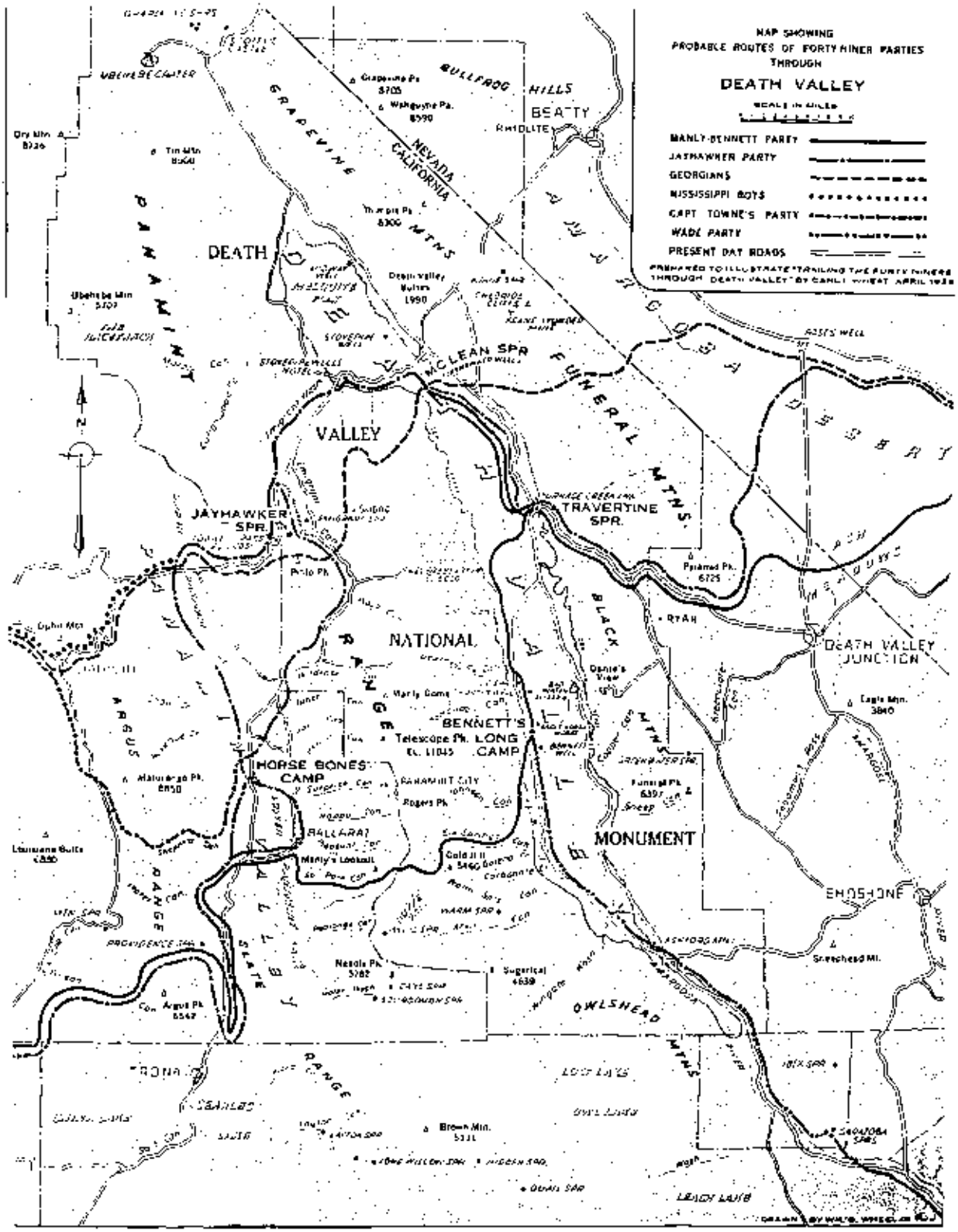

Figure 1: Map showing the probable routes of the "Forty-Niners" parties. Drawn by William B. Wheeler, April 1939. Alternate route alignments based on research by Matthew H. Ryan and John E. Wolff. U.S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, by Benjamine Levy, April 15, 1969, Historical Base Map No. 3.

men crossed the Sierra Nevada over the Sonora Trail, turning north along the Walker River to Walker Lake before heading southeast toward their intended destination at the Vegas de Santa Clara on the Old Spanish Trail at Meadow Valley Creek. The quest for water, however, brought the men farther south to Fish Lake Valley at the base of the White Mountains. From there they continued down into the desiccating basin of Eureka Valley, just missing numerous springs in the Sylvania Mountains. On November 7, 1853, after two waterless days, they crossed eastward, in desperation, over the Last Chance Range and into Death Valley, camping at Last Chance Spring. After several days in the valley they left Death Valley by way of Last Chance Canyon near the California-Nevada border on November 11.

Although the party failed to find a railroad route, Goddard collected more than 600 geological and botanical specimens, and much new country, including the upper reaches of Death Valley, were mapped for the first time. Goddard showed the results of the party's exploration on his map of California, which was published in 1857. On the map the explorers' trail leads to their fledgling one-night camp of November 10 — named "East Camp" — in Oriental Wash just short of the ridge of Gold Mountain. As other mapmakers borrowed from this map, the trail, springs, and other natural features along the trail faded in confusion, but East Camp remained on maps for a decade.[8]

John C. Frémont

The quest for a transcontinental railroad route also lured John C. Frémont through the hills just north of Death Valley in March 1854. This was Frémont's fifth, last, and nearly forgotten expedition to the Great Basin, an undertaking financed from his own pocket because of his disappointment at not having been chosen to lead one of the federal surveys for a transcontinental railroad. Frémont hoped to show that a railroad route existed along the base of that great east-west "dividing range" in the vicinity of 37 and 38 degrees north latitude that he thought he had glimpsed from afar on his earlier explorations, and that he had placed on his great map of the west in 1848. Beginning this last expedition in September 1853, Frémont reached central Utah with a small body of men after a journey of great hardship, demonstrating that practicable passes existed through those mountains. To his dismay, however, Frémont learned that the mountains he thought he had seen farther west were nonexistent. Thus, the expedition added nothing to Frémont's fame, nor did it contribute any practical information for prospective railroads to the Pacific coast. His exploration activities over, Frémont soon went east to undertake another futile quest as the fledgling Republican Party's first candidate for president of the United States.[9]

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8. Lingenfelter, *Death Valley & The Amargosa*, pp. 80-82.

9. Ibid., p. 82; and Allen Johnson and Dumas Malone, eds., *Dictionary of American Biography* (New York, Charles Scribner's Sons, 1960), Vol. IV, p. 22; and *Dictionary of American History* (Rev. ed., New York, Charles Scribner's Sons, 1976), Vol. III, p. 22.

General Land Office Surveys

The next surveyors to enter the Death Valley region arrived with contracts to run township lines for the Department of the Interior's General Land Office and subdivide the land into 160-acre quarter sections for settlers who might come someday. William Dentin and his crew of axmen, chainmen, and a compassman surveyed the south end of Death Valley and the Amargosa in late 1856. At the same time, Allexey von Schmidt surveyed Panamint Valley to the west. Early the following year, "Colonel" Henry Washington, a self-styled colonel from Virginia, was hired to extend the surveys into the heart of Death Valley and up the Amargosa until they reached what the surveyors judged to be the California-Nevada boundary. The surveys, published in the surveyor general's map of California in 1857, provided the first detailed topography of Death Valley, although the valley itself was marked only as an unnamed "Dry Lake." Denton's survey of the curious twin basins on the southwest edge of Death Valley, which appear to form the eyes and face of an owl, gave rise to their present-day name, the Owlshead Mountains.

Although this map showed the topography of the Death Valley country better than any that would follow for more than three decades, the surveys fell under suspicion and their results were generally ignored by later mapmakers. The surveyors had contracted only to subdivide land that was suitable for farming or ranching. Since they were paid essentially by the number of acres they subdivided, the surveyors apparently could not resist stretching the definition of "suitable." Thus, they filed surveys of such unlikely farmlands as salt flats, sand dunes, and steep, rugged mountainsides. Although Denton and von Schmidt were more cautious than Washington, von Schmidt's subdivision of Panamint Valley, a largely barren and sandy desert expanse, drew first fire in 1861, when the cartographer of the California Boundary Commission denounced it as a shameless fraud.[10]

California Boundary Commission Surveys

During 1861, the United States and California Boundary Commission passed through the Death Valley region. The discovery of rich mineral deposits east of the Sierra Nevada in 1859-60 caused Californians to become interested in determining the location of the eastern boundary of the state, which had been defined by Congress in 1850 but never surveyed. Under the command of Dr. J.R.N. Owen, an Oroville physician, amateur geologist, and Coso mine owner, a 14-man party started from the Colorado River, working its way northwest by way of the Potosi mines and reaching Resting Spring southeast of Death Valley late in February 1861. An opportunist, Owen saw the reconnaissance as an opportunity for a government-financed prospecting expedition. Thus, the men he selected consisted of several Coso miners and an experienced assayer. The boundary survey was left to two of the 14 men — an astronomer, J. M. McLeod, and a topographer, Aaron Van Dorn, who became the unofficial chronicler of the expedition. By March 4 the party, accompanied by three camels, had reached the lower edge of the Amargosa Desert, and during the next several days they worked themselves down to Furnace Creek in Death Valley. On March 11, they took a barometer reading on the salt flat south of Furnace Creek, calculating that they were standing more than 377 feet below the level of the sea.

10. Lingenfelter, *Death Valley & The Amargosa*, pp. 82-83.

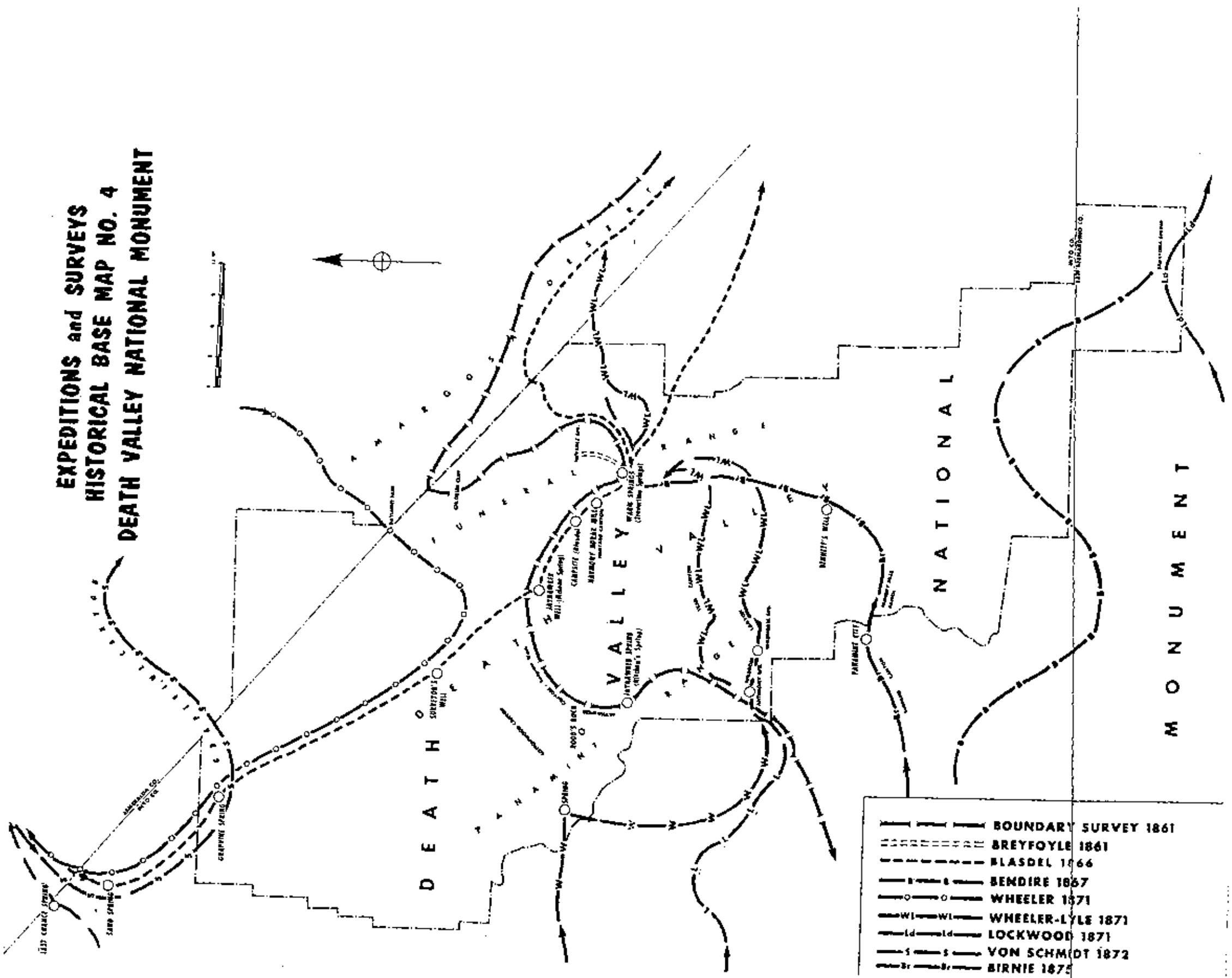

Figure 2: Map showing routes of Major expeditions and surveys in Death Valley Region. U.S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, Historical Base Map. No. 4.

Provisions were running out and the alkali was beginning to take its toll, however, so a party of four men and several camels was detached to go to Coso or Owens Lake for supplies, while the main party would move northeast to the boundary and thence over the White Mountains to Mono Lake where the supply party would rejoin them. The supply party crossed the Panamints and Panamint Valley. Near the mouth of Hall Canyon on the east side of the valley, two local Indians — a middle-aged woman going to the lake to obtain salt to take back to her village up the canyon, and a young man with a bow and some arrows — met them and displayed astonishment at the strange beasts stalking along with the party. Determining that they would not be able to find ample provisions at either Coso or Owens Lake, the supply party then turned northwest, ascending the Argus Range through "Darwin's Canyon," where a surveyor's mark was found. A General Land Office map was discovered to show the area to be fully townshipped and sectionalized. The party expressed contempt for the clearly fraudulent character of many of the desert "surveys" which they noted and would later make public. Crossing north of the Cosos, the party stopped briefly to visit nearby mines before pushing on past Owens Lake to a camp of miners, where the sight of the camels caused a stampede of every mule in the outfit. Thence they moved south of Little Lake and on to Walker Pass, reaching Visalia, where they learned in May that the expedition had been disbanded.[11]

The reconnaissance proved to be a failure. The survey party had completed only about one-third of the boundary between California and Nevada toward its destination at Lake Tahoe. The boundary dispute between the two states was finally settled in February 1865, when the Nevada legislature officially recognized the original California boundary. Three months later, James Lawson and William McBride surveyed the line down into the northern tip of Death Valley. But it was not until 1872 that Allexey W. von Schmidt returned to the Death Valley country to run the first complete survey of the boundary line from Lake Tahoe to the Colorado River.

During this survey, von Schmidt's party approached Death Valley along a ridge in the Last Chance Range. Although he was left breathless by a blast of superheated air blowing up from the valley, von Schmidt found "the view from this point" to be "terrifically grand." Impressed by the worthlessness of the land, he recorded that nut pines were the "principal means of subsistence of the few poor miserable Indians that still remain in this section of the Country, and whom we occasionally met with." Reflecting on the mining possibilities of the region, he remarked:

> The Hills and mountains in the southern portion of the line are to a great extent mineral bearing but the lack of mining facilities, water, fuel and means of transportation, make it impossible to work any ores assaying less than six or eight hundred dollars per ton. Several mining camps and districts have been started and abandoned as failures.[12]

11. Wheat, *Pioneer Visitors to Death Valley*, pp. 11-15, and U. S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, pp. 55-58.

12. Quoted in U. S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, pp. 83-84, and Lingenfelter, *Death Valley & The Amargosa*, pp. 86-89.

Charles E. Bendire Expedition

The search for a route between Silver Peak and Pahranagat east of Death Valley in Nevada brought another expedition through the region during the spring of 1867. This party was led by 1st Lieutenant Charles E. Bendire, 1st U.S. Cavalry, from Camp Independence, a garrison that had been established in Owens Valley on July 4, 1862, to protect the growing Euro-American mining and agricultural settlements in that area from Indian attack.[13] The camp had been dismantled after nearly 1,000 Indians had been removed from Owens Valley to the Fort Tejon Reservation in the southern San Joaquin Valley in 1863. When conflicts between the Indians and whites resumed in 1865, the camp was reopened and remained in operation until 1877. With the reopening of the camp, however, most of the Indian attacks ceased. Travelers in the valley still needed an escort in 1864, but the function of the military steadily shifted away from protection against Indians. Thereafter, the soldiers stationed at Camp Independence, while providing a military presence to protect the settlements if needed, increasingly engaged in exploration, road-building, mapping, and prospecting activities in the Sierra Nevada to the west of the fort and in the Inyo Mountains and the Death Valley region to the east.[14]

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13. Charles Bendire emigrated to the United States from Germany, and possibly to learn English, enlisted on June 10, 1854, in Company D of the 1st U.S. Dragoon Regiment. "Dragoon" was an earlier term for cavalry in the U.S. Army. Before the end of his first five-year enlistment, Bendire was promoted to corporal. He apparently left the Army at the end of his enlistment, but on June 8, 1860, reenlisted, this time in Company D of the relatively new 1st Cavalry regiment, where he quickly moved through the ranks to corporal and sergeant. On August 3, 1861, Congress redesignated and renamed the mounted units in the Army, and the 1st Cavalry became the 4th Cavalry. Soon thereafter, Bendire obtained appointment to the responsible position of regimental hospital steward. By that time, the Civil War was in progress, and Bendire continued to serve in that capacity until September 9, 1864; word apparently was slow in reaching him that on May 18, that year, he had been awarded a commission as a 2d lieutenant in the 2d U.S. Infantry. During the three and one-half months after his commission was awarded, either he or superior officers must have written the Adjutant General's Office, because when on September 9, 1864, he actually assumed the role of 2d lieutenant, it was not in the 2d Infantry but in his original dragoon regiment, now known as the 1st U.S. Cavalry. During wartime, promotions can occur rapidly, and Bendire became a 1st lieutenant on November 12, 1864. His promotion may have been a consequence of casualties in the regiment, because on November 11, Bendire had participated in the Battle of Trevilian Station, one of the notable cavalry battles of the Civil War, for which he was awarded a brevet. But in the following year, the war ended, and Bendire faced the long slow climb in rank in a minuscule "peacetime" regular Army. He was still a 1st lieutenant when he scouted the Death Valley region in 1867, and would not reach the rank of captain until February 21, 1873. He served a little over 13 years in that rank, and subsequently would receive another combat brevet for his participation in the Battle of Canyon Creek with the Nez Perce Indians in 1877. Bendire retired from the Army on April 24, 1886, and died February 4, 1897. Francis B. Heitman, *Historical Register and Dictionary of the United States Army From Its Organization, September 29, 1789, to March 2, 1903* (2 vols., Washington, Government Printing Office, 1903), Vol. I, p. 209.

14. Colin I. Busby, John M. Findlay, and James C. Bard, *A Culture Resource Overview of the Bureau of Land Management Coleville, Bodie, Benton and Owens Valley Planning Units, California* (Oakland, California, Basin Research Associates, June 1979, pp. 54-58; U. S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, p. 88; and Dorothy Clora Cragen, *The Boys In the Sky-Blue Pants: The Men and Events at Camp Independence and Forts of Eastern California, Nevada and Utah, 1862-1877* (Fresno, California, Pioneer Publishing Company, 1975), pp. 67-72, 78-82, and Chapter 8. For more information on the broader context of the conflict between the Indians in California and Euro-American civilization and the impact of the latter on Native American culture, see S. F. Cook, "Conflict Between the California Indian and White Civilization," in R. F. Heizer and M.A. Whipple, comps. and eds., *The California Indians: A Source Book* (2d ed., Berkeley, Los Angeles, London, University of California Press, 1971), pp. 562-71; Edward D. Castillo, "The Impact of Euro-American Exploration and Settlement," in William C. Sturtevant, ed., *Handbook of North American Indians, Volume 8, California* (Washington, Smithsonian Institution, 1978), pp. 99-127; and Carling I. Malouf and John M. Findlay, "Euro-

Bendire's exploration expedition was among the activities to be conducted by the soldiers at Camp Independence. He set out with 29 men, including four private citizens who served as guides and packers, on April 6, 1867, under orders to scout the country east of Coso, through Emigrant Canyon (now Redlands Canyon) in the Panamints and across Death Valley to the Amargosa and beyond, returning by way of Silver Peak. During the six-week trek, the party, with the guidance of Charles Frederick Reinhold Hahn, a veteran prospector from Cerro Gordo, explored portions of the Death Valley country and much of southern Nevada, mapping a practical, if circuitous, route from Pahranagat to Silver Peak. Finding Emigrant Canyon impractical for pack mules, Bendire dispatched Sergeant Neale and nine men through the difficult canyon, while he took the main party south through Panamint Valley and Windy Gap (now Wingate Pass) at the southern end of the Panamints just west of the Owlshead Mountains. On his trek, Neale camped at Anvil Springs, where he found an anvil, wagon tire, and "considerable old iron." Rejoining Bendire at the abandoned Salt Spring mine where they found the remnants of several adobe miners' houses, an old quartz mill, and a cistern, the reunited party followed the Amargosa River until it headed east to Pahranagut. Returning to Camp Independence on May 22 via Silver Peak, Fish Lake Valley, and Deep Springs Valley, Bendire reported that his party had traveled 782 miles during its 47-day trek. Despite 110-degree temperatures, long waterless treks, and "poisionous" wells, Bendire lost only one animal out of 46 during the expedition. Although his men "behaved well," most of them returned "bare-footed." After returning to the camp he observed:

> After leaving Owen's Lake I found the country to be nearly a continuous desert; the mountains of volcanic origin, destitute of timber of any kind; water very scarce in them in nearly every case. The springs at which I camped were generally so insignificant that in most instances the party was put to considerable labor, digging so as to get sufficient water. I believe that many are not permanent but dry up during the summer. I am of the opinion that if the expedition had started 2 or 3 months earlier there would have been far less difficulty in obtaining water. The Telescope, Los Vegas, and Tinpinte Mountains, are the only ones that have any timber on them, mostly Pinon. In the desert joining Death Valley proper, there are a few mesquite brushes; they occur principally near the edges of the Amargosa Swamp, where I found it excessively hot, the temperature being about 110 degrees Fahrenheit.
>
> Land suitable for agriculture, there is none worth mentioning. What little there is, is near the various small springs. Some of this is planted with corn by the Indians. More than four acres suitable for agriculture I have not seen west of Pahranagat Valley in any place. The Amargosa is a insignificant brook (at least it was nothing more when I saw it) and does not deserve the name of a river. During the summer months I suppose it dries up altogether.
>
> More than half the way I made my own trail and saw no evidence of the country having been previously traveled by horse or man. Four miles south of Elliot Spring I crossed what I took to be Governor Blasdel's trail going to Pahranagat.

American Impact Before 1870," in Sturtevant, ed., *Handbook of North American Indians, Volume 11, Great Basin*, pp. 499-516.

> The Indians, Pah Utes, Shoshones and Pahranagats, seem to be peacably inclined. I saw few but plenty fresh signs. Generally any information I got from the few seen proved to be correct. No attempt was made by any Indians to steal any of the stock, however, I would not deem it adviseable for any small party to travel there, or to put too much confidence in them. . . .[15]

As the threat of Indian attacks receded during the mid-1860s, soldiers at Camp Independence took turns "vacationing" and prospecting in the Inyo Mountains and surrounding valleys east of the fort during the summer months. According to William H. Michael in his master's thesis entitled, "'At the Plow and in the Harvest Field': Indian Conflict and Accommodation in the Owens Valley, 1860-1880," the military presence in Owens Valley provided economic benefits to the local regional economy. He observed:

> It was also claimed that the beginning of the mining rush to the Russ District (directly east of Camp Independence) was begun by a soldier who found gold while prospecting in his spare time. This led to the founding of the San Carlos Mining and Exploration Company along with the beginning of the towns of San Carlos and Bend City. It was even claimed that many of this [those] enlisting in the California Volunteers were doing so to get free passage to the rich mining country surrounding the Owens Valley. This claim is believable when it is seen that these troops had a desertion rate that rose as high as 32.6 per cent. . . .[16]

During 1872, a party led by Captain Harry Egbert, commander of Camp Independence, left Owens Valley for a two weeks' prospecting reconnaissance of the Waucoba area on the east side of the Inyos between Eureka and Saline valleys.[17] During the trip, the men apparently found gold. While the date of the discovery is not known, W. A. Chalfant, in his *The Story of Inyo*, states that a Colonel James Brady was actively at work at what would become known as the Waucoba Mine (mine site is within present national park boundaries) by the end of 1872.[18] Some officers and soldiers at Camp Independence apparently became partners in Brady's effort, and plans were developed to construct a furnace. However, construction of the furnace could not be commenced until a road was built to the isolated area. By 1873 the soldiers had only been able to construct a road to the summit of the Inyos eastward from Big Pine.[19] That same year, the Waucoba Mining and Smelting Company constructed a road to the area, thus paving the way for more extensive development of the mines in the area. A summer camp was established near a dry lake bed adjacent to the mines. Although the scattered remains of the camp,

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15. "Report of a Scouting Expedition Made in the Region East of Owens Valley, Cal., by Lieut. Chas. E. Bendire, U.S.A., Camp Independence, Cal., May 26, 1867," Silver Boxes, History - Death Valley, Box 1, Research Library, Death Valley National Park, and Lingenfelter, *Death Valley & The Amargosa*, pp. 90-91.

16. William H. Michael, "'At the Plow and in the Harvest Field': Indian Conflict and Accommodation in the Owens Valley, 1860-1880" (Master's thesis, University of Oklahoma, 1993), pp. 161-62. Also see W.A. Chalfant, *The Story of Inyo* (Rev. ed., Bishop, Chalfant Press, 1933), p. 179, and Robert M. Utley, *Frontier Regulars: The United States Army and the Indian, 1866-1891* (New York, Macmillan, 1973; Reprint, Lincoln, University of Nebraska Press, 1984), p. 23.

17. *Inyo Independent*, November 9, 1872, and Cragen, *Boys In The Sky-Blue Pants*, p. 123.

18. Chalfant, *The Story of Inyo*, pp. 293-94.

19. *Inyo Independent*, April 5, 1873, and Cragen, *Boys In The Sky-Blue Pants*, p. 133.

sometimes referred to as the "soldier's camp," are in ruinous condition today, a site reconnaissance of the camp area by the Robertson family recorded in *Westways* in February 1963 noted the following:

> There was a blacksmith's stump where several hand-hammered rusty nails still lay on the flat top: rusted hand-hammered horseshoes lay nearby. A short distance away the hand-hewn log walls of an ancient building leaned half tumbled, for the sod-and-log roof had fallen in. Hand-whittled pegs, still solidly embedded in the log posts, were intact. Another small building that looked like it had been a storehouse had fallen in upon itself. Several log and stone corrals stood south of the building and, ranging around the area, we also discovered several large glory holes with copper-stained specimen dumps.
>
> There was also evidence of an Indian habitation site. At the northeast and south ends of the small dry lake were scattered obsidian objects. Under the pinyons on the north slope were a number of stone house-rings. The lake edge was scattered with black-red garnets and pink-white crystals. Other objects found included delicate bird-points, one spearhead, one three-inch hide scraper, and several blue trade beads and a quarter-inch pierced shell bead.[20]

Maps compiled by some of the scouting parties from Fort Independence provide information on early routes that passed through some of the lands that were added to Death Valley National Monument in 1994. A map compiled by Captain A. B. MacGowan, 12th Infantry, in 1874 shows two routes into Death Valley. One is called "Wheeler's Trail" and crosses east from Owens Lake to Panamint Valley where it splits, the so-called "Eagan's Trail" veering northeast apparently toward Cottonwood Canyon. The principal trail appears to continue to Wildrose and Trail canyons. The "Eagan Trail" returns to the "Wheeler Trail" in Panamint Valley just north of the mouth of Wildrose Canyon. The other route entered the northwest arm of Death Valley at a spot named "Gov't Wells." The routes east from Death Valley extended to the Gold Mountains from the extreme north end of the valley, apparently exiting via Oriental Wash. The other exit east appears to have been through Grapevine Canyon.

Succeeding maps, although not easy to interpret, show three primary routes of access to Death Valley from Camp Independence. These include the Hunter Mountain route via Jackass Springs, Cottonwood Canyon, and Cottonwood Springs; the aforementioned Wildrose Canyon route, and the Panamint route via Surprise and Johnson Canyons.[21]

George M. Wheeler Expeditions

George M. Wheeler's extensive topographic and scientific surveys west of the 100th meridian for the U.S. Corps of Engineers during the 1870s made an invaluable

20. Dorothy Robertson, "Our Waucoba Adventure," *Westways* (February, 1963), pp. 30-31.

21. U. S. Department of the Interior, National Park Service, *Death Valley National Monument Historical Background Study*, pp. 88-89.

contribution to the knowledge of the West and earned him national recognition.[22] Wheeler was still in his late twenties, a first lieutenant just launching his career, when he came to the Death Valley region in 1871 as part of an exploration expedition covering some 72,250 square miles, including portions of central, southern, and southwestern Nevada; eastern California; southwestern Utah; and northwestern, central, and southern Arizona. This was his first major expedition, coupling scientific investigations with topographic surveys and mapping. Other objectives of the survey as detailed in instructions from Brigadier General A. A. Humphreys, Chief of Engineers, included the gathering of as much information as possible relating to the physical features of the country; number, habits, and disposition of the Indians; selection of sites for military operations or occupation; facilities for making rail or common roads; examinations for mineral resources; and observations on the climate, geological formations, woodlands, water sources, and areas valuable for agricultural and grazing purposes. At the close of the expedition in December 1871, Wheeler prepared a "plan for a systematic topographic survey of the territory of the United States west of the 100th meridian" that was approved by the Chief of Engineers and the Secretary of War and sanctioned by Act of Congress on June 10, 1872. Thus, the success of this expedition enabled him to obtain congressional support for the extensive program of exploration that he would undertake throughout the remainder of the decade.[23]

A special preliminary report of this expedition and survey was made to Humphreys early in 1872 and published by departmental authority. A preliminary topographic map on a scale of one inch to 24 miles accompanied the report, embracing a "skeleton of the general topographic information collected, location of routes pursued, positions of mining camps, etc." A few copies, "expressly for office use, of a list of camps, distances, etc. of the expedition of this year, were printed in oblong folio." Because of the urgency of other duties, "no regular annual report for the fiscal year 1870-'71 was submitted to the Chief of Engineers."[24]

Wheeler started this survey at Halleck Station, Nevada, on the Central Pacific Railroad on May 3, 1871. He had approximately 80 men in his party, including geologists, mineralogists, and naturalists, as well as the necessary corps of topographers, surveyors, astronomers, and meteorologists. Aware of the value of publicity, Wheeler took Timothy O'Sullivan, a talented pioneer photographer, and Frederick Wordsworth Loring, a widely heralded writer and poet from Boston who would contribute sketches to *Appleton's Journal* detailing some of his adventures with the expedition.

To cover more territory, Wheeler divided the expedition into two parties that rendezvoused periodically. One party remained under his direct command, while the other was commanded by Second Lieutenant David A. Lyle, a young artillery officer who had recently returned from Alaska.

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22. For more information on the Wheeler surveys, see Richard A. Bartlett, *Great Surveys of the American West* (Norman, University of Oklahoma, 1862), pp. 333-72.

23. *Report Upon United States Geographical Surveys West of the One Hundredth Meridian, In Charge of Capt. Geo. M. Wheeler, Corps of Engineers, U.S. Army*, Vol. I - "Geographical Report," by George M. Wheeler (Washington, Government Printing Office, 1889), pp. 31-32.

24. *Ibid.*, pp. 30-35.

Although the expedition had been carefully planned, it was poorly timed, converging on Death Valley at the peak of the summer heat in July. The two parties divided again at Belmont, Nevada. Wheeler circled east by way of Pahranagat, then back to the Amargosa to cross Death Valley to the next rendezvous at Camp Independence in Owens Valley. Lyle, hiring the aforementioned Charles Frederick Reinhold Hahn as a guide, headed west through Silver Peak and the new mining camps in the Fish Lake and Deep Springs valleys north of Death Valley after which he crossed the White Mountains into Owens Valley. Reaching Independence on July 18, well ahead of Wheeler, Lyle initiated an ill-conceived endeavor that would take him through much rugged and largely unknown terrain in the Death Valley region, including many of the areas that were added to Death Valley National Monument in 1994.

Lyle described this "reconnaissance" in an appendix that was attached to Wheeler's "Preliminary Report, Exploration in Nevada and Arizona, 1871." In his lengthy report to Wheeler Lyle stated the intended purpose of this excursion:

> Immediately upon my arrival at Camp Independence I fitted out a small party of picked men and carefully selected animals, to run a reconnaissance line to what was known as the head of the Amargosa. The object of this line was to determine whether or not a passage could be found directly to the eastward over the sterile deserts and mountains intervening between the Amargosa and Owen's Rivers that was practicable for a large train of men and animals; to procure data for constructing an accurate topographical map of that unknown area; to make collections in natural history, mineralogy, and geology; and lastly, to form a junction, if possible, with your line, and, if a practicable route was discovered, to lead your large train to our rendezvous camp in Owen's River Valley. This party consisted of one topographer, two civilian assistants, two soldiers, a guide, a packer, an Indian, and myself, with four pack-mules.

Lyle noted that before starting out on his reconnaissance, he "could get no definite information concerning the country to be traversed, and from every quarter received the most discouraging accounts of the dangers attending such a trip through a country entirely destitute of water, as far as known, after crossing the Inyo Range." Nevertheless, he "was enabled to take the field again within three days after" his arrival, with his "animals re-shod, and the party supplied with forage and rations" by the soldiers at Camp Independence.

About noon on July 21, Lyle's small party left Camp Independence, ascending the Inyo Mountains through Mazourka Canon. Lyle described the journey:

> . . . . Fifteen miles up we camped at an excellent spring; grass and wood plenty. Next day crossed the range and camped in a deep, rugged canon filled with blocks of granite, and very narrow, which we called Wheeler's Canon. Here there was plenty of wood and water, but very little grass. Below us, and to the southward, lay Salianas [Saline] Valley, a small interior basin, about twelve miles long, and from five to eight miles wide, containing salt-beds near its southern extremity. . . .

At this point, Hahn requested that the party remain in camp one day while he went to see if there was enough water for the party at Grapevine Springs which he believed to be 35 to 40 miles distant. Hahn set out at 8:00 AM on July 23, accompanied by an Indian named Sam and naturalist John Koehler, who wanted extra time to collect specimens at Grapevine Springs. When Hahn and his companions did not return the following day, Lyle and his party set out at 5:00 AM on July 24, following Hahn's erratic, waterless trail to the northeast in the hope of meeting him. According to Lyle, this trail

> led over a rocky, volcanic divide, separating Salinas [Saline] from Termination [Eureka] Valley, which latter was some fifteen or twenty miles long, having heavy sand-hills [Eureka Sand Dunes], over which the trail led, the mules sinking knee-deep at every step. The day was excessively hot. The wind passing over the heated sand-hills, came in scorching gusts, rendering our sufferings intense and our thirst almost unbearable, while the incessant glaze of the sun upon the white sand nearly blinded us and caused great pain in our eyes and heads after the first few hours. At 4 p.m. we struck the slope leading up to the foot-hills, covered with sharp rocks and jasper flints. By 5 p.m. we were brought to a halt half way up a sharp peak, over which the trail led, by the mules becoming so weak as to be unable to proceed further. I ascended the peak alone on foot to get a view of the country beyond. Once up, I saw no hope of getting my animals, in their then weak and exhausted state, over the summit at this point, so steep and rocky were the mountains. Beyond, range after range of black ridges, their wall-like sides banded with white, red, and yellow strata, reared their frowning crests, and seemed to interpose an impassable barrier to farther [sic] progress. I returned to my anxious followers and we descended in silence and tried two or three cañons, but, after penetrating a short distance in each, were compelled to turn back by vertical walls of rock that effectually prevented our ascent. Worn out and almost exhausted, we bivouacked on the heated, flinty surface to get a little rest; made some coffee, our only fuel being some small bushes, and ate a little hard-tack. We dared not eat any meat for fear of increasing our thirst. I was surprised at the rapidity with which the mules weakened and succumbed to fatigue upon this day's march. We saw nothing of Hahn, and I concluded that he had found the country worse than he anticipated, and had, no doubt, deserted us; or, thinking, perhaps, we would not attempt to follow his trail with pack-mules over such a country, had gone to join you [Wheeler]. Twenty-four miles were made this day. Most of the distance we had to march on foot, owing to the weakness of our animals. The soles of my shoes had completely worn out, and the others were little better off. Fortunately, I had a pair of slippers with me, which protected my already bleeding and lacerated feet a little at least.

Next morning, Lyle started "southward along the foot-hills, to make one last endeavor to find a pass through which" he could "penetrate this range" into Death Valley. Finding a canyon which "bade fair to lead us to the summit without serious obstacle," he named it Last Hope Canyon. According to Lyle, the men

> reached the summit without difficulty, and here found the trails of three animals ridden by Koehler, Hahn, and the Indian. It was at or near this point that Koehler afterward told me he had last seen Hahn about 8 p.m., at which time Hahn, who would never be seen again, turned and left him without saying a word, and that

> he called to him but received no answer, and supposed he had gone back to meet me. Hahn must have followed after Koehler and the Indian that night, for we found the three trails lower down and near the mouth of the cañon. This trail we followed eagerly down a deep cañon, but scarcely had we proceeded half a mile ere we came upon one of those falls of tilted slate which so often impede or prevent one's progress in these cañons. With considerable loss of time we succeeded in reaching the arroyo below by climbing a bluff and going down a steep incline of loose rocks and soil, but hardly half a mile more had been traversed before we came upon another fall, about 30 feet high. This barrier appeared at first sight to be impossible to surmount with our loaded pack-mules, but to return was hopeless, for the mules were too weak to climb back around the first fall. Our situation was indeed critical. Here we drank the last drop of water that we had husbanded carefully, amounting to only a few swallows each. This appeared rather to increase than alleviate our burning thirst. The party looked at me in silence till I gave the order for unpacking and lowering the cargoes with lash-ropes over the precipice. This was done cheerfully and without a murmur. With much labor, patience, and coaxing we got the mules to clamber up the cliffs, and slide down into the wash below, without the loss of a single animal.
>
> I cannot speak in too high terms of the admirable courage and cheerful obedience of my little party during this trying day. Feeling little hope of meeting with water, we moved silently down for several miles, when suddenly a cry of 'water' was heard from the men in front, who pointed to a small green patch on the mountain-slope to the northwest.
>
> At the mouth of this cañon — called Break Neck Cañon by the men — we left the trail of the men who had preceded us, they having turned off to the right, and made for the green spot over a perfect net-work of rocky ravines. The surface was completely covered with broken volcanic rocks about the size of ordinary cobble-stones. About sundown we reached it, and found water sufficient for our wants by digging. Our joy at this discovery knew no bounds. This we christened 'Last Chance Spring.' Distance made from last camp, nineteen miles.[25]

After a day of rest Lyle's party made its way eastward some 22-1/2 miles to the fledgling mining camp of Gold Mountain in Nevada, crossing the north end of Death Valley "over a gravelly, sandy desert." There Lyle persuaded miner Thomas J. Shaw to go down to the Amargosa to find Wheeler and guide him back to Pigeon Spring at the north end of the Last Chance Range, where Lyle would wait with provisions. By the time Wheeler reached the spring, his party was suffering from lack of water and provisions, and when the men finally returned to Camp Independence, Wheeler promptly gave command of Lyle's party to Daniel W. Lockwood, a fellow West Point classmate and topographical engineer.

On August 12, Wheeler set out again to explore Death Valley. Lockwood had left a few days earlier for the south end of the valley, apparently traveling southward as far as the

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25. "Preliminary Report of Explorations in Nevada and Arizona, 1871," by George M. Wheeler, Appendix B by D. A. Lyle, pp. 77-80, in *Annual Report of the Secretary of War, 1872*, Report of Chief of Engineers, Appendix DD, "Report of Lieutenant G. M. Wheeler, Corps of Engineers, of Explorations and Surveys in Nevada, Utah, and Arizona, 1872," U.S. Congress, Senate, 42d Cong., 2d Sess., Senate Executive Document No. 65, 1872.

mouth of Redrock Canyon and then eastward along the Garlock fault to Saratoga Springs and on to the Spring Mountain Range in Nevada. While Lockwood's trek was conducted without incident, new trouble awaited Wheeler. He sent Lyle with the main party south into the Cosos, then east to Darwin Canyon where they observed Darwin Falls, and across Panamint Valley to Wildrose Spring, to wait till he arrived with a second party by way of Cerro Gordo and Cottonwood Canyon, some 20 miles to the north. To aid his journey, Lyle recruited a new guide, William Egan, a quiet, studious man from Cerro Gordo. After several days' wait at Wildrose Spring Lyle dispatched Egan to guide O'Sullivan and a packer to Wheeler's camp in Cottonwood Canyon to take some photographs and then guide them all back to Wildrose. After the main party had moved over Telescope Peak and across Death Valley to Ash Meadows and the remaining men from Cottonwood Canyon had arrived without Egan, Lyle realized that Egan might be lost in the Towne Pass area. As word of the disappearance of Hahn and Egan spread through Owens Valley, four separate search parties formed to seek unsuccessfully for some trace of the two guides, and in their wake came a wave of condemnation of Wheeler and the survey.[26]

Recounting his experiences during this second trip through the Death Valley country in the summer of 1871, Lyle described the terrain that his men had crossed. He reported to Wheeler:

> Our next march was to the east of Owen's Lake, some twelve miles, to a point below Swansea; road very sandy; short alkali grass, very poor in quality; bad water and no wood. We then moved southeast to near Arab Springs, in the Coso Range, about sixteen miles. Here we had plenty of grass and wood, but very little water; though plenty of water was found at a large spring, five miles distant, in east side of range. The next day we crossed a small, broken, desert valley, called Tortoise Valley, and camped twenty-five miles out, near Egan's Falls, in Darwin Cañon; spring here suddenly rises near the foot of a high bluff, and quite a little stream issues forth; running a short distance, it is precipitated over several cascades, from 12 to 80 feet high, formed by slate ledges. The cañon at this point, and for some distance below, was impracticable, being only a narrow gorge cut through the slate by the water. The formation of this range is chiefly slate, granite and volcanic rocks, with large mineral deposits in Granite Mountains. From here we crossed a high mountain by a steep trail, and, passing to the north and west of Granite Mountains, we regained Darwin Canyon, and following it down we debouched from the Tortoise Range into Panamint Desert, a sterile basin, utterly destitute of vegetation except a few thorny shrubs. This desert for some miles was sandy. Then crossing a large alkali flat, till near the eastern side, our route lay over low volcanic mesas whose surfaces were torn up and washed into deep, rocky ravines by the terrific waterspouts which are of frequent occurrence in this section. The trail was now extremely rough and rocky, rendering traveling very difficult; reaching the foothills we quickly changed our direction from southeast to northeast, and proceeded up Rose Cañon seven or eight miles to Rose Springs, about five miles northwest of Telescope Peak, on the western slope of the Telescope Range, where we camped. The weather was extremely hot and animals and men suffered greatly from thirst and fatigue.

26. For more information on Wheeler's 1871 explorations, see Cragen, *The Boys In The Sky-Blue Pants*, pp. 93-110.

> Panamint Desert is between twenty and thirty miles in length, and from eight to eighteen miles wide, a desolate waste of sand, gravel, alkali flats and low mesas, with shifting sand-hills near northern extremity. Horned rattlesnakes met with here. Telescope Range, to the eastward from where we entered the desert, presented that peculiar banded structure of bright colors, known among old prospectors as "calico ranges."

Lyle continued:

> No trees are ever seen; even on the mountains, sage brush, grease-wood, and in some places mesquite and cactus reign supreme, defying alkali, sun and furnace like blasts of air that often come strong from some bake-oven of an inclosed valley. At Saratoga Springs — a fictitious name for a damnable spring, whose only merit is that of size, being actually ten feet across the southern end. . . . Mr. Nell, topographer, came near losing his life, being found, however, after two days exposure, all senses but that of sight being gone. . . .[27]

Although Wheeler's survey shed new light on the Death Valley region, the loss of his guides further shrouded it in mystery. Wheeler nonetheless obtained continuing appropriations to carry on the first extensive surveys of the West. But he had had his fill of the Death Valley region, which he described as "one of the most desolate regions upon the face of the earth." He never returned, although he did send two detachments back to the valley in the summer of 1875 as part of an expedition to survey areas in Colorado, New Mexico, Nebraska, Utah, and California. The object of this survey, as in preceding years, was "primarily the collection of data for the construction of detailed topographic maps, in pursuance of the systematic geographic and topographic survey of the western mountain region." In addition investigations were conducted in geology, paleontology, mineralogy, zoology, and botany, and all mines and mining camps that could be reached were visited and examined, and mineral and thermal springs noted.[28]

During the 1875 expedition, First Lieutenant Rogers Birnie, Jr., led one of the detachments into the heart of Death Valley via Darwin Canyon and Panamint Valley, while Lieutenant Eric Bergland led the other from the south edge of Death Valley to the Colorado River. Birnie's party left Los Angeles on June 23, reaching Granite Springs, near the southwest base of Pilot Knob, on July 7. After ascending Owen's and Olancha peaks the party spent two days encamped at Olancha at the south end of Owens Lake. Skirting the foothills of the Coso Mountains on the north by way of Arab Spring, the Birnie party went to Darwin, which Birnie described as a flourishing mining camp that had been established earlier that year. A topographical station was installed near the camp, and the fledgling town and some of its principal mines were "located in position." According to Birnie:

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27. Appendix B by D. A. Lyle, pp. 80 ff.

28. *Report Upon United States Geographical Surveys West of the One Hundredth Meridian, In Charge of Capt. Geo. M. Wheeler*, Vol. I - "Geographical Report," pp. 35 ff. In Wheeler's report on this expedition, he mentioned the "Waucova" mining district, which occupied the northernmost portion of Saline Valley. His men did not visit the mines, but specimens they examined from the mines resembled "those at Cerro Gordo." He stated that the ore was principally argentiferous galena, with some "indifferent silver rock exposed in places." Wood and water were said to be plentiful, but little development work had been done on the mines to date.

> . . . . Water had been conducted by pipes from springs distant about 7 miles, and in sufficient quantity for the use of the town and furnaces. The party camped on the night of the 23d of July in Darwin Cañon, about 7 miles from the town, where a magnificent spring burst from the side of the canon. Its waters, however, sink after flowing a few miles and before reaching the valley; and such is found to be the case with all the other little streams of this range (the Argus) and those of the Panamint and Amargosa ranges to the east of it.

Returning through Darwin, the Birnie party moved "a short distance westerly to Coso, an old but now abandoned gold-quartz mining-town (except by a few Mexicans) in the Coso Mountains." Birnie reported further:

> . . . . From these hills at present is obtained the supply of wood and charcoal for Darwin; this supply, with any great demand, as seems probable, will, however, soon be exhausted. From Coso, following a wagon-road, we crossed the Argus range into Shepperd's Cañon, and thence directly across Panamint Valley to Cañon Station, (of the Cerro Gordo Freighting Company) in Panamint or Surprise Cañon, on the eastern slope of the range, a few miles from the valley. We remained in this camp about a month, (until August 28) occupied in measuring a check base-line in Panamint Valley; the ascent of Telescope Peak; a trip to Lookout and Rose Spring mining-districts; another to Panamint; and another to Borax Lake and factory, in which the Slate range was crossed; Argus Peak occupied for topography, a route meandered from this peak northward to develop the topography of the angle formed by the junction of the Argus and Slate ranges, (Borax Lake lying between these ranges) and to occupy Maturango Peak of the Argus Range.

Birnie discussed the exploration party's visit to Panamint City, where silver had been discovered two years before, triggering a mining rush:

> Panamint Valley, a little more than 1,000 feet above the sea-level, is exceedingly desert and alkaline, and, together with the other low and desert valleys in this country, very hot in summer. Hot springs are found at nearly the lowest point, which is on the east side of the valley, at the base of the Panamint range. A valuable salt marsh is near them.
>
> The mining-town is situated near the summit of the range, in a cañon of the same name, (Panamint) and is reached from Panamint Valley by a very steep but excellent wagon-road. . . .
>
> While at this camp, all our animals, except a few required for short trips, were sent a distance of about 30 miles, where pasture could be obtained; we were thus enabled to recruit materially those that had developed signs of weakness.
>
> From this place, with a portion of the party, I crossed the head of the cañon in which the town is situated, and from the summit of the pass we overlooked Death Valley and the Amargosa range beyond on the east and Panamint Valley on the west.

Descending into Death Valley via a steep trail through Johnson Canyon, Birnie's party turned northward and camped for two days at Bennett's Well. From there the party crossed to the northeast over the old emigrant road to Furnace Creek where it awaited the arrival of the rest of the party that had separated from it at Cañon Station and had moved along the western foothills of the Panamint range to Willow-Tree Station on the Los Angeles and Panamint Road via Pilot Knob. That party had occupied Brown's Peak in the southern Panamints for triangulation and topography work, before passing south of the range by Leach's Point and Owl Springs into Death Valley at Saratoga Springs.

The reunited party under Birnie moved northward, crossing the Amargosa Range and desert to Bare Peak and Oasis Valley before reentering the northern portion of Death Valley and camping at Salt Wells. Recrossing the Panamint Range through Cottonwood Canyon, the party "reached water and a camping-place." The day's march had exhausted the group's animals, "two having to be left, unable to travel; one died almost immediately, the other was brought into camp the next day." According to Birnie, the "water met with had been sufficient only for ourselves, and riding animals and some of the pack-mules had been without for forty-eight hours; and in this one encounters the difficulty of traveling with more than a few animals. Besides the scantiness of the grazing, the springs are too small to furnish sufficient water."

Birnie observed that his party "passed along the stream of several miles in length, lined with cottonwoods, and following a good trail, camped at springs near the summit of the range and the head of the cañon." Here, according to Birnie, the "uniformity of the ranges is broken," and "a spur that separates Panamint from Salinas [Saline] Valley juts out from the Panamint range." The "highest portion of this spur, somewhat plateau in character, is interspersed with springs, and good grazing is found." A mule ranch [Hunter Mountain Ranch] had been established in the vicinity, and after "occupying a triangulation-station here, we passed along the spur and crossed the Cerro Gordo range by a very steep trail, and came to the mining-town of Cerro Gordo on the eastern slope and near the summit . . ." From there, the party traveled "by excellent wagon-road down the mountain to Cerro Gordo landing, on Owens Lake." The "country from Panamint to Cerro Gordo was without settlers, except the small garden in the cañon east of Panamint."

After returning from an ascent of Mount Whitney in October members of the party made several forays to occupy Cerro Gordo Peak, New York Butte, and Waucoba Peak in the Inyo Mountains to establish triangulation stations. Birnie's party was disbanded in November 1875, and thereafter he reported to Wheeler that his party had been in the field for 143 days during which time they had accomplished a number of projects:

> . . . . A system of triangles was closed over an area of about 8,000 square miles of territory, and the topography of this area, with about a third as much more obtained by running meanders exterior to the system, was as far as practicable, carefully studied and can be mapped.
>
> The parallel ranges of mountains, with but 15 or 20 miles between their crests, and these marked with well-defined points, afforded an excellent opportunity for carrying on the triangulation.

> A base, 6.78 miles in length, was measured in Panamint Valley, where we were able to find a nearly level and favorable surface, and well-conditioned triangles enabled us to include two prominent mountain stations (Telescope and Maturango Peaks) in the first extension. This system was definitely connected with that of the Los Angeles base by the two parties occupying in common Whitney's, Olancha, and Owens Peaks. . . .
>
> The principal roads and trails were meandered, and a table of distances for these, with remarks as to wood, water, &c., prepared in the field.
>
> Twelve hundred and sixty-one miles were meandered and 611 traversed but not meandered. . . .[29]

After this expedition was completed a special report was submitted to the Chief of Engineers and printed by departmental authority. The report was accompanied by a "skeleton map of the region west of the 100th meridian, on a scale of 1 to 6,000,000, illustrative of a scheme for mapping the entire area on a scale of 1 inch to 8 miles." A table of camps, distances, altitudes, etc., was published for office use, serving as "a preliminary rather than completed work, and will contribute its quota to the geographic positions, distances, azimuths, altitudes, etc. to be specially prepared."[30]

SCIENTIFIC EXPEDITIONS: 1890s-1930s

As the period of early exploration of the Death Valley region drew to a close with the completion of the Wheeler expeditions, the lure of mineral riches, which had already led to several mining rushes, drew increasing numbers of people to the area during the 1870s and for several decades thereafter. Even during the boom years, however, mineral wealth was not the only thing that lured men into the region. Some individuals came simply to discover and observe the facts about the isolated and desolate lands that had developed a reputation enshrouded in mystery and fantasy. This group of explorers was a new crew of scientists who picked up where Wheeler's surveys had left off. They collected and catalogued many new species, measured and mapped much new ground, found new geological and topographical facts, and tried to dispel old fantasies and illusions that had grown up about the mystery of the isolated region. Outrageous talk of hellish conditions and satanic creatures and of the unknown and the unknowable which had persisted for some four decades was certain to arouse the interest and curiosity of more scientific Americans, who could not resist coming to see it for themselves.

Biological Exploration

The first of the scientific groups to visit the Death Valley region following the Wheeler explorations was the Department of Agriculture's Death Valley Expedition in 1891. This

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29. "Executive Report of Lieutenant R. Birnie, Jr., Thirteenth United States Infantry, On the Operations of Party No. 2, California Section, Field-Season of 1875," *Annual Report of the Secretary of War, 1876*, Report of Chief of Engineers, Appendix JJ, pp. 350-58.

30. *Report Upon United States Geographical Surveys West of the One Hundredth Meridian, In Charge of Capt. Geo. M. Wheeler*, Vol. I - "Geographical Report," pp. 666-67.

expedition was one of the first in a series of biological surveys of the West conducted by naturalist Clinton Hart Merriam, chief of the department's Division of Ornithology and Mammalogy in Washington, D. C., who initiated studies of the geographical distribution of plants and animals in order to define life zones that could be used to assess the suitability of land for farming and ranching. Merriam was particularly interested in the Death Valley country, not for its dubious agricultural potential or for its "deadly peculiarities," but for the possibility of finding new species of life and for the unique opportunity to study seven separate life zones in the short span from the valley floor to the peaks of the Panamints. For the expedition, Merriam recruited ten young government scientists, including zoologists Vernon Bailey, Basil H. Dutcher, and Edward W. Nelson; ornithologists Albert K. Fisher and Theodore S. Palmer; entomologist Albert Koebele; botanists Frederick V. Coville and Frederick Funston; and an amateur naturalist, Frank Stephens, who later founded the San Diego Natural History Museum. Eight hired helpers, serving as teamsters and packers, a Chinese, who served as the cook, and 17 horses and burros rounded out the participants in the expedition.[31]

The expedition entered Death Valley through Wingate Pass and Long Valley just north of the Owlshead Mountains in mid-January 1891 and spent the next six months crisscrossing the country from Panamint to Pahrump and Saratoga Springs to Sylvania, collecting every type of plant and animal that could be found. The scientists found the region full of life, although much of it was nocturnal. They sighted hundreds of birds and animals; shot sidewinders, coyotes, and mountain goats; trapped chuckwallas, horned toads, and kangaroo rats; caught pupfish, frogs, toads, and a myriad of insects; and clipped or dug up hundreds of varieties of plants. The expedition published two volumes on the wildlife of the region, and it discovered more than 150 new species and two dozen new genera of plants and animals, mostly insects. The new species included pupfish, poppy, and snail, the latter named for Merriam, a toad and a mountain goat for Nelson, a frog for Fisher, a lizard for Palmer, and a greasewood for Bailey.[32]

The expedition proved to be a great success, and, except for Funston's dog, which was "parbroiled [sic] by the sun" in Saline Valley, all participants survived the six-month exploration. Nevertheless, they had some harrowing experiences. With a sense of wit and humor, Funston, for instance, characterized the earliest treks the expedition made during the cooler weeks of winter as being pure "hell." The starkness of the colors of the desert rock formations, the sparseness of the usual types of vegetation, and the "flats of salt and soda" left an indelible impression on his mind. The members of the expedition visited numerous areas throughout the region, sometimes breaking up into smaller units to perform various scientific, as well as functional, tasks. On February 21, for instance, Coville and Funston set out from Mesquite Spring in the Funeral Mountains for Panamint City, the nearest post office, reaching that isolated mining town after encountering a major snowstorm. During the eight-day trek, they crossed 178 miles of incredibly harsh terrain, picking up the party's correspondence and making their way back to the new camp at Ash Meadows in Nevada. No trails existed in the area, and for four days they traveled blindly through a major snowstorm to reach the post office. When they reached the Panamint Range on the west side of Death Valley, they found such a difficult landscape

31. Lingenfelter, *Death Valley & The Amargosa*, p. 362.

32. Ibid, p. 364.

that they had to quit their horses aud proceed on foot. For a short distance, they literally crawled, creeping painfully along on their "hands and knees" toward their destination. On their return, they found the abandoned mounts and were able to expedite the delivery of the mail to their colleagues.

On April 11, a small group packed over the summit of the Panamint Range from Johnson Canyon to Panamint City and camped at Brewery Spring in Surprise Canyon, about 2 miles below the town. After remaining there for four days the party moved its camp to the Hot Springs in Panamint Valley. Between April 24 and May 17, Funston and others went from the Hot Springs through Shepherd Canyon in the Argus Mountains to Maturango Spring, Darwin, Willow Creek Canyon, and Keeler. From May 23 to June 15, he went from Keeler through Cottonwood Canyon, across Mesquite Valley to Grapevine Peak, and back to Keeler by the same route.

On June 18, Coville aud Funston took a trail from Keeler over the southern end of the Inyo Mountains, south of Cerro Gordo Peak, to Willow Creek Canyon, spending four days "in making excursions down a spur of the Panamint Range into Panamint Valley and Saline Valley." Later that month, Funston joined a group led by Nelson that traversed the area from Lone Pine across the Inyo Mountains into Saline Valley, northward to Waucoba Peak, and across the range to Owens Valley.[33]

Surveying

Surveyors returned to the Death Valley region during the 1890s to more accurately define the California-Nevada boundary after von Schmidt's earlier survey was called into question. Cephas H. Sinclair of the U.S. Coast and Geodetic Survey was assigned the task. Starting at Lake Tahoe in 1893, he ran a new line across the north end of Death Valley and ou through the Amargosa during the heat of the summer in 1895, finally completing the project at the Colorado River in 1899. He successfully straightened out the state boundary, moving it west by as much as one mile in the vicinity of Death Valley.[34]

Geological Exploration

During the late 1890s and early 1900s, state and federal government geologists arrived in the Death Valley region to conduct the initial scientific studies of the area's geological formations and mineralogical potential. During April-July 1894, Harold W. Fairbanks, assisted by R. P. Heagan, conducted a mineral deposit survey of Inyo, Mono, and Alpine counties. Because of the "great extent of country, and the exceedingly barren and rugged nature of portions of it," Fairbanks reported that "little more than a reconnaissance report

33. U.S. Department of Agriculture, Division of Botany, Contributions from the U.S. National Herbarium, Vol. IV, Issued November 29, 1893, *Botany of the Death Valley Expedition*, by Frederick Vernon Coville (Washington, Government Printing Office, 1893), pp. 1-10, and Thomas W. Crouch, "Frederick Funston of Kansas: His Formative Years, 1865-1891," *Kansas Historical Quarterly*, XL (Summer, 1974), pp. 203-11.

34. *Ibid*, p. 365.

on the mineral deposits can be made, with the exposition of some general principles of the structure of the country."[35]

During the summer and fall of 1899, Josiah E. Spurr of the U.S. Geological Survey brought his bride of a few months on an extended honeymoon through southern Nevada and across Death Valley. Fresh from geological exploration of the Klondike in Alaska, he sought to unravel the geological history of the region. Spurr visited virtually all of the existing mining districts in lands that were added to Death Valley National Monument in 1994, including Beveridge, Cerro Gordo, Darwin, Deep Springs, Goldbelt, Independence, Lookout, New Coso, Panamint, Saratoga, and Ubehebe. Although he traced most of the geological formations in the area, he missed the rich mineralogical indications, thus calling into question the thoroughness of his study.[36]

The rich strikes at Bullfrog, Nevada, and neighboring Death Valley districts during the early 1900s attracted Frederick L. Ransome, Sydney H. Ball, S. F. Emmons, C. W. Hayes, E. C. Eckel, and G. H. Garrey of the U.S. Geological Survey in the summer and fall of 1905. They studied the various ore bodies and the surrounding geology to attempt to understand the relation between them. They picked out several areas where they expected ore should be found, but these proved to be barren. In addition their subsequent reports were of little value to potential investors, because promoters seldom let government men into their mines. Thus, the government was forced to rely on the promoters' estimates of the size and richness of the ore deposits, and what independent appraisals they did make were published too late.[37]

The Death Valley region's borax and other saline deposits also attracted the attention of geologists during the early 1900s. During the spring of 1900, for instance, Marius R. Campbell of the U.S. Geological Survey made a hasty reconnaissance of the borate deposits of the Death Valley and Mojave Desert regions, mapping out different deposits and speculating on their origin and economic potential. He found that the region's borax industry was flourishing, and that refining plants had been established near Columbus, Nevada, and at three locations in California: Searles Valley in San Bernardino County, Resting Spring in Inyo County, and the mouth of Furnace Creek in Death Valley. Traveling from San Bernardino, Campbell discussed his geological observations relating to borax deposits at Cajon Canyon, Victorville, Daggett, and Borate, before entering the south

35. Harold W. Fairbanks, "Preliminary Report on the Mineral Deposits of Inyo, Mono, and Alpine Counties," in California State Mining Bureau, *Twelfth Report of the State Mineralogist (Second Biennial), Two Years Ending September 15, 1894* (Sacramento, State Printing Office, 1894), pp. 472-78.

36. U.S. Department of the Interior, Geological Survey, Bulletin No. 208, *Descriptive Geology of Nevada South of the Fortieth Parallel and Adjacent Portions of California*, by Josiah E. Spurr (Washington, Government Printing Office, 1903). Also see U. S. Department of the Interior, Geological Survey, Bulletin No. 507, *The Mining Districts of the Western United States*, by James M. Hill (Washington, Government Printing Office, 1912), pp. 115-20.

37. U.S. Department of the Interior, Geological Survey, Bulletin No. 303, *Preliminary Account of Goldfield, Bullfrog, and Other Mining Districts in Southern Nevada*, by Frederick L. Ransome (Washington, Government Printing Office, 1907); Bulletin No. 407, *Geology and Ore Deposits of the Bullfrog District, Nevada*, by Frederick L. Ransome, W.H. Emmons, and G.H. Garrey (Washington, Government Printing Office, 1910); Bulletin No. 285, "Notes on Ore Deposits of Southwestern Nevada and Eastern California," by Sydney H. Ball, in *Contributions to Economic Geology, 1905*, by S. F. Emmons and E. C. Eckel (Washington, Government Printing Office, 1906); and Bulletin No. 308, *A Geologic Reconnaissance in Southwestern Nevada and Eastern California*, by Sydney H. Ball (Washington, Government Printing Office, 1907).

end of Death Valley at Saratoga Spring. As seen from the spring, he noted that "the rocks in the Owls Head peak resemble lake sediments with intercalated sheets of dark lava," although the "distance is too great to determine this with certainty." On his way to Resting Spring in the Amargosa Valley, he noted the geological formations in the Panamints and the Funerals. After reviewing the geology of the Pahrump Valley in Nevada he crossed the Funerals to Furnace Creek and then went on to Mesquite Flat in the northern portion of Death Valley. Crossing the Panamint Range in the vicinity of Wildrose Canyon, he noted that near the mouth of the canyon "alkaline lake beds" occurred that had a "thickness of 130 feet and an altitude above the bottom of the valley of about 1,000 feet." These "were visible at only one point, presumably being generally covered by immense deposits of water-laid gravel several hundred feet in thickness." A similar deposit of gravel "500 feet in height" occurred in the Panamint Valley at Ballarat, rising "toward the east, and at the base of Telescope Mountain reached an altitude of 1,000 feet above the valley floor." From this point, "wave-cut terraces" extended south along the flank of the mountain for a distance of several miles." In the valley near Panamint Springs he noted that there was a small salt field "similar in appearance to that already described." Here he observed that the salt field was "said to excel that of Death Valley, but no tests were made and the report can not be verified." He next traveled to Owens Valley, returning to San Bernardino via Red Rock Canyon.[38]

During the winter of 1901-02, Gilbert E. Bailey, a geologist with the California State Mining Bureau, began a more extensive survey of all saline deposits in the state. His report included a study of the historical development of borax production and manufacturing and a description of known borate and saline deposits, as well as niter deposits, by county.

Of the borate deposits that Bailey visited and described, a number were located in the Death Valley region. These included Bennett's Well, Confidence near Ashford Mill, Furnace Creek, Monte Blanco on the south side of Furnace Creek at the north end of the Funeral Range, Resting Spring in the Amargosa Valley, Saline Valley, Salt Wells Valley, Tecopa, Salt Springs on the south fork of the Amargosa River, Owl Springs, the Saratoga Beds that occupied the flats around Saratoga Spring at the foot of the Funeral Range near the south end of Death Valley, and the Upper and Lower Canyon Beds where the Amargosa River crossed the southern boundary of Inyo County.

The report also listed desert springs reported or possibly containing borates and a short review of processes of manufacture of refined borax. According to Bailey, many of the springs were "saline, and a few are so strongly impregnated with borax or other minerals as to make their waters unfit to drink." The list of springs in the Death Valley region, which did not include those located at well-known mining camps and settlements, included Cold Springs and Hot Springs in Saline Valley, several near Brown Mountain west of the Owlshead Mountains, Owl Springs in the latter mountain range, and a number in Death and Panamint valleys.

Among the significant salt deposits in the Death Valley region listed by Bailey were those located at or near Bennett's Well, Confidence Beds, Furnace Creek, Saline Valley, Salt

38. U.S. Department of the Interior, Geological Survey, Bulletin No. 200, *Reconnaissance of the Borax Deposits of Death Valley and Mohave Desert*, by Marius R. Campbell (Washington, Government Printing Office, 1902), pp. 7-22.

Wells Valley, Tecopa, Upper Canyon Beds, Owl Springs, Salt Springs, the Saratoga borax beds, and the Amargosa River. Bailey noted that to "give a list of the springs carrying noticeable quantities of salt" in Inyo County "would be to name nearly every spring in the desert portions."

Significant niter beds in the Death Valley region included those at Tecopa, Confidence, Upper and Lower Canyon Beds, Salt Springs, Saratoga Spring, and Owl Springs.[39]

During March 1902, the California State Mining Bureau collected data from county, state, and federal records for a comprehensive publication entitled *Register of Mines and Minerals, Inyo County, California*. This publication was accompanied by a *Map of Inyo County, California* showing the location of the mines.[40]

Topographical Exploration

From 1905 to 1907, Robert H. Chapman and half a dozen other surveyors from the U.S. Geological Survey mapped most of the Death Valley and the Amargosa regions, covering an expanse of more than 10,000 square miles. They produced the first reliable topographic maps (1:250,000) of the region — the preliminary Amargosa Region sheet issued in July 1906, the Ballarat and Furnace Creek quadrangles in March 1908, and the Lida quadrangle in June 1908. In a speech to the National Geographic Society on March 24, 1906, Chapman described the physical rigors associated with traveling in the region to conduct the mapping work, concluding his talk by observing:

> Great mountains are a joy to the lover of nature; they are an inspiration to the artist, and express grandeur and nobility. The desert has no such spirit, but has a wonderful fascination, born of the impressiveness of magnificent distance, limitless sky, and the infinite patience of an unbreakable calm.[41]

In 1909 Walter C. Mendenhall, who would later become director of the U.S. Geological Survey, issued a guide to the "watering places" throughout the entire desert country of eastern California and southern Nevada. Using the notes of Bailey and Chapman and perhaps others, his publication entitled *Some Desert Watering Places in Southeastern California and Southwestern Nevada* provided detailed information and maps on the main routes of travel and the location and description of irrigating and artesian waters and springs in the region. The maps and guidebook were invaluable to later travelers and may have saved many lives in the isolated and desolate region.

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39. California State Mining Bureau, Bulletin No. 24, *The Saline Deposits of California*, by Gilbert E. Bailey (Sacramento, State Printing Office, 1902), pp. 44-50, 62-63, 72-76, 80-82, 116-20, 130-32, 170-78. A decade later, Hoyt S. Gale, a geologist with the U. S. Geological Survey, would conduct an extensive survey of salines in Owens, Searles, and Panamint valleys. U. S. Department of the Interior, Geological Survey, Bulletin No. 580-L, *Salines in the Owens, Searles, and Panamint Basins Southeastern California* (Washington, Government Printing Office, 1914).

40. California State Mining Bureau, *Register of Mines and Minerals, Inyo County, California* (San Francisco, 1902), and ibid., *Map of Inyo County, California* (San Francisco, 1902).

41. Robert H. Chapman, "The Deserts of Nevada and the Death Valley," *National Geographic Magazine*, XVII (September 1906), pp. 483-97, and Lingenfelter, *Death Valley & The Amargosa*, pp. 366, 553.

According to Mendenhall, three principal routes led to Death Valley, each of which came from the south. One route started from Johannesburg in Kern County, while two others originated at the San Bernardino County towns of Daggett and Barnwell in the Mojave Desert. His description of these routes demonstrates the difficulties of transportation in the region before the introduction of automobiles and construction of modern paved roadways:

> The Johannesburg route runs by way of Blackwater and Granite Wells. A heavily laden team can leave Johannesburg late in the morning and reach either of these camping places in the evening. A dry camp should be made between Granite Wells and Leach's Spring, the next watering place, as the distance is 45 miles, and pulling is hard over the last 6 miles on account of deep sand and heavy grades. From Leach's Spring the route leads to Owl Springs, Saratoga Springs, the China ranch, and thence to Resting Springs. At Resting Springs directions should be obtained for going to the head of Furnace Creek, whence the route follows down Furnace Creek to the Borax Works at Coleman, in Death Valley.
>
> The Daggett route is a favorite with many. This road runs from Daggett to Otis, thence east of the Calico Mountains to Coyote Well, and across the dry lake to Langford Well and Garlic Spring. From this spring the road passes to the east of the Granite Mountains and climbs the Avawatz Mountains to Cave Springs. From Cave Springs it leads to Saratoga Springs and thence to Resting Springs.
>
> The Barnwell route was for a number of years traveled by a daily stage running from Barnwell, Cal., to Manse, Nev., but the stage has been abandoned since the construction of the Salt Lake Railroad. This route is still preferred by some travelers, who obtain their supplies at Barnwell or at Ivanpah. From Ivanpah the road extends across the dry lake to the north, thence through the State Line Pass to Mesquite Dry Lake and Sandy; from Sandy northwestward to Stump Spring and Manse; thence to Pahrump and Johnnie and Miller Well No. 2, where it joins the stage road from Las Vegas to Bullfrog.
>
> Outfits may also start from Roach or Jean, Nev., and go westward to Sandy. At Pahrump, on this line, roads branch to the Fairbanks ranch at Ash Meadows, but it is advisable to go by way of Johnnie to Miller Well No. 2, and thence to the Fairbanks ranch, where there are springs. A number of recent changes and improvements in the roads give good routes to the head of Death Valley. Travelers can obtain all information regarding these changes at Pahrump and at the Fairbanks ranch.

In his list of springs Mendenhall described several which are in or near the lands that were added to Death Valley National Monument in 1994. One was the Saline Valley Well, which had been dug by Conn and Trudo during the 1880s when they manufactured borax "on an old dry lake in Saline Valley." The well was near their works on the west side of the valley road, and it furnished "a good supply of water of fair quality." The well was "still used by prospectors on their way to the copper regions on the eastern side of Saline Valley."

Some 10 miles northeast of this well were two groups of springs known as "Cold Springs." The springs of one group yielded hot water, while those of the other provided cold water. The "hot springs" were located "farther south than the cold." The water from both springs was "of good quality," and there was "a sufficient quantity, if developed and conserved, to irrigate several acres."

Willow Springs were located "away from the main roads and trails, in Darwin Canyon, about 4 miles northeast of Darwin post-office, at an elevation of 3,600 feet." The water produced by the springs was "said to be excellent," but their "exact location" could "best be ascertained by inquiring at the post-office."

Owl Springs, located about 2 miles north of the pass between the Owlshead Mountains and the Avawatz Mountains, were about 18 miles southwest of Saratoga Spring by road. The springs at the foot of the Owlshead Mountains were easily found, because they were "at the foot of a monument of stones about 3 feet high, placed to mark the corners of mineral claims, and the area round about them" was "littered by the debris of many camps." The springs were "about 6 feet deep, and the water. . . not too saline for comfort." A short distance to the west was a "trench about 25 feet long and 10 feet deep at the deeper end." The water from the trench was "in larger amount and of better quality than that of the original springs." Water could be had "almost anywhere around this point, for a distance of at least 300 feet north and south, by digging shallow wells."

The road northeastward to Saratoga Spring was "sometimes obscured by washouts." Death Valley was "in plain sight, however, and if, after following the wash for about 10 miles, the traveler" could "not find the road, he should keep to the right-hand side of it until he finds a road running directly east." This road crossed a "low spur of the mountains" and was the "best route to Saratoga Springs."[42]

Journalists

A few truth seekers other than scientists also arrived in the Death Valley region during the late 19th century, and wrote some of the best works concerning the area. Journalist John Randolph Spears came in the winter of 1891 to gather facts for the first book on the valley, his classic *Illustrated Sketches of Death Valley and Other Borax Deserts of the Pacific Coast*. In the publication Spears reported a bonanza of entertaining facts and colorful stories associated with the scenic and historic highlights of the region, but he also perpetuated some old fantasies and even started some new yarns.

While compiling data for his book, Spears visited some areas that lie in the lands added to Death Valley National Monument in 1994. Although mentioning the borax works in Saline Valley, he did not travel to that area. However, he did visit Panamint City which had become a moribund ghost town. Spears commented that during the mining rush to Panamint nearly two decades before the road to the town had been "thronged with an eager, reckless crowd," many traveling "afoot with wheel-barrows, or harnessed to buck-

42. U.S. Department of the Interior, Geological Survey, Water Supply Paper No. 224, *Some Desert Watering Places in Southeastern California and Southwestern Nevada*, by Walter C. Mendenhall (Washington, Government Printing Office, 1909), pp. 26-27, 31-33, 37, 45-46.

boards, because they could not buy horses to haul their supplies." After "the mill burned down away went the campers — some perishing on the desert for want of water." "Out of the debris a ten-stamp mill" had been constructed, but "even that is idle for lack of fuel, and only one white man remains." Describing this lone prospector, Spears noted:

> . . . A more curious character than he is said to be would be hard to find. The white Arabs speak of him with much respect as one who writes novels and other literary matter, and has sufficient influence to keep an open mail route to the deserted camp.

Aside from the one prospector, a "handful of Indians who call themselves a distinct race — the Panamints — live about the old camp."[43]

In May 1898 some seven years after Spears visited the region, Carmen Harcourt, a journalist for *Overland Monthly*, arrived in Death Valley to examine the area and report on his findings. Harcourt observed:

> Death Valley is a spot famous wherever the English language is spoken, and to most people it is known only as a pestilential hole anywhere from five hundred feet to one mile below sea level, swarming with Gila monsters, rattlesnakes, sidewinders, poisonous lizards, and other awful, unnamed creatures which, like the Sphinx of Sophocles's great tragedy "Oedipus Tyrannus," awaits to devour the intrepid traveler on the Amargosan plains.

According to Harcourt, the "Death valley of reality is considerably unlike the Death valley of the highly imaginative space writers of the daily press." However, these "knights of the quill" should be forgiven "when we reflect that their knowledge of this region is mainly gained from the early Government reports, which are bristling with inaccuracies, and many of whose surveys were really never made as claimed."

Emphasizing the scenic attractions of the Death Valley region, Harcourt reported that when he visited the valley, which he termed a "wondrous spot," he was "surprised to find that it differed but little in topography and general characteristics from the Panamint and contiguous valleys." Despite "its forbidding aspect," the valley was "a picture masterful in its vast proportions and as varied in color as the entire range of the artist's palette, even without a green thing in the entire detail of the composition." Looking "at the grand panorama, with the sun sinking behind the twin peaks of Mount Whitney, in a sky illumined with nimbus-like clouds of delicate green and fiery copper and gorgeous shades of red, one can begin to understand the fascination of the desert to its inhabitants, and no longer wonders why a man who is once a miner or prospector can never be wholly weaned from the dangerous but seductive influences of the desert." Apart from the incentive of mineral wealth, the rugged region had "a wonderful charm" in which "nature is seen in all the grandeur of her most savage and forbidding moods."[44]

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43. John R. Spears, *Illustrated Sketches of Death Valley and Other Borax Deserts of the Pacific Coast* (Chicago and New York, Rand, McNally & Company, Publishers, 1892), pp. 160, 188.

44. Carmen Harcourt, "Death Valley and the Mojave Desert," *Overland Monthly*, XXXI (Second Series, No. 186, June 1898), pp. 488-91.

Archeological Surveys

Although explorers, scientists, and area residents had found remnants and vestiges of the region's prehistoric past in the lands that would later be added to Death Valley National Monument in 1994, the archeological potential of the region was never surveyed by trained investigators until the early 1930s. Several years earlier, in 1927-28, Julian Steward had commenced ethnographic studies of the Owens Valley Paiute in Owens Valley and at Mono Lake under the auspices of the Department of Anthropology of the University of California, Berkeley, thus focusing attention on the region's rich cultural heritage and attracting the attention of archeologists who were interested in surveying other areas of the largely unknown region for its archeological potential.[45] With the financial support and encouragement of the Southwest Museum in Los Angeles and the Eastern California Museum in Independence, the first archeological survey of the lands that would be added to the national monument in 1994, termed a "preliminary archeological investigation" of parts of Owens Valley, Saline Valley, and the Coso Range, was undertaken by Clifford Park Baldwin in 1931. Accompanying Baldwin was Carl E. Hegner, a photographer, and Mark Kerr, who served as a guide in "locating, maping [sic], sketching and photographing much material." The report of the survey is noteworthy for this study since it includes location maps, photographs, and sketches of archeological sites as well as a description of the men's harrowing automobile journey through Saline Valley, Hunter Canyon, and Darwin.

According to a diary of the trip that accompanies the report, the men photographed and sketched sites in Independence Creek and Swansea near Keeler in the Owens Valley before traveling to Darwin in two automobiles on October 31, 1931. They were equipped with "extra drums of gasoline (about 62 gallons)," and plenty of oil and water. About 18 miles north of Darwin, probably in the vicinity of the Darwin Plateau and/or Lee Flat, their automobile "was soon laid up with tire trouble . . . on a volcanic flat 6000 feet above sea level." "Due to the stony nature of the road," it was necessary to keep their tires in good condition, because after leaving Darwin for the Saline Valley there was no chance to obtain supplies.

According to the diary, the road to Saline Valley was treacherous. It

> winds up from the high flat valley above Darwin through a wash which, after a heavy storm, may require some road building in places. Rising to nearly 7000 feet before begining [sic] the desent [sic] downward for twelve miles to the floor of the Saline Valley, you are lulled somewhat into a sense of false security by the beautiful heights. You are suddenly confronted with an abrupt change in the landscape to that of a rough, and rugged country that quickly changes your atitude [sic] to one of caution and respect for the elements.
>
> There is one place in the canyon wall where the road is blasted out of a steep cliff, making a sharp, winding decent [sic] of several hundred feet of rough, rocky gorge. From here the road continues through a rough wash with the canyon walls rising sheer above on both sides, until you reach the valley below. Now you can

45. Steward, "Ethnography of the Owens Valley Paiute," pp. 233-350, and Smithsonian Institution, Bureau of American Ethnology, Bulletin No. 120, pp. 1-10, 46-49, 68-93.

> see the Ubehebee [sic] Peaks on the right, across the valley, and salt sink straight ahead.

The men's first stop was at "the big rock with Pictographs and Petroglyphs on it about half way up the wash to Hunter Canyon." After surveying the vicinity they drove into the canyon to a spring from where they continued on foot to a cave which they photographed and sketched.

After driving into Saline Valley the men passed the old salt works near which a well was located. Beyond "the Salt Works and about half a mile up the wash from a road that skirts the west side of Saline Valley," the men stopped at "a large granite boulder about 7 feet high, 8 feet wide and 18 feet long beside the road." The rock had numerous pictographs and petroglyphs and mortar holes on it, and rock circles, potsherds, and chips were found in the vicinity. In a wash about one-half mile northwest of the rock, the men found "the scattered residue of cremation, principally beads of the same trade type lying in the small spaces between the rocks." Many of the beads were "burned and broken," and a "fragment of human skull and two shoulder fragments of porcelain doll were also found."

After driving approximately 10 miles "over the bed of the old salt marsh to the north-east side of the big valley," the men found that the "road finnaly [sic] disappeared [sic] into nothingness." They "continued up the wash to Lower Warm Spring," but darkness overtook them so they bedded down until daylight.

The next morning, the men reconnoitered the vicinity of Lower Warm Spring, viewing the remnants of a "small wickiup" that had been intact when Kerr had photographed it eight years before in 1923. It was a "small reed shelter about large enough to protect the head and upper part of the body from the sun or wind." It had "a smaller sort of shield to place along the side of the body that the larger one did not cover." After a three-mile hike during which the men found few artifacts, they left for Upper Warm Spring:

> Morning found us on our way again after a little reconnoiter by Kerr but the road soon gave out again. From Lower to Upper Warm Spring we had to dodge from one narrow wash to another going over boulders that, unless one were very careful, would wreck a car. We had to stop about every fifty feet to roll them out of the way, break down edges, and build our road for a distance of 2.8 miles. This consumed seven hours of our time and meant a whole day lost for us.

The men reached Upper Warm Spring on the afternoon of November 2. Here they found "several pools of water about the temperature of 110 degrees" among "mesquite trees." "Rock slabs in the center" surrounded "another such pool almost entirely hidden by the rushes that grow in the water." The "screw-shaped beans growing" on the mesquite trees were still "picked by the Indians and ground into meal." Early the next morning, the men started "to look over the slopes west of our camp" covering an "area 1/2 a mile and approximately a mile long." Crossing over this area of light colored knolls and flats, the men found them to be cut "by many small washes and gullies." The "surface all about showed signs of former hot springs that, in running over the surrounding surface, made a yellowish hard crust." While walking about the surface of the knolls, the "ground sounded hollow" beneath their feet. They soon found the cause "to be hollow caverns, one of which had a small opening 10 x 15 inches." Investigating the hole through the small opening

with a rope and flash light, they found the hole to be "4 feet 9 inches deep and 4 feet in diameter." The hole, in turn, opened into a cave "11 feet long, 5-1/2 feet deep with a 50 inch ceiling." North of this knoll, they found another "circle situated similarly atop a low knoll," that was "a natural crevice between rocks about 3 x 4 feet in size and 30 inches high, with plenty of chips lying about." They decided that this cave "may have afforded the inhabitants better protection from the wind than the one higher up." All told, they found about ten caves, many of which possessed artifacts, projectile points, and metates as well as pottery and basketry fragments. The diary noted:

> . . . .Everything looked so good that we spent three days in the immediate vicinity, locating Caves, Rock Circles, and Artifacts. Excitement ran high as there was one thrill after another, especially when on Tuesday night Mark Kerr came into camp after scouting around alone all day and reported finding a Cave with Basketry in it. From viewing the site we noticed that a large chunk had broken off the crumbling, overhanging cliff and tumbled into the wash below, so we decided to remove all we could before the site was completely ruined.

The last day was spent hiking "two miles farther up the canyon which brought to light a site of about 125 stone monuments in about an acre of ground." An "old Indian trail" had been "beaten into the hard desert pavement" several "hundred feet [to the] north." After photographing the monuments the men hiked back to Upper Warm Spring, taking "a round about way" that "disclosed three rock circles located on the top of the two highest knolls north-west of camp."

After three days at Upper Warm Spring, the men returned to the Hunter Canyon site to complete their work. On their way down the wash, they stopped "at the two warm springs we called 'Middle Warm Springs'" to photograph "a group of obsidian knives and chips in a 12 inch radius." For more than a day, they scouted the area, recording and photographing petroglyphs, pictographs, caves, rock circles, and artifacts, some of which were collected.

The following afternoon, the men started out "of the valley so as to get through the canyon before dark." The diary noted:

> It was easy enough going in, but with our heavy load it was low and second gear work all the way to the summit. Several stops were made to cool the motors; one to repair the transmission of Kerr's car. Darkness overtook us when we were but a few miles from Darwin. . . .

After spending the night in Darwin the men traveled to Wildrose Canyon. After spending a night in the deserted mining town of Skidoo they pressed on to Emigrant Canyon where they recorded and photographed caves. Back at Darwin, they interviewed a man who operated a restaurant and rented cabins to desert travelers during the winter months. In summer the man prowled the surrounding country. He told them of an unnamed canyon about 17 miles from Darwin in the Cosos that contained many petroglyphs, but since the road to the canyon was in very poor condition, the men went to Olancha from where they

branched out to scout archeological sites in the Cosos, including Coso Hot Springs and King's Canyon.[46]

Although the Baldwin Expedition was the first archeological survey to report and photograph rock shelters, rock circles, lithic scatters, artifacts, and other archeological sites in Saline Valley, the information had limited scientific value because of the unsystematic manner in which the data was collected. More systematic data recovery and archeological surveys would be conducted in the late 1970s and early 1980s as part of the data inventory for the California Desert Conservation Area Plan.[47]

RECOMMENDATIONS FOR NATIONAL REGISTER OF HISTORIC PLACES EVALUATION STUDY

Further study should be given to the ruins at the site sometimes known as the "soldier's camp" in the Waucoba Mine vicinity preparatory to a determination as to whether to proceed with future National Register evaluation work.

46. Clifford Park Baldwin, "Archeological Exploration and Survey in Southern Inyo County, Cal.," 1931, Silver Boxes, Archeology - Death Valley, Research Library, Death Valley National Park.

47. U. S. Department of the Interior, Bureau of Land Management, "A Survey of Archaeological Resources in the Saline-Eureka Valley Area," by Carole Robarchek (UCR), October 1972, pp. 1-27; Francis C. Berg and M. Suzanne Crowley, Draft, "Notes on Selected Historical Sites in the Saline Valley," Presented at Annual Meeting of Society for California Archaeology, San Luis Obispo, California, April 6, 1979; Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area Office; and Richard H. Norwood, Charles S. Bull, Emma Lou Davis, and Ronald Quinn, *A Cultural Resource Overview of the Eureka, Saline, Panamint and Darwin Region, East Central, California*, Prepared for the U. S. Department of the Interior, Bureau of Land Management, California Desert Planning Staff, Riverside, California, Contract No. YA-512-CT7-226, 1980, pp. 10-184.

CHAPTER TWO: MINING

HISTORICAL OVERVIEW OF MINING IN THE DEATH VALLEY REGION[48]

Gold, freed from its matrix by erosion and deposited as nuggets and flakes, or fine "colors" in streambed gravel, provided the first non-Native American mineral production in California. These placer deposits, in what would later be known as Jackson Gulch and Potholes in Imperial County in southern California, were worked for a brief period in 1780-81 by Spanish prospectors. Gold was also discovered and worked at Placerita Canyon near Newhall, north of Los Angeles, in 1842, but neither discovery caused a world-wide rush like that of James W. Marshall's find on a branch of the American River in Eldorado County in the lower Sacramento Valley in January 1848. The Mother Lode in northern California served as a magnet drawing eager and adventurous young and not-so-young men to California in search of fortune. By the end of 1849, it is estimated, the California population had been swelled by some 100,000 persons known as the "Forty-Niners." Despite country-cousin comparison with the Mother Lode, the California desert region of southern and eastern California soon had its share of visitors on their way to the northern goldfields.[49]

The first mineral discoveries in present-day Inyo and San Bernardino counties, in which the lands that were added to Death Valley National Monument in 1994 are located (only the most southerly portion of the lands added to the national monument are in San Bernardino County), were made during the winter of 1849-50.[50] In Inyo County, mining

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48. For an indepth history of mining in the Death Valley region, see the four-volume study entitled, U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining in Death Valley National Monument*, by Linda W. Greene and John A. Latschar, 1981, and State of California, Department of Conservation, Division of Mines and Geology, Special Report No. 125, *Miners and Mineral Deposits in Death Valley National Monument, California*, by James R. Evans, Gary C. Taylor, and John S. Rapp, 1976.

49. Richard B. Morris, ed. *Encyclopedia of American History: Bicentennial Edition* (New York, Hagerstown, San Francisco, London, Harper & Row, Publishers, 1976), p. 247, and Vredenburgh, Shumway, and Hartill, *Desert Fever*, p. 272.

50. Various California state mining publications provide an overview of mining history in Inyo County. The most pertinent publications include: W. A. Goodyear, "Inyo County," in California State Mining Bureau, *Eighth Annual Report of the State Mineralogist* (Sacramento, State Printing Office, 1888), pp. 224-309; H. DeGroot, "Inyo County," in ibid., *Tenth Annual Report of the State Mineralogist* (Sacramento, State Printing Office, 1890, pp. 209-18; "Mines and Mining Products of California," in ibid., *Twelfth Report of the State Mineralogist*, pp. 21, 23-25, 34, 135-41, 326, 333-34, 373-74; Clarence A. Waring and Emile Huguenin, "Inyo County," in ibid., *Report XV of the State Mineralogist, Mines and Mineral Resources of Portions of California* (Sacramento, State Printing Office, 1919), pp. 29-134; "Inyo County," in ibid., *Report XVII of the State Mineralogist, Mining in California During 1920* (Sacramento, State Printing Office, 1921), pp. 273-305; W. B. Tucker, "Los Angeles Field Division," "Inyo County," in ibid., *Chapter of Report XX of the State Mineralogist Covering Mining in California*, Vol. 20, July 1924 (Sacramento, State Printing Office, 1924), pp. 185-91; W. Burling Tucker, "Los Angeles Field Division," "Inyo County," in ibid., *Chapter of Report XXII of the State Mineralogist, 1926*, Vol. 22, January 1926 (Sacramento, State Printing Office, 1926), pp. 453-530; R. J. Sampson, "Mineral Resources of a Part of the Panamint Range," in ibid., *Chapter of Report XXVIII of the State Mineralogist Covering Activities of the Division of Mines including the Geologic Branch*, Vol. 28, October 1932 (Sacramento, State Printing Office, 1933), pp. 357-76; W. B. Tucker and R. J. Sampson, "Los Angeles Field District," "Mineral Resources of Inyo County," *California Journal of Mines and Geology*, Vol. 34, October 1938, pp. 368-500; Vincent C. Kelley, "Geology and Ore Deposits of the Darwin Silver-Lead Mining District, Inyo County, California," *California Journal of Mines and Geology*, Vol. 34, October 1938, pp. 503-62; Edward D. Lenton, "Sulphur Deposits of Inyo County,

activity began with the aforementioned discovery of silver by a man named Turner, who was associated with more than 100 gold seekers who accidentally discovered and explored Death Valley while on the way to the goldfields in northern California. Turner, or perhaps one of his companions named Martin, discovered a promising mineral deposit and carried some of the ore out of Death Valley. Because this ore was reportedly used later to fashion a gunsight, this find gained notoriety as the "Lost Gunsight Mine." The discovery was made within sight of a campsite in the Panamint Valley the men shared with John B. Colton and William B. Rood. The exact location of the ore deposit found by Turner is unknown, but some researchers believe the site to be somewhere in the Panamint or Argus ranges. According to some historians, the discovery could have been ore from what would later become the Modoc Mine on Lookout Mountain in the Argus Range overlooking Panamint Valley.[51]

In San Bernardino County gold was discovered in December 1849 at Salt Spring, along the Mormon Trail that connected Salt Lake City and San Bernardino near the Amargosa River to the south of Death Valley. This discovery was made by a member of the party of remaining emigrants who chose not to follow Captain Smith's shortcut. This party was led to San Bernardino by Jefferson Hunt, a veteran of the Mormon Battalion. The mine would be developed and reworked intermittently until about 1902.[52]

For several years after the harrowing travails of the "Forty-Niners," the desolate Death Valley region was regarded as a vast, forbidding tract, and only a few daring souls finally ventured into it during the 1850s, enticed by rumors of earlier mineral discoveries. Many unfortunates, unaware of and unequipped for the hardships involved, perished from the heat, lack of water, and other excruciatingly painful inflictions characteristic of the harsh environment.[53]

There are various reports of gold discoveries by Mormon prospectors in the vicinity of the Amargosa River during the 1850s. Mormons also reportedly discovered silver in the Panamint Range during the latter part of the decade. Since there was no water source available in the immediate area, some of the ore was refined at Anvil Spring, near the south end of the Panamint Range approximately 20 miles south of Telescope Peak. The mining operations, however, were short-lived since the expense involved in mine development and transportation proved prohibitive because of the arid region's isolation. Mexican miners followed the Mormons into the area, but the results of their efforts remain obscure.[54]

California," *California Journal of Mines and Geology*, Vol. 34, October 1938, pp. 563-90; "Current Mining Activity in Southern California," *California Journal of Mines and Geology*, Vol. 36, January 1940, pp. 10, 12-15, 20-28; "Tungsten Resources of California," *California Journal of Mines and Geology*, Vol 37, April 1941, pp. 310-12; and L. A. Norman, Jr., and Stewart, Richard M., "Mines and Mineral Resources of Inyo County," *California Journal of Mines and Geology*, Vol. 47, January 1951, pp. 17-223. For a brief overview of mining development in the Mojave Desert region, see Russ Leadabrand, "Mines of Mojave," *Westways*, October 1962, pp. 37-41.

51. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 272-73.

52. ibid., p. 273.

53. U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. 1, p. 1.

54. Norwood, *et al.*, *Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, p. 119.

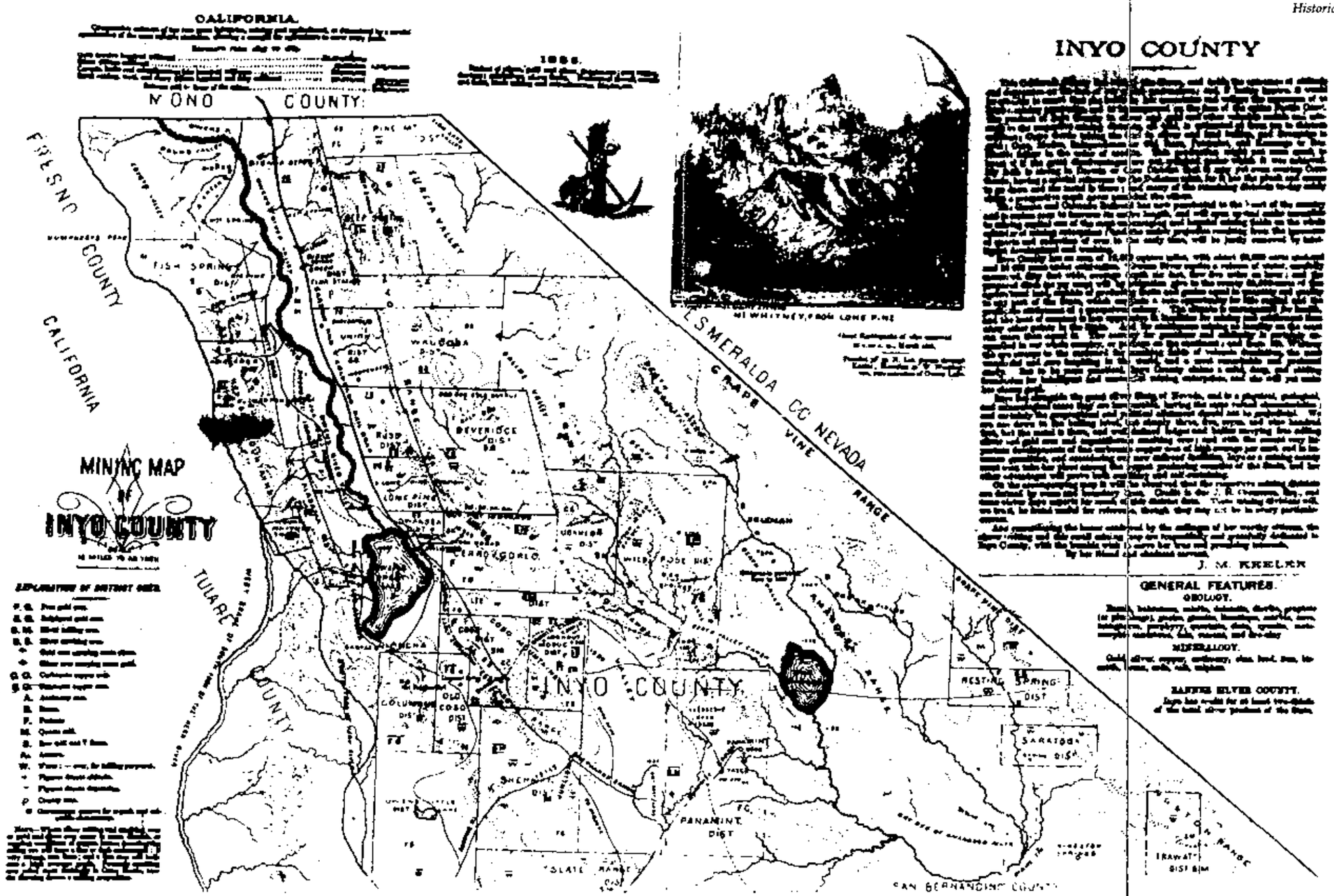

Figure 3: "Mining Map of Inyo County," by J. M. Keeler, 1883.
Land Records, Recorder's Office, Inyo County Courthouse, Independence, California.

Fueled by rumors of the Lost Gunsight, a stampede of prospectors scoured the Great Basin, including the eastern California desert region, after the discovery of the Comstock silver deposits in Nevada in 1858-59. Simultaneously, miners from Mexico began exploring the California desert region during 1859-60 in an attempt to discover the vein that they were convinced extended from the silver mines of Mexico to the Comstock.[55]

One of the more notable prospectors to explore the west side of the Panamint Range during 1860-61 was Charles Alvord, a 60-year-old, college-educated New Yorker who had an avid interest in horticulture and a book knowledge of geology, but no practical experience in mining. Arriving in the Death Valley region to seek the Gunsight silver with Asabel Bennett's party early in April 1860, he and William Stockton found what they thought to be the silver lodes they sought near their camp at Anvil Spring. Tests, however, showed that their find was refractory lead ore. With little food and water, a pick, and a shotgun, Alvord separated from his party and wandered alone in the Panamints for several weeks. Returning to his party, Alvord reported that he had discovered gold. Neither Alvord nor any of his companions, however, was able to relocate the ledge which reportedly contained the gold.[56]

Charles C. Breyfogle was another notorious prospector to enter the Death Valley region. A stout, balding New Yorker who had first arrived in California in 1849, Breyfogle had turned to politics after a brief stint in the Yuba mines and a short farming effort in San Jose. Elected Alameda County assessor in 1854 and county treasurer in 1856, he joined the rush to the Comstock after shortages were found in county funds. During several prospecting trips to the Death Valley region in 1864-66, he and his companions reported the discovery of the gold ledge that the "Forty-Niners" had found years earlier. His trips to the Amargosa-Death Valley region were tainted by bizarre events, however, and neither he nor his companions could find the ledge. Although many concluded that his "discovery" was a hoax, his reports gained widespread publicity and notoriety for what would become known as the "Lost Breyfogle Mine."[57]

During the early 1860s, two groups of explorers, one led by Darwin French, the other by Dr. Samuel G. George, discovered and named mountain peaks, a waterfall, a "volcano" (actually Coso Hot Springs), an antimony mine in Wildrose Canyon, and gold and silver mines in the Coso and Slate ranges. The over-promoted mines were worked until the mid-1860s. Miners from Aurora, Nevada, also traveled south to the White Mountains, discovering prospects that would be developed into the White Mountain City mines in 1861.

Other stimuli to mining ventures in the eastern California desert region were discoveries in nearby Nevada and Arizona during the late 1850s and early 1860s. In 1856 silver was discovered in Potosi, Nevada, while gold was discovered in El Dorado Canyon, Nevada,

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55. Vredenburgh, Shumway, and Hartill, *Desert Fever*, p. 273.

56. Norwood *et al.*, *Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, pp. 119-20; Harold O. Weight, *Lost Mines of Death Valley* (Twentynine Palms, California, The Catico Press, 1953), p. 48; Muriel Sibell Wolle, *The Bonanza Trail* (Bloomington, Indiana University Press, 1953), p. 137; and Lingenfelter, *Death Valley & The Amargosa*, pp. 61-62, 69-72.

57. Lingenfelter, *Death Valley & The Amargosa*, pp. 73-79.

in 1861. Rich dry placers were discovered at La Paz, Arizona, in 1862. Hundreds of miners trekked across the eastern California desert to the Colorado River mines, discovering gold, silver, and copper in present San Bernardino County.

Despite these discoveries, however, mining in the eastern California desert, and especially in the Death Valley region, was slow in gaining momentum, although by the early to mid-1860s, there were reportedly 14 quartz mills and 130 stamps at various locations in Inyo County. Despite their enthusiastic beginnings, the early mining districts met a notable lack of success in their endeavors to extract and process ore due to a variety of reasons, including lack of sufficient funding, primitive and inefficient technological methods, scarcity of water and fuel, and especially the absence of nearby transportation facilities, which made it economically impossible to mine any but the highest-grade ores.[58]

In 1865 the Cerro Gordo silver-lead ores were discovered in the Inyo Mountains west of Death Valley, and lead deposits were found east of Tecopa south-southeast of the valley. Cerro Gordo was the most significant discovery in the region during the 1860s, and its development had an impact on the growth and development of Los Angeles similar to that of the Comstock on San Francisco. Mining engineer Mortimer Belshaw systematically developed the entire Buena Vista Peak (now Cerro Gordo Peak), conquering a variety of problems in linking Cerro Gordo to the outside world, smelting ore, and bringing water to the area. Criticized as a ruthless mining operator, Belshaw nevertheless furnished the technology and obtained the capital needed to extract a large percentage of the $17,000,000 produced from the hill.

Although the mines in the Coso and Slate ranges were vacated in the late 1860s because of hostilities by Shoshone and Paiute tribes who were angered because their traditional lands were being taken over by the Euro-American prospectors, the threat of Indian attack had been removed by the 1870s, and prospectors began heading back to the abandoned portions of the eastern California desert region. The post-Civil War economy of the United States remained prosperous until 1873, further enhancing prospecting. In that year, however, a banking panic occurred, triggering a depression that curtailed speculative capital for mining just as three significant discoveries were made at Panamint in the Panamint Range (discovered six months before the crash), Darwin on the west slope of the Argus Range, and Lookout on the east side of the Argus Range. Of these three silver-lead districts, Panamint became the most famous and the least productive, receiving too much publicity and being over-promoted. Within two years of its discovery, Panamint was already on the decline.

Darwin was developed by Abner Elder and Victor Beaudry, two of Belshaw's ex-partners, while Lookout received the attention of former U. S. Senator George Randolph Hearst, father of newspaper magnate William Randolph Hearst. From the mid-1870s to the early 1880s, Darwin and Lookout produced approximately $2,000,000 each. Both mining districts had similar production figures until World War I, when Darwin produced some 3,500,000 pounds of lead and some 300,000 ounces of silver, while Lookout produced barely 250 pounds of lead and only 34,000 ounces of silver. Although Darwin finally proved itself to be the richer area, supported a larger town, and had its own newspaper, both districts

58. U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. 1, pp. 1-2, and Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 273-74.

shared the spotlight equally as the significant eastern California desert mining districts of the 1870s.

The aforementioned Panic of 1873 resulted in a depression in the western United States. In California the economic downturn was first felt when the Bank of California closed its doors on August 26, 1875. Nevertheless, Panamint, Darwin, and Lookout survived this dark period despite the decline in silver prices. The discovery of new ore bodies on the Comstock in western Nevada in early 1874 served to bolster these desert camps, each of which was considered a second Comstock. However, gold, traditionally strong during depression periods, was beginning to be sought in Inyo County by the time the silver camps were reaching their peak production in 1877. This search would lead to gold discoveries at Beveridge on the eastern slopes of the Inyo Range in Hunter Canyon in 1877 and Ballarat on the east side of Panamint Valley approximately 15 miles south of Wildrose Canyon in 1893.[59]

In 1878 gold was discovered in Mono County, north of Death Valley, initiating the mining rush to Bodie and Mammoth City. That same year, production on the Comstock fell to $20,000,000 (one-half its 1876 production), and Darwin and Cerro Gordo declined rapidly. In spite of the re-introduction of a silver purchasing plan by the federal government under the Bland-Allison Act of 1878, Inyo County silver mines could not recover. With their high-grade ore bodies depleted, most fell into inactivity.[60]

As a result of continuing general prosperity in the United States during the 1880s and the construction of railroads to the area, silver and gold mining ventures were stimulated in the eastern California desert region, particularly in San Bernardino County. During this period, however, only sporadic and limited mining operations were attempted in the Death Valley region and its surrounding mountain ranges and valleys. The still-limited financial means of most miners left them little option — to either strike pay dirt immediately to finance future operations, or else shut down. The exciting gold discoveries in the Black Hills of South Dakota; Leadville, Colorado; Tombstone, Arizona; and elsewhere in the West attracted many prospectors away from the Death Valley region, particularly those who were already discouraged by inability to make paying propositions of their remote and largely inaccessible mines.[61]

The provisions of the Bland-Allison Act were enhanced by the Sherman Silver Purchase Act of 1890, requiring the U.S. Treasury to purchase an increasing amount of silver bullion and coin it. Most European nations were on the gold standard and viewed the stockpiling of silver as an indication of the instability of the American economy and of the nation's inability to stay on the gold standard. This problem and other economic conditions culminated in the Panic of 1893, resulting in political decisions unfavorable to silver interests, but these decisions inspired the discovery and working of significant gold mining operations in Kern, San Bernardino, and Riverside counties in eastern California. While mining in Inyo County remained sluggish, one of the leading gold mines developed

59. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 245, 274-76.

60. ibid., p. 246.

61. U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. I, p. 2.

during the 1890s was the Ratcliff (Radcliffe) Mine near the boom town of Ballarat in the Panamint Range west of Death Valley. During the late 1890s and early 1900s, the widespread use of cyanide for the treatment of gold ore sent many prospectors out reworking old dumps in Inyo County, and formerly unprofitable mines were reopened.

The discovery of gold at Goldfield, Nevada, and at the Keane Wonder in the Funeral Mountains in 1903, initiated a stampede to that area northeast of the Death Valley region in early 1904. During the fall of 1904, this mining rush extended southward to Rhyolite with the discovery of the Shoshone by Robert Montgomery, and soon spilled westward to the Inyo and San Bernardino county areas. Within several years, the ephemeral boom towns of Skidoo, Harrisburg, and Greenwater had sprung up in the Death Valley region. In 1916 Goldstone, north of Barstow in the Mojave Desert, was perhaps the last mining camp to be established on the coattails of Goldfield.

Nineteenth-century mining in the eastern California desert region concerned itself primarily with the "Big Five" minerals — gold, silver, copper, lead, and zinc. During the 20th century, however, non-metallic minerals have played an increasingly important role, and have become Inyo County's most plentiful mineral resource. It was actually the discovery of nonmetallics in the region, initially of borax and later of talc, that ensured the region's industrial future, for in time these commodities far outweighed the more sought-after metallic elements in lasting commercial value. In addition to the Searles Lake borax developments in San Bernardino County, borax was discovered at Monte Blanco, Corkscrew Canyon, and old and new Ryan, salt in Saline Valley, talc at Darwin, sulphur in the Last Chance Range, perlite at Shoshone, and epsom salts in the Owlshead Mountains.[62]

Not until the early 1900s did conditions become conducive to large-scale hard-rock mining operations in the Death Valley region — conditions that were prompted by a renewal of interest in gold and silver. By this time more people had penetrated the desert regions, and responsible authorities were encouraging the immigration by locating and marking water supplies, roads, and trails with signs and designating them on maps. One of the primary instigators of this move was the Los Angeles Chamber of Commerce, which had earlier negotiated passage of a law in California calling for the development and protection of water supply sources in the state's deserts. The U.S. Geological Survey contributed to this improved situation by surveying portions of the southeastern deserts and subsequently publishing maps and studies showing existing trails and water supplies as well as known mineral deposits.[63]

A variety of metallic minerals were exploited in the Death Valley region during the early 1900s, including gold (Bullfrog Hills, Skidoo, Harrisburg, Ubehebe, Chloride Cliff, Funeral Mountains, Black Mountains); antimony (Wildrose Canyon); copper (Greenwater, Black Mountains, Ubehebe); lead, zinc, and silver (Ubehebe, Lemoigne Canyon, Galena Canyon, Wingate Wash); and tungsten (Harrisburg, Trail Canyon). This activity resulted in the establishment of several boom towns whose progress paralleled for a while the maturation

62. ibid., p. 2, and Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 246-47, 254.

63. U.S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. I, p. 3.

of Goldfield, Tonopah, and Rhyolite in Nevada. Much of the productivity witnessed in places such as Bullfrog, Skidoo, and the Ubehebe region was directly attributable to lessees. Often large companies working a particular mine were not immediately successful in blocking out large quantities of shipping ore, due either to time or circumstances, and consequently requested that lessees take over and try their luck. More often than not they were remarkably successful, tending to be more cateful in their prospecting work and generally more interested in quality than quantity. Striving to find pay ore as quickly as possible, they worked hard and were one of the prime factors in the successful development of a mine and thus of the surrounding region. The larger Death Valley area towns of the first decade of the 20th century flourished until the financial panic of 1907, a national economic downturn that resulted in an immediate slowdown of work in most of them and often total cessation of mining activity. In addition, the earthquake that struck San Francisco in 1906 caused many investors to withdraw from mining ventures in the Rhyolite area. Prosperous large-scale metallic mining in Death Valley ended, for all practical purposes, by about 1915, although Skidoo managed to operate until 1917. Later work at Skidoo was sporadic.

As a result of the outbreak of World War I in Europe in 1914 and American entry into the war in 1917, mining in the desert region of eastern California experienced a general revival as prospectors began searching the old dumps for overlooked fortunes in manganese, lead, zinc, talc, and tungsten. Darwin and Cerro Gordo, among other mining areas, were "rediscovered" and had record productions during the war years. Nitrate prospecting was conducted during the war in the Ibex and Saratoga Spring areas in the southern portion of Death Valley, prompted by the nation's need for the product to manufacture explosives and fertilizers.[64]

The end of the war in 1918 and the onset of an inflationary economy during the 1920s placed a damper on new mineral discoveries in the eastern California desert region, and many mines were unable to operate with the high prices prevailing during the period. After the stock market crash in October 1929 the Great Depression had an ironic impact on mining activity in eastern California. Unemployed men turned to the old tailing dumps and prospected old placer streams in search of mineral wealth, particularly gold. Although these ventures were generally small, gold production increased as new lodes were discovered and developed and older districts experienced revivals. Prospect holes appeared wherever gold was known to have been found in earlier times, and some new discoveries, such as the Marble Canyon placers north of Saline Valley, were made as a result of this heightened interest. Because of little demand, however, silver districts did not experience revival during the Depression.

The United States economy emerged from the Depression primarily as a result of the worldwide demand for military-related industrial products with the onset of World War II. These products necessitated increased mineral production, including tungsten, lead, gold, and silver, and hundreds of small miners worked the eastern California desert region in search of these commodities.

After the Japanese attack on Pearl Harbor on December 7, 1941, the United States entered World War II. Men were needed in the armed forces and the factories and industries that

64. ibid., pp. 3-4.

turned out war materials. Mines were also needed to extract the minerals that the federal government declared essential for war production, and the government paid a premium price for manganese, iron, copper, lead, and zinc. Purchase depots were established throughout the western United States to buy tungsten, antimony, and lead-zinc ores from small mines. Mining operations producing these ores prospered. Darwin, for instance, produced more than 100,000,000 pounds of lead and 5,000,000 ounces of silver from 1941 to 1951.

The United States War Production Board, concerned that more than 20,000 men were employed at some 250 gold mines and 700 placer mines throughout the western United States, sought a method to transfer the men and machinery to operations that provided more strategic war-related minerals and manufactured products than gold. On October 8, 1942, the War Production Board issued Limitation Order L-208, classifying gold mines as non-essential to the war effort and giving mine owners 60 days to cease operations. Although lode mines that produced less than 1,200 tons in 1941 were exempt from the order, it resulted in sudden disruption to virtually all significant gold mining. Many of the mines that were closed suffered damage as a result of forced neglect and could not be reopened after the war. Mineral values still present in the mines became inaccessible due to flooding and the rotting of mine timbers. Only those gold mines that received special permission to keep a small crew on the site for maintenance were able to survive the war years.

The inflationary post-World War II years drove labor costs upward, adding to the expense of dewatering and retimbering the mines. Despite various economic and monetary policies and programs adopted by the federal government that have resulted in rising prices for gold in recent decades, gold mining in the eastern California desert region has not fully recovered from the effects of L-208 and the fixing of the price of gold at $35 per ounce during the 1930s.[65]

In 1951 the California Division of Mines estimated that the mineral production of Inyo County, as recorded from 1880 through 1948, was valued at $138,692,011. The production consisted of about 40 different metallic and nonmetallic products. Lead, silver, zinc, gold, tungsten, talc, and salines were the most important commodities economically.[66] Researchers noted in 1981 that the county's recorded mineral production was more than $150,000,000, and that the county had led the state in silver-lead production, with more than 98 percent of the lead produced in California having originated there.[67]

During the years following World War II, tungsten prospectors combed the hills near Skidoo and in Trail Canyon in Death Valley, as well as in surrounding areas, mostly covering properties previously claimed or prospected. This activity was a direct result of new price stability and the absence of tungsten exports from mainland China. Lead and silver deposits in Wingate Wash were also investigated at this time. A major talc industry

65. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 273-83.

66. L. A. Norman and Richard M. Stewart, "Mines and Mineral Resources of Inyo County," *California Journal of Mines and Geology*, Vol. 47, January 1951, p. 28.

67. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 222, 261.

that had begun during World War I but that had never thrived because of a limited market and the remoteness of the deposits started up again after the war, as did uranium prospecting.

Throughout the history of mining in the Death Valley region, as well as the eastern California desert area, the search for and mining of metallic resources has generally been sporadic. This is due to its dependence on the fluctuating selling price of a certain commodity, which in many cases resulted in the development of particular properties over and over again and the reopening of others because the initial owners were ignorant of a mineral that had since obtained economic significance. Most nonmetallic mineral deposits, except for the major borate deposits still being worked, have been of marginal importance, detrimentally influenced by their scattered occurrence in isolated geographic locations, the high transportation costs involved in taking them to market, and the always variable law of supply and demand. Additionally, all mining in the region has been subject to shifts in national and international monetary policies and market controls and to stiff competition with foreign vendors.[68]

MINING DISTRICTS/AREAS RELATING TO THE NEW LANDS

The boundaries of the lands added to Death Valley National Monument in 1994 were drawn to exclude virtually all active mining operations and most significant mineable mineral reserves. For instance, the California Desert Protection Act provided for a boundary adjustment to exclude the Porter Mine, an active operation in the west Panamints. Thus, the new lands generally contain only the remnants of small or modest inactive mining sites. Nevertheless, historic prospecting activities and mining operations in the new lands are associated with significant mining districts/areas that include lands both inside and adjacent to the new park boundaries.

Coso

Darwin French, who had aided Turner in the search for the Lost Gunsight almost 10 years earlier, returned from Oroville in northern California to the Death Valley region in March 1860 as a guide for the Butte Mining and Exploring Company, excited by the chance at discovering the Lost Gunsight or a second Comstock. French's expedition included among others, Dennis Searles and James Hitchens, whose names, along with that of French, would be permanently identified with the geography of the desert region. The expedition was successful, not in finding the Lost Gunsight, but silver as well as gold ore, resulting in a mining boom camp at Coso located approximately 11 air miles northeast of Coso Hot Springs in southern Inyo County. Coso, a Paiute word meaning fire, was the name given to the thermal hot springs used by Shoshone and Paiute groups for medicinal reasons. The hot springs, as well as the mining camp, are located in the Coso Range within the present-day boundaries of the U.S. Naval Air Weapons Station at China Lake southwest of Death Valley National Park.

68. U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. 1, pp. 4-5.

After the discovery at Coso the French party, which quickly renamed itself the Coso Gold and Silver Company, continued northward. On the journey, the party named Darwin Canyon, located near a wash (later named Darwin Wash) that ran through the Argus Range and entered the north end of Panamint Valley. The party also named Darwin Falls (just inside the boundary of the new lands), the Panamint Range, and Towne Pass. In May 1860 the Darwin party returned to Coso. Christening the camp "Silver Mountain," the men established the Coso Mining District on May 28, 1860.

A second group of Gunsight seekers from Visalia, was led by Samuel G. George, one of the first physicians to settle in the San Joaquin Valley after serving as a hospital steward in Company K, First Ohio Volunteer Infantry, during the Mexican War. George's party followed on the heels of the French party, crossing the Cosos to Darwin Spring and Darwin Canyon, passing through Panamint Valley and over the Panamints to Furnace Creek in Death Valley. Tracing the route of the "Forty-Niners" out of Death Valley, the group camped at Wildrose Spring in December 1860. Three miles to the southeast, on Christmas day, George and William T. Henderson, who would later become sheriff of Inyo County, discovered a massive, silvery-looking lode more than 25 feet thick, which they christened the Christmas Gift. Back in Visalia, assays showed the rock to be mainly antimony sulphide, but there was enough silver in the ore that George and his partners returned to the Panamints in April 1861. Crossing the Cosos, they became the first Euro-Americans to view the hot springs that would later be developed as a resort. On the way back to the Panamints, George found an Indian guide near Mesquite Flat. Together they ascended a canyon, which George called Sheep Canyon, so named for the carcass of a dead mountain sheep they encountered. Becoming suspicious of his guide, George did an about-face, and returned to camp, marching the Indian, who became known as "Indian George," ahead of him with his rifle at the ready. During the 1870s, Sheep Canyon would be renamed Surprise Canyon, the site of the famous Panamint silver strike. Meanwhile, George and his associates collected one-quarter ton of ore, staked some more claims around the Christmas Gift, climbed and named Telescope Peak, the highest point in the Panamints, and formally organized the Telescope Mining District. Although the new ore sample proved to be mostly antimony, George and his partners established the Combination Gold and Silver Mining Company on July 24, 1861, to open and develop the Christmas Gift, the first mine in the Panamints.

While engaged in sinking a shaft and starting a tunnel to tap the lode at greater depth, the Panamint Shoshone attacked the camp, killing the four miners at work and burning the company's cabin. The Panamint and Shoshone throughout the desert country had been tolerant of the first prospectors, but when the miners, beginning with the Coso rush, began to have a major impact on their lives by taking over springs, cutting down piñon, and hunting game animals, the Paiute and Shoshone throughout the Death Valley and Amargosa country began sporadic attacks to drive the whites out. Henderson and others, who had gone to Visalia for provisions before the attack, were driven away by the Indians when they tried to return. A short time later, he led an attack on a party of Panamint Shoshone, killing nine, including their leader, dubbed "Thieving Charley" by the miners. The Christmas Gift, however, would not be reopened for more than a decade.

Despite these difficulties, prospecting continued in the Cosos. Ore found in 1860 by M.H. Farley, a prospector in French's party, assayed over $1,000 per ton in silver and $20 per ton in gold. By late June 1860 some 500 men had stormed into Coso as part of the first

mining rush to hit the Death Valley region, and by the fall there were hundreds of prospectors in the surrounding hills. In August mines were discovered with ore assaying $2,000 or more of silver per ton, resulting in the establishment of a flurry of stock promotion companies by promoters who overestimated the money-making possibilities of the Coso area. In 1861 Dennis and John Searles initiated mining exploration in the Slate Range east of Coso, but while investors recognized the rich deposits of borates in the Slate Range region, few shared the enthusiasm of the Searles brothers for the silver and gold potential of the area. By 1862 a trail was constructed to the isolated mining camp at Coso, leading northeast from Little Lake in Owens Valley. The district, however, would continue to be plagued by untriendly Indians who feared the loss of the area's springs, piñon, and game to the growing number of miners.

Several battles with the Shoshone during the mid-1860s precipitated an exodus from the mining camp and mining activity declined. In 1866 a mill constructed to handle output from the Josephine, the largest mine, was burned, and the miners attributed this action to local Indians. These problems, coupled with the fact that the stockholding public had lost trust in Coso's overinflated riches, resulted in abandonment of Coso by Euro-American miners, leaving it to "Mexicans" who reorganized the district on March 23, 1868. By 1870 about 100 miners were in the camp, the total population of which was approximately 150. Ore was processed by mule-driven arrastras, and gold bullion produced during seven months of operation that year had an estimated value of $30,000 to $40,000. By 1874 the Coso district contained about 10 Mexican miners who reportedly produced about $1,200 in gold per year. With the threats of Shoshone attack having subsided, whites returned to the Cosos and a new Coso Mining District was established on December 3, 1874, by white miners. The Coso Range experienced sporadic production during the 1890s and early 1900s and again in the 1930s, although no activity proximated the fever of the early 1860s. Dr. Irving Jacob Woodin of Independence located several mining claims in the Coso Range, and by March 1893 he had located Coso Hot Springs, described as a sulfate and mineral ground and mineral springs located 2 miles east of sulfur banks that were under development. Although sulfur mining proved unprofitable in the Coso region during World War I, approximately $17,000 worth of cinnabar (mercury ore) was mined near Coso Hot Springs between 1929 and 1939. When the land was withdrawn for establishment of the U.S. Naval Air Weapons Station in 1944–45, the Coso area contained more than 100 validated gold, silver, tungsten, copper, zinc, and quicksilver mining claims. However, the old mining settlement of Coso was little more than a picturesque ghost town, although some of its better rock cabins were still occupied.[69]

69. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 223-24, 273, Norwood *et al., Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, pp. 120-22; Lingenfelter, *Death Valley & The Amargosa*, pp. 62-65; Chalfant, *The Story of Inyo*, p. 130; California State Mining Bureau, *Third Report of the State Mineralogist* (Sacramento, 1883), p. 36; Carl I. Wheat, "Pioneer Visitors to Death Valley After the Forty-Niners," *California Historical Quarterly*, XVIII (September 1939), p. 201; W. B. Tucker and R. J. Sampson, "Mineral Resources of Inyo County, California," *California Journal of Mines and Geology*, XXXIV (October 1938), p. 461; Joseph E. Doctor, *Dr. Samuel Gregg George: Death Valley Explorer of 1860-61* (Death Valley, California, The Death Valley '49ers, Inc., 1988), pp. 5-20; Mary DeDecker, *Mines of the Eastern Sierra* (Glendale, California, La Siesta Press, 1966), pp. 37-39; and Iroquois Research Center, *A Land Use History of Coso Hot Springs, Inyo County, California*, Prepared for the Public Works Department, Naval Weapons Center, China Lake, California, January 1979, pp. 117-22, 135-51.

White Mountain City

In 1861 one year after the initial discoveries at Coso, a group of miners, consisting of J. S. Broder, Colonel L. F. Cralley, the Graves brothers, and Dan Wyman traveled from Aurora, Nevada, to the east side of the White Mountains, across the California-Nevada state line, seeking placer gold values said to exist there. By 1864 White Mountain City and Roachville (north on Cottonwood Creek) had been established in what was then Mono County and had prepared surveyed town plats. The two mining camps were located north of Death Valley in Deep Springs Valley in present northern Inyo County (1866 border change) near the Mono County line.

During the 1870s, numerous mines adjacent to Deep Springs Valley were operated, including the California, Oasis, Piper, Copper Queen, Greenly, and Whitman.[70] By 1881 the Tarrytown District was located some 6 miles west of Deep Springs Valley in a mineral belt that was reportedly 6 miles long and 2 miles wide. The district contained both silver and gold deposits, and ore values ran from $75 to $150 per ton. The principal mines in the district were the Heritage, which boasted a 3-1/2-foot-wide vein that averaged $124 in silver and $15 in gold per ton, and the Alta, which had a 2-1/2-foot wide vein and 80 tons of ore on its dump.

At least eight mines were listed as being in the Deep Springs area. Although it was reported that development of these claims had shown that they would become "permanent mines," little is known about them. It is likely that they became unprofitable because of the drop in the price of silver after 1893.

Although little is known about White Mountain City and Roachville, they most likely served as supply centers for miners working in the aforementioned mines as well as those prospecting in the White Mountain gold region of southeastern Mono County. Mark Twain was perhaps the most celebrated personality to visit White Mountain City during its heyday. As recently as 1918, the area experienced some mining activity when D. F. Shively filed 11 tungsten claims on the north edge of Deep Springs Valley to develop a series of parallel quartz veins in granite up to 4 feet in width.[71]

Today, all that remains of White Mountain City, located just north and near State Highway 168, are some stone walls, up to 6 feet in height, foundations of approximately 20 buildings, and the remnants of a mill and retort. The original toll road was constructed in 1873 by J. S. Broder, who lived in a tollhouse located west of Westgard Pass, where he collected tolls until 1900. In 1913 the Inyo Good Roads Club and A. L. Westgard sponsored an Automobile Association tour on this road to promote it as part of a new transcontinental route. This effort failed, however, and the state assumed administration of

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70. State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, *Mineral Land Classification of the Eureka-Saline Valley Area*, by Gary C. Taylor and Stephen E. Joseph, 1988, p. 53.

71. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 224-25; Chalfant, *The Story of Inyo*, p. 129; Horatio Burchard, *Report of the Director of the Mint Upon the Statistics of the Production of Precious Metals in the United States* (Washington, Government Printing Office, 1882), p. 38; and California State Mining Bureau, *Seventeenth Report of the State Mineralogist* (Sacramento, State Printing Office, 1920), p 301.

the road in 1925. The site is presently located on lands administered by Inyo National Forest.[72]

Cerro Gordo

Wandering prospectors from the Coso area were responsible for the discovery and early development of Cerro Gordo[73] near the south end of the Inyo Mountains several miles west of Death Valley between Owens Lake and the Nelson Range. The Cerro Gordo mining properties became California's leading silver and lead producer in a decade of active mining that followed the Civil War. In 1865 Pablo Flores and two Mexican companions discovered rich silver float at the foot of Buena Vista Peak, now known as Cerro Gordo Peak. Attacked and captured by Indians during the summer of 1866, Flores was released after reportedly promising not to return to the area, but his two companions were killed. Later in the fall of 1866, Flores returned with some 40 miners, and together this group located the Ygnacio, San Francisco, and San Felipe mines. Having no capital to invest, these early efforts were limited, the ore being smelted in small crude adobe furnaces.

A man named Ochoa developed the San Lucas Mine near the summit of Buena Vista Peak, thus becoming the first prospector to make a committed effort to establish mining at Cerro Gordo. Ore from the mine was treated at the Silver Sprout Mill, several miles west of Fort Independence in Owens Valley. The Lone Pine Mining District (including Cerro Gordo) was established on April 5, 1866.[74]

In May 1867 a prospector displayed Cerro Gordo ore samples in Virginia City, Nevada, bringing Cerro Gordo to the public's attention and triggering a mining rush. By the end of 1869 more than 900 locations were filed in the district. One of the first persons to arrive in Cerro Gordo during the ensuing stampede was Mortimer W. Belshaw, a mining engineer from San Francisco who had become knowledgeable in silver smelting processes while working mines in Sinaloa, Mexico, six years earlier. Arriving at Cerro Gordo in April 1868, Belshaw recognized its potential and set out to control the entire mountain peak. As lead ore was needed to smelt the silver ores, Belshaw obtained a one-third interest in the Union Mine on May 6, 1868, promising the Union owner, Joaquin Alnada, one-fifth interest in a smelter yet to be constructed.[75]

Belshaw extracted several tons of ore from his new mine, smelting it down in "vaso" furnaces. After traveling to Los Angeles and San Francisco to secure financial backing,

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72. Norwood *et al., Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, pp. 139-40, and David A. Wright, "Scandal at Big Springs," *The Album*, XI (October 1989), pp. 15-18.

73. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 225-32, and Norwood *et al., Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, pp. 122-28. For a comprehensive study of the historical development and geological features of the Cerro Gordo mining district, see U.S. Department of Interior, Geological Survey, Professional Paper No. 408, *Geology of the Cerro Gordo Mining District Inyo County, California*, by C. W. Merriam (Washington, Government Printing Office, 1963), pp. 1-80.

74. Chalfant, *The Story of Inyo*, pp. 277-78.

75. Remi Nadeau, *City Makers* (Los Angeles, Trans-Anglo Books, 1965), pp. 29-30.

Belshaw and Egbert Johnson, president of the California Paper Company, established the Union Mines Company. Belshaw returned to Cerro Gordo with A. B. Elder, his mining companion from his Mexico mining days, and the two men began systematic development of the peak that would soon be theirs.[76]

In July 1868 Belshaw graded a steep and winding eight-mile-long toll road, called the Yellow Grade Road, from Owens Valley to Cerro Gordo, charging $1 for wagons and 25¢ for a horse and rider. The toll road finished, Belshaw started hauling machinery for his second project, a smelter located near present-day Swansea on the east shore of Owens Lake that reportedly would produce 4 tons of bullion per day.[77]

The blast furnace began operation in September 1868, and its output proved to be so efficient that the facility's production was increased to 5 tons of bullion per day. Regular ore shipments to San Francisco via Los Angeles began on December 1, 1868, each trip from Cerro Gordo to Los Angeles and return taking a month. From Los Angeles, the ore was transported to San Francisco via a three-day trip on the steamer *Orizaba*. In San Francisco Thomas H. Selby smelted the silver ore further, sending the silver to the U.S. Mint. The opening of Belshaw's smelter caused the population at Cerro Gordo to swell from 200 to 700, as miners began flocking to the camp. By 1870 the Cerro Gordo boom town had stage service connections with Independence in Owens Valley, and, a year later, with Nevada, San Francisco, and Los Angeles.[78]

Victor Beaudry, a French Canadian who had come to Cerro Gordo as a merchant in 1866, built a blast furnace in 1870 that was patterned after that of Belshaw, thus increasing Cerro Gordo's bullion output to 9 tons per day. Beaudry acquired numerous other mining claims in the vicinity, extending credit to miners with whom he did business. Among his acquisitions was a one-half interest in the Union Mine, and in 1870 he and Belshaw, who owned one-half of the Union as well, went into partnership. Within several years, the town boasted a population of some 3,000 persons, a large number of shops and offices, an ice plant, 12 saloons, and two brothels.[79]

Belshaw and Beaudry charged $50 a ton for reducing ore at their furnaces. The ore needed to have a silver value of $100 per ton or higher in order to turn a profit. All of the silver mines worked during 1872-74 became indebted to the furnaces on the sale of ores, and many, if not all, slowly closed down as Belshaw and Beaudry came to control the entire peak.[80]

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76. Robert C. Likes and Glenn R. Day, *From This Mountain--Cerro Gordo* (Bishop, Chalfant Press, 1975), p. 12.

77. Elizabeth von Till Warren and Ralph J. Roske, *Cultural Resources of the California Desert, 1776-1880: Historic Trails and Wagon Roads*, Prepared for the U. S. Department of the Interior, Bureau of Land Management, Desert Planning Unit, Riverside, California, Contract No. YA-510--Ph7-47, 1981, p. 33.

78. Nadeau, *City Makers*, pp. 30-31.

79. Likes and Day, *From This Mountain*, pp. 10, 15, 20.

80. Rossiter W. Raymond, *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (Washington, Government Printing Office, 1875), p. 32.

The payroll at the Beaudry furnace, where 25 men worked, was more than $3,000 a month by 1876. The furnace consumed $750 in water and $7,800 worth of charcoal per month. Eight tons of charcoal were required to smelt 25 tons of galena sulphate and carbonate lead ores.[81]

Few timbers were used in the Union Mine, causing frequent accidents for the 20 underground miners, but by 1876 these men were raising 60 tons of ore per day from the mine. With the aid of a 16-horsepower engine, the ore was taken to the surface, where it was loaded on wagons for transport to the furnaces. Slightly less than $1,000,000 was produced by the district in 1872, but two years later the district produced more than $1,000,000 in silver and more than $500,000 in lead.[82]

Remi Nadeau received the contract to haul Cerro Gordo's bullion to San Pedro, an ocean port near Los Angeles from where the ore was transported by ship to San Francisco. Nadeau began hauling the bullion by December 1868. Two years later in 1870, Nadeau, using 32 teams, agreed to haul 130 tons a month, a quantity that was only one-half the capacity of the furnaces. Wagons started on the 200-mile, month-long trip to Los Angeles by chaining their wheels in place for the ride down the Yellow Grade Road into Owens Valley. An average of $50,000 worth of Cerro Gordo silver and lead were hauled by Nadeau's company per day. From December 1868 to the end of 1869, a total of 340 tons of bullion were hauled, and that amount was more than doubled to 700 tons during 1870. The wagon loads had a significant economic impact upon the development of the City of Los Angeles, because the wagons stopped in Los Angeles on the return trips to purchase food, supplies, and machinery to support the Cerro Gordo mining camp operations.

Nadeau's contract with Belshaw expired on December 1, 1871, and thereafter it was awarded to James Brady, who had come to Inyo County in 1869 as superintendent of the Owens Lake Silver-Lead Company. Brady founded the town of Swansea, some 3 miles north of Keeler, and built a furnace to work Cerro Gordo's ores. To save expenses and speed up haulage procedures, Brady built a small 85-foot-long steamer that he launched on Owens Lake on June 27, 1872. Christened the *Bessie Brady* after his daughter on July 4, 1872, the steamer carried 70 tons of bullion a day from Swansea across Owens Lake to Cartago, cutting off several days of the month-long trip to Los Angeles and return. At Cartago, wagons picked up the bullion and hauled it to Los Angeles, but they could never keep up with the Cerro Gordo mines' production.[83]

During the fall of 1872, rains hampered the freight teams, causing 12,000 bars of bullion to accumulate at Cartago and 6,000 each at Swansea and Cerro Gordo. The following spring a disease affecting horses spread throughout Inyo County, causing even greater freighting

81. ibid., *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (Washington, Government Printing Office, 1876), p. 31.

82. ibid., *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (Washington, Government Printing Office, 1873), p. 21, and ibid., *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (Washington, Government Printing Office, 1875), p. 32.

83. Nadeau, *City Makers*, pp. 33-34, 65-66.

complications. By May the pile of bullion had grown to 30,000 bars, and Belshaw and Beaudry were becoming desperate.[84]

The two entrepreneurs approached Nadeau in hopes that he would once again accept the bullion freighting contract. He agreed but stipulated that Belshaw and Beaudry join him in establishing the Cerro Gordo Freighting Company and spend $150,000 in building a line of stations a day's journey apart between Cerro Gordo and Los Angeles and increase his stock of mules to 80 teams, each containing 18 mules. After the negotiations were completed Nadeau accepted the contract, and on June 6, 1873, he arrived once again in Los Angeles with a load of Cerro Gordo's bullion.[85]

By the fall of 1873 the Nadeau teams began catching up with the backlog of Cerro Gordo bullion. Belshaw and Beaudry undertook some furnace remodeling, shutting down their furnaces and allowing the freighters more time to catch up. In 1874 with enlarged furnaces, the two mills produced a total of 400 bars a day, twice the output of 1871.

The Cerro Gordo mines required large amounts of lumber for fuel and mine timbers, and wood supplies in the Inyo Mountains were becoming scarce by 1873. Thus, a Colonel Stevens constructed a mill high in Cottonwood Canyon, west of Owens Lake in the Sierra Nevada, with a flume 6 miles in length running down the canyon to the wagon road. The mill began operation in 1873, and the flume was completed during the spring of 1874. Although the mill tapped many square miles of scrubby forest growth, much of Cottonwood Canyon was out of reach during the winter months because of deep snows.

In 1870 Belshaw attempted unsuccessfully to pipe water into Cerro Gordo. Three years later, however, Stephen Boushey's Cerro Gordo Water and Mining Company began construction of a pipeline and a steam pumping plant that brought water to Cerro Gordo from Miller Spring, some 10-1/2 miles northwest of the mining camp. When the water system was completed in May 1874 at a cost of more than $74,000, the four-inch pipeline extended 13-1/2 miles, falling 950 feet into the town. Although water that previously cost 7 to 10¢ per gallon was reduced to 1-1/2 to 4¢, the pipeline, because of leaks, was able only to deliver about two-thirds of the water that passed through the pumping plant.

In 1874, John Simpson was employed by Belshaw and Beaudry to construct a 4,000-foot tunnel under the town of Cerro Gordo to tap the Union vein and provide easier access to the mine's ore. While in their employ, Simpson refused to pay the toll price of the Belshaw-controlled road up the Yellow Grade. With public opinion in his favor, Simpson was successful in pressuring the Inyo County Board of Supervisors to reduce the toll charges, an action that favored the Owens Lake Silver-Lead Company that used the road to transport ore to its smelter at Swansea.

The two largest mines in the district during the early 1870s were the Union, owned by Belshaw and Beaudry, and the San Felipe, or Omega (located adjacent to the Union), owned by the Owens Lake Silver-Lead Company. The latter company brought suit in 1873 against the Union Mine and Belshaw's company to force a point. The Owens Lake Silver-

84. Likes and Day, *From This Mountain*, pp. 28-29, 35.

85. Warren and Roske, *Cultural Resources of the California Desert, 1776-1880*, p. 33.

Lead Company was driving a tunnel to intersect its silver vein when it struck lead. Belshaw, upon seeing galena on the San Felipe dump, accused the Owens Lake Silver-Lead Company of robbing his mine vein and boldly took over the San Felipe tunnel. Thus, the Owens Lake Silver-Lead Company filed suit for damages resulting from Belshaw's action and to regain control of the vein.

During a week-long trial in July 1873, it was claimed by the Owens Lake Silver-Lead Company that the Union Mine was claim-jumped by its original locators, it being a part of the San Felipe vein. The Union group contended that the San Felipe was a silver vein mine cutting diagonally across a lead vein. The jury determined that the San Felipe discovery shafts intersected the two veins, and thus the Owens Lake Silver-Lead Company won the lawsuit.

While the verdict was under appeal, the Union group robbed the mine of its rich ores, leaving all ores assaying less than 25 percent lead in the mine or dumping them as waste. In May 1875 Belshaw obtained a new trial that dragged on for a year. The Union Consolidated Company was finally established in 1876 as a compromise between both parties.

When both furnaces at Cerro Gordo and the furnace at Swansea were in full operation, Cerro Gordo boasted a population of 500 to 600 men working as miners, furnacemen, coal burners, and packers. Nevertheless, the best days of Cerro Gordo had passed by 1876 as the Panic of 1873 and its subsequent nationwide economic downturn had begun to impact the boom camp. In December of that year the Belshaw furnace shut down, and by 1877 only 60 people were employed. The Union works were destroyed by fire on August 14, 1877, causing some $40,000 in damage.

By October of that year the Union had been repaired, but Belshaw reported a debt of $110,000. Beaudry resigned from the company and left for Darwin. Miners' wages were reduced to $3 per day in March 1878, so half the men immediately left Cerro Gordo. That April the last stage left Cerro Gordo, the Union Mine was abandoned in October 1879, and on November 20, 1879, Beaudry's furnace closed. Nadeau hauled the last load of 208 bars of bullion and a 420-pound mass of silver on November 21, 1879, and in June 1882 the *Bessie Brady* was destroyed by fire.

California state mineralogist W. A. Goodyear visited Cerro Gordo in July 1888. He found approximately 40 men eking out a living in the area. In September 1889 Archie Farrington began reconstruction of the Union Mine, but this venture proved a failure, and the Union closed operations in February 1892. Depressed silver prices further discouraged any plans for reviving the Cerro Gordo mines. During the early 1900s, Thomas Boland, a lone miner, remained the only active prospector in the Cerro Gordo vicinity.[86]

In 1905 the Great Western Ore Reduction Company acquired the rights to the Cerro Gordo mines, constructing a steam traction engine that transported ore from Cerro Gordo to a smelter at Keeler. In November 1907 the company sold its mining rights at Cerro Gordo to the Four Metals Company of Keeler, and this firm constructed an aerial tramway

86. Likes and Day, *From This Mountain*, pp. 54-57.

connecting Cerro Gordo and Keeler and built a 200-ton smelter just east of the town.[87] By the spring of 1910, however, this company encountered financial difficulties, because it overestimated the amount of silver still available in the Cerro Gordo mines.[88]

Although Cerro Gordo is known primarily for its silver and lead production, Louis P. Gordon discovered zinc in the Cerro Gordo properties in 1911, later purchasing the Union Mine from the Four Metals Company. He reorganized the entire enterprise under the Cerro Gordo Mines Company, working the mines until September 15, 1915. An electric powerline was completed to Cerro Gordo in 1917, replacing steam for hoisting, air compressors, and tram operation. The old and inefficient aerial tram was supplanted by a 5-1/2-mile Leschen tram which transported supplies and ore to and from the railway terminus at Keeler. In addition to producing the highest grade zinc carbonate ores in the country, new silver-lead ore bodies were discovered and successfully mined during the 1911-19 period. Various owners worked the mines on an intermittent basis during 1923-33. From June 1929 to April 1933, for instance, the American Smelting and Refining Company, after purchasing the lease rights to the properties, obtained 10,000 tons of ore worth more than $300,000. The Cerro Gordo properties, which include the Union, Ignacio, Hart, Sunset, Ella, Perseverance, Newtown, San Lucas, and Morning Star mines, as well as the Newboy and Belmont Canyon approximately 1-1/4 miles east of Cerro Gordo, were worked briefly during World War II by Goldfields of South Africa in 1944 and by W. C. Rigg and Associates from 1946 to 1949. Only small shipments, however, were made before closing the mining operations. All told, the Cerro Gordo properties have produced an estimated $17,000,000 from some 30 miles of underground workings. Total recorded silver yield is nearly 4,400,000 ounces, and total lead production roughly 37,000 tons. Of these totals, more than one-half of the lead and about three-fourths of the silver were produced in the boom years from 1869 to 1876. Gold was an important smelter by-product with about 2,000 ounces being produced. Total zinc production has been about 12,000 tons, and copper production about 300 tons.

In 1959 the tram house and machinery were taken down for use in new mining operations near Candalaria, Nevada. Remnants of a half dozen of the buildings and houses, including the American Hotel, Belshaw's residence, the ice plant, and a massive stone smokestack for a smelter, remain at Cerro Gordo. The rebuilt Union Mine head works still contains machinery and equipment from the boom days, and the grade of the Yellow Grade Road may still be seen. The ruins of the Ignacio Mine can still be seen one-half mile south of Cerro Gordo, the canyon sides above the town are still pocked with the remains of the half-caves and half-shacks where miners once lived, and the area near the peak is still pitted with craters marking the caved-in portals of old mines.[89]

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87. For the eyewitness account of a visitor to Cerro Gordo in 1908, see John A. Reid, "A Little Known Corner of California," *Overland Monthly*, LII (Second Series, No. 3, September 1908), pp. 271-75.

88. ibid., pp. 60-64.

89. ibid., pp. 64-85; Annis M. Cuppett, "Cerro Gordo," *Desert Magazine* (February 1980), pp. 17-19; Lambert Florin, *California Ghost Towns* (Seattle, Superior Publishing Company, 1971), pp. 24-25; DeDecker, *Mines of the Eastern Sierra*, pp. 57-67; State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, pp. 59-61; and Remi Nadeau, *Ghost Towns and Mining Camps of California* (Los Angeles, The Ward Ritchie Press, 1965), pp. 187-94.

Located at the northeastern edge of Owens Lake, the town of Keeler was established as a result of the Cerro Gordo mining operations. The site of the town was the place where residents of Cerro Gordo had originally obtained spring water. James Marshall Keeler, an agent for D. N. Hawley, began construction of a mill at the town site in March 1880, and some bullion from Cerro Gordo was processed there after the mill was placed in operation in March 1881. The Carson and Colorado Railroad, a narrow gauge railroad which extended from Mound House, Nevada, opened service to Keeler, its southern terminus, on August 1, 1883, and thereafter the town became a shipping point for the Cerro Gordo mines and other lead-silver mines at Darwin. By 1900 the Carson and Colorado was sold to the Southern Pacific Railroad Company. In 1910 this company built a new standard gauge line northward from Mojave to Owens Valley, jogging around the west side of Owens Lake and reaching the narrow gauge at Owenyo, north of Keeler. The town expanded rapidly, reaching a peak population of nearly 7,500. After the Cerro Gordo mines gave out the establishment of the Inyo Marble Works, some 5 miles north of Keeler, during the late 1880s sustained the town. In recent years the town has been kept alive by a fairly active Inyo County soda works and talc industry.[90]

Tecopa

At approximately the same time that Pablo Flores discovered Cerro Gordo, silver-lead ores were discovered at Tecopa, named for a local Paiute who befriended early settlers and located south-southeast of Death Valley at the southern edge of the Nopah Range some 10 miles east of the park boundary.[91] Known as the Gunsight Mine, it is related to Turner's discovery in name only, because his discovery is presumed to be much farther north-northwest in the Argus Range. Little is known about the early history of this mine except that it operated from 1865 to 1882 and that a ten-stamp mill and three furnaces were constructed in 1880. Prior to that time, ore from Tecopa had been smelted and processed at Resting Springs and Ivanpah. By 1881 some 40 men were involved in the mining operations. A 1,000-foot tunnel was dug to open a vein composed of galena at the surface that changed in depth to a carbonate ranging in value from $60 to $400 a ton, with an $80 average.[92]

Due in part to the interest generated by the Greenwater mining rush to the northwest of the Gunsight Mine during the early 1900s, the Tonopah and Tidewater Railroad pushed its railroad construction northward through the Amargosa Valley in an attempt to obtain the developing copper camp's business. Completed to Tecopa at the time of Greenwater's collapse, the railroad provided the Noonday and Gunsight mines, both owned by the Tecopa Consolidated Mining Company, with an outlet for their silver ores. The company quickly shipped a 30-car train of ore worth $40 per ton. By 1910 an 11-mile standard

90. Likes and Day, *From This Mountain*, p. 51; Francis C. Krautter, *The Story of Keeler* (Independence, California, 1959), n.p.; David F. Myrick, *Railroads of Nevada and Eastern California*, 2 vols. (Berkeley, Howell-North Books, 1963), Vol. I, pp. 166-210; and John F. Due, "Carson & Colorado Railroad," *The Western Railroader*, XXII (May 1959), pp. 3-25.

91. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 232-33, 251-52.

92. Myrick, *Railroads of Nevada and Eastern California*, Vol. II, p. 593, and Horatio Burchard, *Report of the Director of the Mint Upon the Statistics of the Production of Precious Metals in the United States* (Washington, Government Printing Office, 1882), p. 40.

gauge railway, known as the Tecopa Railroad, was hauling ore from the Gunsight and Noonday mines to Tecopa station, where high-grade values were shipped over the Tonopah and Tidewater to smelters at Murray, Utah.[93]

Between 1912 and 1928, the Tecopa Consolidated Mining Company produced $3,000,000 in silver and lead, becoming California's leading silver-lead producer between 1917 and 1920. By the time declining lead prices and ore values forced the Tecopa to shut down in 1928, 148,000 tons of ore averaging nearly $24 a ton were produced, two-thirds of which was lead while the rest was silver with a trace of gold. By that date the Tecopa mines' production had reached nearly $4,000,000, making them the biggest metal producers in the Death Valley and Amargosa country. After World War II the mines, which had been inactive during the Depression, were purchased by the Anaconda Copper Mining Company. The mines were operated with a crew of some 45 men until March 1953, when operations closed.[94]

Panamint/Panamint City

The Panamint mining rush that began in 1873 was another product of the search for the Lost Gunsight Mine. The mining boom camp of Panamint City was established at the head of Surprise Canyon, a secluded steep and narrow canyon tucked between Telescope Peak and Panamint Valley on the west side of the Panamint Range at an approximate elevation of 6,600 feet above sea level. Panamint City is significant for this study since it is the only "ghost town" that is located within the boundaries of the lands that were added to Death Valley National Monument in 1994. Accordingly, the National Park Service has determined to nominate Panamint City for listing on the National Register of Historic Places because of its historical significance, integrity of archeological remains, and research potential.[95]

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93. Myrick, *Railroads of Nevada and Eastern California*, Vol. II, pp. 593-96. The Tonopah and Tidewater was constructed northward from Ludlow on the Santa Fe. Crossing the "Salt Lake Route" at Crucero, the railroad went northward through Soda Springs (present-day Baker) and Silver Lake, passing into the Amargosa Valley via Amargosa Canyon. The rail line continued northward to Death Valley Junction from which point a branch line was constructed to Old Ryan. The railroad extended northward from Death Valley Junction to an eventual meeting with the Bullfrog-Goldfield Railroad, thus giving it a connection to Goldfield and Tonopah.

94. Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," p. 80; J. Grant Goodwin, "Lead and Zinc in California," *California Journal of Mines and Geology*, LIII (July 1957), p. 511; Lingenfelter, *Death Valley & The Amargosa*, pp. 355-59; and R. J. Sampson, "Mineral Resources of the Resting Springs Region, Inyo County," *California Journal of Mines and Geology*, XXXIII (October 1937), pp. 264-73.

95. Information on Panamint/Panamint City may be found in Norwood *et al.*, *Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, pp. 128-33; Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 233-38; Lingenfelter, *Death Valley & The Amargosa*, pp. 113-34; Neill C. Wilson, *Silver Stampede: The Career of Death Valley's Hell-Camp, Old Panamint* (New York, The Macmillan Company, 1937; Reprint, New York, Ballentine Books, 1974); Dane Coolidge, *Death Valley Prospectors* (New York, E. P. Dutton & Co., Inc., 1937), pp. 77-84; George Koenig, *"23" Skidoo and Panamint, Too!* (Death Valley, California, The Death Valley '49ers, 1971); and F. MacMurphy, "Geology of the Panamint Silver District, California," *Economic Geology*, XXV (June 1930), pp. 305-25. The Eastern California Museum in Independence, California, has a sizable collection of historic photographs of Panamint, and documentary records, titled "Panamint Mining District Records (1873-74), may be found in the Recorder's Office at the Inyo County Courthouse in Independence.

The Surprise Canyon vicinity was originally a favorite hideaway for local bandits and stagecoach robbers. Rumors of the Lost Gunsight Mine may have caused these desperadoes to conduct some prospecting while holing up in the area. During December 1872, William L. Kennedy and Robert P. Stewart,[96] both of whom had arrived in the Cosos in 1860 and the Slate Range in 1862 and had prospected in the Panamints intermittently for the next decade, together with Richard C. Jacobs, discovered silver in a little valley at the head of Surprise Canyon. In February 1873 the Panamint Mining District was established, and by June of that year 80 locations had been filed. Ore reportedly assaying between $300 and $3,000 per ton had been extracted. As a result of the ensuing mining rush, Panamint City had a population of 125 by March 1874.[97]

After securing a bond on the largest mines in the Panamint vicinity, Eliphalet P. Raines, a smooth-talking Southerner who had plied his skills most recently at Pioche, Nevada, attempted to publicize and promote the district. Unsuccessful at first, he later received newspaper publicity by displaying a half ton of Panamint ore at the Clarendon Hotel in Los Angeles. The city's businessmen were envious of San Francisco's flourishing economy that was based in part on the mineral wealth that had been produced during the gold rush of 1849 and was continuing to be stimulated by the Virginia City Comstock silver mines. Thus, they agreed to undertake construction of a wagon road to Panamint, replacing a crude trail that extended from Little Lake across the Coso and Argus ranges to Surprise Canyon. After this success Raines traveled to San Francisco to meet John P. Jones, a U. S. Senator from Nevada and a former mine superintendent in the Comstock. Jones immediately loaned $1,000 to Raines, following the initial loan with an additional loan of $14,000 when the two later met in Washington, D.C.[98]

Jones and his fellow colleague from Nevada, Senator William M. Stewart, were known as the "Silver Senators," because they had a wide range of mining investments, primarily in the Comstock mines. In September 1874 the two political leaders quickly organized the Surprise Valley Mill and Water Company with a capital stock of $1,000,000, and they spent some $250,000 to purchase the most promising Panamint mining properties. With Stewart came his partner in the mining promotion, Trenor W. Park, a fellow lawyer who had first struck gold in the litigation over Frémont's Mariposa mines and who had built on that by dealing in railroads and steamships. News that the two Nevada senators had purchased the Panamint mines for approximately $250,000 sparked the largest rush that the Death Valley country would see for the remainder of the 19th century.[99]

One of the Panamint transactions by Jones and Stewart involved men known to have robbed Wells Fargo on more than one occasion. Senator Stewart arranged amnesty for the mine owner, but only after making sure that the owner's profit, amounting to some $12,000 to $20,000, was paid to the express company to cover its losses. It is possible that

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96. George R. Brown, ed., *Reminiscences of Senator William Stewart of Nevada* (New York, Neale Publishing Company, 1908), pp. 261-64.

97. Wilson, *Silver Stampede*, p. 59, and Chalfant, *The Story of Inyo*, p. 285.

98. Chalfant, *The Story of Inyo*, pp. 285-86.

99. Remi Nadeau, *Ghost Towns and Mining Camps of California* (Los Angeles, Ward Ritchie Press, 1972), p. 198, and Chalfant, *The Story of Inyo*, p. 286.

Stewart's willingness to deal with bandits persuaded Wells Fargo never to open up an express office in Panamint City.[100]

Because Panamint City did not have an express office and the town had a reputation for violence, the two senators resorted to molding the bullion from their mines into 400-pound balls, each nearly a foot in diameter and worth about $6,200, as a deterrent to robbery. The ingots were so heavy and unmanageable that thieves could not possibly get away with one. In this condition the company eventually shipped more than one-third million dollars in fine silver bullion down Surprise Canyon and on to Los Angeles as ordinary freight, without a single guard.[101]

During late 1874, a number of mining companies were established at Panamint because the publicized interest of Jones and Stewart in the mines attracted a large number of investors. On November 28, for instance, the Idaho Panamint Silver Mining Company was organized with a capital stock of $5,000,000. The next day the Maryland Company of Panamint was organized with $3,000,000 of capital stock. In December seven more Panamint corporations were established with an aggregate capital of $42,000,000. Some 300 men, nearly half of whom were Chinese, were hired by the Surprise Valley Mill and Water Company to open the mines, construct its offices, boardinghouses, and warehouses. The workers built a company store, cut pack trails up the steep slopes to the mines, and graded sites for the mill and ore concentrators under the direction of Henry A. Jones, the senator's brother, who was named superintendent, and Isaac G. Messic, an old gold rush friend of the senator who was named manager. Because the Chinese worked for low wages, they became the focus of racial and labor hostility and frequent victims of random violence.[102]

Mining investors were attracted to Panamint not only because of the interest of Jones and Stewart but also because its mines had the promise of becoming a second Comstock. The mineral belt was 2-1/2 miles wide and 5 miles long, and a number of veins were discovered that were wide enough that a wagon could be driven through them. The veins could be traced for great distances, running parallel to Surprise Canyon. Some of the veins were fractured, while others appeared to be unbroken. The silver ore came in two forms: a rich, purer mineral near the surface, changing with depth to antimoniates of copper, lead, iron, and zinc, with sulphuret of silver and water. The rich ore assayed more than $900 per ton from Stewart's Wonder, $350 per ton from Jacob's Wonder, and $600 per ton from the Wyoming. The more common ore ranged in value from $12 to $85 a ton.[103]

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100. ibid. For a somewhat sensationalized account of Wells Fargo's relationship with Panamint and its backers, see Lucius Beebe and Charles Clegg, *U. S. West — The Saga of Wells Fargo* (New York, Bonanza Books, 1974), pp. 160-69.

101. Chalfant, *The Story of Inyo*, p. 286, and Wilson, *Silver Stampede*, pp. 125, 214.

102. Wilson, *Silver Stampede*, p. 117. For more information on issues relating to the use of Chinese workmen in eastern California mining areas, see S. W. Kung, *Chinese in American Life: Some Aspects of Their History, Status, Problems, and Contributions* (Seattle, University of Washington, 1962), pp. 68-70, and Roberta Starry, "California's Chinese Wall," *Desert Magazine*, XXXII (April 1969), pp. 10-13.

103. Raymond, *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains*, pp. 35-37.

Although new mining companies continued to be established, the Panamint mines were still not developed in depth by late 1874. Nevertheless, companies that were heavily financed purchased and opened up mines with little regard as to which were better situated on the veins, everyone apparently hoping that wealth to one would be wealth for all. In October, for instance, the Surprise Valley Mill and Water Company began stripping out the richest ore from the surface croppings of the Emma Mine for shipment to the Atlantic coast and then to Wales for final smelting via a shipping line in which Park was a director. The shipments were made to bring some immediate return on their investment, appease British investors who had paid so much for the Emma Mine that it was unable to pay back more than a fraction of the cost, and help foster a continuing European market for their mining stock. The shipping ore averaged $300 a ton, and despite the great distance it was shipped, it paid back more than $200 of that in profit. More than $150,000 of ore was shipped abroad, thus bringing further publicity to the mines and paying back most, if not all, of the cash spent in purchasing the mines.

The winter of 1874-75 was Panamint's most successful season. In December 1874 Jones, Stewart, and Park merged the majority of their mining interests to form the Wonder Consolidated and Wyoming Consolidated companies with a combined capital of $12,000,000. The consolidated companies controlled 3 running miles of the richest lodes in Panamint. Money from the sale of the stock of these companies was to provide funds for construction of mills and roads to process the ore from the mines and to make the Panamint properties more accessible for mining, but the mills would belong to the Surprise Valley Mill and Water Company.

With these developments, Panamint City quickly became a bustling mining town. In November 1874 Thomas S. Harris began publication of the *Panamint News*, the town's newspaper. Two stage lines opened service to Panamint in November 1874, and Louis Felsenthal opened the Bank of Panamint for business. Fifty structures soon lined either side of Surprise Canyon, and mules and burros provided transportation in town, the only vehicle being a meat market wagon that doubled as a hearse and parade platform. The Oriental Saloon was billed as "the finest on the coast outside of San Francisco."[104]

By January 1875 more than 1,500 persons inhabited Panamint City, which had become the largest town in a 100-mile radius. Some 600 claims covering a combined area of some 20 square miles had been filed, and lots on Main Street were selling for as much as $3,000. Since the boom town was built on a hill, the main street stretched 1,000 feet from top to bottom. One of the most prominent businessmen of the town was George Zobelein, later to become the founder of the Los Angeles Brewing Company, who bought a $400 lot and opened up a general store.[105] In April two San Francisco-based corporations, the Sunrise Silver Mining Company and the Panamint Mining and Concentration Works,[106] offered mining stock worth $11,000,000. The former sought to work the district's only pocket of free-milling ore at its Sunrise Mine at the head of Surprise Canyon, and it constructed a five-stamp mill that summer that produced as much as $900 in bullion per day. By the

104. ibid., pp. 36-38, and Nadeau, *Ghost Towns and Mining Camps*, p. 199.

105. "Panamint District," *Mining and Scientific Press*, XXX (January 9, 1875), p. 2.

106. "Prospectus of the Panamint Mining and Concentration Works," San Francisco, 1875, in Matt Ryan Collection, Research Library, Death Valley National Park.

summer of 1875 the town boasted some 5,000 inhabitants, 6 general stores, and 12 saloons. Three stage lines provided almost daily service, and there was daily mail service from Lone Pine in Owens Valley as well as Jones and Stewart's "Panamint Pony Express" to Los Angeles. In addition the town boasted two banks, three doctors, four lawyers, butcher shops, barbershops, bakeries, booteries, apothecaries, assayers, and jewelers.[107]

On June 29, 1875, the Surprise Valley Mill and Water Company's 20-stamp mill began test operations, and it went into full production on August 27. Built with one-half million bricks at a cost of $210,000, the mill had four Hendy concentrators and a Stetefeldt furnace. Tests showed that the mill recovered up to 96 percent of the value of the most fractious ore on hand and produced bullion that was 98 percent pure silver. Running around the clock, it processed about 15 tons a day of $90-a-ton rock, turning out bullion at a rate of $1,300 a day, $40,000 a month, or $500,000 a year. Ore averaging $80 to $100 per ton from the Wyoming and Hemlock mines was transported down the mountain by means of a 2,600-foot wire aerial tramway to a mill constructed by Daniel P. Bell. Wood consumption in the mill's furnace amounted to three cords per day. Each cord cost $12, and miners and mill workers received wages ranging from $4.00 to $5.50 a day.[108]

Inadequate transportation to the remote location of Panamint City, however, continued to pose serious problems for the success of the Panamint mines. The road from Independence to Panamint, running south by way of Little Lake and Indian Wells, curving east through Panamint Valley, and then taking a northward route to Surprise Canyon, took four days to traverse. Prosperity in Owens Valley during the 1870s was directly related to the mining camps of Cerro Gordo, Panamint City, and Darwin, and residents feared that slow traffic between Panamint and Independence would prevent most of the bullion from the Panamint mines from passing through Owens Valley. Accordingly, the residents of Independence and Lone Pine petitioned the Inyo County Board of Supervisors to construct a new, more direct route from Owens Valley to Panamint. The board responded by awarding a contract for the new road to John Shepherd, a wealthy rancher living on George Creek, some 6 miles south of Independence.

Completion of the new road from Independence to Panamint was a partial success, speeding up the flow of goods and people between the two locations. For example, Rothschild and Company of Independence became one of the major suppliers of lumber, liquor, and food to residents of Surprise Canyon. The new road, however, did not solve all of the transportation problems of the isolated Panamint area, as demand continued to outdistance supply, thus contributing to an extremely high cost of living in the town.[109]

By the spring of 1875 the first flush of the Panamint boom was past, as the scarcity of both water and high-grade ore began to take a toll on the mine operations. The camp had settled back to a population of approximately 600, nearly half of whom worked for the Surprise Valley Mill and Water Company and its subsidiary mines. William Ralston's

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107. Chalfant, *The Story of Inyo*, p. 287; Wilson, *Silver Stampede*, p. 117; and Nadeau, *Ghost Towns and Mining Camps*, pp. 199-200.

108. Nadeau, *Ghost Towns and Mining Camps*, p. 199, and Raymond, *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (1876), p. 24.

109. Cragen, *Boys in the Sky-Blue Pants*, pp. 150-57, 173.

Bank of California in Panamint City closed in August 1875, less than two months after the company's mill went into operation, thus signaling the early demise of the mining town. The bank's fall brought down with it much of the Comstock's wealth that had been invested in the Panamint mines. Harris published the last issue of the *Panamint News* on October 25, 1875, and left for Darwin. Virtually everyone left Panamint City in November 1875 as rumors continued to circulate that the ore bodies were nearing exhaustion.[110]

To restore production at Panamint, Senator Jones backed the construction of the Los Angeles and Independence Railroad that would presumably provide cheaper and more reliable transportation to the Panamint mines in Surprise Canyon, as well as to Cerro Gordo and Darwin. As the railway company was grading its right-of-way in Cajon Pass near San Bernardino on May 17, 1876, William Workman, a prominent financial backer of the railroad, committed suicide. With Francis Temple, his brother-in-law who was treasurer of the railroad, Workman had owned the Workman and Temple Bank in Los Angeles. The bank soon failed, thus spelling the end of the railroad as its assets fell into the hands of competitors.[111]

Although many sources indicate that a cloudburst washed down Surprise Canyon on July 24, 1876, killing 15 people and destroying virtually every building in Panamint City, research indicates that the storms that wrought havoc elsewhere in the Great Basin on that date barely touched the failing camp. Later in May 1877, after another panic swept the stock market, Senator Jones was forced to shut down his Panamint mill. Of the approximately $2,000,000 that the "Silver Senators" poured into Panamint, it appears that they received little, if anything, in return.[112]

After more than a decade of little mining activity in the Panamint City area, Richard Decker reopened the Panamint post office on May 23, 1887, operating it until June 19, 1895. Decker and two companions apparently conducted some prospecting, because they filed a mining claim on January 3, 1890, in nearby Woodpecker Canyon. Between 1900 and 1918, two miners, Judge Curran and Jack Byrne, reportedly packed ore out of the Panamint mines while laboring to reconstruct the road up Surprise Canyon, the roadwork being completed in Augnst 1918 with the aid of S. F. Hopkins and Harry Wellman. Soon after the roadwork was completed, however, another cloudburst destroyed much of their labor. Al Myers, one of the original discoverers of the Goldfield, Nevada, mines, acquired title to most of the old mines at Panamint during the early 1910s. In 1923 Dallas Corum took an option on the Panamint mines from Myers, and during the fall of 1924, he began rebuilding the road to Panamint which had been washed out since 1917. Apparently, Corum and Myers, along with mining engineer William L. Seeley, began building a mill. After six months of exploratory work they found that leasers had picked out the last of the high-grade, and that the remainder of the exposed ore would not pay. The only remaining chance of striking pay ore was to run a tunnel to cut the veins at depth in the

110. Wilson, *Silver Stampede*, pp. 26-36, 117, and Raymond, *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (1876), p. 24.

111. Cragen, *Boys in the Sky-Blue Pants*, pp. 168-69.

112. Lingenfelter, *Death Valley & The Amargosa*, p. 132; Nadeau, *City Makers*, pp. 139, 225; and Chalfant, *The Story of Inyo*, p. 286.

hope there was some hidden bonanza below. But that was a more expensive gamble than Myers, already strapped for cash, wanted to take.

Accordingly, Myers, in 1925, sold the tunnel idea and a one-half interest in the Panamint mines to Edward G. Lewis, a crusading con artist who had gathered a following of some 9,000 people who had given him not only their hard-earned savings but their unfaltering faith as well. Lewis was opening a reconstruction fund to drill some wildcat oil wells in Maricopa, the proceeds with which he reportedly would resurrect his utopian dream city of Atascadero in western California. The "Lewis Tunnel" was started at the foot of the south wall of Surprise Canyon in June 1925 to tap the Wyoming vein at a distance of 1,500 feet or more and at a depth of roughly 1,000 feet below its once-rich surface croppings. The tunnel was extended more than 2,000 feet when on June 1, 1926, all work stopped as the law finally began closing in on Lewis. Several months later, he was indicted on multiple counts of mail fraud by a federal grand jury in Los Angeles, and he was tried and convicted on a total of two dozen charges, reaching back several years. Ultimately he was sentenced to two concurrent prison terms totaling 11 years.[113]

The American Silver Corporation leased 12 patented claims, 4 patented millsites, and 42 unpatented claims in the Panamint City area in 1947-48, concentrating its work on the Marvel and Hemlock claims. Apparently, Nathan Elliott, a movie press agent, established the company to commence another "get-rich-quick" scheme involving the long dormant mines. Elliott spun a sumptuous verbal web that entrapped many of the film capital's finest, aided by the company's vice president and comedian Ben Blue, the silver-tongued promoter. The company built a camp at Panamint, improved the Surprise Canyon road, and initiated efforts to promote the "Consolidated Panamint Silver Mining Company" on the New York Stock Market, reportedly raising $1,000,000 before the District Attorney of New York County took action to quash the fraudulent scheme. As a result, the company reported no shipments before filing bankruptcy on March 22, 1948. During the mid-1950s, the American Silver Company reopened the road up Surprise Canyon to Panamint City preparatory to some mining activity, and in the 1970s mining activity was renewed for a time at Panamint, but faulting in the elusive veins would make them difficult to follow.[114]

Today the Panamint City site features a few reminders of its colorful past, including remnants of the brick mill and its 65-foot-high stack, parts of walls, rock foundations, and old cellars from destroyed buildings along Panamint's main street, and reportedly a few graves in Sour Dough Canyon. Up the mountain behind the mill are remains of the old tramway. Near the end of the Surprise Canyon road is an old miner's shack, and a

113. Lingenfelter, *Death Valley & The Amargosa*, pp. 422-24; Coolidge, *Death Valley Prospectors*, pp. 81-84; and "Copy of Taped Conversation between Ranger Matt Ryan and Mr. Dallas Corum, February 4, 1963, pp. 1-2, Matt Ryan Collection.

114. Beebe and Clegg, *U. S. West*, pp. 168-69, and Photograph Negative No. 1289, dated September 1956, showing blasting operations of American Silver Company to reopen the road through Surprise Canyon to Panamint City. (Copy of photograph negative may be found in Reference Library, Death Valley National Park.)

hundred yards beyond the remnants of an old mine. Cabins, many of which date from the 1960s, dot the hillsides.[115]

Darwin

As the fortunes of Panamint declined, the rise of Darwin kept the mining prospects of Inyo County alive. Located southwest of Panamint Springs on a mesa above Darwin Wash in the northern part of the Argus Range, Darwin, although several miles outside the lands that were added to Death Valley National Monument in 1994, nevertheless influenced prospecting activities and mining operations in those lands. With more than 30 miles of workings and underground shafts and tunnels, the Darwin district has produced more than $29,000,000 in mineral wealth during its extended history of mining development.[116]

As the Panamint rush subsided, some prospectors stopped short of Panamint in the old Coso district to the west. There, late in October 1874, Raphael Cuervo, "Professor" William D. Brown, and his brother Robert, discovered massive deposits of easily smelted silver-lead ore that assayed as much as $700 a ton. Within six weeks of their discovery, more than 150 men had set up the new mining camp of Darwin (named for E. Darwin French). Soon an exodus from the declining Panamint City area began as most of the floating prospector population started drifting back down Surprise Canyon. By December some 200 men had been drawn to the new district, and Abner B. Elder, Belshaw's earliest partner, was elected recorder of the New Coso Mining District. Victor Beaudry, another of Belshaw's partners, aided development of the new mining town, constructing the Darwin Water Works to pipe water from springs located 7 miles south of Darwin near the old Josephine mill at Coso to tanks north of the townsite that held 28,000 gallons.[117]

Major mining operations at Darwin began during the spring of 1875. Under the management of L. L. Robinson, the New Coso Mining Company purchased the Christmas Gift and Lucky Jim prospects in May 1875. The Cuervo Mining Company was organized

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115. Stanley W. Paher, *Death Valley Ghost Towns* (Las Vegas, Nevada, Nevada Publications, 1973), pp. 40-42; Phil Howell, "Surprise Canyon: Surviving the Road to Panamint City," *4WD Sport Utility* (November 1993), pp. 60-65, 76-77; Stanley Demes,"Tempest in Silver," *Desert Magazine*, XXX (February 1967), pp. 8-11, 35; Wolle, *The Bonanza Trail*, pp. 134-41; Erwin Z. Sauke, "'Greater Than the Comstock!'," *Frontier Times* XXXIII (No. 4, Fall 1959; New Series No. 8), pp. 26-27, 49-51; ibid., "Panamint City," *Bonanza Magazine*, I (November 1958), pp. 36-39; Gary Moore, "Scenes Behind the Scenes in Death Valley," *Desert Magazine*, XXVII (November 1964), pp. 29-32; Frank J. Berberich, "Idyll for Outlaws," *Desert Magazine*, XXVIII (November 1965), pp. 8-9; Betty Shannon, "Canyon With A Surprise," *Desert Magazine*, XXXVII (April 1974), pp. 13-15; "Ruins of Old Panamint," *The Pony Express*, XIX (March 1953), p. 3; and O.N. Cole, "Panamint — City of Silver," *California Geology* (December 1975), pp. 278-79.

116. Among the best sources for the historical development of the Darwin mining region are: Robert P. Palazzo, *Darwin, California* (Lake Grove, Oregon, Western Places, 1996); Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 238-41, 256-57; U. S. Department of the Interior, Geological Survey, Professional Paper No. 368, *Geology and Ore Deposits of the Darwin Quadrangle, Inyo County, California*, by Wayne E. Hall and E. M. MacKevett, Jr. (Washington, Government Printing Office, 1962), pp. 1-83; State of California, Department of Natural Resources, Division of Mines, Special Report No. 51, *Economic Geology of the Darwin Quadrangle, Inyo County, California*, by Wayne E. Hall and E. M. MacKevett, Jr. (Sacramento, California State Printing Office, October 1958), pp. 1-73.

117. Lingenfelter, *Death Valley & The Amargosa*, p. 130; Nadeau, *Ghost Towns and Mining Camps*, p. 194; ibid., *City Makers*, p. 112; Kelley, "Geology and Ore Deposits of the Darwin Silver-Lead Mining District," pp. 508, 551; Wilson, *Silver Stampede*, p. 175; and Chalfant, *The Story of Inyo*, p. 294.

under the leadership of J. D. Fry on June 6, 1875, with $10,000,000 in capital stock, and quickly obtained controlling interest in the Grand and Promentorio mines.[118]

By 1875 the New Coso Mining Company had produced some 6,000 bullion bars worth $100,000 from mines less than 100 feet in depth. In August 1875 the company's 60-ton furnace commenced operation. Each day the furnace, employing 23 men, could be fed 20 tons of ore, along with 1-1/2 tons of iron ore, 4-1/2 tons of slag, and 3 tons of lime. If things went well and the ore was of sufficiently high grade, this 29-ton mixture would reduce to 6 or 7 tons of bullion (150-175 bars) worth $2,000 in silver alone.

Running steadily, the company mill consumed water at a rate of 80,000 gallons per year. The company spent another $3,000 monthly on coal and wood for the furnace. Operating its mines without horsepower, the company employed four men on a windlass at each of the firm's five mining shafts. Eight to 10 sorters were employed to separate the high-grade ore from that of the low grade, ensuring the efficient transport of good ore to the furnace.[119]

By the end of 1875 Darwin had become a boom town of some 700 inhabitants. In addition to the New Coso Mining Company's furnace, Pat Reddy, a prominent attorney in Independence, began operation of his 100-ton per day Defiance furnace in 1875. A third furnace, the Cuervo, with a 25-ton capacity, was under construction during the winter of 1875-76. The boom town featured 20 mines, 200 frame houses, 9 general stores, a brewery, 2 hotels, and a Wells Fargo express office. The Cerro Gordo Freighting Company extended service to Darwin in 1875. Three more furnaces were constructed in 1876, and the town's population reached 1,000 by the end of that year.[120]

In 1877 Colonel Sherman Stevens built two adobe kilns in a wash just north of Cottonwood Creek to produce charcoal for the Darwin furnaces. That summer, the Cuervo Mine produced $45,000 from 13 tons of exceptionally high-grade ore. Nevertheless, the early boom days were over for Darwin. While a business directory in the *Coso Mining News* in September listed some 20 businesses in Darwin, including an attorney, doctor, brewery, stables, two saloons, a lumberyard, and butcher shop, most would be gone within several months. When the owners of the New Coso Mining Company reduced smelter workers' pay from $4 to $3 per day in 1878, the Workingmen's Club of Darwin called a lengthy strike. After the company attempted to resume mining operations with nonunion workers in May 1878, the Workingmen blocked the trail leading to the works, and the superintendent called in the county's deputy sheriff, constable, and two deputized gunmen to escort the scabs. When the Workingmen refused to disperse, the sheriff's men opened fire. One of the strikers, C. M. Delahanty, was killed by the first shotgun blast, and the others quickly scattered. Violence flared again that evening when the constable killed another striker in an argument over the first killing. Two days later, after a citizens'

118. State of California, Department of Natural Resources, Division of Mines, Special Report No. 51, p. 15.

119. Raymond, *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (1876), pp. 25-27.

120. Nadeau, *City Makers*, p. 112, and Cragen, *Boys in the Sky-Blue Pants*, p. 156.

meeting praised the peace officers and denounced the Workingmen's Club for leading Delahanty to his death, the club disbanded.[121]

As the Darwin boom began to decline, the 1878 gold rush to Bodie and Mammoth City lured away many of the camp's prospectors and inhabitants. Additionally, excessive freight costs and the depletion of high-grade ores hastened the decline of Darwin as its smelters were forced to shut down. Although mining at Darwin continued sporadically during the 1880s and 1890s, poor and expensive transportation, lack of modern facilities, and litigation would continue to plague operations.[122]

As the easily mined ore had given out, the Darwin mines continued to be operated sporadically by lessees until World War I. In 1915 the Darwin Development Company consolidated the Lucky Jim, Columbia, Promontory, and Lane mines, and after several mergers, the Darwin Silver Corporation consolidated these mines with the Defiance and Independence mines in 1917. New development, including equipment, roads, and camps, was initiated with the financial aid of E. W. Wagner for the purpose of reestablishing Darwin as a major silver producer. This boom, however, was halted by a major decline in silver prices following the war.[123]

In 1925 after clearing legal entanglements with the Wagner estate in the wake of his suicide in 1921, the American Metals Company leased the Darwin properties and shipped a considerable amount of ore for a one-year period. When lead prices struck a new low in 1927, the camp closed. In 1928 a fire destroyed the shaft and timbering of the Lucky Jim Mine, thus making the largest mine in the district inaccessible until its repair in 1948.

In 1940 Sam Mosher, owner of Imperial Metals, operated the Darwin mining properties. Several years later, in March 1943, the Darwin Mines Company took over the mining operations, and in August 1945, the Anaconda Copper Mining Company purchased the Darwin properties. That company turned the Darwin mines into the largest lead-producing area in the State of California, producing two-thirds of the state's lead production. Most of the lead was taken from four mines: Defiance, Essex, Independence, and Thompson. Between 1875 and 1952, the Darwin district produced some $29,000,000 in mineral wealth, with 80 percent of that production occurring between 1940 and 1952. Anaconda closed its Darwin operations in 1957.[124]

In 1967 the Darwin mines were reactivated by the West Hill Exploration Company as a result of the activities of William Skinner who believed the mines contained sufficient lead, zinc, and silver to be profitable. The company signed a lease with Anaconda and

121. Richard E. Lingenfelter, *The Hardrock Miners* (Los Angeles, University of California Press, 1974), pp. 141-42, and W. A. Chalfant, *Tales of the Pioneers* (Palo Alto, California, Stanford University Press, 1942), pp. 106-09.

122. Kelley, "Geology and Ore Deposits of the Darwin Silver-Lead Mining District," pp. 552-53, and Nadeau, *City Makers*, p. 153.

123. Kelley, "Geology and Ore Deposits of the Darwin Silver-Lead Mining District," p. 553.

124. ibid., pp. 552-53, and State of California, Department of Natural Resources, Division of Mines, Special Report No. 51, p. 15.

contracted with Skinner's Brownstone Mining Company to revive the Defiance and Thompson mines. Within a year, some 100 men were employed in the mines.[125]

Today the ghost of old Darwin is a collection of crude shacks amidst the confines of an active mining town — few if any of them traceable to the 1870s. The Defiance smelter, with its scattered and rusted machinery, remains the one prime recognizable landmark of the old town. After Anaconda sold its Darwin mining properties subsequent owners have included Quintana Minerals and Blue Ridge Mining. The current mining activities are operated by the Darwin Project, Inc.

Although known principally for its lead and silver mining operations, the Darwin area has also been a major talc producer during the 20th century. One-half of all known talc deposits of commercial interest in eastern California lie in Inyo County. Until the 1940s, the Talc City Mine, 6 miles northwest of Darwin, provided nearly all the steatite-grade talc in the United States. During the 1940s the Warm Spring Mine produced most of the nation's steatite-grade talc.

Originally known as the Simmonds Mine, the Talc City Mine was operated by the Groah Mineral Company of San Francisco prior to 1915. Later mine operators have included the California Talc Company (1915-17), the Inyo Talc Company (1917-22), and the Sierra Talc Company (1922-present). The mine first provided talc for use in the manufacture of insulating cores for Hotpoint stoves. Later, during the mid-1930s, the talc was used for manufacturing high-frequency electrical insulations. By 1950 the total production from the mine was approximately $250,000.

During the 1917-20 period, the Zinc Hill Mine, 6 miles northeast of Darwin and just outside the boundary of Death Valley National Park, was the largest zinc producer in California. During World War II, the mine produced some 2,500 tons of zinc ore. The site of a mill and mining camp that once serviced the mine is located between Darwin and Panamint Springs. A packtrail extended from the mill to the mine, and several shafts had inclined tramways and aerial tram lines that connected them to the pack trail.[126]

Lookout

Prospectors have discovered dozens of silver mines in the Panamint and Argus ranges, but few have claimed to find the legendary Lost Gunsight, and fewer still have believed those who so claimed. If it was found at all, most historians believe the mostly likely location for the Lost Gunsight Mine would be one of the mines on Lookout Mountain on the east slope of the Argus Range overlooking Panamint Valley some 1,500 feet below. Lookout, a mining camp associated with the rise of Darwin, is located several miles south of Panamint Springs and several miles east of Darwin outside the lands added to Death

125. *Inyo Independent*, July 12, 1968.

126. State of California, Department of Natural Resources, Division of Mines, Special Report No. 51, p. 15, and Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," pp. 83, 113-15, 119.

Valley National Monument in 1994. Like Darwin, however, operations on Lookout Mountain would impact mining activities in those lands.[127]

Approximately two years after the discovery at Panamint and about five months after the discovery at Darwin, rich silver-lead deposits were discovered on the north face of Lookout Mountain on April 22, 1875. The discovery was made by B. E. Ball, J. E. Boardman, E. W. Burke, and Jerome S. Childs, reportedly while "looking for the Lost Gunsight." Shortly after the discovery, the men sold their interest in the claims, which would later be consolidated in the Modoc mining property, to the Modock Consolidated Mining Company of San Francisco. One of the five directors of that company, which had been established on August 9, 1875, was former U.S. Senator George Randolph Hearst, father of newspaper magnate William Randolph Hearst.[128]

In 1876 the Minnietta Belle Silver Mining Company was established, and mining operations on the Minnietta Mine, located on the south face of Lookout Mountain, began under the superintendence of James Dolan. By the end of the year the mine's shaft was some 100 feet in depth, and Dolan calculated that the Minnietta contained at least 3,000 tons of ore valued at some $100 per ton. The silver content of the Modoc Mine ore ranged between 100 and 300 ounces of silver per ton. The ore was packed by mule across the Panamint Valley to the 20-stamp mill at Panamint City for crushing and treatment until October 1876, when the first of two 30-ton furnaces at Lookout began operation. Each furnace could produce 160 bars of bullion, weighing 80 to 85 pounds, per day. The smelting process required the use of iron, which was obtained from the nearby Iron Cap Mine.[129]

By the end of November 1876 it was reported that some $100,000 of bullion had been produced by the Lookout furnaces, which required 3,000 bushels of coal per day to operate. The coal and other supplies were hauled to Lookout by several hundred mules that maintained an almost continuous parade moving to and from the Argus Range. In late 1876 the Cerro Gordo Freighting Company began hauling silver bars from Lookout.[130]

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127. Norwood *et al., Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, p. 137; Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 242-45; Mike Engle, "A Look at Lookout," *Desert Magazine*, XXXV (November 1972), pp. 18-20, 38; U. S. Department of the Interior, Geological Survey, Bulletin No. 1299, *Geology of the Panamint Butte Quadrangle, Inyo County, California*, by Wayne E. Hall (Washington, Government Printing Office, 1971), pp., 1-64; and State of California, Department of Natural Resources, Division of Mines and Geology, Special Report No. 73, *Economic Geology of the Panamint Butte Quadrangle and Modoc District, Inyo County, California*, by Wayne E. Hall and Hal G. Stephens (Sacramento, California State Printing Office, 1963), pp. 1-39. Also see Jessica Kinchloe, "From Riches to Rags: A Historical Archaeological Perspective of Lookout," paper presented to historical archaeological class, University of California, Los Angeles, June 12, 1997.

128. Paul B. Hubbard, Doris Bray, and George Pipkin, *Ballarat, 1897-1917: Facts and Folklore* (Lancaster, California, 1965), and Robert J. Murphy, *Wildrose Charcoal Kilns* (Bishop, Chalfant Press, 1972), p. 9.

129. California State Mining Bureau, *Twelfth Report of the State Mineralogist, (Second Biennial,) Two Years Ending September 15, 1894*, p. 326; Raymond, *Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains* (1876), p. 32; and Murphy, *Wildrose Charcoal Kilns*, p. 89.

130. Murphy, *Wildrose Charcoal Kilns*, pp. 9-12.

By that time the demand for charcoal had nearly exhausted the scant timber in the immediate vicinity of the Lookout district, and Hearst and his associates turned to the piñon stands of Wildrose Canyon in the Panamint Range. In early 1877 charcoal for the Lookout furnaces was produced in pits dug in the vicinity of the wood supply on the slopes adjacent to Wildrose Canyon. During the spring of 1877, under the direction of S. B. Morrison, the Modock company built 10 large charcoal kilns that still stand near the head of Wildrose Canyon in Death Valley National Park. The kilns, which were modeled after several smaller beehive kilns constructed near Owens Lake for the Cerro Gordo mines, provided clean hard charcoal superior to that made in the pits. The Wildrose kilns measure about 25 feet in height and 30 feet in diameter, and during their operation, they held 42 cords of piñon, which burned for a week to yield about 2,000 bushels of charcoal. James Honan, a former Panamint saloon keeper, contracted to supply wood for the kilns and kept a crew of some 40 men cutting piñon for a mile or two around the kilns. Remi Nadeau's Cerro Gordo Freighting Company teams hauled the charcoal to the furnaces over a wagon road, sometimes referred to as the "Shotgun Road," that he completed in May 1877. Most of the charcoal produced by the kilns was produced during the spring and summer of 1877, while the Modock furnaces turned out $630,000 in bullion. The kilns were operated by the Lookout Coal and Transportation Company, which would soon replace the Cerro Gordo Freighting Company as the major transportation line operating to Lookout.[131]

The Lookout mining boom hit its peak in 1877. The small settlement, laid out on the barren 4,000-foot high windswept peak of Lookout Mountain near the diggings, included three saloons, two general stores, a slaughterhouse, a community hall, and a post office. The official name of the town was changed to Modock after the town's citizens learned that California had another town named Lookout. A triweekly stage operated between Darwin and Lookout over a toll road across the Argus Range that had been constructed in early 1876. Eight Lookout children attended classes in the Darwin school district, and 140 voters were registered at Lookout.

During the fall of 1877, the Lookout furnaces broke down, portending difficult times for the mining camp. The town's problems were compounded when Modock Consolidated changed managers, the price of lead fell, and the company reduced wages. The miners struck, causing another company reorganization. By May 1878 both Lookout furnaces resumed operation, each having an average daily output of some 200 bullion bars, weighing 85 pounds each, from 38 tons of ore. By 1879 however, the high-grade ore was exhausted, and woodcutting in Wildrose Canyon stopped. The furnaces continued to operate for a short period thereafter, but the Modock Consolidated leased its property to Frank Fitzgerald, operator of the triweekly stage from Darwin to Lookout, in 1881.

By 1890 the Modoc Mine had produced some $1,900,000 in mineral wealth. Five years later, Fitzgerald reworked the Minnietta Mine, recovering $65,000 in silver and $600 in gold. During the late 1890s, Jack Gunn, a native of Canada who had served in the Confederate Army during the Civil War and who had come to the region during the Panamint and Bodie rushes, worked the Minnietta. By 1905 that mine had produced more than $350,000 in silver and $25,000 in gold. The Minnietta, although under lease during 1934-39 to Ralph P. Merritt, who would later serve as project director of the Manzanar

131. Lingenfelter, *Death Valley & The Amargosa*, pp. 126-27.

War Relocation Center in Owens Valley during World War II, was not worked between 1920 and 1944. In the latter year, however, it produced 3,000 ounces of silver and 50,000 pounds of lead. After World War II, however, the slag and mine dumps, as well as the values that the original owners could not extract, were recovered. Total estimated production for the Minnietta from 1895 to 1955 was approximately $600,000. The Modoc dumps, amounting to some 40,000 tons of ore carrying 6 to 10 percent lead and 10 to 15 ounces of silver per ton, were also worked after the war.

During the 1890s, the Argus Gold Mining Company developed and operated its St. George Mine, located just south of the Minnietta. Farther to the south, the Sterling Silver Mine was developed by the Sterling Mining Company in 1918. Ore from the Sterling averaged 30 percent lead and 19 ounces of silver per ton. The Lead (Hughes) Mine, located to the north of the Minnietta, was operated from 1924 to 1927, with some 600 feet of underground workings. It averaged one ounce of gold and 11 ounces of silver per ton, and its lead content was 30 percent.[132]

During the 1930s, the Great Depression resulted in devaluation of the American dollar, thus triggering renewed interest in prospecting for gold, a mineral traditionally strong during depression periods. One of the gold mining operations in Inyo County was the Little Mack Mine that was operated during 1930-37 by Otto Siedentopf, a mining prospector from Trona, California. Notable because it was a small one- or two-man operation and because it was the only mine producing gold as the primary metal in the Lookout district, the mine was located in isolated Thompson Canyon, some 400 feet east of the Minnietta Mine. A 250-foot tunnel was bored to develop a four-foot-wide vein of quartz, averaging $15 to $20 in gold per ton. Total production amounted to some $15,000. Ore was transported by an aerial tram some 325 feet to a 20-ton ore bin. From there it was next crushed by one 800-pound gasoline-engine powered stamp, and the gold was recovered with an amalgamation plate. A Rix air compressor powered the mine's drills.[133]

The aggregate production of the Lookout mines during World War II amounted to 4,000 ounces of silver, 160,000 pounds of lead, and 20,000 pounds of zinc. Nearly one-third of the lead and one-fourth of the Lookout district's silver mined during the war came from the Defense Mine. All of the zinc produced by the district came from the Big Four Mine (known also as the War Eagle), a lead-silver-zinc mine located approximately 7 miles northeast of Panamint Springs and southwest of Panamint Butte within the boundaries of the lands added to Death Valley National Monument in 1994. Although discovered as early as 1907, it was never more than a prospect until William Reid restaked three claims in 1940. Development work began in 1942, and 333 tons of ore were extracted during 1944-45. Leased from 1946 to 1952 by various miners, the mine produced nearly 137 tons

132. Murphy, *Wildrose Charcoal Kilns*, pp. 14-16; Hubbard, Bray, and Pipkin, *Ballarat, 1897-1917*, pp. 7-11; W. B. Tucker and R. J. Sampson, "Mineral Resources of Inyo County, California," *California Journal of Mines and Geology*, XXXIV (October 1938), pp. 418, 446-47, 456; State of California, Department of Natural Resources, Division of Mines and Geology, Special Report No. 73, pp. 24-35; and Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," p. 187.

133. Tucker and Sampson, "Mineral Resources of Inyo County, California," p. 405, and State of California, Department of Natural Resources, Division of Mines and Geology, Special Report No. 73, p. 37.

of ore in 1952. The total production of 470 tons mined during 1944-52 yielded ore averaging 16.6 percent lead, 12.5 percent zinc, and 2.6 ounces of silver per ton.[134]

Today, the stone shells of several dozen buildings, scales, an old boiler, a toppled wooden public hall, mill foundations, and the broken chips of hundreds of champagne bottles are all that remain on Lookout Mountain. The area is dotted with mine portals, tunnels, and other remnants of mine workings. At the Modoc, there are remains of some 40 buildings in various stages of deterioration.[135]

Beveridge

Located in Hunter Canyon on the eastern slopes of the Inyo Mountains southwest of Saline Valley and north of Cerro Gordo, the Beveridge Mining District consists of about 17 square miles, including the rugged and difficult terrain of Keynote and Beveridge (Hahn's) canyons. Beveridge is probably one of the most inaccessible gold-producing districts in Inyo County, but despite its remote location, it is the most productive gold-producing district in the county.[136]

William L. Hunter, who had come to Cerro Gordo in the mid-1860s and established a pack animal ranch in the Hunter Mountain area, is credited with making the initial discovery that led to establishment of the Beveridge Mining District. After selling his lead mine in the Rose Springs (Ubehebe) district to Belshaw of Cerro Gordo fame, Hunter prospected to the northwest and in 1877 discovered the Big Horn Mine, consisting of eight claims and one millsite located between Hunter and Beveridge canyons. On December 7 of that year, the Beveridge Mining District was organized at Big Horn Spring in Hunter Canyon, midway between the summit of New York Butte and the salt flat in Saline Valley. The district included the eastern slopes of the Inyo Mountains just north of the Cerro Gordo Mining District. Because of the scarcity of timber in the area, the new mining district claimed all the timber of Hunter and Robles canyons (Robles Canyon was a small canyon running northerly from Hunter Canyon near the Big Horn Mine) for mining, building, and fuel purposes, and prohibited the wanton destruction or location of any timber claims for private use. Beveridge took its name from John Beveridge, an early Inyo County pioneer who had been active in mining discoveries east of Cerro Gordo. Beveridge had been named justice of the peace at Bend City in Owens Valley in 1865 and had continued in that capacity after moving to Independence. He was elected first district attorney for Inyo

134. State of California, Department of Natural Resources, Division of Mines and Geology, Special Report No. 73, pp. 24-35; Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," p. 57; and U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-678, *Mineral Resources and Mineral Resource Potential of the Panamint Dunes Wilderness Study Area, Inyo County, California*, by George L. Kennedy, James E. Kilburn, and James E. Conrad, U. S. Geological Survey, and Andrew M. Leszcykowski, U. S. Bureau of Mines, 1984, pp. 1-10.

135. Engle, "A Look At Lookout," pp. 18-19, 35; Roger Mitchell, "The Legend of Lookout," *Desert Magazine*, XXXI (April 1968), pp. 28-29; and David A. Wright, "Looking In On Lookout," pp. 17-26, Subject History Files, "Lookout (Town)," Eastern California Museum.

136. Norwood *et al.*, *Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, p. 144, and Vredenburgh, Shumway, and Hartill, *Desert Fever*, p. 246.

County, but, after failing to qualify for the position, he became active in politics, eventually rising to leadership of the 1912 Bull Moose political party in the county.

Hunter began development of the Big Horn Mine in 1878, building three arrastras in Hunter Canyon to treat the ore. Transportation of the treated ore from the isolated area was expensive. Selected ore was transported by pack mules over the Inyo crest to the roadhead in Long John Canyon, from where it was transported to Owenyo in Owens Valley. There it was transferred to the railroad for shipment to smelters at Salt Lake City.

In 1878 the Keynote Mine, consisting of seven claims on the ridge north of Keynote Canyon, also began operation. Eventually the Keynote would include seven tunnels from 150 to 750 feet in length, as well as a shaft some 1,800 feet in depth. Ore was at first reduced in arrastras driven by horsepower, but by 1885, the ore was carried 3 miles by pack mules to a five-stamp "custom mill" located in nearby Beveridge Canyon.

As a result of these mining operations, a small town, boasting some 10 stone houses, a grocery store, a saloon, and other buildings, developed below the junction of Cave and Beveridge canyons. The Big Horn and Keynote mines were worked intermittently until the early 1900s, much of the early development work apparently being conducted by Mexican miners. The Big Horn had a total production of some $10,000, while the Keynote produced more than $500,000. Both mines were worked briefly during the 1930s, the Keynote being reopened as the Golden Princess Mine with funding provided by a Reconstruction Finance Corporation loan for a seven-month period.

Located on the Inyo crest about 1-1/2 miles south of the summit of New York Butte and south of the Keynote, the Burgess mine, a later gold producer sometimes known as Iron Sides, included 19 claims. Its workings included a shaft 156 feet deep, a tunnel 700 feet long, and 2,000-foot drifts. A gasoline hoist and compressor were used to extract ore from the mine.

From the late 1870s until the early 1900s, approximately 35 gold and silver mines operated intermittently in the Beveridge area. Some of the more important mining operations included the Chilula, Gavalan, Montano, and San Antonio near the head of Robles Canyon; the Laura and McAvoy north of Keynote Peak; and the Cinnamon, which had its own two-stamp mill near the Big Horn Mine. The Golden Eagle and Gold Standard (Vega) mines of later date were located in the vicinity of Craig and Little Hunter canyons. Individual prospectors have explored the Beveridge region for gold since the 1930s, but its inaccessibility has discouraged investors from fully exploring the area's mineral possibilities.[137]

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137. U. S. Department of the Treasury, *Report of the Director of the Mint Upon the Production of the Precious Metals in the United States During the Calendar Year 1885* (Washington, Government Printing Office, 1886), p. 159; DeDecker, *Mines of the Eastern Sierra*, pp. 49-51; Tucker and Sampson, "Mineral Resources of Inyo County, California," pp. 383-44, 405; Thomas S. Budlong, "Beveridge: A Three-Mystery Ghost Town," pp. 33-39, and "The Keynote Group of Gold Bearing Ledges, Statements and Reports Issued by the Keynote Mining and Milling Company, the former owners, 1906," Vertical Reference Files, "Towns-Beveridge," Inyo County Library, Independence; Delos E. Flint, "The Geology of the Beveridge Mining District, California" (Master's thesis, Northwestern University, 1941), pp. 1-7, 66-70; and State of California, Department of Conservation, Division of Mines and Geology, Bulletin No. 193, *Gold Districts of California*, by William B. Clark, 1970, p. 147. For a summary of the identified mineral resources and significant mines and prospects in the Beveridge area, see U. S. Department

Mines within the Beveridge district were the focus of renewed activity during the mid-1980s, with most, if not all, old properties under active operation. An attempt was made in 1983 by Far West Exploration to bring the Keynote into production, when the company flew a 250-ton-per-day cyanide gold recovery plant to the site by helicopter and began mining the dump. Operations, however, were suspended later in the year.[138]

Ballarat

Located on the east side of the Panamint Valley and on the west flank of the Panamint Range approximately 15 miles south of Wildrose Canyon and several miles outside the western boundary of the lands that were added to Death Valley National Monument in 1994, Ballarat served as a supply and entertainment center for that gold-producing region during its heyday. Mining was extraordinarily difficult in the Ballarat region. More often than not, valuable ore was located high up in the gorges above the Panamint Valley. In order to obtain the gold ore miners had to surmount some of the steepest grades in the Panamint Range. In Pleasant Canyon (portions of which are in lauds added to Death Valley National Monument in 1994), for example, where much of the Ballarat gold mining operations occurred, it took six teams of "good" mules to haul a wagon of two tons.[139]

Charles Anthony, a 60-year-old storekeeper and part-time prospector who had come to the Death Valley region during the Panamint rush and stayed on at Darwin, and John Lampier discovered a gold ledge they called the "Mineral Ranch" high up on the south wall of Pleasant Canyon on July 27, 1893. A native of New York, Anthony had gone west to find his fortune, engaging in the cattle business near Carson City, Nevada, before moving to Darwin where he was serving as justice of the peace at the time of the discovery. In September 1895 Anthony sold an interest in his "Ranch" to a group of Los Angeles investors, who formed the Golden West Mining and Milling Company, established a small camp, and set up a five-stamp mill just below the mine. The mine, consisting of five claims, promised wealth, but the venture foundered on poor management, an inadequate water supply, and poor milling procedures. This mine, known variously as the Anthony, Gold Bug, and Knob Mine, is located some 3-1/2 miles east of Post Office Spring in Post Office (now Pleasant) Canyon.

While the company attempted to secure an adequate water supply and make improvements to the mill, most of the men took off to prospect for mines of their own. The most successful was Henry Ratcliff, a Kentuckian who located the Never Give Up Mine 2 miles above the "Mineral Ranch" in May 1896. Ratcliff's six claims east of the camp, named the Never Give Up, Grover Cleveland, Kentucky, Sun Rise, John G. Carlisle, and Joker, would ultimately form the basis of the Ratcliff (Radcliffe) Consolidated Gold Mines, Ltd., the district's largest producer. This strike attracted the Montgomery brothers,

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of the Interior, Geological Survey, Bulletin No. 1708-A, *Mineral Resources of the Inyo Mountains Wilderness Study Area, Inyo County, California*, by Edwin H. McKee, James E. Kilburn, J. Howard McCarthy, Jr., James E. Conrad, and Richard J. Blakely (Washington, Government Printing Office, 1985), pp. 11-13.

138. State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, p. 54.

139. Norwood *et al.*, *Cultural Resource Overview of the Eureka, Saline, Panamint and Darwin Region*, pp. 137-38; Fred Gray, "Memories of Ballarat," *Westways*, XXII (September 1940), pp. 8-10; and Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 247-48.

and that September, one-half mile above Ratcliff's claims, Bob and George located their World Beater Mine. After the South Park Mining District (portions of which are in the lands added to Death Valley National Monument in 1994) was formed that month, George sent out the word, and a new rush to the Panamints began.[140]

Others had been working gold ledges in the Panamints for some time, but it took a natural publicist like George Montgomery to work up a boom. Tales of Goller's elusive nuggets and Alvord's lost ledge had enticed a number of prospectors to hunt for gold among the silver leads of the Panamints, but they had done little more than leave a few names on the land. In June 1883, for instance, Milo Page thought he had found Goller's gold in what has since been known as Goler Wash (in the lands added to Death Valley National Monument in 1994), south of Anvil Spring. Page organized the Butte Valley Mining District and made wages for a few seasons working high-grade ore from the ledge in a little arrastra. In April 1889 two other prospectors, grubstaked by Riverside banker Robert B. Taylor, located the Gold Hill ledge on a spur of the Panamints that still bears that name, and in April 1894, Royal McIntyre, a Redlands carpenter, discovered gold in what is currently called Redlands Canyon.[141]

With characteristic enthusiasm, George Montgomery rallied Hugh Canson and his other Mormon backers and plunged ahead. Before the end of the year, he had dismantled the Confidence mill and moved the machinery to a spring at the mouth of Pleasant Canyon. With added backing from several San Francisco promoters, Montgomery formed the South Park Development Company, added a rock crusher and a concentrator to the old Bryan mill, and put a crew of 45 men to work at the mine and mill. The mill began operation in March 1897, treating free-milling ore from surface croppings which paid as much as $40 a ton.

Three rival camps in the Pleasant Canyon vicinity sprang up as a result of this mining activity, including Pleasant City, in the canyon near the mines; Post Office Spring, at the foot of the great fan at the mouth of the canyon; and Ballarat, out on the flat, one-half mile north of the spring. Ballarat, named for the Australian gold rush camp of the early 1850s, became tha boss camp, with Pleasant City a distant second. The 80-acre townsite of Ballarat was laid out in March 1897, and the buildings from the Ratcliff Mine were hauled down Pleasant Canyon to help start the new town. By the end of the month Ballarat had two saloons, plus a general store and a dozen tents. Two months later, the boom camp boasted four saloons, two general stores, two restaurants, three feed yards, an assay office, a hotel, and a population of more than 100. By the end of the year the camp had added a post office, two rival weekly stages, and two little gasoline-powered custom mills having a total of 18 stamps, each running on sample lots of high-grade ore from the mines opening up in nearly every canyon in the Panamints. The two-story Calloway Hotel was constructed in 1898, and a school operated in an adobe building for one year in 1899. In 1900 the Porter brothers built a jail at Ballarat at the request of the Inyo County Board of Supervisors, and the following year the Teagle brothers opened a feed and supply yard.[142]

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140. Hubbard, Bray, and Pipkin, *Ballarat, 1897-1917*, pp. 15-16.

141. Lingenfelter, *Death Valley & The Amargosa*, p. 194.

142. ibid., pp. 195-96; Hubbard, Bray, and Pipkin, *Ballarat, 1897-1917*, pp. 15-30; and William Caruthers, *Loafing Along Death Valley Trails* (Pomona, California, Privately printed, 1951), p. 176.

Mining operations in the surrounding canyons were not sufficient to sustain the town of Ballarat, and it is likely that Ballarat would not have lasted more than a decade if it had not been for the discovery of gold at Skidoo in 1906. Ballarat became the major business supplier for the boom town of Skidoo, as well as for nearby Harrisburg, in subsequent years.

The Montgomery brothers led the development of the district around Ballarat with large payrolls and steady bullion production. By the fall of 1898 they had extracted about 2,500 tons of ore, turning the surface croppings of the World Beater into an "immense quarry" and producing more than $50,000 in bullion. They also opened the lode at depth, blocking out fully 16,000 tons of ore.

Because of its proven production and large reserves, the Montgomery brothers determined to sell the World Beater, and in the spring of 1899, the South Park Development Company sold the property to Los Angeles investors. At the same time, the brothers sold the mill tailings separately to Pridham, Dineen, and Quinn, who styled themselves the P.D.Q. Cyanide Company, established the Death Valley country's first cyaniding plant at the tailings, and recovered around $20,000 of gold from them within several months.

The new owners of the World Beater were James P. Flint, a young Los Angeles entrepreneur who had dabbled successfully in oil promotion; his father, Rev. Frederick W. Flint; and Tracey N. Stebbins, a practical miner who became superintendent. Stebbins immediately moved the mill 6 miles up the canyon to the mine, remodeled it, and began operation in July 1899, running on the richer portions of the rock that the Montgomerys had blocked out. Even though the mill recovered barely $15 a ton, Stebbins managed to turn out several thousand dollars' worth of bullion every month until early 1900.

By September 1898 Ratcliff had opened the ore body of the Never Give Up enough to sell it for $30,000 to several Michigan investors, led by the brothers Albert J. and William W. Godsmark, who had built up prosperous grocery and creamery businesses on Battle Creek. They formed a closed corporation, the Ratcliff Consolidated Gold Mines, Ltd., with an experienced mining man, Robert F. Harrison, as superintendent. Harrison commenced work that winter, erecting a ten-stamp mill just below the mine and running a 4,200-foot aerial tramway to carry the ore and a 10,000-foot pipeline to provide the necessary water supply. The first stamps dropped in February 1899, but there were problems. The stationary cable tram kept breaking down, and the mill barely recovered half of the value of the ore. Overhauling the operation, Harrison installed a new double-traveling cable tramway, enlarged the mill to 20 stamps, and added a 50-ton cyanide tank to work the tailings, thus doubling both the capacity and the efficiency of the plant. Harrison started the mill again in January 1900, turning out $15,000 a month in gold to make the Ratcliff the most prominent mine in the Panamints.

Further up the canyon near what is known as the Stone Corral (near the boundary of Death Valley National Park), two more mills began operation. James Fenimore Cooper, a seasoned miner with a borrowed name, found a little high-grade deposit that he converted into a model of pay-as-you-go mining. He worked the first ore in a hand mortar until he had saved enough to purchase a two-stamp mill during the fall of 1897. With this small mill, he eventually accumulated sufficient funds to buy a four-stamp mill, which he sold

in March 1899 to J. R. Dover and his son, both of whom were following his example by developing their own mine, the Mountain Boy.

After lengthy litigation with his former partners Charles Anthony gained control of the Gold West mill. During the spring of 1898, he moved the mill down to the canyon floor where he could get water, and started crushing ore again that summer. Although the ore was refractory, the yield low, and the production erratic, Anthony reportedly took out over $100,000 in gold before he sold out.

Although the Pleasant Canyon mines were Ballarat's biggest producers, there were some hopeful contenders in the neighboring canyons. The richest of these was the Oh Be Joyful, discovered in February 1897 by Bob Montgomery and several partners who named it for their favorite whiskey. It was located near the mouth of the canyon now known as Tuber, a corruption of *tuba*, the Shoshone word for piñon pine . Bob and his partners systematically opened the lode, blocked out the ore to reveal its extent, made sample runs on the custom mills at Ballarat to demonstrate its worth, and made $48,000 for their trouble during the spring of 1899, before selling the mine to Flint and Stebbins. The new owners put in a Bryan roller mill that fall, but it broke down after several months — the rock was too hard — and was finally replaced by a six-stamp mill. By the summer of 1900 the Oh Be Joyful was turning out about $10,000 in gold bullion every month.

In neighboring Jail Canyon Jack Carran discovered claims that he developed into the Gem Mine (on lands added to Death Valley National Monument in 1994), giving a half interest to Ballarat storekeeper Charles Weaver in exchange for a three-stamp mill. The mill was rigged up to run from a waterwheel — the first in the Death Valley country — and started shipping several thousand dollars in bullion monthly during the winter of 1899-1900.

By 1900 there were nearly 300 men working in the mines around Ballarat. The Ratcliff, World Beater, Oh Be Joyful, and Gem were turning out bullion, and by the end of that year their total production had reached nearly $500,000. Ballarat was at its peak, and its citizens proudly proclaimed it "The Mining Camp of the Desert."

After the discovery of silver at Tonopah, 150 miles north of Ballarat, during the fall of 1900 the new Nevada camp became the center of the largest mining rush the desert country would ever see. The exodus of miners to the new camp in 1901 dealt Ballarat a crippling blow, leaving it almost deserted. Then a series of natural calamities occurred. A severe storm during the summer of 1901 caused extensive damage to Ballarat, smashing houses, killing one woman, and destroying the Gem Mine mill in Jail Canyon. A year later, just as Ballarat was starting to recover, cyclonic winds wrought even more havoc, tearing the roofs from many buildings and leveling virtually every frame building that was left. A rush of water poured down Pleasant Canyon, deruolishing Anthony's mill, which he had just sold to a Boston company, and flooding the battered town. But as the mines resumed operations, Ballarat rebuilt again.

First to resume operations was the Ratcliff Consolidated Gold Mines, Ltd., in January 1902, with owner William W. Godsmark replacing the departed Harrison as superintendent. With a crew of 50 men, he soon had the mill running night and day, making it once again the mainstay of the Ballarat area. By the summer of 1903 he had turned out another $250,000 in bullion, bringing the total production of the mine to roughly $450,000. By then,

however, all of the remaining ore was so refactory that it could not be worked profitably, and Godsmark was forced to close the mine. He stayed on for another year, experimenting with roasting and smelting furnaces and trying to make the base ore pay, before finally giving up.

By that time George Montgomery had returned to Ballarat, and late in 1903 he and his brother Frank had found a rich chute of free milling high-grade in the abandoned World Beater. George staked claim to the mine again, renaming it the Republican. After hustling up new backers in Los Angeles he established the Republican Mining Company, constructed an aerial tramway to the mine, and refurbished the old Bryan mill. Commencing operations in April 1904, he produced $107,000 in bullion by the summer of 1905 when the high-grade was exhausted. J. P. Flint established a new company, Inyo Gold, during the summer of 1902, to reopen the Oh Be Joyful, but he only recovered about $20,000 by cyaniding the tailings before returning to Los Angeles to enter the liquid air business. Several other new companies joined in the Ballarat revival, but they produced little for anyone but their promoters.[143]

Estimates of the total production for the Ratcliff Mine have ranged from $300,000 to $1,000,000. An assay office, engine room, blacksmith shop, and other outbuildings formed the nucleus of a small camp that developed at the base of the mountain. By 1951 remnants of the Ratcliff Mine included a 20-stamp mill, a 4-foot by 6-foot ball mill, and 4,000 feet of underground workings.

Although the Ratcliff Mine gave out in 1903, the World Beater continued to produce. According to some estimates, this mine produced $185,000 prior to 1930 and another $75,000 between 1936 and 1942. Adjoining the World Beater, the Buster Brown Mine featured a five-stamp mill, and its 1927-42 production amounted to some $250,000. Nearby mines, such as the Oh Be Joyful in Tuber Canyon and the Gem Mine in Jail Canyon, produced aggregates of some $250,000 and $150,000, respectively.

During the early part of the 1930s, the Gem Mine was owned by R. D. Warnock of Trona and leased by the Panyo Gold Mining Company of Los Angeles, but by 1938 the mine had been purchased by Gem Mines, Inc., with E. S. Sinclair of Bakersfield as president. Between 1932 and 1938, a 25-ton mill was constructed at the mine to process the ore. As described in 1938, the mill, which remains at the mine site, consisted of a "9 by 12 jaw crusher, elevator bin, 4 by 5 ft., ball mill, simplex Dorr type classifier, Groch, 4-cell flotation unit and table." Mill power was furnished by "50-hp. diesel engines." During subsequent years, A. F. Troster obtained the Gem Mine claims, formerly known as the New Discovery and Gem, by relocation. Thus, the lode claims came to be known as the Corona, Corona No. 1, and Corona No. 2, and the mine was renamed the Corona. Troster sank a new 42-foot vertical prospect shaft 60 feet south of the main shaft, exposing a quartz vein, 2-3 feet in width. He also extended the creek-level adit on the Corona No. 1 claim by some 110 feet. Troster shipped 8 tons of ore containing gold with some silver, lead, and zinc, assaying $90 per ton, to the American Smelting and Refining Company at Selby. The mill equipment was upgraded with installation of a 12-inch by 16-inch Pilgrim crusher. In 1949 Troster sold his claims to John F. Lee, who assigned them to the Corona

143. Lingenfelter, *Death Valley & The Amargosa*, pp. 195-201, and Hubbard, Bray, and Pipkin, *Ballarat, 1897-1917*, pp. 3, 18, 86-90.

Mining Company of Trona, a mining partnership consisting of Rene Loustalot, John F. Lee, and Fred Rosser.

The Lotus and Monte Cristo mines, 15 miles south of Ballarat, were developed after 1900 with the aid of two aerial trams and a 2,800-foot inclined rail tram. A 1,750-foot aerial tramway that served the Anthony, Gold Bug, and Knob mines, connecting them to Clair Camp, was rebuilt in 1940 to facilitate removal of ore for processing. Other mines in the Ballarat district included the Cecil R., Lestro Mountain, Porter, and Thorndyke.[144]

Despite continuing sporadic mining operations in the vicinity, the Ballarat Post Office closed on September 29, 1917. Today adobe walls (most of the buildings were built of adobe because of the scarcity of lumber in the vicinity), a few shacks, and a cemetery are all that remain of the mining town. Since 1917, however, Ballarat has been a favorite gathering place for many of the area's colorful prospectors and desert residents who have continued to prospect for gold in the nearby canyons of the Panamint Range. Among the colorful residents who have been associated with Ballarat are Indian George, Panamint Tom, Carl "Peg Leg" Mengel, Frank "Shorty" Harris, Jim Sherlock, "French" Pete Aguereberry, Charles Ferge, better known as "Seldom Seen Slim," and Chris Wicht, the Ballarat saloon proprietor who went broke grubstaking area prospectors and later opened a small cabin resort in Surprise Canyon.[145]

This band of lingerers, sometimes referred to as "single blanket jackass prospectors," lived mostly off the kindness of strangers while trekking up and down the Death Valley country in a never-ending quest for a new strike in a picked-over land. While most of these prospectors found little to reward their efforts, some did find real gold. W. D. Clair, for instance, found his reward in the tailings of the old Ratcliff mine above Ballarat. In 1930 he started reworking the rock, which still held over $4 a ton, and cleaned up more than $60,000 in several years. He reportedly accomplished this work between skirmishes with two gun-toting sisters, Orpha Hart and Mary Ann Thompson, who held nearly all the other claims in Pleasant Canyon and tried to run him out.[146]

Most of the major mining operations in the Ballarat area, such as the Ratcliff and the World Beater, are outside the boundary of the lands added to Death Valley National Monument in 1994. However, remnants of mining operations dot Pleasant Canyon, as well

144. Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," pp. 40-41, 45-48, 157; Hubbard, Bray, and Pipkin, *Ballarat, 1897-1917*, pp. 13, 17; Tucker and Sampson, "Mineral Resources of Inyo County, California," p. 388; Gray, "Memories of Ballarat," p. 9; R. J. Sampson, "Mineral Resources of a Part of the Panamint Range," in California State Mining Bureau, *Chapter of Report XXVIII of the State Mineralogist* (Sacramento, California State Printing Office, 1933), pp. 364-76; Tucker and Sampson, "Mineral Resources of Inyo County," p. 413; and State of California, Department of Conservation, Division of Mines and Geology, Bulletin No. 193, p. 146.

145. Hubbard, Bray, and Pipkin, *Ballarat, 1897-1917*, p. 90; Florine Lawlor, "Seldom Seen — Except in Ballarat," *Desert Magazine*, XXX (November 1967), p. 14; Florin Lambert, "Ballarat," *Desert Magazine*, XXVII (November 1964), p. 36; Robert F. Campbell and Ron Taylor, "Prospects of a Desert," *Westways*, LX (November 1968), pp. 36-38; Coolidge, *Death Valley Prospectors*, pp. 127-57; Lambert, *California Ghost Towns*, pp. 10-11; LeRoy and Margaret Bales, "They Never Locked the Door of the Jail at Ballarat," *Desert Magazine*, V (May 1941), pp. 10-13; George R. Cartter, *Twilight of the Jackass Prospector: Death Valley Area Portraits of the 1930's* (Morongo Valley, California, Sagebrush Press, 1982); and Paher, *Death Valley Ghost Towns*, p. 40.

146. Lingenfelter, *Death Valley & The Amargosa*, p. 414.

as nearby Jail, Hall, and Tuber canyons, both inside and outside the new park boundary.[147] One such mining operation is the Gem Mine and Mill in Jail Canyon, located on Keith R. Kummerfeld's Corona Mine and Corona No. 1 unpatented mining claims. The historic mill is relatively intact and is an excellent, well preserved example of 1920s/30s-period, small scale, milling technology in the area. Thus, the National Park Service has determined to recommend listing of the mine and mill on the National Register of Historic Places.

Ryan

Ryan, a company town owned and developed by the Pacific Coast Borax Company and after 1958 owned and operated by the U. S. Borax and Chemical Corporation, is located on the eastern slopes of the northern part of the Greenwater Range overlooking Furnace Creek Wash just outside the east boundary of the lands that added to Death Valley National Monument in 1994.[148]

By 1900 the Pacific Coast Borax Company, realizing that its colemanite mine at Borate in the Calico Mountains of San Bernardino County would soon be exhausted, began reexamining its reserves in the Death Valley region in search of new sources for the mineral. The company focused on the Lila C. Mine, named for a daughter of William Coleman, where prospectors had located outcroppings of colemanite in 1884 on a hill several miles east of the Greenwater Range in the valley of the Amargosa River. In 1903 the company began development of the mine, which contained three beds of colemanite 6 to 18 feet wide and at least 2,500 feet long. In October 1907 the Tonopah and Tidewater Railroad was completed, and a spur from the railroad connected the Lila C. Mine to the main line, allowing ore to be shipped over the Tonopah and Tidewater. The opening of the Lila C. Mine resulted in a two-cent per pound drop in the price of borax to between 4-1/2 and 5-1/2¢. The Lila C. was worked until January 1915, and the town of Ryan (Old Ryan), named for John Ryan, the company's general superintendent, was established near the mine. The town, which soon had some 200 inhabitants and a post office, was developed by hauling many of the buildings from Borate to the new townsite.[149]

By the time the Lila C. was nearing exhaustion in 1914 plans were underway to open new colemanite deposits, including hugh borate reserves at Monte Blanco and some in Corkscrew Canyon, both south of Furnace Creek Wash and west of the present-day Billie Mine and the Sigma and Boraxo pits. The next most accessible deposit of any significance was the Biddy McCarthy, on the west side of the Greenwater Range overlooking Furnace Creek Wash, a 12 miles northwest of Ryan. Nearby were several other promising claims — the Played Out, Grand View, Lizzie V. Oakey, and Widow — all of which had been patented by Coleman in 1886. John Ryan surveyed a new rail line from the Biddy to the

147. E. Hillier, District Manager to Ms. Kathryn Gualtieri, State Historic Preservation Officer, Sacramento, October 23, 1986 (and attachments), "Pleasant Canyon, Krucker OP Plan," New Lands Files, in possession of Caven Clark, Archeologist, Resources Management Division, Death Valley National Park.

148. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 248-49.

149. W. E. Ver Planck, "History of Borax Production in the United States," *California Journal of Mines and Geology*, LII (July 1956), pp. 283-85, and Paher, *Death Valley Ghost Towns*, p. 17.

Lila C. branch 4 miles out from Death Valley Junction, and was ready to begin construction in the fall of 1913. After the California Railroad Commission refused to allow Smith's debt-ridden Tonopah and Tidewater to issue new bonds to finance the work, a separate Death Valley Railroad Company was founded on January 26, 1914, to do the job, its bonds guaranteed by Borax Consolidated. Construction began in mid-February with a crew of 325 men and 150 mules in hopes of completing the road by the end of June. Because of the intense summer heat and engineering difficulties that had to be surmounted, however, the railroad was not completed until December 1 at a cost of $370,000.[150]

During the interim the Biddy McCarthy had been opened, and ore was shipped as soon as the rails reached the mine's dump. The Lila C. was shut down, and all of the old buildings in Ryan, except for the roaster, were loaded on to railroad cars and hauled to a site on the slope adjacent to the Biddy. The company officially named the ensemble Devar, for the Death Valley Railroad, but sentiment and the post office restored it to Ryan by November 1915. One train a day ran from Death Valley Junction to the new Ryan and back, hauling water in the morning and taking out the ore in the afternoon.

The roaster at old Ryan was dismantled and hauled to Death Valley Junction, thus making that location the new mill town. There the machinery was incorporated into a new $500,000 roasting plant that began operation on Biddy ore in January 1915. The company also constructed quarters for the mill hands and a company store at the new townsite.

The other claims near the Biddy were placed in production within a year or two. The Played Out, located along the line of the railroad several miles northeast of the Biddy, was opened first. Work then started on the Grand View and Lizzie V. Oakey, a mile or so south of Ryan, and a winding 2-foot-wide gauge rail line, dubbed the Baby Gauge, was laid from Ryan to the mines in 1915-16. Further to the southeast was the Widow, which did not look promising at first. Thus, its ore was packed to the railroad by mule. After rich ore was struck at depth, however, the Baby Gauge was extended to the Widow in 1919. By that date the Baby Gauge was 7 miles long and had its own gasoline engine and 3-ton cars. The company worked the mines at new Ryan year-round, with a crew of about 100 men. The combined production of the mines amounted to more than 200 tons a day — about double that of the Lila C. — and the new mill at Death Valley Junction operated 24 hours a day.

During the 1920s the Pacific Coast Borax Company constructed modern fireproof dormitories and a dozen cottages for the staff at Ryan which would soon have a population of 250. During 1923-24 the company constructed more elaborate improvements, completing a unique new company town at Death Valley Junction that featured a grand Spanish-style, U-shaped adobe headquarters building, with a colonnade across the front that measured 420 feet by 198 feet on a side and enclosed a 2-acre plaza. A complex of company houses was constructed north of the adobe structure. Meanwhile, the mining operations at Ryan were modernized, the last of the mules in the mines being replaced

150. For a history of the Death Valley Railroad Company see Myrick, *Railroads of Nevada and Eastern California*, Vol. II, pp. 608-21. Also see Gordon Chappell, "To Death Valley by Rail: A Brief History of the Death Valley Railroad," in U.S. Department of the Interior, National Park Service, *Proceedings, Third Death Valley Conference on History and Prehistory*, January 30-February 2, 1992.

with gasoline engines. The Lila C. was reopened in the fall of 1920. A narrow gauge track was laid back to the mine, and a Milwaukee gasoline engine hauled out ore for seven more years. Another rich colemantite deposit was discovered in a gulch on Red Mountain, 2 miles from the railroad northeast of Shoshone, in January 1922. The mine, named the Gerstley, shipped several carloads of ore per day until work stopped in the fall of 1927. When the Ryan operations closed that year, the dormitories at Ryan were converted into the Death Valley View Hotel that operated until 1930. In 1927 the borax company converted the Spanish-style adobe structure at Death Valley Junction into the Amargosa Hotel, but this resort also closed in 1930.

By 1927 more than $30,000,000 worth of borates had been extracted from the mines at new Ryan, making it by far the largest and most profitable mining venture in the Death Valley and Amargosa country. After the Kramer borax mines were discovered near Boron in the Mojave Desert in 1927 the Pacific Coast Borax Company transferred its operations to that area, closing down new Ryan in October. At the time of its closure, the ore mined in the new Ryan vicinity was averaging 26 percent borax.[151]

Tenneco Mining Inc. of Lathrop Wells, Nevada, initiated open-pit borate mining operations near new Ryan in Death Valley National Monument during the 1970s. The Boraxo Pit was opened in 1970, and the Sigma Pit was developed in 1975. During the same period, the underground Billie Mine, owned by Tenneco Mining and the U.S. Borax and Chemical Corporation, was developed. The borate deposits were developed using bulldozer-pushed scrapers and front-end loader/off-highway truck combinations to haul the ore to a treatment facility. Colemanite was crushed to "-6 inches, washed, dried at 350 [degrees] F, then calcined at 800 [degrees] F with 100 tpd capacity." "Crushed (-6 inch) ulexite or probertite" was "Raymond milled to customer specifications with a capacity of 1000 tpd."[152]

Greenwater

The Greenwater Mining District was located in the Greenwater Valley, east of the southern portion of Death Valley and nestled between the Black Mountains on the west and the Greenwater Range on the east. The town of Greenwater was located on the eastern slopes of the Black Mountains, a small chain of the Funeral Range that form the

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151. Lingenfelter, *Death Valley & the Amargosa*, pp. 390-91, 395-96; Paher, *Death Valley Ghost Towns*, pp. 14-17; Gordon Chappell, "The First Ryan: A Borate Mining Camp of the Amargosa," in U.S. Department of the Interior, National Park Service, *Proceedings, Fourth Death Valley Conference on History and Prehistory*, February 2-5, 1995, pp. 94-110; ibid., "Ryan, California: The Curious Case of the 'Portable' Borate Mining Camp Near Death Valley," in U.S. Department of the Interior, National Park Service, *Death Valley to Deadwood; Kennecott to Cripple Creek: Proceedings of the Historic Mining Conference, January 23-27, 1989, Death Valley National Monument*, ed. by Leo R. Barker and Ann E. Huston, September 1990, pp. 158-66. Also see Norman J. Travis and E. J. Cocks, *The Tincal Trail: A History of Borax* (London, Harrap Limited, 1984); Harry P. Gower, *50 Years in Death Valley — Memoirs of a Borax Man* (Death Valley, California, Death Valley '49ers, 1969); and George H. Hildebrand, *Borax Pioneer: Francis Marion Smith* (San Diego, Hovel-North Books, 1982).

152. James M. Barker, "Borate Exploration and Mining in the Death Valley Region," pp. 1-27, Paper Presented at Annual Meeting of American Institute of Mining and Metallurgical Engineers, Las Vegas, February 22-26, 1976, Silver Boxes, "History - Mines," "Gordon Chappell Research Materials," Box 1, Research Library, Death Valley National Park.

eastern rim of Death Valley. Although portions of the Greenwater Valley were located in Death Valley National Monument prior to 1994, extensive acreage in the valley was included in lands added to the national monument that year.[153]

The first indications of copper in the Greenwater Valley region were discovered in 1880 by Nicholas Kavanaugh, a miner from Resting Spring. He and a partner, remembered only as Tony, dug out the little spring that slowly filled with green-tinged water and gave the place its name. Several miles to the north, the men staked the first copper ledge and sank a shallow prospect hole. But they soon realized the ledge was too remote even to sell, so they let their claims lapse. The claims would repeatedly be discovered and located by others.

Foremost among the later relocators was a trio from Ballarat — Frank McAllister, John Wesley "Doc" Trotter, and Robert Warnock. They relocated the ledge on March 3, 1898, as the Copper King and Copper Queen. Failing to find an interested buyer, however, they too let their claims lapse. But one by one the prospectors returned to the ledge in subsequent years.

During the spring of 1904, McAllister and a partner, Allen Cook, obtained a grubstake from a Tonopah mining superintendent, Arthur Kunze — the man who would eventually claim the title of "Father of Greenwater." They relocated the old ledges again as the Copper Queen and Copper Glance on May 22, 1904, covering the ground with 16 mining claims and five fractional claims.

In January 1905 Fred Birney and Phil Creasor, two men from Spokane who had traveled to the southwestern Nevada boom camps to prospect, made further discoveries some 6 miles north of Greenwater Spring almost to the crest of the Black Mountains, staking six claims on a ledge they called the Copper Blue. The property was incorporated as the Furnace Creek Copper Company with a paper capital of $1,250,000, on May 15, 1905, by Patrick Clark, a miner from Spokane who had developed mines in Butte, Montana, and the Coeur d'Alene region of northern Idaho. Using mining engineers to tout his claims, he began selling stock in the eastern mining exchanges, generating a frenzy of escalating prices. The first outsiders to cash in on the excitement that Clark was generating were Arthur Kunze and his partners. After opening a network of surface fractures with ore shoots carrying up to 25 percent copper, Kunze sold his Copper Queen claims to steel king Charles Schwab, fresh from his purchase of the Montgomery Shoshone at Rhyolite, Nevada. Schwab quickly organized the Greenwater and Death Valley Copper Company with a capital offering of 3,000,000 shares at $1 par, and the stampede to Greenwater began during the scorching days of late July and early August 1906. By July 29 more than 70 men had gathered at the little spring to organize the Greenwater Mining District. Within a month, there were nearly 1,000 men on the ground. Close behind, in autos chartered at $100 a day, mining engineers and promoters arrived from Nevada mining

153. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 29-51; O. M. Boyle, "The Greenwater Mining District, Cal.," *California Journal of Technology*, X (No. 1, 1907), pp. 29-32; "A Calico Print-Folio," *Calico Print*, IX (January 1953), pp. 13-28; and Harold O. Weight, ed., *Greenwater* (Twentynine Palms, California, The Calico Press, 1969), pp. 1-35. For a seriocomic history of Greenwater, see C. B. Glasscock, *Gold in Them Hills: The Story of the West's Last Wild Mining Days* (Indianapolis, The Bobbs-Merrill Company, Publishers, 1932), pp. 264-86.

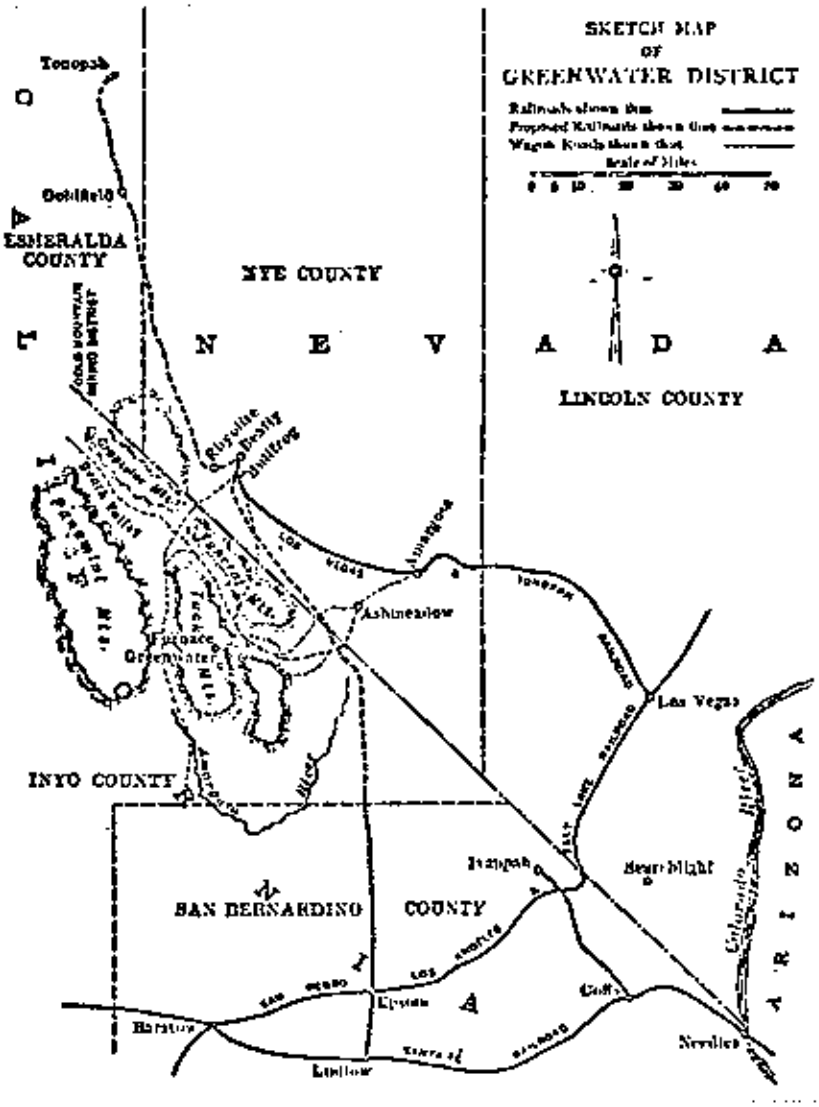

Figure 4: Although somewhat inaccurate, this map, published in late 1906, shows the relative distances between Greenwater and Rhyolite and Amargosa, its two principal supply points.

areas shopping for claims. Within a short period, some 4,500 claims were filed, covering roughly 150 square miles.

During the first two weeks of August 1906, three boom towns were established. Kunze established the Greenwater townsite near his claims, taking its name from the aforementioned Greenwater Spring south of the site. Clark surveyed a townsite, dubbed Furnace, near his camp, and Harry Ramsey, who had purchased McAllister's mining interests, laid out the rival townsite of Copperfield (Ramsey) midway between Kunze's and Clark's, 2 miles to the east of the Greenwater townsite. In September 1906 the Tonopah Lumber Company reported that it had sold 150,000 feet of lumber to the Greenwater camps and mines.

Disputes between the three rival camps were finally resolved late in November, when Jack Salsberry and three partners bought out both Kunze and Ramsey. In early December Salsberry began merging the camps at Ramsey's site, to be known as Greenwater. By April 1907 a telegraph and telephone line from Rhyolite extended to the growing town. Within months, the town boasted two newspapers, a bank, drug store, boardinghouse, two stage lines, and several saloons. Water, a precious commodity in the arid region, sold for high prices — $15 a barrel or $1 a gallon. The Ash Meadows Water Company started laying a 30-mile, 6-inch pipeline from Longstreet Spring in Nevada to a projected 15,000,000-gallon reservoir in a canyon above the town. After spending some $200,000 on the water line, however, it only extended some 10 miles in length, and it was never completed. In May 1907 Kunze traveled to Los Angeles to order a printing press and supplies for two publications — the *Death Valley Chuck-Walla* and the *Greenwater Miner*. The press building at Greenwater burned to the ground the following month, and the new press was never shipped.

More than 30 mining companies, having capitalizations between $1,000,000 and $5,000,000, were established to tap Greeenwater's highly-promoted mineral riches. During the frenzy of the Greenwater boom, the price of stock skyrocketed. The Furnace Creek Copper Company, for instance, was capitalized with 1,000,000 shares offered originally at 25¢ each, but soon the shares were selling for more than $5. The public, encouraged by the prominent names promoting Greenwater, including such men as Charles Schwab, Augustus Heinze, T. L. Oddie, and F. M. (Borax) Smith, purchased any stock with Greenwater in its name, and most new stock promotions were sure to include the name Greenwater somewhere in their corporate titles. It is estimated that some $30,000,000 was invested in Greenwater in four months, but, despite the frenzy, no one found a paying mine in the area.

By the winter of 1906-07 the Greenwater stock excitement had turned into a feeding frenzy for mining sharks, and the rampant speculation soon attracted the critical attention of muckrakers in the eastern press. By early 1907 western mining stocks had started to fall, and Greenwater stocks fell much faster than most. Within several months, the district was all but dead. The only Greenwater companies still working were Clark's and Schwab's. Both had stopped construction on shafts at a depth of about 500 feet and were spending their time on crosscuts to tap the stringers and titillate stock prices by discovering the hoped-for "sulphide level." Pope Yeatman, a mining engineer hired by the Guggenheim interests in the eastern United States, arrived in Greenwater during the late summer of 1907 to investigate the Furnace Creek copper mine, Greenwater's largest mining operation. By that time it was some 200 feet in depth, opening up a body of copper oxides. Some 20 tons of ore, yielding 20 percent copper, had been shipped in early 1906. After examining the mine, however, Yeatman left the camp and made a long distance telephone call to New York, alerting his employers that the ore body went nowhere and the shaft had hit what appeared to be volcanic ash. With this news, the Greenwater copper rush collapsed. By September 1907 only about 100 people were still living at Greenwater. Buildings were torn down one by one, many of them being hauled to mining camps at Zabriskie or Shoshone. Although work on the two mine shafts resumed briefly during the winter of 1907-08, Greenwater's last hope vanished on September 1, 1909, when Schwab, whose shaft had reached 1,404 feet in depth without striking pay dirt, decided to terminate operations.

Despite its insignificant copper production, Greenwater played a role in the onset of the Panic of 1907. In April of that year, when the frenzy at Greenwater was at its height, the Amalgamated Copper Company, in control of more than 50 percent of the nation's copper production in the early 1900s, began stockpiling copper. In September 1907, after the myth of Greenwater's riches had been exposed by Yeatman, the company unloaded its copper stockpiles on the open market, thus reducing the price of copper and copper mining shares. Augustus Heinze, who had allegedly purchased claims at Greenwater totaling $200,000, attempted to keep the price of copper up by using funds from several large eastern banks that he controlled — efforts that contributed greatly to the bank panic.[154]

Today, rusty tin cans, caved-in cellars, sagebrush, three lonely graves, and the remnants of a crude rock house mark the spot of the once boisterous town of Greenwater. Remnants, including dugouts and collapsed mining structures, survive at the site of Furnace, and a few wooden structures amid vast piles of broken glass remain at the site of Kunze.[155]

Saline Valley Region (Including the Ubehebe Peak, Waucoba, Lee Flat, Nelson Range, Hunter Mountain, Marble Canyon, and Eureka Valley Areas)

Saline Valley, named for the brilliant white salt playa that occurs near its southwestern edge, is one of the major areas added to Death Valley National Monument in 1994. Lying north of the Nelson Range, the valley is nestled between the Inyo Mountains on the west and the Saline and Last Chance ranges on the east. Although Ubehebe Peak in the Saline Range was located in the national monument prior to 1994, the area west of the peak extending to Saline Valley was added to the monument that year. Other new areas added to the park in the Saline Valley region include: the Waucoba area, lying on the east side of the Saline Range between Saline and Eureka valleys; the Lee Flat area, a high plateau, lying to the east of the Inyos south of the Nelson Range and north of Rainbow Canyon; the Nelson Range, lying between Saline Valley on the north and Lee Flat on the south; the Hunter Mountain area, lying south-southeast of Ubehebe Peak and including Grapevine and Mill canyons; and the Marble Canyon area north of Saline Valley between the Inyo Mountains on the west and the Saline Range on the east with Cowhorn Valley immediately to the north and Jackass Flats to the south. Eureka Valley, between the Saline and Last Chance ranges, lies east of Cowhorn Valley, Marble Canyon, and Jackass Flats.

Waucoba — Ubehebe Peak Area. As aforementioned in Chapter One of this study, a party led by Captain Harry Egbert, commander of Camp Independence, left Owens Valley during 1872 for a two weeks' prospecting reconnaissance of the Waucoba area on the east

154. Lingenfelter, *Death Valley & The Amargosa*, pp. 310-37; Weight, *Greenwater*, pp. 5, 8, 13-17, 31, 34; Paher, *Death Valley Ghost Towns*, pp. 10, 13; and Harry D. Schultz, *Panics and Crashes and How You Can Make Money Out of Them* (New Rochelle, New York, Arlington House, 1972), p. 49.

155. Weight, *Greenwater*, p. 15; Harold O. Weight, "The Greatest Copper Camp on Earth," *Westways*, (January 1961), pp. 4-5; Richard S. Smith, "No Water in Greenwater," pp. 12-13, "Death Valley," Vertical Reference Files, Inyo County Library, Independence; and Paher, *Death Valley Ghost Towns*, pp. 10-14. For an assessment of the mineral resources in the Greenwater Valley area, see U.S. Department of the Interior, Geological Survey, Bulletin No. 1709-B, *Mineral Resources of the Greenwater Valley Wilderness Study Area, Inyo County, California*, by Augustus K. Armstrong, Michael T. Garrison, James G. Frisken, and Robert C. Jachens (Washington, Government Printing Office, 1987), pp. B1-B11.

side of the Inyos between Eureka and Saline valleys. During the trip, the men apparently discovered gold. While the date of the discovery is not known, Chalfant in *The Story of Inyo* states that a Colonel James Brady was actively at work at what would become known as the Waucoba Mine by the end of 1872. Some officers and soldiers at Camp Independence became partners in an effort to develop the mine. It was anticipated that a furnace would be constructed to process the ore. However, construction of the furnace could not be commenced until a road was built to the isolated area. By 1873 the soldiers had only been able to construct a road eastward to the summit of the Inyos above Big Pine. That same year, the Waucoba Mining and Smelting Company constructed a road to the area, thus paving the way for more extensive development of its mines in the area.

Despite its isolation, the Waucoba district was so promising that in July 1872 the *Inyo Independent* anticipated that "ere the half of another decade passes away a majority of the citizens of Inyo county will demand the location of its courthouse on the eastern side of the Inyo range. Already Waucoba district bids fair to have the largest population within a year of any in the county. The very first railroad to touch any part of this county will be on that side; at least such is the present indication."[156]

Prospectors scoured the Waucoba area, and by 1875 discoveries had been made 4 miles south of the Waucoba Mining and Smelting Company's operations. In 1875 Brady, who now listed himself as a mining engineer from San Francisco, reported on the Waverley Mines, a group of 10 claims "situated in the southern portion of the Waucaba Mining Dist." He noted that the mines were located on the eastern slope of the Inyo Mountains, "twenty miles north of the celebrated smelting works and mines of Cerro Gordo, twenty-five miles east of Independence . . . and four miles south of Pownzina Creek, the camp of the Wacuba Mining and Smelting Co." Each of the Waverley mines contained "argentiferous galena except the Uncle Sam, the mineral of which is sulphuret of silver." He noted further:

> The Waverley, after which the group is named, is a large lode of argentiferous galena commencing on the crest of a ravine four miles south of Powzina [sic] Creek. Where the work done has exposed the ledge it is from eight feet in width, soft and very easy to work with the pick and assaying $60 in silver to the ton of 2,000 lbs. and 80% in lead. . . .
>
> The Delhi [mine] is a quartz vein richly charged with argentiferous galena and bearing in it a solid streak of the metal six inches in width. It is situated at the head of a cross ravine, and from it a nearly continuous series of quartz croppings runs to the south for a distance of one and a half miles, widening in their course until the Big Bell [mine] is reached.
>
> This is a heavily-charged vein of quartz, carrying argentiferous galena to a width of four and six feet. The galena is a very hard and solid mass and assay about $20 higher in silver than the Waverley, and the normal percentage of lead. Along the whole course of the vein from the Delhi to the Big Bell the quartz contains galena, and wherever openings have been made, as in the Lucknow, General and others, the galena is found in considerable bulk, assaying from $50 to $80 in

156. Chalfant, *The Story of Inyo*, pp. 293-94.

> silver, rendering it very safe to predict that it is a continuous silver bearing fissure of extraordinary length.
>
> The Uncle Sam [claim] is a quartz vein bearing sulphuret of silver in apparently large quantities, but sufficient work has not yet been done to warrent [sic] any further statement than that it will yield sufficient sulphuret to enrich the argentiferous galena of the other mines as is so successfully done at Cerro Gordo. The vein is in limestone and the mineral-bearing streak from 10 to 14 inches in thickness as at present exposed. The mineral assays $300 per ton in silver.

According to Brady good wagon roads "have been and are still being constructed" from Owens Valley to Pownzina Creek. From Pownzina to the mines, the country was "rolling and the road can be completed at a cost of less than $1,000." Ten miles south of the Uncle Sam was "Saline Lake, into which flows a large fresh water stream." In that region "of perpetual summer, experiment has already demonstrated, that an abundant supply of vegetables and tropical fruit, as well as those of a more temperate climate, can be raised." Brady concluded his report by recommending construction of a 15-ton furnace at the Waverley.[157]

About the time that Brady was investigating the Waverley claims, William L. Hunter and John L. Porter discovered two enormous copper ledges, the Piute and Cohee, northeast of Wildrose. These ledges would later be consolidated as part of the Ulida Mine. On July 8, 1875, the Ubehebe Mining District was organized.[158] That euphonious name still survives on the neighboring peak and on the volcanic crater farther north. Although some of the ore was rich in copper, averaging about 24 percent by weight, it could not be produced economically enough to pay a profit. With the price of copper at 20¢ per pound, the ore was worth barely $100 a ton, a sum that would not pay to ship from the isolated location. Because of the shortage of wood and water, it would also not pay to smelt the ore locally. Thus, little mining activity would occur in the area until the early 20th century.

During the Greenwater frenzy, a brief boom hit the Ubehebe area. One resourceful group of promoters, led by A. D. Whittier, a cartoonist from the *Bullfrog Miner* who claimed to be a nephew of the poet, happened upon the ruins of several arrastras, a little ore roaster, and some stone walls — the remnants of Hunter's earlier futile efforts. Taking claim to the ruins and some nearby ground, the enterprising entrepreneurs announced that they had discovered a fabulous "Lost Spanish mine" that had been sought for 50 years. Several Ubehebe companies were established during the boom, including the Ulida Copper Company which was organized by Salt Lake operators on Hunter's actual claims. Ubehebe's biggest operator, however, was Jack Salsberry from Greenwater. Arriving in the area in August 1906, he took up, according to some reports, as many as 500 claims. In partnership with a Baltimore speculator, Henry G. Merry, he formed the Ubehebe Copper

157. "Report of The Waverley, Delhi, Big Bell, Rob Roy, Uncle Sam, Lucknow, and General Ord Mines, Comprising A Portion Of The Property Of The Waverley Mining and Smelting Co. in Inyo County Of This State," By James Brady, Mining Engineer, San Francisco, 1875. "Waucoba Mining District," Subject History Files, Eastern California Museum, Independence, California.

158. State of California, Department of Natural Resources, Division of Mines, Special Report No. 42, *Geology of Mineral Deposits in the Ubehebe Peak Quadrangle, Inyo County, California*, by James F. McAllister (Sacramento, California State Printing Office, January 1955), pp. 1-63.

Mines and Smelter Company, capitalized with 3,000,000 shares at $1 par, which he began selling at 25¢. Salsberry talked grandly of building a railroad and a smelter. He even printed up a $1,000,000 bond issue for the railroad, which was to run 60 miles across Death Valley and up Grapevine Canyon to connect with the Tonopah and Tidewater line. He actually built an automobile road over that route to bring in several carloads of eastern investors. Several miles northwest of the Racetrack dry lake, Salsberry laid out a small townsite, which he first called Salina City but later renamed Latimer to flatter a major investor, Cleveland traction magnate Jay E. Latimer. The town, however, never had more than 20 tents, and its business was limited to the company store, a lodging tent, feed yard, and two saloons. A rival town called Ubehebe City was started at the south end of the Racetrack, but it amounted to even less. Salsberry made one last push for his fledgling Ubehebe Copper Mines and Smelter Company stock with an expensive double-page spread in *Harper's Weekly* during the spring of 1908, before letting it die quietly.[159]

The Ubehebe and Lippincott mines, located at the north and south ends of the Racetrack, respectfully, have been the chief producers in the Ubehebe area. The first recorded production from the Ubehebe Mining District was silver from the Ubehebe Mine in 1908. By 1951 the Ubehebe Mine, the most productive, yielded a total of 2,940 tons of ore containing 2,249,438 pounds of lead, 122,742 pounds of zinc, 26,424 pounds of copper, 34,912 ounces of silver, and 40 ounces of gold. Much of the copper output may have been contained in ore produced from the adjoining Copper Belle mine, owned and operated by the same company during its productive history.

The Lippincott Mine was worked for lead and silver as early as 1908 and operated intermittently until the mid-1950s. Through November 1, 1954, the Lippincott Mine, according to George Lippincott, yielded 834,000 pounds of ore having an average grade of 30 percent lead. The owner also estimated the mine's total yield to be approximately 5,000,000 pounds of ore of that grade, or about 1,500,000 pounds of lead. The mine was opened in 1940 and became productive in 1942. By the mid-1950s it supplied about one-third of the lead requirements for Lippincott's battery manufacturing concern at Santa Ana in Orange County, California. The ore was trucked from the mine over a road constructed by Lippincott from the mine to the Saline Valley road and smelted at the owner's smelters at Bonnie Claire, Nevada, and Ontario, California.[160]

Some gold and tungsten has also been produced in the Ubehebe copper-lead-silver district. The chief source of gold has been the Lost Burro Mine located east of Racetrack Valley. This mine was worked from 1906 to 1917 and from 1934 to 1942 when gold mines were closed during World War II. The value of its total output is about $100,000. Mines in the Dodd Spring-Hunter Mountain area were reported to have produced several hundred pounds of high-grade tungsten in 1915.[161]

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159. Lingenfelter, *Death Valley & The Amargosa*, pp. 129-30, 327-29, 336.

160. State of California, Department of Natural Resources, Division of Mines, "Saline Valley Area, Inyo County, California," *Mineral Information Service*, VIII (August 1, 1955), pp. 1-5.

161. State of California, Department of Natural Resources, Division of Mines and Geology, Bulletin No. 193, p. 152. For further information on mining development in the Hunter Mountain area, see U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-638, *Mineral Resources and Resource Potential of the Hunter Mountain Wilderness Study Area, Inyo County, California*, by Edwin H. McKee, James E. Kilburn, James E. Conrad, and J. Howard McCarthy, U. S. Geological Survey, and J. Douglas Causey, David A. Benjamin, and Clayton M. Rumsey, U. S. Bureau of Mines, 1984, pp. 1-10.

Saline Valley Salt Works/Salt Tram. In 1864 a farmer from Owens Valley, whose surname was Smith, discovered the salt deposit covering a 12-square-mile area at the southwestern edge of Saline Valley. Using horse-drawn teams, Smith scraped and removed salt from the surface of several square miles of the salt marsh and transported wagon loads of the product to Owens Valley, crossing the Inyo Mountains via Waucoba Canyon on trips that took two days. He sold the salt to settlers who used it for table purposes and for making butter. Because of the difficulties in transporting the salt out of remote Saline Valley, Smith sold the product for a very expensive $20 per ton. Although he never lacked customers because of the excellent quality of the salt, Smith eventually abandoned the project because of the difficulty and cost of hauling.[162]

Although Smith discontinued his operations in Saline Valley, the presence of the mineable salt deposit was "rediscovered" in 1902. The attractiveness of the commodity was enhanced by the fact that the salt (sodium chloride) was found to be more than 98 percent pure. The Saline Valley Salt Company, which had been incorporated in Arizona, was established with L. Bourland as president the following year. After operating the salt works on a small scale during 1903 and 1904, the activities of the company were halted temporarily in 1905 when Bourland died, but two years later the company, under the leadership of Bishop attorney White Smith, commenced an in-depth study of the transportation problems involved in moving the salt from Saline Valley to Owens Valley. After Bourland's death Smith, who had come to Bishop with relatives from Tennessee and found employment hauling borax and supplies to and from Saline Valley for the Conn and Trudo Borax Works, had taken over the Saline Valley Salt Company, together with his brothers Fred and Eugene, also of Bishop, and determined to develop the salt works. The Smith brothers had interested G. D. Ferrell from Humboldt, Tennessee, in the venture, and after visiting Saline Valley he in turn had obtained further financial backing from other Tennessee investors. The company determined that construction of a railroad would be too costly and considered the idea of building a pipeline over the Inyo Mountains in which the salt could be transported as a brine before settling on construction of an aerial tramway, because it could be used not only to transport salt out of the valley but also to ship supplies into the largely inaccessible area.[163]

In 1908 surveys were begun by White Smith preparatory to construction of the tramway which would link the salt marsh in Saline Valley to a processing plant across the Inyo Mountains at a railroad stop named Tramway — a siding on the narrow gauge railroad northwest of the community of Swansea on the east side of Owens Lake. It was estimated that the tramway, designed to be the steepest in the United States, would reduce transportation costs of the salt from $20 per ton to $4 per ton. A final survey was conducted in April 1911 to determine the cost and suitable location for the tramway by W. H. Leffingwell, a resident of Bishop and civil engineer of the Mono Power Company, and

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162. State of California, Department of Natural Resources, Division of Mines, Bulletin No. 175, *Salt in California*, by William E. Ver Planck, March 1958, pp. 25-26, 76, 116-18; H. G. Hanks, "On the Occurrence of Salt in California and Its Manufacture," in California State Mining Bureau, *Second Report of the State Mineralogist of California From December 1, 1880, to October 1, 1882* (Sacramento, State Printing Office, 1882), pp. 217-26; and "The Salt Marsh in Saline Valley," *Inyo Magazine*, I (July 15, 1908), pp. 9-10.

163. State of California, Department of Natural Resources, Division of Mines, Bulletin No. 175, pp. 116-17; Hanks, "On the Occurrence of Salt in California," pp. 217-26; and Mary DeDecker, *White Smith's Fabulous Salt Tram* (Death Valley, California, The Death Valley '49ers, Inc., 1993) pp. 7-8.

a proposed location line was selected in late May. A final location was completed in July by C. H. Wickham, field engineer for the Trenton Iron Company. On August 14, 1911, the Trenton Iron Company, a subsidiary of the American Steel and Wire Company with headquarters in Trenton, New Jersey, received a contract from the Saline Valley Salt Company to construct the 13.4-mile aerial wire-rope electric tramway. The contract called for preparation of designs and finished drawings, as well as the wire cables, carriers, and machinery, for a Trenton-Bleichert tramway to carry salt weighing 60 pounds per cubic foot. The slope length of the line was 69,645 feet; the capacity 20 tons per hour; the elevation of the discharge terminal above the loading terminal, 2,450 feet; the carriers to have a volume of 12 cubic feet; and the speed of the traction rope was to be 500 feet per minute. The Trenton company would use the Bleichert System, developed in Germany, to which it held patent rights in the United States. The two men in charge of supervising construction were C. H. Wickham, field engineer for the Trenton company, and W. H. Leffingwell.[164]

Prominent items in the tramway specifications provided for: (1) 13,850 feet of patent locked coil steel track cable, 1-1/4 inch; (2) 55,450 feet of patent locked coil steel track cable, 1-1/8 inch; (3) 69,300 feet of patent locked coil steel track cable, 7/8 inch; (4) 141,000 feet of special steel traction rope, 3/4 inch; (5) 286 special steel buckets, capacity 12 cubic feet, with protecting covers, and hangers, carriages, and patent compression grips; (6) 120 intermediate supports; (7) 240 track cable saddles; and (8) 240 steel traction rope rollers, with shafts, bearings, bolts, washers, and foot castings. The specifications included supervision for the erection of the timber work and attaching the machinery; the equipment for one loading terminal, one discharge terminal, five intermediate control stations, 21 rail structures, 12 anchorage-tension structures, and one double-tension structure; tools for coupling and splicing track cables and traction rope; signal gongs for the control of the line when in operation; track cable oiling cars, traction rope oiling tanks, and water carriers.

Construction began on the west side of the Inyos in September 1911. Material for construction was unloaded at the Tramway railroad stop by 35 to 50 men. Materials included 650 tons of iron in bolts, nuts, braces (two box cars of nuts and bolts), 1,300,000 board feet of Douglas fir lumber, 5,000 sacks of cement, and more than 280,000 feet of steel track cable and traction rope.

The rugged terrain and steep ascent of the Inyo Mountains made construction of the tramway difficult. Thus, the first section of the tramway to be constructed was on the west side of the mountain range where the grade was less formidable. An "old charcoal road" was reconstructed on the west slope of the mountain range and combined with new road construction to facilitate movement of machinery and equipment, but, because one section of the road had a 25 percent grade, it took eight horses to move 5,000 pounds of equipment and 10 or 12 to haul heavier loads. A work and supply camp was established along the road about 3-1/2 miles west of the summit. By this arrangement teams could make one trip per day from the railroad to the camp, leaving their loaded wagons for

164. DeDecker, *White Smith's Fabulous Salt Tram*, pp. 8-9; *Inyo Independent*, September 9, 1910, and March 24, April 21, 1911; F. C. Carstarphen,"An Aerial Tramway for the Saline Valley Salt Company, Inyo County, California," *Transactions, American Society of Civil Engineers*, Paper No. 1304, May 2, 1917, pp. 709-42; and "The Purest Salt in the World," in *Inyo County, California, Anno Domini 1912* (Bishop, The Inyo Register, [1912]), pp. 27-28.

other teams, quartered at the camp, to haul to the summit for unloading. The camp teams could make three trips in two days. The total weight of material hauled from the railroad to this camp was estimated to be 1.1 tons of grain, 5.4 tons of hay, and 23.2 tons of water for each 70.3 tons of material required for the tramway construction.

No tram construction could be undertaken on the precipitous east side of the Inyos until a trail could be built for access up and down Daisy Canyon. Because heavy machinery could not be moved by pack animals, it was necessary to construct temporary, double-cable, reversible tramways as well as a "go devil." The latter was a device consisting of a timber frame supported on an axle 8 feet long which passed through two heavy wheels to transport materials from the summit down to the east side of the tramway construction. During 1912, a trail was constructed that followed the route of the tram from the Saline Valley floor up Daisy Canyon to the crest of the Inyos at an elevation of 8,720 feet. Hoyt S. Gale, a geologist with the U. S. Geological Survey, observed that the trail, popularly referred to as the "Zig Zag Trail," was "a remarkable rock-cut trail, picturesque in the extreme from its ruggedness and the precipitous gorges and rocky slopes it discloses." After the trail was completed some 375 tons of material were hauled from Big Pine via Waucoba Canyon into Saline Valley. A temporary tram, operated by a gasoline-powered "donkey engine," was built in the lower half of Daisy Canyon to haul materials to the levels above. Above that point, everything was hauled by mules on the newly-constructed trail or let down by ropes from the summit above. When the trail was in good condition, the trip from the Saline Valley floor to the summit could be made in one strenuous day. The towers and structures were constructed on concrete foundations, and the water required for making the concrete was hauled in tanks or packed by mules for distances ranging from 1 to 7 miles.[165]

While the Saline Valley tramway was under construction, Gale examined the salt deposit on October 27, 1912. The purpose of the scientific examination was the procurement of "samples of the salt for analysis to determine whether or not" it contained "soluble potash, and for such incidental data as might be obtained bearing on the deposition of desert-basin salines."

Based on his investigation, Hoyt (see a copy of Hoyt's map accompanying his report on the following page) reported that the "salt deposits of Saline Valley" occupied "the lowest part of the depression, which, like other desert basins" was "completely inclosed by high drainage divides" having "no outlet." Surface and ground waters "derived from this area" flowed "toward the central depression, which had probably been submerged, though perhaps only by shallow depths and for short epochs." "No terraces or traces of upper shore marking" were observed by Gale. The "central or playa deposit of salts and mud, lying almost flat at the bottom of the valley," occupied "approximately 12 square miles." Of this total, "only about 1 square mile" was "composed of a smooth, white, salt crust containing a small pond of salt water." The "white salt from this surface" was the

165. Carstarphen, "An Aerial Tramway," pp. 712-13, 716-27; DeDecker, *White Smith's Fabulous Salt Tram*, pp. 13-16; and Hoyt S. Gale, "Salt, Borax, and Potash in Saline Valley, Inyo County, California," in U. S. Department of the Interior, Geological Survey, Bulletin No. 540, *Contributions to Economic Geology (Short Papers and Preliminary Reports), 1912, Part I, Metals and Nonmetals Except Fuels*, by David White (Washington, Government Printing Office, 1914), pp. 416-17.

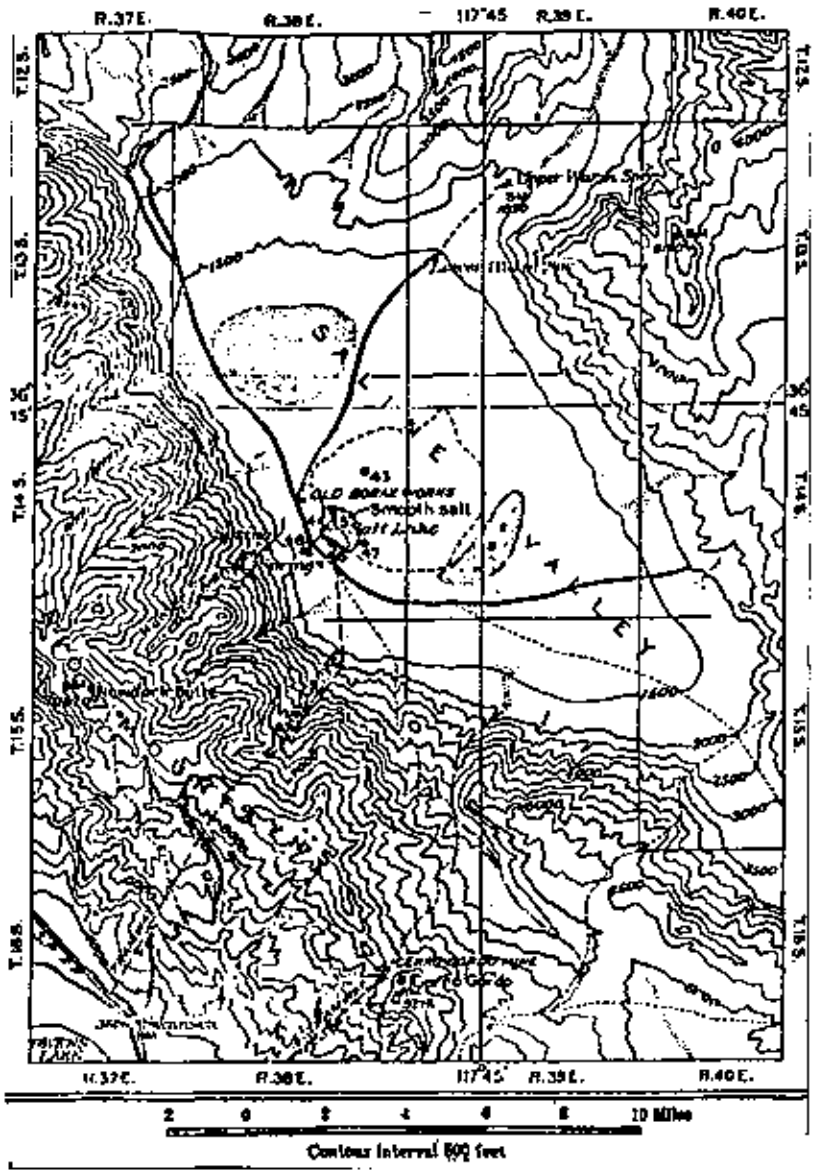


Figure 5: U.S. Geological Survey, October 27, 1912, Saline Valley.

commodity that was "proposed to harvest and ship to market." The "playa surface beyond the white salt" was "like that of marginal salt crusts in some other desert basins, a rough expanse of broken and tilted salt blocks which, having been partly dissolved by storm waters, now stand with an exceedingly sharp, craggy surface." The "rough salt" had "a dirty brown color, doubtless due to the dust which is blown upon it in windstorms and which does not have an opportunity to settle out by occasional floodings and partial solution such as occur in the area of smooth salt."

Gale noted that the salt company's prospectus stated "that no refining or treatment other than grinding will be needed before placing the salt on the market, and it is assumed that

in the main the product to be shipped will be gathered by scraping on the surface of the smooth salt." When Hoyt visited the site, "a great amount of salt had been piled in stacks ready for transfer to the tram for shipment" when it would be completed. Hoyt gathered samples "of the undisturbed salt in these stacks" with "the intention of making a representative average sample of the salt on the ground." Portions were "taken from the inner part of six of these stacks from various parts of the field, and these were combined and later mixed, quartered, and analyzed" by R. K. Bailey, a chemist with the Geological Survey in Washington. The composition of the "average salt sample" from the stacks revealed that the salt was 98.52 percent pure sodium chloride.

Gale observed that the salt sample proved to be "of rather exceptional purity for an entire natural product." One of the "principal factors in its favor" was the "absence of soluble salts of magnesium or calcium, which would, if present as chlorides, tend to make the salt subject to caking on account of the attraction they have for moisture." With the exception of a "small insoluble residue, which is doubtless dust blown in by the wind," the sulphate (sodium sulphate 1.02 percent) was the "only impurity."

According to Hoyt, little was known about the thickness of the salt deposit, since "no satisfactory drilling" had been undertaken. "Shallow holes dug in the surface of the white salt crust for the purpose of obtaining samples of the underlying brines," however, had shown "a surface thickness of 4 inches of a loose-textured, porous white crystalline salt, below which is a layer of dark-greenish or almost black saline mud several inches thick." Other layers of hard salt were encountered below this mud, making it "difficult to dig the deposit with an ordinary shovel, not only on account of its hardness but also because the pit immediately fills with the freely flowing brine."

Hoyt noted further that the "ground water stands so high that either the salt crust is barely submerged or water or brine will fill any hole dug in the salt almost at once, rising practically to the surface level." Thus, the "salt crust" was "not so hard as it would be on a dry surface" and was readily worked. The salt on the surface of the salt flat was "gathered by raking or scraping it into heaps while in a wet or slushy condition." The "crystals" dried in the stacks and were "benefited if washed by an occasional rain." The "outer surfaces of the stacks" became "'sunburned' or somewhat darkened on exposure," "probably due to the dust swept over them by the wind."

Although "the principal harvest" would be "the natural salt crop, which continuously replaces itself," a series of "evaporating vats" had been built "about the southwest margin of the salt flat and pond, where by evaporation of the liquor of the lake or recrystallization of the less pure salt from the area surrounding the white salt, the production" could be "increased."

Gale also took six samples (marked Nos. 43-48 on the map on the preceding page) of the ground solutions at several points around the "salt flat, with the special object of testing them for potassium compounds." The results of the tests, however, "were practically negative." Samples Nos. 43-47 showed various potassium compounds ranging from .78 to 2.47 percent. All of the samples, with the lone exception of No. 48, were "brines collected in the salt flat." No. 48, which showed potassium compounds of only .05 to .10 percent, was a "sample of the natural flow of lukewarm water from the large spring above the salt company's camp, taken in the center of the open stream just below the junction of the

several flows." This water drained "into the southwest corner of the salt flat and probably" supplied "the pond of open water." The "total flow from this spring, several hundred gallons a minute" was "said to vary considerably with the rainfall in the mountains."

Thus, Gale concluded that there was "little or no evidence from these tests of an important segregation of potash in the residual solutions near the surface." Better results might be discovered by drilling, but from "general considerations" it was not "now supposed likely that a segregation of the potash would be found on a sufficiently large scale to justify much expense in exploration."[166]

Despite construction delays as a result of heavy fall and winter snowstorms, "which constituted a menace to construction at all altitudes above 6,500 ft.," and occasional landslides during the spring, the towers and control stations for the tramway were completed by November 1912, but machinery still had to be installed at the loading and discharge terminals. The tramway was ready for a preliminary test on June 10, 1913, but electrical connections from the powerhouse of the Los Angeles Aqueduct in Cottonwood Canyon on the west side of Owens Valley were not completed. Finally, the first salt carried by the tram was delivered at Tramway on July 2. Before the processing facilities at Tramway were fully operational, however, the salt was transported to the Albright Mill in Bishop for packaging under the label "Tramway Salt."[167]

As completed the 13.4-mile tramway system, commencing at the edge of the salt field in Saline Valley, was divided into five sections which varied in length from 1-3/4 to 4 miles, depending on the elevation reached by each section. Each section was in effect a separate tramway at each end of which was a control station where both the carrier wires and the traction wires terminated. Three sections of the tramway transported the salt from the valley floor up precipitous Daisy Canyon to the summit of the Inyo Mountains, a distance of about 7,600 feet. The tram crossed the summit saddle between 10,668-foot New York Butte and 9,705-foot Pleasant Mountain. The other two sections carried the salt from the summit down the west side of the Inyos across a series of brushy canyons and pock-marked striated cliffs to the floor of Owens Valley to Tramway, approximately 5,100 feet below on the east side of Owens Lake. The maximum horizontal angle, about 30 degrees, was at Control Station No. 1 at the head of Daisy Canyon, while the vertical angle was as much as 40 degrees in places. Separate control stations, each equipped with a telephone, were constructed at each section of the tramway, and power was supplied to the endless traction cable by 75-horsepower Westinghouse electric motors maintained at each control station through a grip sheave 8 feet in diameter. The motors required 2,200 volts of electricity to operate, the power being supplied from the Los Angeles Department of Water and Power's Cottonwood Canyon power plant. The electrical transmission line that paralleled the tramway was "of the usual pole construction, carrying copper wires for a 3-phase circuit." The voltage was 33,000, and the transformer stations were "of the out-door type," the voltage stepped down from 33,000 to 2,200 for use in the motors of the driving

166. Hoyt, "Salt, Borax, and Potash in Saline Valley," in U. S. Department of the Interior, Geological Survey, Bulletin No. 540, pp. 418-20.

167. Horace Albright, a youth of 22 years, worked at the mill, but he would soon leave for Washington to become an attorney for the Department of the Interior. After serving as Assistant Director of the National Park Service, Albright would later become Director of the National Park Service from 1929 to 1933 and play a significant role in the establishment of Death Valley National Monument.

stations. The normal tramway's capacity was 20 tons of salt per hour, and the salt was transported along the aerial wire-rope tramway in 286 cylindrical-shaped buckets that were suspended from wheels that ran on the carrier wires and were attached to the traction cable by friction grips. The suspension was designed so that the buckets hung horizontally regardless of the angle of the carrier wire. Each bucket, coated to prevent corrosion and rusting, carried 12 cubic feet (800 pounds) of salt.

When the tramway began operation, two men were employed at each of the control stations, and two workers manned each of the terminals. Four line riders performed the maintenance work on the tramway. A foreman exercised supervision of the entire line. The cost of labor and power for salt transported was 4.6¢ per ton-mile. One of the critical problems that confronted initial operation of the tramway was the weight of the salt — planners had designed the tramway based on their estimate that air-dried salt weighed approximately 60 pounds per cubic foot. After operation began it was found that most of the salt carried by the tram was of "the wet variety," weighing in excess of 80 pounds per cubic foot. After several years of experimentation new grips, known as Universal Wico grips, were installed. The improved grips were capable of holding the heaviest bucket plus the weight of one line rider.

A small settlement developed around the unloading and processing facilities at Tramway. Besides the unloading terminal and processing structures, including a 70-ton mill for drying, grinding, and sizing the salt, the company built five houses for employees. The last of these buildings collapsed from weathering in the late 1980s, but a cement foundation for the oil burning drier is still visible. In addition to the housing at Tramway a six-room residence, which would remain intact until the 1960s, was constructed for the operator of the summit control station. Water was hauled to the summit station and stored in a tank under the tram for use of the operator. No homes were built in Saline Valley. The workers, most of whom were reportedly Mexicans and Indians, apparently lived in tents, tent houses, or the nearby Saline Valley Indian Ranch.

Preparation of the salt in Saline Valley for transport over the tramway was "mostly a natural process." Fresh water from the spring at the salt marsh that reportedly produced 55 miners' inches was carried in wooden pipes to flood the salt fields. The fresh water dissolved the salt rapidly. Dikes were used to control the spreading water. The valley's temperatures, which often reached 120 degrees in summer, provided the necessary heat to evaporate the water, leaving essentially pure salt crystals in brine ready for harvesting. The workers shoveled the dried salt into piles, 3-1/2 feet in diameter and 2 feet thick. Each pile contained 400 to 500 pounds of salt. The piles were arranged in rows approximately 12 feet apart, the spacing between the piles being 6 feet. Each worker could pile 8 to 10 tons of salt per day. The salt remained in the piles until the brine had drained, because this "mother liquor" contained the majority of the impurities. The salt, however, did not drain freely and remained damp for a considerable period. The prime harvesting season was May to October. From the piles, the salt was loaded on specially built steel and galvanized iron "buggies," with 12-inch-wide (20 inches in diameter) rear wheels and front wheels that were 16 inches in diameter with a 4-1/2-inch face. The buggies had beds 3 feet wide, 8 feet long, and 6 inches deep, and each was capable of carrying up to 1,000 pounds of salt. The buggies were pulled across the surface by 3/8-inch cables from a gasoline-powered winch. At the dumping point, the buggies were pulled up an inclined plane until they assumed an angle of approximately 44 degrees, at which slope the "moist"

salt slid freely into a hopper above a car which was 30 inches wide, 4 feet, 6 inches long, and approximately 30 inches high. The bottom of the car was hoppered both ways at an angle of 45 degrees, so that its sides, instead of its ends, were used for doors. The wooden cars ran on a double-track railway about 1/2 mile long, operated by an endless rope haulage system operating at a speed of 200 feet per minute. A 10-horsepower gasoline engine moved seven loads and seven empties on these tracks. The cars dumped into a boot serving a drag conveyor that elevated the salt to a point sufficiently high to command the 50-ton bins at the loading terminal where the tramway buckets were filled by a lever chute. The buckets were dispatched from the loading terminal at the tap of an automatic spacing gong. The rate established was 56 buckets per hour.to the loading terminal, thus permitting the tramway to carry material continuously at the rate of 23 or 24 tons per hour.[168]

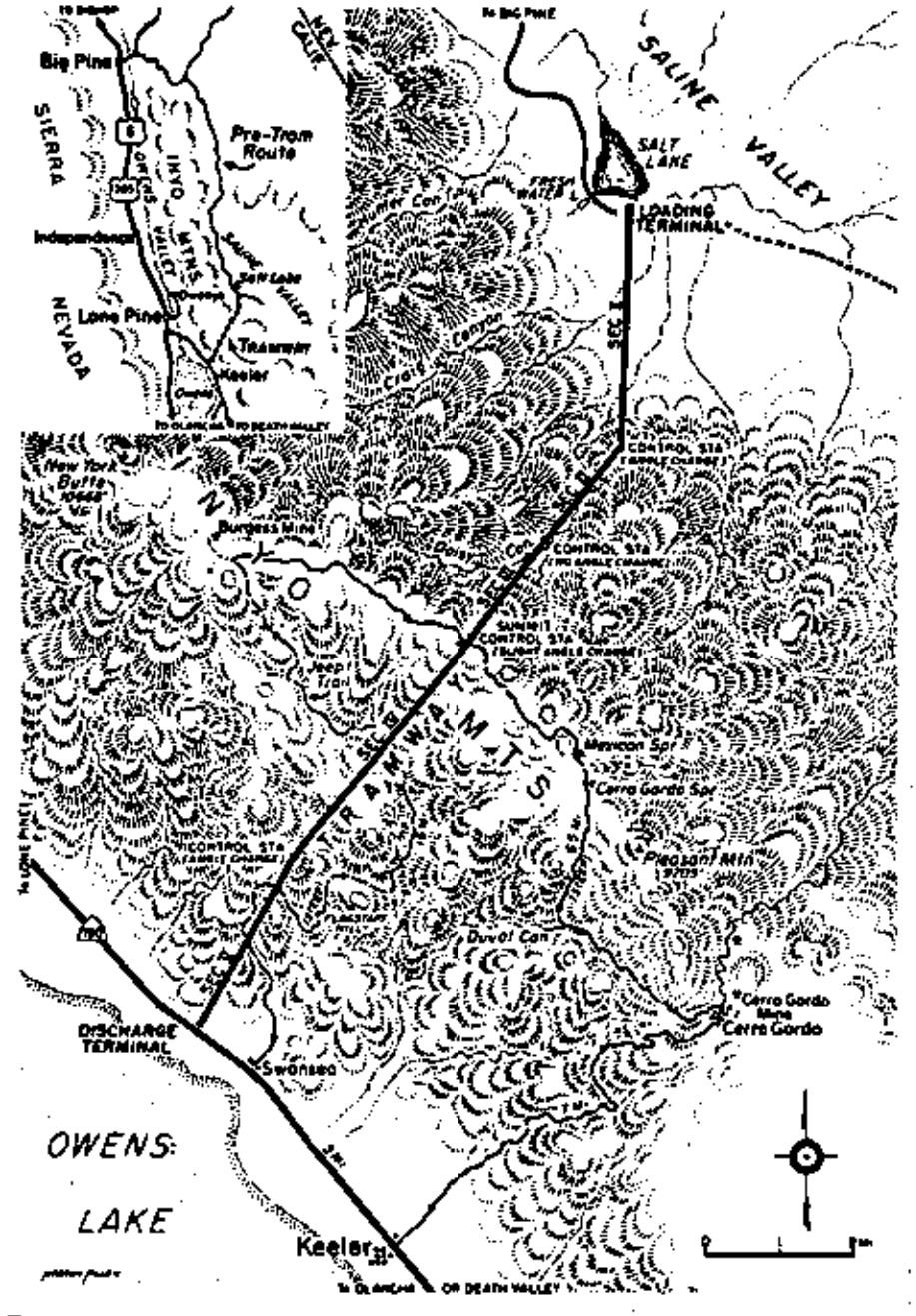
During 1913, more than 5,000 tons of salt was shipped over the tramway, and by February 1914, the Saline Valley Salt Company was sending to market an average of 9 to 15 narrow-gauge railroad cars of processed salt per week. Despite the success of the tramway operation, however, construction costs for the tramway proved to be excessive, thus forcing the firm to lease its operations to the Owens Valley Salt Company in 1915. Under the lease agreement, one-half of the revenue from the salt operations was to go to the Saline Valley Salt Company, while the name of the product was changed to "White Mountain Salt."

W. J. Savage, whose office was in the American Bank Building in Los Angeles, managed the Owens Valley Salt Company, while John A. Lewis was superintendent of the salt works. In 1916 40 men were employed in the salt fields during the harvest season that extended from April to December. Seventeen men operated and maintained the tramway which operated only during the summer months, and 30 men were employed at the mill at Tramway throughout the year. The mill processed approximately 30 tons of salt per day at a cost of $2.75 per ton (harvesting salt in field, 50¢; tramming, $1.50; and milling, 75¢). At the mill, the salt was shovelled into a bin that automatically fed into a large rotary, oil burning, drying furnace. Subsequently elevated to rolls, the salt was crushed to the desired sizes and passed over shaking screens to classify the different sizes. Five classes of salt were produced, varying from natural crystallized rock salt to pulverized table salt. A narrow gauge spur rail line was built to the mill to facilitate loading of the processed salt on to railroad cars.[169]

After operating the tramway for three years the Owens Valley Salt Company, beset by financial difficulties, internal dissension, and lawsuits from creditors, abandoned its interests in the salt works, and the tramway ceased operation in 1918. Between 1913 and

168. Carstarphen, "An Aerial Tramway," pp. 713-16, 727-28, 733-41; DeDecker, *White Smith's Fabulous Salt Tram*, pp. 16-22; State of California, Department of Natural Resources, Division of Mines, Bulletin No. 175, p. 117; and Gary B. Speck, "Exploring a Ghost Railroad," *Western and Eastern Treasures*, (March 1995), pp. 28-30. See the following two pages for a map showing the location of the tram and a chart showing its profile.

169. California State Mining Bureau, *Report XV of the State Mineralogist, Mines and Mineral Resources of Portions of California*, pp. 121-23; DeDecker, *White Smith's Fabulous Salt Tram*, pp. 20-22; and Thalia Weed Newcomb, "Agricultural and Industrial Survey of Inyo County, Calif. made by the California Development Board of San Francisco, California at the Request of the Board of Supervisors of Inyo County," June - July 1917, p. 98.



Map by Norton Allen / *Desert Magazine*, Aug. 1959

Figure 6: Map showing the location of the Saline Valley salt tram.
Map by Norton Allen/*Desert Magazine*, August 1959.

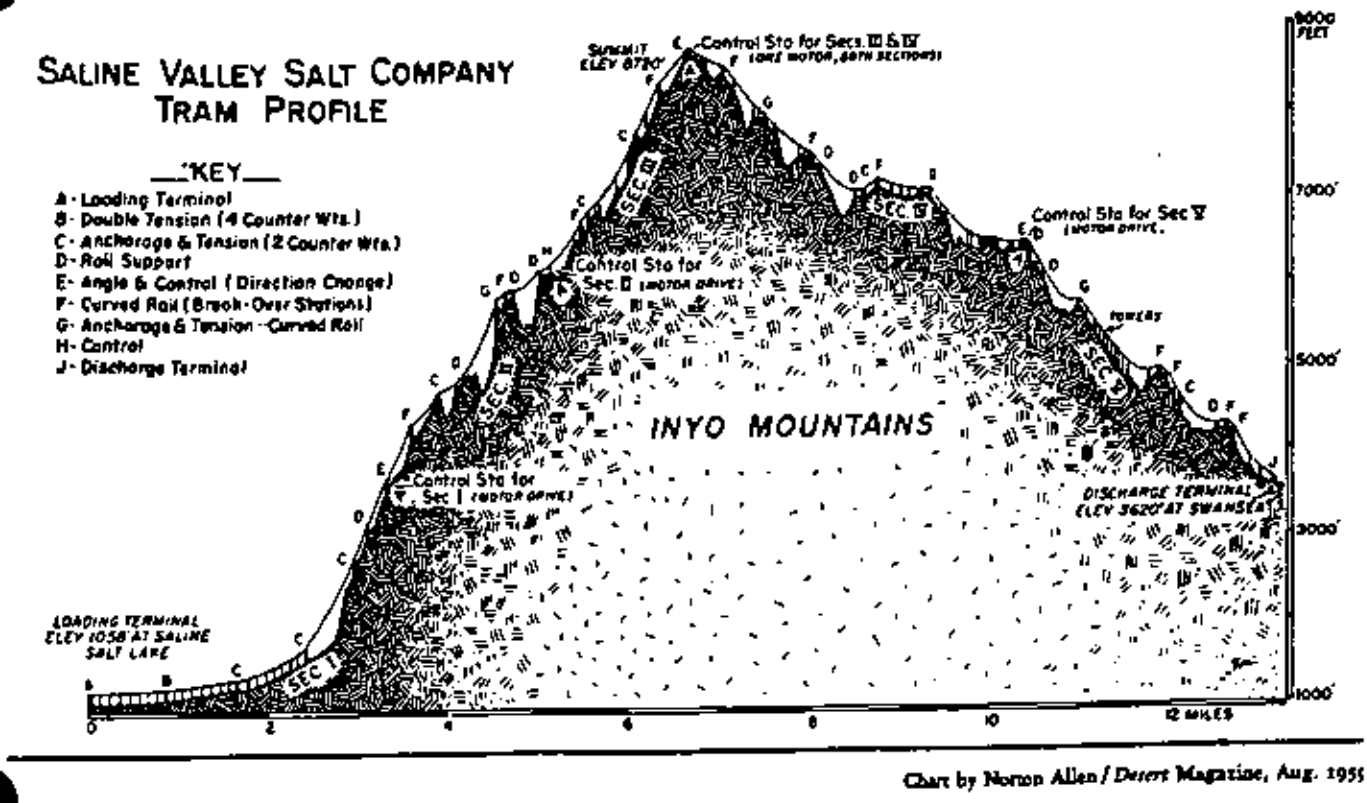


Figure 7: Chart showing the Saline Valley salt tram profile.
Chart by Norton Allen/*Desert Magazine*, August 1959.

1918, several tens of thousands of tons of salt were produced, more than one-half the total production from Saline Valley.[170]

By 1920 U.S. Steel, which had purchased the Trenton Iron Company during construction of the tramway, had become owner of the salt fields and tram, and in that year, the corporation leased the salt operations to the Taylor Milling Company. Under the direction of George W. Russell of Pasadena, the salt works were revived, but the venture lasted only one year. While the tramway lay idle for several years, efforts were initiated to provide more efficient transportation to the remote salt fields. During 1925-26, a new road into Saline Valley from the south was constructed by White Smith under contract to Inyo County. Thomas Hancock superintended the crews that constructed the new road — a herculean engineering project that would be delayed by at least one major washout. The new road to the valley, which was formally accepted by the county in May 1926, extended from the Keeler-Darwin road by way of Lee Flat and Grapevine Canyon.[171]

170. State of California, Department of Natural Resources, Division of Mines, Bulletin No. 175, p. 118.

171. *Inyo Independent*, May 3, July 26, September 13, 1924, and March 28, August 1, 1925, and Chapter 183, Southern Inyo American Association of Retired Persons, *Saga of Inyo County* (Covina, California, Taylor Publishing Company, 1977), p. 111.

While construction of the Saline Valley road was underway, Russell, in December 1925, established a new company — the Sierra Salt Company with offices in Las Vegas, Nevada — to resume operation of the salt works, hiring White Smith as his assistant manager and technical advisor.[172] Russell served as vice-president and general manager of the new firm, while Frank A. Stevens, a prominent attorney of the Las Vegas law firm Stevens & Henderson, served as president. According to a company pamphlet printed in June 1926, the firm was capitalized at $750,000. The company's operations consisted of 640 acres of salt lands and 40 acres of semi-agricultural land, the latter acreage containing the spring which provided all the water required for the operation of the salt fields. The 640 acres of salt lands were owned by virtue of "Placer Salt Mining Claims," subject to patent from the U.S. Government, and were under a 50-year lease. The 40-acre, semi-agricultural land was owned in fee and leased for 15 years with an option to purchase at a nominal figure at any time during the lease period. The salt was hauled out of the valley to the railroad at Keeler on the east shore of Owens Lake by six-cylinder, 10-ton trucks via the recently completed Saline Valley road. C. W. Hayes, contractor for harvesting and hauling the salt which was to be marketed under the "Sun Brand Salt" label, delivered the first shipment to the City Market in Bishop on June 16, 1926. During the summer of 1926, a contract for erection of a milling plant in the Central Manufacturing District of Los Angeles was signed, a preliminary deposit was made on the contract, and ground was broken for the plant's foundations.[173]

In 1929 Russell purchased the tramway from U.S. Steel. After overhauling the long-idled tram Russell resumed its operation in December, and it began transporting some 60 to 100 tons of salt per day. The Sierra Salt Company modified the operation of the salt fields by installing crystallizing ponds near the tramway terminal in the salt marsh, the outlines of which may still be seen. Brine was prepared by dissolving the crust in fresh water as in the earlier operation. Despite this promising beginning, by 1930, financial difficulties, complicated by plunging prices for salt during the Depression and continuing tramway maintenance problems, forced Russell to close the salt works, and the operation went into receivership in 1935.

Nearly 20 years later, in 1954, three men — D. O. Morrison, J. J. McKenna, and Tony Pinheiro of Bakersfield — leased the salt works and tramway from T. K. Temple of Los Angeles. Levees were reconstructed, some salt was recrystallized in place, and approximately 2,000 tons of salt were harvested and stockpiled on the northwest side of the salt fields. Development work revealed that a 4-foot layer of thenardite lay beneath the ooze of the salt fields. Despite these efforts to revive the salt operations, the men were forced to terminate their work within less than a year. Total production of the salt field operations is estimated to be approximately 30,000 tons.[174]

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172. According to an article in the *Inyo Independent* on March 28, 1925, White Smith announced that he and Russell, then general manager of Minerals Products, Inc., of Los Angeles, had organized a syndicate of Los Angeles and Bishop businessmen to take over the salt works in Saline Valley, as well as acquire extensive copper, lead, and talc properties in the "contiguous mountains."

173. "Saline Valley Salt Deposit, Inyo County, California, Owned by Sierra Salt Company, A Nevada Corporation," June 1, 1926, "Saline Valley/Salt Company-Salt Tram," Subject History Files, Eastern California Museum, Independence. Also see *Inyo Independent*, June 26, 1926.

174. DeDecker, *White Smith's Fabulous Salt Tram*, pp. 22-24, and State of California, Department of Natural Resources, Division of Mines, Bulletin No. 175, pp. 25, 76, 118.

The tramway was listed on the National Register of Historic Places on December 31, 1974. Despite its status as a significant historic engineering structure, vandalism and weather have taken their toll on the tramway components. Although the outline of some of the evaporating ponds may still be seen at the salt works, virtually anything removable has disappeared. Remnants of several wooden tramway towers remain in Saline Valley, but the best preserved components of the tramway system survive only in inaccessible places on the higher slopes of Daisy Canyon.[175]

Saline Valley Conn and Trudo Borax Works. Located on both sides of the Saline Valley road north-northwest of the salt fields, the ruins of the Conn and Trudo Borax Works, a privately owned historic property, constitute a significant story in the historical development of the borax industry in the United States, as well as in the history of Saline Valley. The ruins on the east of the road are located on lands added to Death Valley National Monument in 1994, while those on the west side are privately owned and remain on lands administered by the Bureau of Land Management.

The first discoveries of borax in the United States were made by Dr. John A. Veatch in 1856 in northern California some 80 miles north of San Francisco. Veatch first discovered borax in springs at the north end of the Sacramento Valley in Tehama County and then in larger quantities in a cutoff bay of Clear Lake in Lake County.[176]

According to Charles G. Yale and Hoyt S. Gale, two geologists with the U. S. Geological Survey, borax was first produced on a commercial scale in northern California in 1864. At first, borax was obtained by evaporation of the lake water, but this process was later supplanted by the collection and washing of natural borax crystals which were found embedded in the mud on the bottom of lakes. Yale and Gale observed that the second stage in the development of borax production in the United States followed discovery of the "so-called marsh or dry-lake borax deposits, a considerable number of which were developed in western Nevada." Fish Lake, Columbus, Rhodes, and Teals marshes in southwestern Nevada near the California line, as well as California locations at Searles Lake in San Bernardino County, Cane Lake in Kern County, and Saline Valley and Death Valley in Inyo County, "were among the more important localities containing deposits of this type from which active production was established." Other locations where borax was discovered and produced included Dixie Valley and Alkali Valley near Fallon, Nevada, the Black Rock Desert near Gerlach in Washoe County, Nevada, and China Lake in Kern County, California. Deposits were also discovered and developed at Lake Alvord and the Warner Lakes in Harney County, Oregon. In the early days of the borax industry the

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175. U. S. Department of the Interior, National Park Service, National Register of Historic Places Inventory — Nomination Form, "Saline Valley Salt Tram Historic Structure," prepared by Richard D. Conrad, Bureau of Land Management, October 31, 1973; Francis C. Berg and M. Suzanne Crowley, Draft, "Notes on Selected Historical Sites in the Saline Valley," Bureau of Land Management, Ridgecrest (California) Resource Area Office; DeDecker, *White Smith's Fabulous Salt Tram*, p. 24; Wilma C. Willis, "Skeleton on the Hill," *Westways*, XL (May 1948), p. 6; Robert O. Greenawalt, "We Hiked the Inyo Bucket Brigade," *Desert Magazine* (August 1959), pp. 19-21; ibid., "We Hiked the Inyo Bucket Brigade," *Desert Sage* (March 1995), pp. 28-30; and "And a Rare Peek of the Inyo Tram," *Desert Magazine* (January 1963), pp. 14-15.

176. *Dictionary of American History*, (Rev. ed., New York, Charles Scribner's Sons, 1976), Vol. I, p. 340; Ver Planck, "History of Borax Production in the United States," pp. 273-91; California State Mining Bureau, Bulletin No. 24, pp. 36-42; and Hanks, "Report of the Borax Deposits of California and Nevada," in California State Mining Bureau, *Third Annual Report of the State Mineralogist, Part 2* (Sacramento, State Printing Office, 1883), pp. 7-55.

"marsh" or "dry-lake" borax deposits came to yield practically the entire output for a considerable period of time. The "saline deposits" were "the product of evaporation of saline waters which, having been accumulated in undrained reservoirs through long periods of time, have in many places reached considerable magnitude." Borax found in the "marsh" or "dry-lake" deposits appeared to be "primarily derived from the boric acid of adjacent springs, commonly warm or hot springs, so that its ultimate source may be found in colvanic emanations." In these deposits the borax occurred "as a thin saline crust on the surface of the marsh, the most characteristic portion of which is the 'cotton-ball' or soft fibrous tufts of the mineral ulexite." Such "deposits are generally associated with other salts, from which the borax has to be separated or refined. Many of these marshes were remotely situated at the time the borax was shipped from them, and the product was customarily transported by horse or mule teams over long desert hauls to the railroad."[177]

Development of the borax works in Saline Valley began in late 1888 or early 1889. On January 12, 1889, the *Mining and Scientific Press* reported that three men, Trudo, McAfee, and Carson, had "Indians at work making" an 18-mile road across the Inyo Mountains "from Saline Valley up to Cerro Gordo" for the purpose of reaching an extensive "borax deposit in Saline Valley." From Cerro Gordo, the borax would be taken to Keeler on the east shore of Owens Lake. Several months later, on April 6, the mining journal reported that "Messrs. Conn & Trudo" had located "1,120 acres of borax land in Saline Valley, and will work the property extensively." The two men, who had come to Inyo County from Candelaria, Nevada, and were currently residents of Big Pine in Owens Valley, applied for patents "for over 1200 acres of land" in November 1890. Of this total, 160 acres was "a pre-emption and the remainder" was "borax land." Patent to the mining claims was awarded to Frederick Conn (Patent 504 D/C) on November 23, 1891.[178]

Coun and Trudo built a small reduction plant about 1-1/2 miles north of the spring in the Saline Valley salt marsh. The June 15, 1889, issue of the *Mining and Scientific Press* reported that "Conn & Trdo [sic] have their borax works in Saline Valley in working order and are making borax." The article, noting that the men had "already made a great many tons" of borax, provides the earliest description of the establishment and operation of the borax works:

> . . . .They have 18 crystallizing tanks, each of a capacity of 1000 gallons. Three tanks are emptied each day, and the yield from these is about two tons of borax. In very warm weather the yield might not quite reach that amount, as the borax does not crystallize so well as in cool weather. The crude material is first boiled, the boiler having a capacity equal to three of the crystallizing tanks, and the solution is then run into them and allowed to stand six days. The borax accumulates on the sides of the tanks, which are made of zinc, and on plates of

177. Charles G. Yale and Hoyt S. Gale, "Borax," in U. S. Department of the Interior, Geological Survey, *Mineral Resources of the United States, Calendar Year 1911, Part II — Nonmetals* (Washington, Government Printing Office, 1912), pp. 857-60, and ibid, "Borax," in U. S. Department of the Interior, Geological Survey, *Mineral Resources of the United States, Calendar Year 1913, Part II — Nonmetals* (Washington, Government Printing Office, 1914), pp. 521-36.

178. *Mining and Scientific Press*, LVII (January 12, 1889), p. 28; LVIII (April 6, 1889), p. 248; and LXI (November 29, 1890), p. 348. Also see copy of patent, "United Stated States of America to Frederick Conn, November 23, 1891, in Cultural Resources Files, Resources Management Division, Death Valley National Park.

> the same metal suspended in the liquid. Seven of these plates are used in each tank. The borax is put in sacks direct from the tanks, and is then ready for shipment. From the works to the railroad at Alvord [in Owens Valley], the distance is 55 miles. Within a few hundred yards of the works is an Indian settlement. The borax marsh has an elevation of about 500 feet above the level of the sea. The Inyo mountains rise like a wall close to the works and attain an elevation of about 11,000 feet above sea level. This is one of the grandest stretches of mountain scenery in the State.[179]

Conn and Trudo made their first shipment of borax in early July 1889. According to the *Mining and Scientific Press*, the borax was "of very fine quality and if the weather will permit regular shipments will be made." Although many had "predicted that borax could not be made in Saline Valley," Conn and Trudo had "shown that such is not the case." In December the mining journal reported "much activity in making borax in Saline Valley." The capacity of the borax works would be "largely increased soon and more than double the amount of teams will be employed in hauling the borax from the works to Alvord." The borax operation was already providing "a good deal of business for the town of Big Pine."[180]

The *Report of the State Mineralogist* for 1889 observed that "70 per cent" of the "borax crop of the United States" was "made in California, the remainder in Nevada." About "the middle of the year a new company operating in Saline Valley, Inyo County, began making borax, and have since turned out the refined article at the rate of about forty tons per month."[181]

By February 1890 the *Mining and Scientific Press* reported that a Mr. Bush had taken "samples of borate of lime from his borax location" in Saline Valley to Independence in Owens Valley. The samples were "the richest form in which borax is found and Mr. Bush has one location of 160 acres that carries that kind of material." Four partners, including John Stoutenborough of Bishop, John F. Millner of Benton, Mr. Lent, and Mr. Cox from Boston, had "made some locations of Borax land" in Saline Valley. The men proposed "to go over to the valley soon with a large outfit for a borax camp." Conn and Trudo had "a large quantity of borax at their camp all [sic] ready," but there was a "scarcity of teams." Accordingly, J. D. Marshall of Keeler would begin hauling borax from Saline Valley to Alvord, the round trip taking one week.[182]

Because of the high cost of hauling the borax to Alvord, some entrepreneurs, according to the mining journal, suggested the need for a shorter and more practical route from Saline Valley to Independence. Those interested in a shorter route claimed "that an easy route for a pack-trail" could be found and that "the distance will be but little, if any, in excess of 20 miles." Accordingly, a "practical man" reconnoitered the route "with a view to contracting

179. *Mining and Scientific Press*, LVIII (June 15, 1889), p. 436.

180. ibid., LIX (July 6, 1889), p. 4, and LIX (December 14, 1889), p. 450.

181. California State Mining Bureau, *Report of the State Mineralogist, Volume IX, 1889* (Sacramento, State Printing Office, 1889), p. 338.

182. *Mining and Scientific Press*, LX (February 15, 1890), p. 112.

for the transportation of borax by pack-train at a much less figure than the present cost of hauling."

Although there is no record that a new pack-train trail was laid out during the early 1890s, the mining journal reported in early March 1890 that five teams were engaged in hauling borax from Saline Valley to the railroad at Alvord. Two teams belonged to a Mr. Schober and one each to Messrs. Marshall, Hall, and Smith. Snow curtailed the transit operations for one week during the winter of 1889-90.

In early April 1890 the mining journal printed the findings of a correspondent for the *Inyo Independent*, the principal newspaper in Inyo County. According to the correspondent's report, the Saline Valley borax deposits extended

> . . . over a portion of four townships. The principal portion of the borax deposit is in the northwest part of township No. 14 S. R. 38 E. The marsh portion of the valley has an area of from 25 to 30 square miles. The best portion of the deposit is at the southwest border of the valley and has an area of two to 3 square miles. This is the lowest point in the valley, the altitude being about 1100 feet. The borax belt and a soda belt cross each other at this portion of the valley, forming the combination known as borate of soda. The course of these belts, as near as I can determine, is: soda, north, 20 [degrees] east; borax, north 20 [degrees] west. The deposits of borate of soda found on the east side of the marsh are heavy and rich, but not regularly distributed over the surface. This indicates that the deposits have been formed by water running in a number of channels, or 'washers,' from the northeast to the southwest side. The deposit on the east side of the marsh extends for a distance of four to five miles in a northwesterly and southeasterly direction and is rich in borax and very evenly distributed. When the borax found on the surface is removed, another deposit speedily forms which seems, judging from ordinary tests, to be as rich as the original deposits. At the northeast edge of the marsh there rises out of the bedrock a number of springs, the water of which is strongly impregnated with boracic acid. The water from all these springs quickly sinks into the marsh, the flow being strongest from October till April of each year. The belts of borax and soda already spoken of, in their course southerly are far separated at the extreme south side of the valley, and on that side of the marsh is found a deposit of borate of lime, more commonly called 'cotton-ball.' The supply of wood and water in the valley is abundant. In my judgment there is not a place in the United States where borax can be got at so small a cost as in Saline valley. . . .[183]

In a U.S. Geological Survey publication entitled *Mineral Resources of the United States, Calendar Years 1889 and 1890*, published in 1892, David T. Day, chief of the agency's Division of Mining Statistics and Technology, reported on the Saline Valley borax deposit. His report noted:

> . . . .The marsh in which the crude material, the borate of soda, occurs covers some 20,000 acres, though the more fertile portion, so far as known, is confined to less than one-tenth that area. Over much of this the borate of soda incrustation

183. ibid., LX (February 22, 1890), p. 180; LX (March 9, 1890), p. 148; and LX (April 5, 1890), p. 232.

> varies from 3 to 6 inches in thickness. The owners of this more fertile section, Messrs. Conn & Trudo, have erected here a plant after the usual style, having a capacity of 40 tons concentrated per month. A working force of thirty men is employed here. Water for these works is brought through iron pipes from the mountains to the west, a distance of 1-1/2 miles. Mesquite trees, which make an excellent fuel, are abundant in the neighborhood. An average of eight assays of this crude material, made by Mr. John Fleming, gave 66.83 per cent. boric acid. During 1890 Messrs. Conn & Trudo turned out 400 tons of concentrated borax, with nearly as much the preceding year.[184]

The California State Mineralogist reported in 1895-96 that the Conn and Trudo Borax Works controlled "about 700 acres, part of which is covered with a crust of crystallized tincal from 6 inches to 2 feet thick, which contains 90% borax." The "crude material" was "dissolved in boiling water and drawn off in tanks, where the impurities settle and the borax crystallizes out." The crystallized material became "supersaturated with that salt upon cooling."[185] The crystallization process alluded to by the state mineralogist was more fully described some years later in the *Dictionary of Applied Chemistry* (1912):

> All the manipulation that is required is to shovel off the surface of the marsh to a depth of 18 inches and cart the material to long hemispherical wrought-iron pans set on arches of stone, fixed beneath with wood fuel obtained in the neighborhood. The pans are charged with water and the crude material thrown in and vigorously stirred with long poles, until, with the aid of heat, all of the soluble salts are dissolved. The fires are then withdrawn and the contents of the pans allowed to settle for 10 hours, when the liquor is drawn off into vats, where the borax crystallizes out. The mother liquor after six days is drawn off and the borax is taken out and packed into sacks for shipment.[186]

Borax production at the Conn and Trudo Borax Works continued until 1907, and five years later Geological Survey Geologist Hoyt S. Gale reported that the "borax industry in Saline Valley is probably a thing of the past." To heat the tanks at the borax works, much of the "grove of mesquite trees about the spring at the southwest corner of the salt flat had been cut and burned, but these trees" were "now replacing themselves by natural growth." The "principal borax-producing plant was about a mile north of the present salt company's camp," and "some of the buildings and old tanks" were still there. There was "another borax works on the opposite side of the valley, said to have been situated east of south from the lower hot springs." Gale observed that it seemed "not unreasonable to assume that a part at least of the boric-acid content of these deposits is derived from the hot springs," although "no analyses of these waters" was known to him. However, he ventured that possibly "the marked decrease in solubility of borate salts on lowering of temperature accounts for the localization of these salts reported in the saline deposits." "Aside from the

184. U. S. Department of the Interior, Geological Survey, *Mineral Resources of the United States, Calendar Years 1889 and 1890*, by David T. Day (Washington, Government Printing Office, 1892), p. 505.

185. California State Mining Bureau, *Report of the State Mineralogist, Vol. XIII, 1895-96* (Sacramento, State Printing Office, 1896), p. 46.

186. Edward Thorpe, *Dictionary of Applied Chemistry* (Rev. ed., 1912), Vol. I, p. 508, quoted in Gale, "Salt, Borax, and Potash in Saline Valley," in U. S. Department of the Interior, Geological Survey, Bulletin No. 540, p. 421.

fact that the richer ore of borax known as colemanite has now displaced the material derived from dry lake deposits," such as that in Saline Valley, he "supposed that the richer borate-bearing portions of the salt crust have been largely worked over and exhausted."[187]

Today five shallow rock-lined basins of varying sizes are present at the site of the borax works on the east side of the Saline Valley road. These features were probably crystallizing tanks and may have been lined with wood. Stone walls define the front of a large foundation on the west side of the road. This feature displays a trench down the middle and stone-lined troughs perpendicular to it on both sides. Several vertical pipes and wooden posts extend above the top of the foundation. It appears as though compost is eroding out of the back of this salt-encrusted mound. This structure appears to have housed the dissolving tanks. Nearby are the remnants of a smaller rectangular stone structure approximately 2 meters high. This structure may have supported the boilers for the borax operation. Other mining features may be seen at the site, as well as concentrations of weathered lumber and scattered trash. The area to the south is characterized by slag and other evidences of burning.[188]

There are no records of borax operations at the Conn and Trudo site after 1907. In August 1921, however, reports by two Big Pine promoters of "another big colemanite strike" in Saline Valley drew prospectors to the area. The alleged strike, which occurred about one-quarter mile from Warm Spring, consisted of "little crystalline veinlets of lime and silica along the contact between limestone and lava." Samples were taken to Big Pine for testing by a chemist, the results of which showed they were poor grade. Thereafter, enthusiasm for the alleged "strike" waned rapidly.[189]

Other Mining Operations in the Saline Valley Region. During the 1880s, copper deposits were discovered on the east side of Saline Valley. Albert Bierstadt, a well-known artist from New York, spent considerable money in initial development of the deposits. Transportation difficulties and the remote location of the discovery, however, prevented extensive development, and little activity occurred in the area for nearly two decades.[190]

On October 19, 1906, the *Inyo Independent* reported that there was "a big rush on to the copper camps in Saline Valley." "Prospectors by the hundred" were "flocking in from Big Pine, Keeler and Rhyolite" to make "thousands of locations" "covering the entire mineral belt." The article continued:

> . . . .Of course most of this locating is done with the hope that capital will become interested and a market will be made for any kind of claim that can be staked. It

187. Gale, "Salt, Borax, and Potash in Saline Valley," in U. S. Department of the Interior, Geological Survey, Bulletin No. 540, pp. 420-21. By 1903 the Conn and Trudo Borax Works consisted of four buildings. "Survey Plan," Prepared for Saline Valley Salt Company by William Dixon, Licensed Surveyor, December 31, 1903, Cultural Resource Files, Resource Management Division, Death Valley National Park.

188. Berg and Crowley, Draft, "Notes on Selected Historical Sites in the Saline Valley."

189. Gower, *50 Years in Death Valley — Memoirs of a Borax*, pp. 80-81.

190. Charles Mulholland, *Inyo County: Its Lands, Water, Soil, Climate, Mines, Scenery and Other Resources* (Los Angeles, Times-Mirror Printing and Binding House, 1893), p. 29.

> is not so much a matter of prospecting as it is locating. Out of it all, however, there is the prospect that capital will take the camp up and develop a great district.[191]

In the aforementioned *Agricultural and Industrial Survey of Inyo County* in 1917, Thalia Weed Newcomb stated that many "silver-lead, zinc, copper and gold prospects" had been discovered in the Saline Valley region, some "of them promising rich returns if the ore were brought out." The survey predicted that operators of some of these claims would "probably take advantage of the means afforded by the [salt] tramway, to convey their ore to the smelters and railroad." In many instances the Owens Valley Salt Company, according to Newcomb, had "been a large purchaser of ore and conveyed it out over their tram line."[192]

Two of the mines referred to by Newcomb included the Daisy, a lead-silver mine located on the east flank of the Inyo Mountains overlooking Saline Valley, and the Blue Jay, a copper and silver mine on the east side of Saline Valley. Owned by the Hercules Mining Company of Wallace, Idaho, the Daisy was under development during 1915-16. Using hand drills, four men had sunk a shaft on a vein to a depth of 100 feet. Several prospect tunnels had been driven on the vein, which could be traced along the surface for several thousand feet. By 1916 development work at the Blue Jay, which produced 20 tons of ore that yielded 4,000 pounds of copper and 1,199 ounces of silver the previous year, included a tunnel 100 feet in depth, a winze 35 feet deep, and a crosscut 25 feet in length on an outcropping of malachite and chalcocite ore 60 feet wide and 500 feet long.[193]

Copper and lead mines were also developed in the Nelson Range, lying between Saline Valley on the north and Lee Flat on the south, during this period. The Anton and Pobst Mine was reported to have produced 400 tons of ore, containing 82,000 pounds of copper, in 1916. The Copper Queen-Lucky Boy Mine also produced copper, while the Cerrusite Mine, located between the two copper properties, produced lead.[194]

In the Lee Flat area the Lee Mine (also known as the Emigrant Mine), which had produced lead ore rich in silver during the early 1880s, was reopened in 1916 under lease from its owners, Dr. I. J. Woodin and William Skinner of Independence, to J. R. Le Cyr of Lone Pine. Le Cyr put two men to work on a zinc deposit exposed in old workings.[195]

During this period the Monarch Mine, located on the northern flank of Hunter Mountain, was developed, and a small production of tungsten from huebernite was reported in 1915. The mine developed a 2-inch by 6-inch quartz vein with six partly or wholly caved shafts

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191. *Inyo Independent*, October 19, 1906.

192. Newcomb, "Agricultural and Industrial Survey of Inyo County," June - July 1917, p. 98.

193. Clarence A. Waring and Emile Huguenin, "Inyo County," in California State Mining Bureau, *Report XV of the State Mineralogist, Mines and Mineral Resources of Portions of California* (Sacramento, State Printing Office, 1919), pp. 71, 94, and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, p. 83.

194. State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, p. 73.

195. Waring and Huguenin, "Inyo County," pp. 99-100.

with crosscuts over a strike length of 2,500 feet. Evidence at the site, however, indicates that this mine probably supported earlier high-grade silver production by Mexicans during the 1860s and 1870s. Three arrastas and a crude retort exist at Spanish Spring about one mile from the mine, and U. S. Bureau of Mines sampling has determined silver mineralization (tetrahedrite) assaying 101 ounces of silver per ton and 0.10 ounces of gold per ton as coming from a selected dump sample.[196]

Among the more significant mines to be developed in the Saline Valley region between World Wars I and II were the Big Silver (Essex), Monster (Blue Monster), Bunker Hill, and Waucoba Tungsten. In 1926 the Big Silver Mining Company, owned by Chicago mining interests who were represented by A. G. Kirby of Darwin, initiated development work on the Big Silver (Essex) Mine on the west edge of Saline Valley on the eastern slopes of the Inyo Mountains at an elevation between 1,600 and 3,000 feet. The mine consisted of two groups of claims known as the Essex and the Hudson, each group having five claims. The mining operations covered some 200 acres located within one-fourth mile of the salt tram. A number of tunnels were driven into the different veins at various elevations. Ore mined from one vein provided "500 sacks, which by sorting" was said to "average 200 ounces in silver per ton."[197] By 1938 the Big Silver Mine was owned by the Saline Valley Mining Company, a Los Angeles-based firm, and it consisted of three tunnels, the longest being 240 feet.[198]

Discovered prior to 1907, the Monster (Blue Monster) Mine, consisting of six claims on the east slope of the Inyo Mountains at the northwest edge of Saline Valley, operated from 1907 to 1911, producing lead-silver ore that was valued at more than $100 per ton. The mine was leased by its owner, Dr. John MacLean of Los Angeles, in 1935, and the leasers shipped 50 tons of ore to the U.S. Smelting, Refining and Mining Company's smelter at Midvale, Utah. The Bunker Hill, located to the north of the Blue Monster, shipped ore during the late 1920s and 1930s that was from 30 to 60 percent lead, 33 ounces of silver per ton, and 0.10 ounce of gold per ton.[199]

Located during the 1880s as a copper prospect, the Waucoba Tungsten Mine was operated during 1939-42 by J. L. Danziger of Glendale, California, for its owners, Stuart Bedell and Clyde McBride of Big Pine. Consisting of two claims on the east slope of the Inyo Mountains 3 miles southwest of Waucoba Spring and some 40 miles over the Waucoba-Saline Valley road from Big Pine, work consisted of a 168-foot shaft and 700 feet of workings. Early milling was conducted by dry concentration, but this process was later replaced by a mill which included a primary crusher, rolls, screen, and two Wilfley concentrating tables in a series. Water was obtained from Waucoba Spring by means of a

196. State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, pp. 76, 89-90, A48. The J. O. Mine area, site of an extensive wollastonite mineralized body, is also located on the northern flank of Hunter Mountain. Total volume of reserves has been estimated to be 18,000,000 tons of ore containing an average of 60 percent wollastonite.

197. California State Mining Bureau, *Chapter of Report XXII of the State Mineralogist, 1926*, pp. 477-78.

198. *Inyo Independent*, March 28, 1925, and Tucker and Sampson, "Mineral Resources of Inyo County, California," p. 428.

199. Tucker and Sampson, "Mineral Resources of Inyo County, California," p. 447, and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, p. 76.

three-mile pipeline, financed by a Reconstruction Finance Corporation loan. Concentrates, which included tungsten trioxide amounts of one-two percent, were sold to the Molybdenum Corporation of America.[200]

Other mines that were discovered in the eastern foothills of the Inyo Mountains prior to 1907 included the Scheelite (tungsten and copper) at the western edge of Eureka Valley, and the Opal (lead and silver) west of Jackass Flats. The Scheelite was credited with 400 pounds tungsten averaging 40 percent sheelite in 1906. The Victor Consolidated mine, located at the northwest edge of Eureka Valley as a gold prospect in 1909, was patented in 1912, and was later operated as a talc mine. The Loretto Mine, a copper deposit west of the Victor Consolidated that was developed by Schwab and Associates with an 1,800-foot shaft during 1907-15, was patented in 1922 and was reactivated in 1975-77 by the Bristlecone Copper Company as an open pit operation. Silver and lead quartz veins at the Lee, Del, August, Ruby Port, Emma, Hillside, and Morning Star prospects in the Whipporwill Flats-Jackass Flats area north of Saline Valley were prospected probably before 1900. Minor production, amounting to 17 tons averaging 13.5 percent lead and 4-5 ounces of silver per ton, was recorded in 1968 from the Morning Star.[201]

The Lee Mine in the Lee Flat area also underwent further development during the period from the mid-1920s to the late 1930s. By 1926 the mine, consisting of six claims, was developed by a number of shafts and open cuts, the deepest shaft being 80 feet, and by an open stope to a depth of about 80 feet. The dumps from these old workings were reported to carry 22 ounces in silver per ton. The lessees, B. F. Shively and A. E. Beauregard of Laws, operated a Stebbins dry concentrator on ore from the dumps and old fills. The concentrates were reported to carry 100 ounces in silver per ton with 20 percent lead. By 1937 the mine had been developed by some 1,000 feet of underground workings. That year, 250 tons of ore, having a net value of $49 per ton in silver, had been shipped from the site.[202]

In addition to the aforementioned mines a manganese prospect was also discovered near Upper Warm Spring in Saline Valley on the eve of World War II. Claims were filed on the manganese deposit in Saline Valley by P. I. Dolley, a Lone Pine resident and president of the Pacific Alkali Company, in 1941. The deposit, known originally as the Saline Valley Claims and now known as the Black Diamond prospect, assayed at 20-30 percent manganese and 0.24-0.63 percent tunsten trioxide. There is no record of development or production from these claims.[203]

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200. Norman and Stewart, "Mines and Mineral Resources of Inyo County," pp. 96-97.

201. U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-560, *Mineral Resources and Mineral Resource Potential of the Saline Valley and Lower Saline Wilderness Study Areas, Inyo County, California*, by Chester T. Wrucke, Sherman P. Marsh, Gary L. Raines, R. Scott Werschky, Richard J. Blakely, and Donald B. Hoover, U. S. Geological Survey, and Edward L. McHugh, Clayton M. Rumsey, Richard S. Gaps, and J. Douglas Causey, U. S. Bureau of Mines, 1984, p. 3, and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, pp. 67-68, 71.

202. Tucker, "Los Angeles Field Division," "Inyo County," p. 488, and Tucker and Sampson, "Mineral Resources of Inyo County," p. 443.

203. ibid., p. 192, and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, p. 75.

Placer gold was discovered north of Saline Valley in Marble Canyon (between Cowhorn Valley on the north and Jackass Flats on the south) during the early 1900s. Substantial development of the placers did not begin, however, until 1934, when unemployment and devaluation of the American dollar resulting from the Great Depression renewed interest in the search for gold. A small mining rush occurred that year when J. C. Lewis "rediscovered" coarse gold in the gulches of Marble Canyon. By 1938 approximately 20 men were working placer gold mines in the area, recovering gold by dry washing. One gold nugget worth $300 was found at the Bedell group of mines, and all of the mines reported recovering nuggets ranging in value from $3 to $20. Although production was mostly unrecorded, at least 329 ounces of gold and 22 ounces of silver were recovered from more than 7,300 cubic yards of gravel between 1936 and 1960. The principal drawback to operation of these claims, however, was the lack of water. Operation of some Marble Canyon mines was renewed after World War II, and at least one mine, the Easy Pickings, was active as late as the early 1960s. Several placer mines in Marble Canyon were prospected during the mid-1980s.

The source of the placer gold values in Marble Canyon is an ancient stream channel some 200 feet in width and 9 miles in length running in an east-west direction at an altitude of about 7,000 feet. The miners sank approximately 20 shafts through this channel until they hit bedrock, usually some 70 to 115 feet in depth. The gold was likely washed down from the Magpie or Blue Bell veins located 3 miles south-southwest in the Inyo Mountains.[204]

In August 1955 California's Mineral Information Service published a survey of mining operations in the Saline Valley region. The survey stated that mines in the area had "yielded commercial quantities of copper, gold, lead-silver-zinc, tungsten, asbestos (tremolite), and talc." Deposits which might be "potentially productive" included "chrysotile asbestos, nepheline syenite, and many metalliferous ore prospects." After noting that the Ubehebe and Lippincott mines had been the chief producers of lead-silver-zinc in the region, the survey noted that the Lee Mine, although not as extensively developed, was notable for the high silver content of its ore. Copper deposits in the region had a total recorded production of at least 120,000 pounds. Minor amounts of tungsten had been produced in the area, but tactite, the common host rock for tungsten, was widespread. Of the deposits of non-metallic minerals in the area, however, only those containing tremolite asbestos were active. Several hundred tons of this material, used chiefly as a filler in plaster, had been mined for several years by Huntley Industrial Minerals from an area northeast of Burro Spring.

According to the 1955 survey, relatively undeveloped but possibly important reserves of high-quality talc existed in the vicinity of Goldbelt Spring. Three of the deposits — the Ubehebe, Gold Belt, and White Horse — had been seriously worked, first during World War II and later during 1951-53. Although the proven reserves were small, the characteristic irregularity of the steatite deposits made it difficult to develop them. The talc operations were inactive mainly because the steatite demand was supplied by deposits closer to milling facilities, and the more distant deposits were being held in reserve.

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204. Tucker and Sampson, "Mineral Resources of Inyo County, California," pp. 407-11; Vredenburgh, Shumway, and Hartill, *Desert Fever*, p. 253; Samuel B. Jackson, *200 Trails to Gold* (Garden City, New York, Doubleday & Company, Inc., 1976), pp. 106-07; State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, p. 53; and Robertson, "Our Waucoba Adventure," pp. 30-31.

The survey noted that three mines along the east flank of the Inyo Mountains on the western edge of Saline Valley provided significant amounts of high-quality steatite grade talc by the mid-1950s. Access to these mines was via the Saline Valley road. The Bonham (White Mountain) Mine, which ranked second in California as a source of high-quality steatite, had yielded several tens of thousands of tons. The White Eagle Mine in the vicinity of Willow Creek, whose reserves were measurable in tens of thousands of tons, was first brought into production in 1941 and had produced some 3,000 to 4,000 tons by the early 1950s and remained active. The Willow Creek Mine, located on the south side of Willow Creek Canyon on the east slope of the Inyos, had produced about 1,000 tons, obtained mostly during 1941-42. Other talc deposits that contained significant unmined tonnages, but which were being held in reserve, included the Saline Valley and Grey Eagle (Eleanor), the latter being located just south of the White Eagle.

The survey also stated that lead-silver-zinc deposits, such as those at the Big Silver, Bunker Hill, and Monster mines on the eastern slopes of the Inyos, had been explored extensively. The Santa Rosa Mine, located north of the Talc City Hills in the southern Inyo Mountains to the west of Lee Flat and the Darwin Plateau, was the eighth largest lead producer in the state. From the time of its discovery in 1910 until 1950, the mine was credited with a production of 36,854 tons of ore containing 11,990,792 pounds of lead, 487,347 pounds of copper, 4,105 pounds of zinc, 426,543 ounces of silver, and 478.7 ounces of gold. In addition an 1,800-foot westerly trending crosscut adit had been driven in 1953 to explore and develop known veins at greater depth.[205]

By the mid-1980s the two largest talc-producing operations in the Saline Valley region were the Nikolaus-Eureka and the Harlis-Broady mines in Eureka Valley. Intermittent operation of the former from 1945 to 1970 produced about 75,000 tons of talc for use in cosmetics and pharmaceuticals. The Harlis-Broady produced 31 tons of talc in 1957.[206]

Individual prospectors also continued to look for elusive mineral treasures in the Saline Valley area. During the early 1960s, for instance, a lone prospector named Rowan operated along the east slope of the Inyo Mountains from his "Vega Camp" located near the spring at the mouth of Hunter Canyon on the west side of the valley. Rowan, who welcomed visitors at his little oasis home by the pool adjacent to the spring, posted a hand-lettered sign along the Saline Valley road, asking travelers not to shoot his burros.[207]

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205. State of California, Department of Natural Resources, Mineral Information Service, "Saline Valley Area, Inyo County," pp. 1-5; Norman and Stewart, "Mines and Mineral Resources of Inyo County," pp. 79-80; State of California, Department of Natural Resources, Division of Mines, Special Report No. 51, pp. 53-55; and Gary Richardson, Researcher to Louis A. Boll, District Manager, Bureau of Land Management, August 29, 1973, "Saline Valley/Salt Company — Salt Tram," Subject History Files, Eastern California Museum, Independence. By 1979 the White Eagle and the Grey Eagle mines had a combined production of some 50,000 tons of high-grade talc, the majority of the production coming from the White Eagle. The White Eagle was the only active talc operation in the area by 1988, producing some 2,000 to 3,000 tons a year for use in cosmetic and ceramic tile manufacture. The Snowflake Mine, near the Grey Eagle, was discovered in the 1890s and was worked intermittently. In 1984 the mine reportedly produced 5,000 tons of talc on a custom basis. U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-560, pp. 14-15, and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, pp. 55, 89, 92.

206. U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-560, pp. 14-15.

207. Dorothy Robertson, "At the End of A Back Country Trail," *Westways* (April 1961), pp. 16-17, and ibid., "Three Pools in the Desert," *Desert Magazine* (February 1965), p. 29

Crater

California's largest sulphur deposits are located in the Crater area in Hanging Rock Canyon on the western slopes of the Last Chance Range east of Eureka Valley. By the mid-1950s the deposits yielded almost one-third of the state's total sulphur production. Although the Crater Mine property is located in a "keyhole" area carved out of the northern tip of the lands that were added to Death Valley National Monument in 1994, some of its associated processing operations are located within the new park boundaries.[208]

The Crater sulphur deposits were first discovered in 1917 and were located by Frank Hicks and his brother Dan early in 1924. The men opened up an estimated 150,000 tons of 99 percent pure brimstone before selling the property to Woolworth dimestore millionaire Fred M. Kirby in the spring of 1928. The Crater sulphur deposits lay in a mineralized area 3 miles long and 1 mile wide. A bedded deposit 16 to 30 feet thick contained ore values ranging from 30 to 80 percent sulphur. Based on mining surveys, the estimated reserves of the deposits in 1938 showed more than 1,000,000 tons of ore containing at least 40 percent sulphur.[209]

Kirby established the Pacific Sulphur Company of New York in June 1928. To reach the remote Crater area, the company bulldozed a 12-mile road (commonly referred to as the Big Pine Road) to the mine from a point 2 miles southwest of the junction of the Zurich-Oasis and Big Pine-Willow Springs-Lida roads at the eastern border of Eureka Valley. The company established the small Crater camp, consisting of a half dozen buildings and several dozen miners, and began blocking out ore. Six claims, known as the Crater Group, were developed in 1929-30, with the completion of several shafts and a large open pit. This company produced approximately 12,000 tons of sulphur before suspending operations in December 1930. During the fall of 1932, W. H. Sanger and Morris Albertoli of Big Pine leased the mine and started trucking out an average of 10 tons of sulphur per day. In 1934 Western Sulphur Industries reportedly shipped 4,500 tons of 96 percent sulphur. In August 1936 Sulphur Diggers Inc. obtained a lease on the Crater Group, operating the mines until September 1937. Mercury retorts (remnants of a mercury retort are located on the north side of Big Pine Road in Hanging Rock Canyon on lands added to Death Valley National Monument in 1994) were installed at the mine, and some 5,000 tons of 96 percent sulphur ore and some refined sulphur were produced.

The Western Mining Company took over operation of the Crater Group in 1938 and constructed a new 100-ton retort. Using open pit methods, the company concentrated its operations on an exposure of 10,000 tons of sulphur on the Crater Number Six Claim. A 125-horsepower boiler provided steam for the retorts that consumed 3,250 gallons of water each day. Fifteen men were employed at the mine, while 15 worked at the retort. An explosion destroyed the retort in late 1941, and operations at the mine ceased in August 1942.

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208. Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 256-57, and Lenton, "Sulphur Deposits of Inyo County, California," pp. 563-90.

209. Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," pp. 112-13, and Lingenfelter, *Death Valley & The Amargosa*, p. 407.

Adjoining the Crater Group on the south were the Fraction and Southwest Sulphur claims, comprising an 18-acre area on which a 6- to 12-foot sulphur vein was developed by the Italio Sulphur Industries Company during the late 1930s. The sulphur was trucked to three stone compartment ovens that produced sulphur in 175-pound cakes having 99.5 percent purity. Farther south, the Gulch Group included 10 claims located originally by James Jacoby in 1918. One-half of the 20-foot-wide sulphur vein on this property consisted of massive crystalline sulphur that was 90 percent pure. Production from the Gulch Group is listed at 3,700 "long" tons of crude ore. Some sulphur was mined from an open cut in this group in 1955 for use as an agricultural mineral. Although the richness and extent of the sulphur reserves in this area have been proven, their isolation and distance from an adequate water supply for milling operations have discouraged extensive development.[210]

By the mid-1950s the Crater Camp, as it came to be called, consisted of about a half dozen buildings, and the mining activities were operated by the United Sulphur Company, a subsidiary of Allied Chemical of Houston, Texas. In 1962 Inyo County completed a new road, graded but unpaved, from a point 18 miles east of Big Pine to the northern part of Death Valley National Monument near Ubehebe Crater. The new road passed near the Crater Camp and thus provided a more direct route to the isolated mining area from both Owens and Death valleys. The new road passed through Cowhorn Valley, skirted Saline Valley and the Waucoba country, pierced the Saline Range, crossed Eureka Valley, and climbed the Last Chance Range, before dropping down into the northern part of the national monument.[211]

Mining operations at the Crater Group were conducted by the Inyo Soil Sulfur Company during 1963-67 and Magma-Minerals, Inc. during 1968-69. It is estimated that the equivalent of more than 50,000 tons of 100 percent sulphur were produced in the Crater area up to 1945. Since that time, mining operations have yielded only a few thousand tons of 25-40 percent sulphur for use as a soil aid. By 1986 the main pit on the Crater claims, which contain the remains of the old plant, had been enlarged to some 200 feet (north-south) by 500 feet (east-west) and approximately 50-60 feet in depth.[212]

Although mercury prospects have been discovered at numerous places in the Last Chance Range, the most prominent mercury (cinnabar) deposit in the area was discovered in 1966 at the El Capitan, some 2 miles north of the Crater Mine. Production from the El Capitan and general exploration of other mercury deposits in the area took place in the late 1960s when mercury prices were high ($536 per flask in 1968). After producing 3,400 flasks of

210. Lingenfelter, *Death Valley & The Amargosa*, p. 407; Tucker and Sampson, "Mineral Resources of Inyo County, California," pp. 490-91; Norman and Stewart, "Mines and Mineral Resources of Inyo County, California," pp. 112-13; and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, pp. 87-88.

211. Russ Leadabrand, "Let's Explore a Byway ... A New Road into Death Valley," *Westways*, (April 1963), pp. 22-25.

212. Mary Frances Strong, "Crater Camp," pp. 12-13, "Death Valley," Vertical Reference Files, Inyo County Library, Independence, and State of California, Department of Conservation, Division of Mines and Geology, DMG Open-File Report No. 88-2, pp. 54, 87-88.

mercury from the property during 1967-70, the El Capitan Mercury Company terminated operations in 1971 when prices dropped to $292 per flask.[213]

Shoshone

During the post-World War II era, a light to dark greenish gray color of perlite was discovered on the east side of the Dublin Hills, 2 miles west of Shoshone and just outside the southeast boundary of the lands added to Death Valley National Monument in 1994. Perlite is a volcanic glass used as a filler for plaster, rubber, and paint, an abrasive in soaps and cleansers, an insecticide carrier in filters, and a soil conditioner. In 1948 21 lode claims, known as the Shoshone Perlite Deposit, were leased to Perlite Industries, Inc., a Los Angeles based mining firm, for development. At the time, the claims were owned by Ed Grimshaw of Tecopa and A. W. Stalker and Walter Davis of Shoshone.[214]

Owlshead Mountains

The Owlshead Mountains are located in northern San Bernardino and southern Inyo counties in the southwest corner of the lands added to Death Valley National Monument in 1994. A large low-grade manganese deposit, about one mile north of Owl Hole Spring, was discovered by Alex Yeoman in February 1910, but the rock would not pay to ship until metal prices escalated after the beginning of World War I. Yeoman opened the lode, dubbed the Owls Head Mine (sometimes referred to as the Owl Hole Mine), constructed a new road across the south end of Death Valley to Riggs Station on the Tonopah and Tidewater Railroad, and started hauling out ore in the spring of 1915 with two caterpillar tractors. Even at boom prices, however, the mine was a marginal operation, the ore averaging only $35 a ton. The mine was optioned to an Ohio steel man, Samuel Mollet, in 1916, but the transaction soon ended in litigation that closed the mine until the spring of 1918. Yeoman resumed work only briefly before declining metal prices forced him to suspend operations. In all the Owls Head Mine had shipped about 3,000 tons of ore, averaging 45 percent manganese. During World War II, the mine became an important producer as more than 12,000 tons of ore, averaging 20 percent manganese, was mined between 1941 and 1946. Additional tonnage resulted from mining operations that continued until the fall of 1950.[215]

Manganese and iron lode claims in the area north of Owl Hole Spring and southeast of the Owls Head Mine were located (and periodically relocated or restaked) during times of favorable metals prices and particularly during the federal government's stockpiling programs during World War II and the post-Korean War period. The Black Magic Mine

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213. U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-560, pp. 4, 13-14.

214. Norman and Stewart, "Mines and Mineral Resources of Inyo County," pp. 103-04, 106, and Vredenburgh, Shumway, and Hartill, *Desert Fever*, p. 257.

215. Vredenburgh, Shumway, and Hartill, *Desert Fever*, p. 68; H. E. Cloudman, E. Huguenin, and F. J. H. Merrill, "San Bernardino County," in California State Mining Bureau, *Report XV of the State Mineralogist, Mines and Mineral Resources of Portions of California* (Sacramento, State Printing Office, 1919), pp. 822-23; L. A. Wright, *et al.*, "Mines and Mineral Deposits of San Bernardino County, California," *California Journal of Mines and Geology*, XLIX (January-April 1953), pp. 119-20; and Lingenfelter, *Death Valley & The Amargosa*, p. 415.

recorded a production of more than 300 "short" tons of manganese ore averaging 34.8 percent manganese in 1942, and small shipments were made in 1953, 1954, and 1957. An air concentrator, now removed, was installed at the mine in 1958, although it is unlikely that concentrates were shipped. The New Deal Mine produced about 4,000 tons of ore between 1916 and 1956 that averaged from 19 to 43 percent manganese. By 1978 the Elie Iron Mine had produced some 250,000 tons of ferruginous material, and during 1981-82 its production was approximately 7,000 tons. On the west side of the Owlshead Mountains, the Kennedy Boys Lead Mine had been developed by 1984, tapping a vein that contained 19,000 tons of ore, averaging 2.6 percent zinc, 2.3 percent lead, 0.29 percent copper, 0.3 ounces of silver per ton, and traces of gold.[216]

By far the most widely publicized of all the ill-fated salt ventures in the Death Valley region was an epsom salt mine located in the low, lavender Crystal Hills south-southeast of the old borax road in Wingate Pass and to the west of the Owlshead Mountains (within the boundary of the lands added to Death Valley National Monument in 1994). The salt deposit was discovered during the fall of 1917 by Jasper Stanley and two other amateur prospectors from Los Angeles, who found alum — potassium aluminum sulfate — and staked nine placer claims that they called the Aluminum group. It was not until the summer of 1919, however, that an acquaintance of Stanley, Thomas H. Wright, found that the deposit was actually richer in magnesium sulfate, or epsom salt, commonly used as a bath salt and a laxative. Wright, a Los Angeles florist, purchased a controlling interest in the claims, organized the grand-sounding American Magnesium Company, and began selling shares. A railroad to the deposit appeared to be the only economical means to develop the discovery. The high cost of roadbed grading, however, persuaded Wright to adopt a monorail system. Work began on the monorail in the fall of 1922, beginning at Magnesium siding on the Trona Railroad, 6 miles south of Trona in Searles Valley. From there the rail ran east across the south end of Searles Lake, up torturous Layton Canyon and over the Slate Range, northeast across the tip of Panamint Valley, through Wingate Pass, and down the wash to the salt deposit at Crystal Camp. The 28-mile monorail was a single steel rail spiked to a 6-inch by 8-inch riding beam supported on an A-frame trestle about 3 feet high. The specially-designed locomotives and cars ran on two wheels, like motorcycles, with steel outriggers hanging down both sides to form another A-frame. They rode like pack saddles astride the track with carefully balanced cargo strapped low on both sides. Rollers mounted under the outriggers ran on wooden guide rails tacked to the sides of the trestle to help stabilize the swaying cars as they skimmed just inches above the ground. Construction of the creative transportation link took almost two years and cost roughly $200,000.

When an engineer made the 28-mile trip with a full load of salt in one hour shortly after the line opened, the Epsom Salts Line was heralded as the "fastest moving monorail in the world." During the next two years, Wright's American Magnesium Company produced a small tonnage of hydrated magnesium sulfate that was shipped over the monorail to Magnesium siding and on to Wilmington near Los Angeles Harbor for refining.

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216. U. S. Department of the Interior, Geological Survey, Open-File Report No. 84-755, *Mineral Resources and Resource Potential of the Owlshead Mountains Wilderness Study Area, San Bernardino County, California,"* by Richard D. Koch and Jay A. Ach, U. S. Geological Survey, and Arel B. McMahan, William L. Rice, and Michael Sokaski, U. S. Bureau of Mines, 1984, pp. 7-8, 11-14.

By the summer of 1925, however, the epsom salt mining operations began to decline. The ore being shipped to Wilmington contained 50 percent waste rock, and operation of the monorail suffered from track warpage, cloudbursts and washouts, and poor locomotive design. After hauling out and refining nearly 1,000 tons of crude salt at a cost of approximately $20 a ton during the fall of 1927, the mining operations closed during the winter. Some 10 years later, the single rail and timbers were removed for scrap. During the 1940s, portions of the epsom salt deposit, as well as the monorail line, were incorporated within the lands of the U.S. Naval Air Weapons Station at China Lake.[217]

CURRENT STATUS OF MINING IN THE NEW LANDS

The boundaries of the lands added to Death Valley National Monument in 1994 were drawn to exclude virtually all active mining operations and most significant mineable mineral reserves. For instance, Title III, Section 308 of the California Desert Protection Act provided for a boundary adjustment to exclude the Porter Mine, an active operation in the west Panamints. Thus, the new lands generally contain only the remnants of small or modest inactive mining sites. Title III, Section 305 of the California Desert Protection Act of 1994 provides the basis for the withdrawal from all forms of mineral location and development of lands added to the park. This section states:

> Subject to valid existing rights, all Federal lands within the park are hereby withdrawn from all forms of entry, appropriations, or disposal under the public land laws; from location, entry, and patent under the United States mining laws; and from disposition under all laws pertaining to mineral and geothermal leasing, and mineral materials, and all amendments thereto.

At the present time, the National Park Service computerized list of mining claims in lands added to the park in 1994 enumerates the claims by section only, meaning that in some cases the list includes claims both inside and outside the new lands. Thus, the Park Service does not know the precise number of new claims it has in the new lands. Further work in mapping and "ground-truthing" of the claims on the list is necessary to develop a comprehensive and all-inclusive list of these properties.

Currently, only two claimants have filed proposed plans for mining operations in the new lands. One proposal has been submitted by the D & S Mining Company to resume underground mining in the idle Rainbow Talc Mine covered by six lode claims (Death Valley BB&J Claims) in the Saddle Peak Hills in the southeastern corner of the new lands. The other proposal is for a small operation on the J. O. Mine wollastinite claims on the northern flank of Hunter Mountain on the west side of the new lands.[218]

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217. Lingenfelter, *Death Valley & The Amargosa*, pp. 399-403; Vredenburgh, Shumway, and Hartill, *Desert Fever*, pp. 257-58; Myrick, *Railroads of Nevada and Eastern California*, Vol. II, pp. 809-14; and Richard H. Jahns, "The Epsom Salts Line — Monorail to Nowhere," Reprint from *Engineering and Science Monthly*, April 1951, Published by the California Institute of Technology, Silver Boxes, "Transportation," Research Library, Death Valley National Park.

218. Personal interviews with Mel Essington, Death Valley National Park mining engineer and GIS coordinator, January 29-30, 1997.

RECOMMENDATIONS FOR NATIONAL REGISTER OF HISTORIC PLACES EVALUATION STUDY

At the present time, the only historic mining property in the new lands that is listed on the National Register of Historic Places is the Saline Valley Salt Tram Historic Structure. This historic property (portions of which lie in the new lands) was listed on the National Register on December 31, 1974, because of its significance under Criteria A (properties associated with events that have made a significant contribution to the broad patterns of American history) and C (properties significant as representatives of the manmade expression of technology).

This study includes draft National Register nomination forms for listing of two other historic mining properties in the new lands. These historic properties are Panamint City, the only significant mining camp "ghost town" in the new lands, and the Gem Mine and Mill, a well-preserved example of 1920s/30s-period, small scale, milling technology in Jail Canyon in the west Panamints.

It is recommended that further study and evaluation be given to several other historic mining properties in the new lands for the purpose of nominating them for listing on the National Register. These include the Monarch Mine in the Spanish Spring area on the northern flank of Hunter Mountain, the Black Magic Mine in the Owlshead Mountains, and the Conn and Trudo Borax Works (portions of which lie outside the new lands) in Saline Valley. Further study should also be given to two other historic properties preparatory to a determination as to whether to proceed with future National Register evaluation work. These two properties include a mercury retort on the north side of Big Pine Road in Hanging Rock Canyon near the Crater Mine area and the historic mining trail system in the Grapevine Canyon-Spanish Spring-Hunter Mountain area, portions of which are known to retain a high level of integrity.

It is also recommended that Saline Valley be evaluated for nomination to the National Register as a rural historic landscape, because it appears to meet the criteria for such a designation. National Register Bulletin No. 30, *Guidelines for Evaluating and Documenting Rural Historic Landscapes* defines a rural historic landscape as a "geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention" and "possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features."[219]

RECOMMENDATIONS FOR INVENTORY OF ABANDONED MINING SITES

The existence of numerous historic and recently abandoned mining sites within the lands added to Death Valley National Monument in 1994, and the relationship of those sites to questions of visitor safety, interpretation, recreational use, and resource protection, underlies the need for a comprehensive parkwide policy governing the management of abandoned mineral lands. A program, consisting of documentary research and field

219. Carey Feierabend, "Historic Mine Lands As Cultural Landscapes," in U. S. Department of the Interior, National Park Service, *Death Valley to Deadwood; Kennecott to Cripple Creek*, pp. 24-27.

survey and inventory, should be established to provide the basis for formulation of this management policy so that it reflects an appropriate balance among concerns for visitor use and safety, historic preservation, and interpretation.[220]

220. Ann Huston, "The Survey and Inventory of Mining Properties," and Linda W. Greene, "The Need and Procedures For Inventorying Abandoned Historic Mining Sites," in U. S. Department of the Interior, National Park Service, *Death Valley to Deadwood: Kennecott to Cripple Creek*, pp. 16-19 and 20-23, respectively.

CHAPTER THREE: RANCHING/GRAZING

HISTORICAL OVERVIEW OF RANCHING WITHIN OR NEAR THE NEW LANDS

Ranching Along the Western and Northern Boundaries

In the midst of the Death Valley region — an extensive desert expanse — little oases with rich pockets of ground, could become for a time more profitable bonanzas than most of the surrounding mineral lands. These isolated patches of fertile soil and perennial springs could produce bonanza crops of vegetables and hay, or fatten a small herd of beef cattle, thus providing quick fortunes for the homesteader or rancher as long as the neighboring mining camps boomed. Even a hay ranch could pay startling profits. With as many as eight alfalfa cuttings a year, each acre could produce 10 tons and a modest 40-acre plot could yield as much as $80,000 worth of hay per year — provided there was a mining boom camp nearby. The proximity of ranches and mining camps determined the profitability of both, but ultimately it was the size of the ore pocket that limited the size of the saleable crop, so as the mines went from boom to bust, so did the ranches.[221]

The natural fecundity of watered land in the Death Valley region had long been demonstrated by the Southern Paiute and the Shoshone, who raised abundant crops of corn, beans, melons, and squash around some of the springs and seeps. During the late 1860s, Mormon Charlie, a progressive Paiute, started a stock ranch in Pahrump Valley, across the California-Nevada border east of Death Valley, with animals left to him by the miners at Potosi. Euro-American homesteaders would soon follow.[222]

Andrew Jackson Laswell, a hot-blooded Kentuckian, is generally credited with being Death Valley's first homesteader. Laswell came through Death Valley from Pioche during the summer of 1874 with a partner, Cal Mowrey. They came in the rush to the Panamint mines, although they sought their fortunes not in minerals but in the soil. They struck pay dirt when they received a contract from the Surprise Valley Mill and Water Company to supply hay for about $200 a ton. Later that summer, the two men headed east over the Panamints into Death Valley to start a hay ranch at Bennett's Well. They built a shelter, seeded a field of alfalfa, dug an irrigation ditch, and within several months Laswell packed their first load of hay to Panamint. After a second load was delivered to Panamint, a dispute between the two strong-willed partners over how to divide the proceeds erupted into violence in early December with Laswell shooting Mowrey several times. Although Mowrey recovered, the partnership ended, and Laswell kept the ranch while Mowrey moved on.[223]

Laswell prospered during the Panamint boom and started a second hay ranch on the east side of Death Valley at the mouth of Furnace Creek. As the Panamint mining rush began to decline during the fall of 1875, however, he abandoned his Death Valley ranches and moved east to the foot of the Spring Mountains, east of the Amargosa basin. He

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221. Lingenfelter, *Death Valley & The Amargosa*, p. 162.

222. Smithsonian Institution, Bureau of American Ethnology, Bulletin No. 120, pp. 94-97, 180-84.

223. Lingenfelter, *Death Valley & The Amargosa*, p. 163.

purchased the Paiute rancheria at Indian Springs and made it a popular way station on what had become the main road from Pioche to the Death Valley mining camps. After involvement in several shooting incidents and scrapes with the law at Ash Meadows and Ivanpah, he finally reformed, settling down with his family at Calico in San Bernardino County.[224]

The Panamint boom attracted one other settler to the Death Valley region — William Johnson, a Kentuckian in his early thirties. He started a truck garden in the canyon that now bears his name on the west side of Death Valley some 6 miles east of Panamint City. Moving in on the spring at the Shoshone camp of Pumaitingahi or Puaitungani, Johnson terraced 4 to 5 acres, dug a ditch, and planted a variety of vegetables that eventually brought him several hundred dollars a ton at the boom camp just over the crest of the Panamint Range. In the expectation that Panamint would last, he set out some fruit trees, but the boom was over before they could bloom. Johnson then moved across the Sierra to the Long Tom district in the Kern River Valley, where he became involved in a bitter mining dispute with the Yoakum brothers. As a result, he and a partner were killed in an ambush on April 13, 1878.[225]

At the north end of the Panamints, Ubehebe discoverer William L. Hunter started a seasonal ranch during the early 1870s that would become known as the Hunter Mountain Ranch. Hunter initially established the ranch, which lies within the lands added to Death Valley National Monument in 1994, as a place where he left his pack animals to graze while he attempted to open his copper claims.

A few ranchers also settled in the hills of the Last Chance Range at the far north end of Death Valley during the Lida boom. The most persistent was a Nova Scotian named Charles Murphy, who squatted at Pigeon Spring about 1873 with his aged mother on a little ranch he called the Home Rule. Remaining long after the boom collapsed, he supplemented his meager earnings by working small high-grade pockets in the neighboring mines and selling whiskey to the Indians. The whiskey business soured in 1891, when several of his customers laid siege to his cabin and had to be turned away with a rain of buckshot. Soon after that incident, the authorities arrested him in a crackdown on the liquor trade with the Indians. Rather than risk a prison sentence, Murphy jumped bail, abandoned his ranch and his mother, and fled the area.[226]

During the late 1870s and 1880s, Euro-American, as well as Native American, settlers established new ranches in Death Valley and in areas to the west. Hungry Bill moved onto Johnson's abandoned ranch and replanted the garden. With the help of George Hansen, generally known as "Indian George," and other relatives, he also terraced and irrigated several more acres and set out more peach trees. At the south end of Panamint Valley, Hungry Bill's brother, Panamint Tom, established a ranch at Pabuna near Warm Spring and the mouth of Hall Canyon in Panamint Valley. At the north end of Death Valley, Jacob Staininger, who would become known as the "Hermit of Death Valley," established a new ranch. As a young man in his late twenties, Staininger, along with his brother, had

224. ibid., pp. 163-64.

225. ibid., p. 164.

226. ibid. p. 164.

left his farm home in Pennsylvania and gone west after the Civil War, settling in central Nevada and starting the first ranch in Monitor Valley. But the Stainingers quickly earned a bad reputation, killing a neighbor whom they accused of jumping their land, and then suing the deceased's estate for title to the property. Thereafter, in 1880, the Stainingers brothers went their separate ways, Jacob moving to Death Valley where he started several hay ranches — one near the hot springs in Grapevine Canyon, and the other a few miles west at Grapevine Springs in Death Valley. Hoping for another mining boom, he patented land in Upper Grapevine Canyon under the provisions of the Desert Land Act of 1871. Here he raised mustangs and quail and tended a vineyard of native grapes, while dreaming of the day when his hot springs ranch would become a "famous pleasure resort." He never saw that day, but long after his death his dream came true, when Walter Scott's (Death Valley Scotty) partner, Albert M. Johnson, purchased the ranch and surrounding lands in northern Death Valley during the 1910s to construct Scotty's Castle.[227]

The largest and most profitable ranch in Death Valley, however, was the Greenland Ranch at the mouth of Furnace Creek, started in 1883 as part of the extensive borax operation of William Tell Coleman. Ultimately, this ranching operation would become known as the Furnace Creek Ranch, providing tourist accommodations for park visitors.[228]

Ranching in Owens Valley and Fish Lake Valley

While ranching operations were beginning in Death Valley and areas to the west and north during the last several decades of the 19th century, Euro-American agricultural settlers and stock raisers were also entering Owens Valley to the west of the Inyo Mountains and the Mono Basin to the north of the Inyos and the Last Chance Range. These ranching operations would impact some of the lands added to Death Valley National Monument in 1994, because ranchers would use portions of the lands for livestock grazing.

As miners, lumbermen, and travelers entered Owens Valley and surrounding basins east of the Sierra Nevada, opportunities developed for more permanent types of settlement. Visitors to the region noticed that the area could be used for agriculture and ranching, and the influx of miners and mining-related workmen seemed to assure a market for dairy and beef products and farm produce, as well as the services of craftsmen.

The first recorded Euro-American settlement in present Inyo and Mono counties occurred in Antelope Valley in Mono County in the autumn of 1859, when Hod Raymond drove a herd to feed in the valley. The following year, George W. Parker settled in the Adobe Valley along the commonly traveled road between southern California and the mining

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227. ibid., pp. 171-72, and U. S. Department of the Interior, National Park Service, *Historic Structure Report, Death Valley Scotty Historic District, Main House and Annex, Death Valley Ranch, Death Valley National Monument, California/Nevada*, September 1991, p. 30-31. Historic documents and photographs at Scotty's Castle illustrate Johnson's attempts to acquire land, water rights, and mining properties in northern Death Valley and the Last Chance Range from the 1910s to the early 1930s.

228. Lingenfelter, *Death Valley & The Amargosa*, pp. 173-86, and U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. 1, pp. 934 ff.

strike at Aurora, Nevada. During the summer of 1861, the first Euro-American settlers entered Owens Valley. A cattle-driving party, including A. Van Fleet and Henry Vansickle, moved into the valley from the north in August, scouting lands as far south as the present site of Lone Pine. After seeing no white settlers they returned to the north edge of the valley to construct the first Euro-American dwelling, of sod and stone, near the present site of Laws. About the same time, Charles Putnam constructed a stone cabin on Independence Creek at the present site of Independence to serve as a trading post. During the same period Samuel A. Bishop drove a herd of cattle from Fort Tejon, near the south edge of the San Joaquin Valley, to Owens Valley and started a ranch southwest of the town that today bears his name. In late November 1861 Barton and Alney McGee herded some cattle into the present Lone Pine area from the San Joaquin Valley, constructing the first residence in that vicinity.

Thus, by the end of the first year of Euro-American settlement in Owens Valley, three of the valley's four major town sites had been selected. During the next several years, the fledgling communities became the nuclei of expanding agricultural and stock raising enterprises. Independence, which was for a short time known as "Putnam's" and "Little Pine," gradually grew, aided by the establishment of Camp Independence in 1862. The fort was established to provide a military presence in the valley and thus protect the expanding settlements against attack by the Indians whose ancestral lands were being usurped by Euro-American homesteaders. Thomas Edwards and his family, travelling with a large herd of cattle, moved into the valley in 1863, purchased Putnam's trading post and stone cabin, and laid out the first official town at Independence. Lone Pine prospered with the influx of miners to the region, and the community quickly attracted a multi-ethnic population. In 1862 a group of cattlemen settled on George Creek, south of Independence, to form a rural community. During the 1910s, the orchard town of Manzanar would be established north of George Creek.

These embryonic communities were important because they formed the loci for later settlement in the valley. Thus, the driving force of permanence in the valley, and the solid bedrock on which the valley was to be developed during the next several decades, was the settlement by farmers and ranchers during the early 1860s . The impulse for the rapid increase of farmers and stockmen in the valley was in part due to the drought that afflicted western Californian grazing and agricultural lands from 1862 to 1864. Searching for adequate pasturage for their hungry stock, sheep and cattle raisers from the Central Valley drove their herds into Owens Valley and the Mono Basin. Crossing over Walker Pass, these men drove north through Owens Valley and into lower Mono County. Later, in developing a route that remains in use today, herders would push their stock over Sierra passes in Mono County into the northern part of the Central Valley, and complete their circle of travel for summer pasturage. Some of these stockmen made their permanent homes east of the Sierra, so that by 1870 the Mono County government assessed more than $100,000 worth of resident livestock. Others were so pleased with the pasturage east of the Sierra that they continued making the summer journey on an annual basis, thus providing a steady stream of traffic through the region.[229]

229. Busby, Findlay, and Bard, *A Culture Resource Overview of the Bureau of Land Management Coleville, Bodie, Benton and Owens Valley Planning Units*, pp. 48-50, and Chalfant, *The Story of Inyo*, pp. 139-45, 201-14.

In 1872 Noah T. Piper, son of English immigrants and a native of Michigan who arrived in California in 1855, established the Oasis Ranch north of the Last Chance Range in Fish Lake Valley to provide foodstuffs for the emerging mining camps in the surrounding areas of eastern California and western Nevada. The name "Oasis" was derived from Piper's planting hundreds of cottonwood and black locust trees on his 2,000-acre ranch. Piper befriended Indians in the valley and employed some 30 Euro-American and Native American farmhands on his ranch. The ranch dominated the economy of southeastern Mono County for several decades, and Piper became the area's most influential citizen, serving as Mono County's agricultural commissioner during the 1880s. Although the ranch was primarily a cattle operation, Piper raised vegetables, potatoes, hay, and alfalfa. When mining in the area diminished around the turn of the century, Piper sold the ranch for $100,000 and retired to Los Angeles where he died in 1910.[230]

By the 1880s large cattle operations had been established in the Owens Valley area. The Frank Shaw Land and Cattle Company, reportedly the most extensive cattle ranch in Inyo and Mono counties, was headquartered in Bishop. During the mid-1880s, John W. Lacey, a native of Arkansas who had worked in various Nevada mines, established a large cattle ranch in the vicinity of the former site of Fort Independence. George A. Brown developed a large cattle and sheep ranch in Olancha during the late 19th century, and during the early 20th century Mark Lacey, the oldest son of John, moved to Olancha to establish the Double Circle L Ranch. Starting with 150 to 200 head of short-horned or Durham cattle, Lacey later switched to Herefords, and after 1960 the ranch crossbred the Herefords with Angus, running approximately 1,200 head. This ranch, which would pass through three generations of Lacey ownership and management, acquired grazing permits from the Bureau of Land Management and the U. S. Forest Service for pasturage in the Inyo Mountains, portions of which would be added to Death Valley National Monument in 1994. During the early 1900s, Beveridge Hunter, son of William, homesteaded a ranch in Owens Valley, using the Hunter Mountain area to graze about 1,000 cattle, horses, and burros. Today, Roy and John Hunter, grandson and great-grandson of William, respectively, operate a cattle ranch in Olancha and use the Hunter Mountain area for grazing under permits from the Bureau of Land Management and the National Park Service.[231]

Ranching Along the Eastern Boundaries

Many of the best ranch lands in the Death Valley region were located east of the valley on the Amargosa at Resting Spring, Ash Meadows, and Oasis Valley, and farther east at Pahrump, where more than a dozen ranches were started during the mining booms of the

230. Norwood *et al., Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region*, pp. 138-39. Also see (Draft) Transcribed Oral Interview of Edna Piper by Richard Potashin, January 17, 1995, pp. 1-78, ECM OH 346, Eastern California Museum, Independence.

231. Chapter 183, Southern Inyo American Association of Retired Persons, *Saga of Inyo County*, pp. 116-20; Peter Perkins, *Cowboys of the High Sierra* (Flagstaff, Arizona, Northland Press, 1980), pp. 71-78; (Draft) Transcribed oral interview of Dugan Hansen by Richard Potashin, March 19, 1992, ECM OH 142, Eastern California Museum, Independence; and "Kispert" and "Lacey," Family History Files, Eastern California Museum.

1870s.[232] Charles King was the first of the ranchers to settle on the Amargosa. A Yankee from Maine, he had joined the gold rush to California in 1850. During the next 20 years, he held a number of jobs, including that of ship unloader on San Francisco Bay, merchant in Sacramento, lumberman at Yankee Jim, sheriff in Placer County, and miner in various localities in California and Nevada. During the summer of 1871, he served as a guide with the Wheeler Expedition, using the survey to look over the business prospects of the Death Valley country. With the Ivanpah, Chloride Cliff, and other mines opening in the neighboring hills, he saw a chance for a fortune on the range land at Ash Meadows where amid the scattered ash trees that gave the meadow its name were dozens of perennial springs and seeps that watered thousands of acres of virgin grasslands.[233]

With the financial backing of Pioche mining superintendent Charles Forman, King entered the cattle business, purchasing 1,300 head in southern California and driving them to Ash Meadows in January 1873. He gave the cattle free range, and at the foot of a small butte, he built a stone house at what is now Point of Rocks Spring. Although experiencing some setbacks because of the limited market of the neighboring mines and the deadly toll that alkali, black leg, and occasional Paiute arrows took on his stock, the advent of the Panamint rush provided him with a new market. He began running his cattle across Death Valley to his new butcher establishment at Panamint in 1874. By the spring of 1875, however, King had apparently had his fill of the Death Valley country, and he had learned enough about the cattle business to decide that he should get out before the Panamint boom collapsed. Thus, he sold his half of the partnership to Gold Hill butcher L. T. Fox at boom prices and moved out of the area.[234]

The oases along the Amargosa attracted other settlers, who began arriving even before King left. For instance, Philander and Leander Lee, two brothers in their early twenties, came to the area during the Panamint rush in the winter of 1874-75 with a herd of cattle from the San Joaquin Valley to stake out a spring near King. Taking Paiute wives, the brothers became long-term area ranchers.[235]

Further south in the Amargosa, two brothers, William and Robert Brown, started the first ranch at Resting Spring after discovering silver at Tecopa. The Tecopa mines boomed for several years, providing a market for ranchers along the Amargosa. But the Browns soon moved on, and Philander Lee eventually took over the Resting Spring ranch. During the fall of 1879, Eugene Lander started a ranch in Oasis Valley near the present town of Beatty. When Lander moved several years later, William M. Stockton, nicknamed "Old

232. Claude N. Warren, Martha Knack, and Elizabeth von Till Warren, *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units*, Contract No. YA-512–CT7-225, Bureau of Land Management, Desert Planning Staff, Riverside, California, 1980, pp. 223-31. Ranches were also established in the Lida Valley northeast of Last Chance Canyon and east of Fish Lake Valley during the early 1870s to provide food for mining camps in the area. For further information on Lida Valley ranching see, Myron Angel, *History of Nevada* (Oakland, California, Thompson and West, 1881), pp. 416-25, and Sam P. Davis, ed., *The History of Nevada* (2 vols., Reno, The Elmo Publishing Company, 1913), Vol. II, pp. 847-87.

233. Lingenfelter, *Death Valley & The Amargosa*, pp. 165-66, and Angel, *History of Nevada*, p. 582.

234. Lingenfelter, *Death Valley & The Amargosa*, pp. 166-67, and Angel, *History of Nevada*, p. 604.

235. Lingenfelter, *Death Valley & The Amargosa*, p. 167, and U. S. Department of the Interior, Geological Survey, Water Supply Paper No. 224, pp. 39-40.

Man of the Desert," took over the ranch as a base for his all-consuming quest for the Gunsight Silver and Breyfogle's gold. By the end of the 1870s most of the remaining springs and seeps along the Amargosa had been homesteaded. Among the newcomers were Aaron Winters and his wife, Rosie, who would gain brief fame and fortune with their borax discoveries in Death Valley. Ash Meadows Charlie also expanded his ranch east of Longstreet Spring.[236]

Farther east, Charles Bennett and his family moved next to Tecopa's rancheria at Pahrump Spring in 1875, starting what would become the largest ranch in the entire Death Valley and Amargosa region. Seven years later, Bennett sold the ranch to Aaron Winters, who had made a considerable sum from the recent sale of his Death Valley borax claims. Mormon Charlie's pioneer ranch to the east was taken over by the Jordan brothers in 1876 and sold to Joseph Yount and his family early the following year. The Younts, who were wintering a herd of cattle at Ash Meadows en route from eastern Oregon to Arizona, suddenly decided to stay when a Paiute renegade, Horseshutem, shot all their draft horses near the springs that now bears his name. With their son-in-law, Harsha White, the Younts spent most of their lives on that ranch, known as the Manse, before selling it in 1910.[237]

With the decline of the Ivanpah and Tecopa mines in the early 1880s, about half the ranchers on the Amargosa were forced to move on for lack of a market. However, several new settlers arrived in the area to try their luck. Among them was John Howell, the first black settler in the region, who took up a ranch in Oasis Valley in 1895, and Ah Foo, who farmed for a few years on Willow Creek, at what has since been known as the China Ranch.[238]

The most notable of the later settlers, however, were Montillion Murray Beatty, a former Gold Mountain miner and Amargosa borax worker in his late fifties, and Andrew Jackson Longstreet, a hot-blooded Kentuckian who had rustled cattle and operated a saloon in the Mormon settlements on the Muddy River near the Utah line. Beatty took over the original Lander ranch in the spring of 1896 and made his ranch a welcome home to passing travelers. After the Bullfrog mining rush started in the early 1900s, he sold his ranch for $10,000, gave his name to the town, started a new ranch at Cow Creek in Death Valley, and dabbled in mines until his death in 1908. Longstreet settled in Oasis Valley in 1889, but after a few years he moved to a ranch in Ash Meadows near the spring that now bears his name. After involvement in several scrapes with area settlers he left the Amargosa around the turn of the century.[239]

Virtually all the Amargosa ranchers held 160-acre homestead claims, but they were usually able to irrigate only a fraction of that, while their stock ranged free for miles

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236. Lingenfelter, *Death Valley & The Amargosa*, p. 167, and Spears, *Illustrated Sketches*, pp. 58-62.

237. Lingenfelter, *Death Valley & The Amargosa*, pp. 167-68; Spears, *Illustrated Sketches*, pp. 60, 84-86; and U. S. Department of the Interior, Geological Survey, Water Supply Paper No. 224, pp. 91-92.

238. Lingenfelter, *Death Valley & The Amargosa*, p. 168; U. S. Department of the Interior, Geological Survey, Water Supply Paper No. 224, pp. 40-41; and Warren, Knack, and von Till Warren, *A Cultural Resource Overview For The Amargosa-Mojave Basin Planning Units*, pp. 227-28.

239. Lingenfelter, *Death Valley & The Amargosa*, p. 168, and Glasscock, *Gold in Them Hills*, pp. 212-16.

beyond. During the mining booms, they were mostly hay ranchers, with their cultivated acreage in alfalfa, since that paid the biggest return for the least work. Most ranches yielded four cuttings a year, with a yield of about 6 tons an acre worth from $70 to $200 a ton in the camps, depending on the market. Some ranchers also raised barley, which generally sold for about $200 a ton, but yielded only several tons per acre. Most ranches had vegetable gardens that included corn, beans, potatoes, beets, cabbages, onions, squash, and melons. Some ranchers planted small orchards with apples, peaches, pears, figs, plums, apricots, nectarines, almonds, and walnuts. Surplus quantities could usually be sold in the mines at over $200 a ton for vegetables, and more than $500 a ton for fruit and nuts. A few ranchers set out small vineyards and made wine. Joseph Yount had the largest vineyard — 2.5 acres in seven varieties of grapes — and he made a wine that he called Chateau Manse.[240]

All of the ranchers kept some stock, but except for King, none had even 100 head. Most kept about two dozen cattle, a dozen or so stock horses and mustangs, several work horses, and some hogs. The horses and cattle grazed the open range on bunch- and saltgrass from spring until fall, and were fed hay, barley, or even mesquite beans during the winter. Alkali and locoweed posed continuing problems to the health of the herds.

The size and value of the scattered ranches, generally one to a spring, varied. The smaller hay ranches, worth only a few hundred dollars, were generally two-man operations with little irrigation and all of the cutting and baling done by hand. The largest ranches — Bennett's and Yount's — each had several hundred acres in crops, miles of irrigation ditches and fences, and were highly mechanized and worth $20,000 or more. Bennett was the first to mechanize, buying a "mammoth self-binding harvest machine" in the spring of 1880. He and Yount later brought in a variety of mowing, reaping, and threshing machines for the fields, and fruit cutters, parers, and dryers for the orchard harvest. They employed several permanent ranch hands and a large seasonal crew of Paiute.[241]

Amargosa ranch houses ran the gamut from brush and mud structures to comfortable, thick-walled adobes with wooden floors, shady verandas, and cool cellars. Aaron Winters' house at Ash Meadows, the former King place, was typical of most ranch residences. According to one visitor to the ranch, the house stood

> Close against the hill, one side half-hewn out of the rock, stood a low stone building, with a tule-thatched roof. The single room within was about fifteen feet square. In front was a canvas-covered addition of about the same size. The earth, somewhat cleared of broken rock originally there, served as floor for both rooms. There was a door to the stone structure, and directly opposite this was a fire-place, while a cook-stove stood on a projecting rock at one side of it. At the right was a bed, and at the foot of the bed a few shelves for dishes. A cotton curtain was stretched over some clothing hanging on wooden pegs in the corner. . . .
>
> The water of the spring ran down the hill and formed a pool in front of the house, and here a number of ducks and chickens, with a pig and a big dog,

240. Lingenfelter, *Death Valley & The Amargosa*, pp. 168-69.

241. ibid., p. 169-70.

formed a happy group, a group that rambled about in the house as well as romped beside the water of the spring. A few cattle grazed on the bunch-grass of the valley that stretched away before the house, gray and desolate.[242]

HISTORICAL OVERVIEW OF GRAZING WITHIN OR NEAR THE NEW LANDS

Historical documentation on grazing activities in the lands added to Death Valley National Monument in 1994 is scarce. Appendix XIII of the *California Desert Conservation Area Plan: Final Environmental Impact Statement and Proposed Plan*, prepared by the Bureau of Land Management in September 1980, contains "A Short History of Grazing in the California Desert Conservation Area." Although this historical sketch is brief, it provides pertinent information regarding grazing activities on the lands added to the park. The following information is a summarized version of the data presented in the appendix.[243]

Livestock grazing in the lands added to Death Valley National Monument in 1994 began during the late 1860s and early 1870s and was first regulated in 1935 under the provisions of the Taylor Grazing Act of 1934. Since passage of that law, grazing management has been an ongoing program administered by federal agencies. Grazing districts were established, defining allotment boundaries, seasons of use, and carrying capacity for "public rangelands." The public rangelands established under the Taylor Grazing Act include all unfenced lands, public and private, within allotment boundaries. Livestock operators were given use of private lands concurrently with public lands because of the difficulties of confining animals to particular areas, unless fenced by the landowner. Outside of public rangelands, grazing occurred at landowner discretion and, as local zoning regulations and ordinances were passed, within any limitations set forth by local jurisdictions.

Fish Lake Valley

Fish Lake Valley, north of the Last Chance Range and Eureka Valley and northeast of Deep Springs Valley (and outside the park boundaries), was probably not extensively utilized as early as some of the more southern grazing areas. Grazing activity occurred during the late 19th century, however, because the Piper Ranch was established by the mid-1870s. After well drilling during the 1930s the range and distribution of cattle in Fish Lake Valley increased. Overgrazing was inevitable, especially during the period when the Lida Livestock Company attempted to control the area by moving cattle into ranges already stocked by other ranches. These attempts (the main idea being to force smaller outfits out of business) placed severe pressure on the range and were particularly prevalent prior to federal government management of grazing. In addition the valley was impacted by numerous bands of sheep that annually passed through the area from the turn of the century until the mid-1930s.

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242. Spears, *Illustrated Sketches*, pp. 56-57.

243. Unless otherwise noted, information for this section is derived from U. S. Department of the Interior, Bureau of Land Management, *The California Desert Conservation Area Plan: Final Environmental Impact Statement and Proposed Plan*, September 1980, Vol. F, Appendix XIII, "Livestock Grazing," pp. 15-28, 109-13.

In 1980 it was estimated that about 600 animals used the valley as winter range, while fewer numbers remained during the summer. Ranchers preferred to graze their animals in the nearby mountain ranges during the summer months to take advantage of the forage. In 1980 range conditions were considered stable as there was sufficient water for irrigation of supplemental forage on private lands.

Eureka Valley

Portions of Eureka Valley, nestled between the Saline Range on the west and the Last Chance Range on the east and to the south of Fish Lake and Deep Springs valleys, were leased for grazing by the Bureau of Land Management in 1980. However, the valley has seen infrequent grazing activity, primarily because the barren expanse lacks sufficient water facilities. Cattle use the northern park of the valley outside the park boundaries only during years of good rainfall and then only as far south as the Big Pine Road.

Deep Springs Valley

Deep Springs Valley, located southwest of Fish Lake Valley and outside the park boundaries, has been used continuously for grazing purposes since the mid-1870s when a rancher by the name of Stewart settled there. In 1980 Deep Springs College leased Bureau of Land Management land in the valley for grazing purposes. Estimates of cattle using the area since the turn of the century range between 300 and 750. At times, severe sub-freezing winter temperatures and significant snow depth have made winter forage use difficult. For instance, many cattle died during severe winters in 1933, 1949, and 1952.

Saline Valley

The area adjacent to and including the Waucoba allotment were used for grazing more extensively in the past than in 1980. Little and Big Cowhorn valleys, located near the northwest corner of the Waucoba allotment, have received intermittent use. Known or estimated dates of significant grazing in the area were the mid-1920s and the immediate post-World War II period. The portion of the allotment that extends down into Saline Valley was used by a cattleman named Henry Miller prior to the turn of the 20th century. The Saline Valley floor, in the vicinity of the dunes and up to Willow Creek, have had considerable domestic livestock use. Beginning in the 1890s and lasting until the 1950s, Johnny Hunter, a Native American living at the Saline Valley Indian Ranch, reportedly ran about 40 brood mares year-round.

Hunter Mountain

The Hunter Mountain area, at the south-southeastern end of Saline Valley, has probably had continuous grazing use for as long as any area in the eastern California desert. William Lyle Hunter, a miner and cattleman, began using the area as a seasonal ranch to raise cattle, horses, and mules by the mid-1870s. The Hunter family has been the principal user of the area for grazing since that time. During the early 1900s, about 1,000 animals

grazed in the area. The establishment of Death Valley National Monument in 1933 resulted in a reduction of the area's land base available for range usage. Because of this reduction and a decrease of some important forage species as a result of overuse and possible climatic changes, the number of animals using the area was reduced from the 400-500 that had utilized it prior to the national monument withdrawal. Although it was illegal after the establishment of the national monument, grazing of horses, burros, and weaner calves continued in nearby Emigrant and Cottonwood canyons and Hidden Valley. After a lengthy period of litigation National Park Service officials stopped this practice in 1964. Severe weather has sometimes impacted grazing in the Hunter Mountain area. For instance, a severe drought during the 1880s and a lengthy hard freeze during the winter of 1949-50 resulted in the deaths of many cattle.

Burros have had a significant adverse impact on grazing in the Hunter Mountain area in recent years. Burros in the Saline Valley and Hunter Mountain areas may have different origins. The majority of the burros on Hunter Mountain apparently come from stock owned by Hunter, who acquired purebred animals from the Tagus Ranch in San Joaquin Valley. These burros were released when the State of California contested Hunter's ownership to the area. Most of the burros on the Saline Valley floor, however, probably come from a herd that was brought to the valley during the 1930s by Deep Springs College for a two-to-three-year stay during poor feed conditions in Owens Valley. Approximately 200 to 300 animals were taken to Saline Valley, and it was intended to remove them the following year. However, the roundup took two years to complete, and some animals undoubtedly escaped to isolated parts of the valley and its surrounding foothills.

Wild horses and burros have accounted for most of the grazing use in the Hunter Mountain Allotment in recent years, and are responsible for a majority of adverse impacts caused by grazing. It is estimated that the equivalent of 1,000 to 1,500 burros lived in the allotment on a year-round basis prior to the late 1970s. It is estimated that some 2,300 burros were removed from the Hunter Mountain-Saline Valley area between 1978 and 1985. By the latter date around 100 burros and 70 horses used the allotment at least part of the year. Bureau of Land Management goals during the mid-1980s called for removal of all horses and all but 30 burros that were to be maintained in the Lee Flat area southwest of Hunter Mountain.[244]

Coso

The Coso Range area, southwest of the lands added to Death Valley National Monument in 1994, has been used for grazing purposes since the mid-1860s. Sheep were first introduced on the Junction Ranch established by two Basques, Domingo Etcharren and Jean Carricart, in the east Coso area, but during the 1880s cattle were introduced after Etcharren entered into a partnership with a cattleman named Reynolds. This operation ran cattle in the area until the early 1900s. In 1914 Etcharren sold the Junction Ranch to Sumner and Butler, whose main ranching headquarters were located at Big Pine in Owens

244. U. S. Department of the Interior, Bureau of Land Management, California Desert District, Ridgecrest Resource Area, "Allotment Management Plan, Hunter Mountain Allotment" (Draft), 1985, n. p., Reference Library, Death Valley National Park.

Valley. They soon became the largest cattle operators in the Coso area, bringing 1,000 head of cattle from Long Valley and establishing their winter range between Centennial Flat, Mountain Springs Canyon, and the Junction Ranch and their summer range in Monache Meadows in the Sierra Nevada. Sumner and Butler, in partnership with Peter and Norman Mairs, later ran some 2,800 cattle on the range extending from Coso Village, Coles Spring, and China Gardens to Coso Peak, Louisiana Butte, and Coso Hot Springs. Mark Lácey, one of the initial partners of the Sumner and Butler enterprise, later established an independent cattle operation at Olancha with approximately 1,000 head, and he used portions of the present-day U. S. Naval Air Weapons Station at China Lake for winter pasturage. Sometime after the mid-1910s, Beveridge Hunter ran about 750 to 1,000 head on the range with Reynolds and several other cattlemen. Approximately 100 horses used the Cactus and McCloud flats areas in the northern portion of the Coso Range during a six-month grazing season from the early 1900s until the 1950s. Joshua and Upper Centennial Flats, in the same area, were used from about 1885 to 1900, but those areas have been used sparingly since the turn of the century. Bart Bellows filed a preemptive claim on Haiwee Meadows in 1870, and some years later he imported 8,000 Angora goats. Bellows operated what became known as the Goat Ranch until the early 1900s, but Angora goats were reported as having been herded in the area below Silver Mountain as late as the mid-1920s.[245]

Panamint Valley

Panamint Valley, a sandy desert expanse located south of the Hunter Mountain area between the Argus and Slate ranges on the west and the Panamint range on the east, has been little used for grazing activity. The range above Searles Lake in the Homewood Canyon area was used as early as 1915 by a cattleman named Shuey. Grazing continued until the early 1960s, when it was terminated because of range management problems involving private holdings. The North and South lake areas in the valley were used for grazing until the late 1940s, but competition with burros caused the eventual withdrawal of cattle. By 1980 burros were making heavy use of most of the available forage in the valley.

A table in the aforementioned appendix provides data on the estimated five-year use of grazing allotments in the California Desert Conservation Area. Information on four allotments, portions of which were located in lands that would be transferred from the Bureau of Land Management to the National Park Service in 1994 under the provisions of the California Desert Protection Act were:

ALLOTMENT NAME	5-YEAR AVERAGE ANIMAL UNIT MONTHS (AUMS)	5-YEAR AVERAGE NUMBER OF LIVESTOCK	SEASON OF USE	AVERAGE NUMBER HEAD IN TOTAL OPERATION
Hunter Mountain	1,105	150 Cattle	11/20 - 6/30	300
Last Chance	3,267	1,790 Cattle	Not Known	Not Known
Lacey-Cactus-McCloud	3,563	585 Cattle	11/1 - 5/31	Not Known
Deep Springs (later to become part of Eureka Valley)	1,250	250 Cattle	Not Known	Not Known

245. Iroquois Research Center, *Land Use History of Coso Hot Springs*, pp. 122-27.

GRAZING ALLOTMENTS IN THE NEW LANDS

Portions of four grazing allotments are included in lands added to Death Valley National Monument in 1994. These include:

Allotment Name	Owner	Acreage In Park
Hunter Mountain	Roy and John Hunter, Olancha, California	88,661
Last Chance	Lida Ranch, Lida, Nevada	49,000 (Approximate)
Lacey-Cactus-McCloud	Busch Properties, St. Louis, Missouri (Managed by Cabin Bar Ranch, Olancha, California)	340 (Approximate)
Eureka Valley	Inyo-Mono Farms, Bishop, California	1,100 (Approximate)

EURO-AMERICAN RANCHING/GRAZING SITES IN THE NEW LANDS

Hunter Grazing Allotment

William Lyle Hunter, born in Augusta County, Virginia, on August 24,1842, arrived in the Death Valley region during the 1860s after having served as a member of Mosby's Rangers in the Confederate Army during the Civil War. The rangers were an irregular body of Confederate troops commanded by Colonel John S. Mosby that operated south of the Potomac River behind Union lines, conducting sudden attacks on Union outposts, that were followed, when pursued, by quick dispersion. Taking a ship to San Francisco, Hunter arrived at the thriving mining camp of Cerro Gordo in 1868. Soon he began operation of a large train of pack mules, transporting ore from the mines to nearby smelters and carrying supplies to the camp. Reportedly, he acquired purebred mules from the Tagus Ranch in San Joaquin Valley for his pack animals. In addition to his packing business he joined with other prospectors in reconnoitering the surrounding region, apparently locating a lead mine in the Ubehebe area. Northeast of Wildrose, he and John L. Porter discovered two enormous copper ledges, the Piute and Cohee, and on July 8, 1875, they organized the Ubehebe Mining District. During the same period, Hunter started a seasonal ranch at the north end of the Panamints in the lush green hills and piñon forested area south of the Ubehebe district where a variety of springs provided plentiful water (military maps show a ranch in the Hunter Mountain area as early as 1875). Hunter left his pack animals to graze on the bunch grass on the slopes of what would become known as Hunter Mountain while he tried to develop his uew copper claims. This seasonal ranch/grazing area would become known as the Hunter Mountain Ranch, and the Hunter family has been the principal user of the area for grazing purposes to the present time.

After playing a leading role in establishment of the Ubehebe Mining District, Hunter continued to prospect in the Death Valley region. After selling his aforementioned lead mine to Belshaw of Cerro Gordo fame, Hunter prospected to the northwest, and in 1877 discovered the Big Horn Mine, consisting of eight claims and one millsite located between Hunter and Beveridge cauyons. On December 7 of that year, the Beveridge Mining District, which included the eastern slopes of the Inyo Mountains north of the Cerro Gordo Mining District, was organized at Big Horn Spring in Hunter Canyon, midway

between the summit of New York Butte and the salt flat in Saline Valley. Hunter began development of the Big Horn Mine in 1878, building a cabin and three arrastras in Hunter Canyon to treat the ore. Processed ore was transported by pack mules over the crest of the Inyos to the roadhead in Long John Canyon, from where it was transported to Owenyo in Owens Valley for transfer to the railroad for shipment to smelters at Salt Lake City.

In 1875 Hunter married Carrie Duval of Virginia City, Nevada, and the couple had five children. He was elected Inyo County clerk in 1884, serving in that capacity for two years. Later, he was appointed as a county supervisor. In 1886 the Hunters moved from Independence to George Creek, south of Independence. Along with associates, he continued to engage in mining activities, operating his Beveridge mines and conducting periodic development work "on old claims at 'Hunter's ranch'" until his death on March 8, 1902. Prior to his death, Hunter filed claims in 1898-99 on the water rights for springs and streams in the Hunter Mountain Ranch area, and a 1967 court decision upheld the validity of those claims.[246]

Sometime after the turn of the 20th century, Hunter's son, Beveridge, homesteaded a cattle ranch in Owens Valley, using the Sierra Nevada for summer pasturage and the Hunter Mountain Ranch area for grazing purposes during other seasons of the year. During his early years, he grazed about 1,000 animals, including burros, cattle, and horses, on lands that extended from Hunter Mountain eastward to Cottonwood Canyon. Later, he concentrated on running cattle in the Hunter Mountain area and over to Death Valley and the Koweechee Mountains of Nevada, south of Silver Peak, establishing the center of his cow operations in the vicinity of present-day Scotty's Castle. The Hunter Mountain Ranch was used by Beveridge as a line camp during his annual grazing operations, and the earliest structure in the vicinity (located just inside the pre-1994 boundaries of Death Valley National Monument) is a rustic one-room piñon pine structure, generally referred to as the "Hunter Cabin." According to Hunter family tradition and one National Park Service historian, the cabin was constructed by a "packer" named John, who was apparently one of Beveridge's ranch hands, in 1910. However, Silas Ness, son of Jens Ness, a Norwegian immigrant who was employed by Beveridge, and Rosie Sams, a Native American who was born on the Saline Valley Indian Ranch, credits his father as the man who built the cabin in 1906. Remnants of ranching activities in the vicinity of the cabin include a spring (20 yards uphill) that was developed into a watering trough and a primitive corral about 100 yards downhill to the northeast. A tin shack in the vicinity

246. Lester Reed, *Old-Timers of Southeastern California* (Redlands, California, Citrograph Printing Company, 1967), pp. 27-57; Perkins, *Cowboys of the High Sierra*, pp. 114-20; Chapter 183, Southern Inyo American Association of Retired Persons, *Saga of Inyo County*, pp. 163-64; *Dictionary of American History* (Rev. ed., New York, Charles Scribner's Sons, 1976), Vol. IV, p. 415; and *Inyo Independent*, August 6, 1897, and March 14, 1902. By the turn of the 20th century the Hunter Mountain Ranch area was crossed by a mining trail leading east from Keeler to the Ubehebe region. Traversing the Inyo Mountains south of Cerro Gordo, the trail crossed the head of Panamint Valley and ascended "a superbly wooded and amply watered upland for many years known as Hunter's Ranch." From the vicinity of the present-day Lee Pump, trails led to Saline Valley to the northwest, the Lee Flat area to the southwest, and to Furnace Creek to the southeast via Cottonwood Canyon. *Inyo Independent*, March 30, 1906.

reportedly is located on the site of the homestead originally belonging to the wife of Beveridge Hunter, the original cabin having burned around 1912.[247]

By the early 1930s some 400-500 animals were grazed on the Hunter Mountain Ranch. When Death Valley National Monument was established in 1933, the monument's lands constituted approximately 50 percent of the area of use. Although it was illegal after establishment of the monument, Beveridge, and his son Roy, continued to graze horses, burros, and weaner calves in nearby Emigrant and Cottonwood canyons and Hidden Valley. Lengthy litigation initiated by the Park Service removed livestock use from the lands within the boundaries of the monument in 1964. At that time, the Bureau of Land Management permit for the Hunter Mountain grazing allotment outside the monument's boundaries reduced the number of cattle that could be grazed from 300 to 150 head.[248]

The Coso Grazing Unit adjudication conducted by the Bureau of Land Management in 1966 established a carrying capacity for the Hunter Mountain Grazing Allotment of 1,600 AUMs. A portion of those AUMs, however, were considered unsuitable, because the area lacked a sufficient water supply. During the adjudication, it was determined that Roy Hunter had only Class II base property and a right to 1,105 AUMs. This resulted in a permit for 150 head of cattle for the period from January 1 to August 11 (1,105 AUMs). The provisions of the permit were unchanged until 1978, when Hunter applied for and was granted a change in his season of grazing use to match that of his grazing permit from the U. S. Forest Service. Thus, the Bureau of Land Management permit was changed to read "150 cattle 11-20 to 6-30 for 1,105 AUMs."

By the mid-1980s Roy Hunter owned approximately 235 head of cattle which he operated as a cow-calf operation at his ranch in Olancha. Grazing took place on his privately-owned and leased private lands around Owens Lake and Olancha, as well as on lands of the Bureau of Land Management and the U. S. Forest Service. Under the terms of Hunter's permit, 150 head of cattle grazed on the Hunter Mountain Allotment from November 20 to June 30. However, poor autumn water and forage conditions have resulted in delays to Hunter's "on date" until January on several occasions. While Hunter grazed his cattle on the Hunter Mountain Allotment, his other cattle remained on the home ranch at Olancha or on the Owens Lake leased lands.

Hunter trailed his cattle from the Hunter Mountain Allotment to his Olancha ranch in late June, where they were combined with the cattle that had remained in Owens Valley. The entire herd was trailed to a high elevation range for summer pasturage in Inyo National Forest. Although the U. S. Forest Service "season of use" varied according to weather conditions, it generally included the months of July, August, and September. From Inyo National Forest, the cattle were trailed back to Hunter's ranch, where they remained until a portion of the herd was trailed to the Hunter Mountain Allotment.

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247. U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. 2, pp. 766-78; ibid., *Death Valley National Monument Historical Background Study*, p. 92; Personal Communication from Roy Hunter of Olancha, California, October 19, 1996; and (Draft) Transcribed Oral Interview of Silas Ness by Richard Potashin, March 26, 1991, ECM, OH 84, Eastern California Museum, Independence.

248. Perkins, *Cowboys of the High Sierra*, pp. 114-20, and U. S. Department of the Interior, Bureau of Land Management, *The California Desert Conservation Area Plan*, Vol. F, Appendix XIII, "Livestock Grazing," pp. 23-24.

When his cattle were on the Hunter Mountain Allotment, Hunter followed a general cattle management plan developed in consultation with the Bureau of Land Management. Four sites on the allotment were monitored to evaluate forage readiness. Cattle were trailed to the allotment when forage and water conditions appeared adequate. During his early "season of use," the Hunter cattle were grazed from Grapevine Canyon westward. As the season progressed and the snow melted, some of the cattle were moved to Hunter Mountain where they remained until herded back to the Wilson Ranch on Lee Flat. Then they were trailed or trucked off to the allotment.[249]

Myers and Barker Ranches — Goler Wash

The Myers Ranch property is a 40-acre homestead located near Sourdough Spring in the Goler Wash area south of Mengel Pass just inside the west boundary of the lands added to Death Valley National Monument in 1994. The ranch site, which is an example of "recreational ranching" in the area during the 1930s-1950s era, is reached by turning west off the Wingate Road some 15 miles south of Ballarat on to Goler Wash Road. The latter road passes by the remnants of the Lotus Mine, now generally known as the Keystone Mine, which has gone through a series of private owners, including Carl "Peg Leg" Mengel, a mining engineer from San Bernardino who arrived in the Panamints during the mid-1920s. Opening a mine at the head of Anvil Spring Canyon in Butte Valley, Mengel developed Greater View Springs where he established his residence while pursuing prospecting and mining interests in the area. When Carl died from a long bout with tuberculosis in San Bernardino in 1944, he willed his interest in the Lotus Mine to his friends, William (Bill) and Barbara Myers.

The Myers, both of whom were graduates of the University of California, Berkeley, were schoolteachers in the San Joaquin Valley. Beginning in 1926, Bill made exploratory trips to the Death Valley region, visiting Wild Rose Canyon, Ballarat, Trona, and the Goler Wash and Butte Valley areas. After their marriage in 1929 the Myers continued to visit the Death Valley region, and during the early 1930s, after befriending Carl Mengel, they began constructing a stone cabin near Sourdough Spring in Goler Wash. Mengel, Myers, and other residents in the vicinity built the road into Goler Wash from Butte Valley during the early 1930s. The Myers regularly visited their new homestead during vacation periods, continuing construction of the cabin and making improvements to the "ranch" regularly. In 1953 they purchased Wild Rose Station from Warren and Mary Pinney, operating the "resort" as a concession in Death Valley National Monument for the next five years. During this period, the Myers continued to visit their Goler Wash "ranch," which was patented in 1958. Improvements on the property included the cabin with an indoor water supply fed from a spring by gravity, a stone garage and stone shed, fencing, a small swimming pool, and a garden, grapevines, and some fruit trees. That year, the Myers sold the Wild Rose Station business and moved to Fresno to provide a better educational environment for their three children. The Myers family, however, continued to visit the "ranch" regularly, and the Myers children still visit the site periodically.

249. U. S. Department of the Interior, Bureau of Land Management, California Desert District, Ridgecrest Resource Area, "Allotment Management Plan, Hunter Mountain Allotment (Draft), ca. 1985, n. p., and U. S. Department of the Interior, Bureau of Land Management, *The California Desert Conservation Area Plan*, Vol. F, Appendix XIII, "Livestock Grazing," pp. 23-24.

During the 1930s and 1940s, approximately five families maintained "ranches," similar to that of the Myers family, in the Goler Wash area, while five or six families developed "ranch" properties in nearby Butte Valley. In the early 1940s Blouch Thomason, a former detective in Los Angeles who later worked as a security officer in Hanford, Oregon, and his wife purchased a small mining property in Goler Wash and built a stone cabin at Sourdough Spring below the Myers Ranch. After living there for a decade Thomason died during a fishing trip, and the cabin homestead was sold to James and Curt Barker, two men who pursued mining interests in the area. The Barkers enlarged the cabin, and continued to visit the area for many years. The Barker Ranch would later gain notoriety as one of the sites where the Charles Manson "family" lived prior to the Tate-LaBianca murders in 1969 and where Manson and some of his followers were arrested following the murders.[250]

NATIVE AMERICAN RANCHING SITES IN THE NEW LANDS

Historical Overview of Native American Ranching in the Death Valley Region

Native Americans continued to live in the Death Valley region, attempting to eke out a living even as their traditional lands were penetrated by Euro-American explorers, scientists, prospectors, miners, stock raisers, and ranchers. Of necessity, Native American existence from precontact time to the 1920s involved a transitory lifestyle with settlements and camp locations determined by the seasons and food sources as well as ever-increasing encroachment by Euro-Americans on their ancestral lands. During the winter months, the Native Americans retreated from mountain areas to the valley floors to escape the snow and severe cold. During the summer months, the excessive heat and low water levels in the valleys forced them to return to higher elevations.[251]

During the 1880s, after William Johnson left his terraced truck garden in Johnson Canyon on the west side of Death Valley during the last stages of the Panamint boom, a Shoshone, "Hungry Bill," along with his family, took over the 4 or 5 acres of ground and replanted the garden. With the help of George Hansen ("Indian George"), and other relatives, he also terraced and irrigated several more acres, planting more grapevines and peach trees, as well as squash, melons, beans, corn, wheat, and alfalfa. Three Shoshone families would live at "Hungry Bill's Ranch" during the summer months until well into the 20th century.

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250. Richard D. Crowe, "Sourdough Pancakes and Fried Burro Liver," ca. 1994, n. p., and (Draft) Transcribed oral interview of Barbara Myers by Kari Coughlin and Linda W. Greene, September 17-18, 1994, Reference Library, Death Valley National Park. In the interview Myers reminiscences about activities in Anvil Spring Canyon, Butte Valley, and Goler Wash during the 1930s-1950s. For instance, she mentions that during the early 1930s, burro hunters visited the Goler Wash and Butte Valley areas, trapping the animals and taking them to Los Angeles for dog food manufacture. After his death Mengel was cremated, and the Myers erected a round stone cairn atop Mengel Pass (some 50 feet outside the Death Valley National Monument boundary) in which they placed the urn containing his ashes. Mengel's wooden leg was placed in the small monument. Mengel Pass was included in lands added to Death Valley National Monument in 1994.

251. Smithsonian Institution, Bureau of American Ethnology, Bulletin No. 120, pp. 68-93; U. S. Department of the Interior, National Park Service, *Death Valley National Monument's Prehistoric Past*, pp. 32-84; and Lingenfelter, *Death Valley & The Amargosa*, pp. 16-22.

During the winter months, the families moved to a site about 15 miles south of Furnace Creek in the vicinity of the Eagle Borax Works and Bennett's Well.[252]

When Lieutenant Birnie and his companions participated in the Wheeler Expedition survey in 1875, the men took the trail leading from Panamint City eastward across the Panamint Range to Johnson Canyon. Birnie noted that in the canyon "through which we passed grass and a short running stream were found." In addition "a small culivated piece of ground, where vegetables were raised with facility by irrigation."[253]

During the Death Valley Expedition in 1891, Frederick Vernon Coville reported that he saw about 25 Panamint Indians, all living "in the Panamint mountains, on the west side of Death Valley." As this group of people was "now nearly exterminated and their customs and language are little known," he desired "to put on record" some "observations, made among them while he was performing the duties of botanist" of the expedition. He stated further:

> At the mouth of Hall cañon, near Hot springs, at the west foot of the Panamint mountains [where three Panamint families lived], and in Johnson cañon, on the eastern or Death Valley slope of the same range, the Indians have under crude irrigation and cultivation two or three acres of ground. The crops commonly raised are corn, potatoes, squashes, and watermelons. Of the last they are especially fond, fully as much so as the African, and the desert climate is admirably suited to their growth.
>
> The cultivation of plants, however, furnishes them neither a sure nor an adequate food supply. They occasionally purchase from miners and prospectors bacon and flour. Their animal food consists principally of jack-rabbits, cotton-tail rabbits, and quails, occasionally mountain sheep or deer, and sometimes wood rats, kangaroo rats, white-footed mice, and a large lizard known as the chuckawalla. They are seldom able, however, to obtain any of these in abundance, and they are compelled to rely mainly on various indigenous food-plants.[254]

E. W. Nelson, another member of the Death Valley Expedition, also reported on the two Panamint Indian ranches. One was "at the mouth of Hall's cañon, a mile north of the Hot Springs, on the east side of Panamint valley, close to the base of the Panamint mountains." The Indians obtained "water for irrigation from Hall's Cañon creek," and raised "corn, beans, melons, and squashes." They were "starting a small fruit orchard of peaches and figs." On the east side of the crest of the Panamint mountains, at the site of the former Johnson Ranch, "a series of three or four little patches of soil along the course of a steep rocky cañon leading down into Death valley," several families eked out a meager living,

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252. U. S. Department of the Interior, National Park Service, *Historic Resource Study: A History of Mining*, Vol. I, Pt. I, pp. 362-97; Lingenfelter, *Death Valley & The Amargosa*, pp. 20, 171, 272, 291; and Smithsonian Institution, Bureau of American Ethnology, Bulletin No. 120, pp. 92-93.

253. "Executive Report of Lieutenant R. Birnie, Jr.," *Annual Report of the Secretary of War, 1876*, Report of Chief of Engineers, Appendix JJ, p. 352.

254. Frederick Vernon Coville, 'The Panamint Indians of California," *American Anthropologist*, V (October 1892), pp. 351-52. In pages 352-61 of the article, Coville discusses the Indians' use of various plants and trees for preparation of food, utensils, baskets, hunting equipment, facial paint, clothes, and glue.

raising "corn, melons, squashes, and a few peaches and grapes, with pine-nuts and grass-seed in their season."

Both groups of people, according to Nelson, lived in "square and dome-shaped" houses, made with "wattled straw or brush laid over a frame-work." They owned ponies, and the men found periodic employment in the "mining camps of Panamint, Darwin, and elsewhere."[255]

The references by Coville and Nelson to a ranch at the mouth of Hall Canyon north of Warm Springs on the east side of Panamint Valley refer to "Indian George's Ranch," located just outside but adjacent to the boundaries of the lands added to Death Valley National Monument in 1994. Born at Ohyu in Death Valley about 1841, George Hansen had watched some of the "Forty-Niner" parties struggle through Death Valley. Later, he was startled during 1852-53, when he suddenly came upon a Mexican prospector on a trail near Emigrant Spring. In his fright the youngster fled. Thereafter, his father called him Bah-vanda-sava-nu-kee, or Boy-who-runs-away. Much later he came to be known to Euro-Americans as Indian George, after Dr. Samuel G. George hired him as his guide to prospect the Panamints during the early 1860s. Indian George worked as a wood packer at Panamint City during the mid-1870s, and he reportedly prospected throughout the Death Valley region. Sometime after the turn of the century, the Indian Service gave him a last name, calling him George Hansen. After living briefly in Sunavadu in Wildrose Canyon, he started a ranch in Panamint Valley at the mouth of Hall Canyon. His ranch was a welcome oasis for travelers and is now owned by Dugan Hansen of Ridgecrest.[256]

In May 1896 an article in the *Inyo Register* described "Hungry Bill's Ranch" as a "garden area" in Johnson Canyon. Noting that the ranch had been operated for more than 20 years, the article noted:

> . . . . just over the summit, and southeast of Panamint, was 'Johnson's garden' in the flush days of the rise and before the fall of Panamint. Here Indians Pete and George [Hansen] are cultivating four or five acres of land. With immense labor they have cleared away the surface rocks, building huge walls for fences, and irrigating ditches from the large springs. March 31st alfalfa was four to six inches high. The grapevines hanging over a framework of poles, showed formed grapes in the verdure and the peaches appeared half formed. In their larder was found fine varieties of beans, wheat, and corn. On the hillside George has graded away a large space, and has material on hand for a regular house.

255. E. W. Nelson, "The Panamint and Saline Valley (Col.) Indians," *American Anthropologist*, IV (October 1891), pp. 371-72.

256. Lingenfelter, *Death Valley & The Amargosa*, pp. 20, 43-45, 60, 125; J. C. Boyles, "He Witnessed the Death Valley Tragedy of '49," *Desert Magazine*, III (February 1940), pp. 3-6; Hubbard, Bray, and Pipkin, *Ballarat: 1897-1917*, p. 33; and (Draft) Transcribed Oral Interview of Dugan Hansen by Richard Potashin, March 19, 1992, ECM OH 142, Eastern California Museum, Independence.

The newspaper article also contained a description of "Panamint Tom's Ranch" in Anvil Canyon [Warm Spring Canyon] "where a copious spring of lukewarm water makes a small oasis in the wash, and right among the mineralized mountains."[257]

During the 1880s and 1890s Panamint Tom, the last "chief" of the Panamint Shoshone, established the aforementioned ranch with an orchard of some 150 fruit trees at Pabuna near Warm Spring and the mouth of Hall Canyon in Panamint Valley. Tom, whose sister had married Indian George, and his brother, Hungry Bill, pursued a somewhat circumspect course with the influx of miners and prospectors to the Death Valley region after an informal peace was reached between the Shoshones and Euro-American settlers during the mid-1860s. However, the two men continued to make periodic raids to steal horses from ranches near the passes to San Bernardino and Los Angeles for some years. Horsemeat was a welcome treat in the Panamint villages when the pine-nut stores ran low in late winter, and the brothers were generous with their spoils. Although Panamint Tom was accused by whites of many murders in the Death Valley region, he was one of the few Indians who braved the summer heat to try to rescue stranded prospectors. Although he admitted to having killed three whites at one time or another during his life, many more owed their lives to him.[258]

In August 1897 a severe thunderstorm destroyed Panamint Tom's orchard and garden and swept away the wickiups that his family, consisting of 11 individuals, lived in. His livestock were on "high ground," however, and thus escaped the brunt of the storm. As a result of the storm damage, Panamiut Tom and his family moved to Hungry Bill's Ranch.[259]

At the same time, the *Inyo Independent* reported that "Panamint George [Hansen] has a fine ranch, supplies the miners with fruit and melons and raises large crops of alfalfa." It is likely that he was supplying miners and prospectors at the recently-established boom camp of Ballarat as well as tthose who were actively working claims in nearby Tuber, Jail, Hall, Surprise, and Pleasant canyons.[260]

Another Indian who supplied Ballarat with fresh fruits and vegetables was "Indian Joe." He lived on Peterson Creek in the Argus Mountains before being pushed off the land by John Searles, who had started a garden there in 1873, building a terraced plot where he planted grapevines as well as fig, apple, and other fruit trees. After Searles left the area Indian Joe returned and began harvesting the produce which he sold to Ballarat storeowner, Harry Robinson, for sale to miners.[261]

During March 1910, two men, F. J. Busch and Pat Burke, took a trip through southern Inyo County during which they visited Hungry Bill's Ranch in Johnson Canyon. The ranch, according to the men, "might well be called the western base of Telescope Peak."

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257. *Inyo Register*, May 14, 1896.

258. Lingenfelter, *Death Valley & The Amargosa*, pp. 19-20, 31, 175-78, 198, 397-98.

259. ibid., p. 20, and *Inyo Independent*, August 13, 1897.

260. *Inyo Independent*, August 13, 1897.

261. Hubbard *et al.*, *Ballarat: 1897-1917*, p. 91.

Hungry Bill and his family had lived at the ranch for "perhaps thirty years." Hungry Bill had "about fifty fruit trees" that bore "splendid fruit in July," and he raised "grapes, potatoes, corn, peas and beans." The ranch was "not of ordinary Indian type;" rather it showed "evidence of being kept up."[262]

After Philip Johnston visited Indian George's Ranch in 1927 during an automobile tour of the Panamints in 1927, he noted that the "oasis" was "rich in local color with its primitive fences, ancient wagons, and simple hovels where a number of Shoshones live in a state scarcely more civilized than that of their forebears." A "sulphur spring" flowed "from the mountainside nearby to a meadow covered with coarse grass" which supplied "provender for a number of burros, who regard the passing visitor with a philosphic gaze."[263]

In 1928 Indian George's Ranch was established as an Indian Ranch Reservation or "rancheria". By 1930 the ranch featured a large flock of Angora goats provided by the U. S. Indian Service. Living on the ranch with Indian George, who was nearly 90 years of age, were his sister, "Old Woman," a daughter, Isobel, and a granddaughter, Molly, who herded the goats. Mike, the crippled son of Indian George, along with his three sons, Leland, Dugan, and Buster, came to the ranch from their home in Darwin for periodic visits. The ranch had a crude water system, consisting of flumes, that channeled water from Hall Canyon to the ranch for irrigation and domestic purposes. The Warm Spring vicinity, south of the ranch, was used for grazing the goats during the winter months. During the late spring, Molly took the goats into the Panamint Range for summer grazing, principally in the vicinity of the Stone Corral in Pleasant Canyon where the Panamint Shoshone had established a summer camp for many years. Remnants of the corral are located near the border of the lands added to Death Valley National Monument in 1994, and the area around the corral features a number of sites associated with the Indian Ranch residents' summer encampments. At times, the goats were herded to the Junction Ranch in the Argus Range for the summer. Indian George died around 1943, and the Indian Ranch Reservation was terminated in 1958. The legal designation of the reservation, however, was not formally rescinded until 1964.[264] The Timbisha Shoshone Tribe is the modern federally recognized tribe of descendent families and individuals of the Panamint Shoshone.[265]

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262. *Rhyolite Herald*, March 12, 1910.

263. Philip Johnston, "To the Roof of the Panamints," *Touring Topics*, X (October 1927), p. 23.

264. Hubbard, Bray, and Pipkin, *Ballarat: 1897-1917*, pp. 33-37; Iroquois Research Center, *Land Use History of Coso Hot Springs*, p. 133; Sturtevant, ed., *Handbook of North American Indians, Volume 11, Great Basin*, pp. 278, 533; and Cartter, *Twilight of the Jackass Prospector*, pp. 10, 12. Also see Louise Werner, "We Climbed Telescope Peak," *Desert Magazine*, XVI (November 1953), pp. 7-8.

265. U.S. Department of the Interior, National Park Service, *Death Valley — Ethnohistorical Study of the Timbisha Band of Shoshone Indians*, by John G. Herron, September 1981; Fowler, Dufort, Rusco, and the Historic Preservation Committee, Timbisha Tribe, *Residence Without Reservation*; and the Timbisha Shoshone — Death Valley Land Restoration Project, *Timbisha Shoshone Land Restoration Committee Report: Principles Related to Identifying Aboriginal Homeland Areas for Restoration to the Tribe*, presented to Study Group Two at the meeting of August 17, 1995, Death Valley, California.

Saline Valley Indian Ranch

The Saline Valley Indian Ranch, located in the vicinity of the principal water course that historically flowed approximately one mile from Hunter Canyon down to the salt marsh in Saline Valley, is the most significant example of Native American ranching in the lands added to Death Valley National Monument in 1994. Evidence of Native American presence in the Saline Valley area can be found in scattered locations throughout the valley and in the surrounding mountains. Habitation sites ("Indian rings"), stone tools and implements, obsidian chip scatters, occasional arrowheads, rock structures and formations, petroglyphs and pictographs, beads, baskets, and homemaking articles have been found in numerous locations throughout the valley.

Wendell W. Moyer, a research chemist who purchased a 40-acre parcel of land that once comprised a portion of the Saline Valley Indian Ranch, prepared a documented history of the ranch during the early 1990s.[266] According to Moyer, there were probably three principal habitation sites in the valley. One was located in the northeast corridor approximately 2 miles above Warm Springs, adjacent to a hill often referred to as Arrow Makers Knoll. Another habitation site was located about 1-1/2 miles southeast of the Warm Springs vicinity in an area of natural water seeps known as the Seven Sisters. The third and largest of the three sites was located in the area of the principal valley water course that flowed approximately 1 mile from Hunter Canyon down to the salt marsh at the lowest spot of the valley between the salt lake marsh and the mouth of Hunter Canyon.

The Saline Valley Indians were semi-nomadic hunter/gatherers, migrating from the valley to the surrounding mountains and back, depending on the season and the changing food sources. The valley habitation sites were occupied during the autumn, winter, and spring, while the hot summer months were spent in the nearby mountains, primarily in the vicinity of Hunter Mountain to the south or Whipporwill Flats on the east flank of Waucoba Peak to the north.[267]

During the summer months in the mountains, the Indians gathered piñon pine nuts. This seasonal activity was described by B. H. Dutcher, a member of the Death Valley Expedition of 1891 who accompanied Indian mail-carrier John Hughes and several other Indians on a trek from Keeler to the Death Valley signal station at the east end of the Nelson Range just south of Saline Valley in September. During the day and two nights that he visited the temporary camp, five or six families harvested 1 or 2 bushels of nuts.[268]

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266. Unless otherwise noted, material for this section has been obtained from Wendell W. Moyer, "The Rise and Fall of the Saline Valley Indian Ranch," *The Album*, XVIII (1996), pp. 30-44.

267. Richard A. Brook, "Inferences Regarding Aboriginal Hunting Behavior in the Saline Valley, Inyo County, California," *Journal of California and Great Basin Anthropology*, II (No. 1, 1980), pp. 60-79, and Smithsonian Institution, Bureau of American Ethnology, Bulletin No. 120, pp. 76-80.

268. B. H. Dutcher, "Pinon Gathering Among the Panamint Indians," *American Anthropologist*, VI (October 1893), pp. 377-80, and (Draft) Transcribed Oral Interview of Ted Etcharren by Richard Potashin, June 18, 1992, ECM OH 162, pp. 29-31, Eastern California Museum, Independence.

With the establishment of Fort Independence in 1862, the U. S. Army undertook a program to round up the Indians in Owens Valley and the surrounding region, including Saline Valley, and relocate them to the Fort Tejon Reservation in southern San Joaquin Valley. It is likely, however, that many Indians in the Saline Valley area escaped from the military because of the region's isolation and rugged terrain. Others eventually returned to the area, and by the early 1870s they had reestablished their traditional valley settlements and lifestyle.

As prospectors and settlers moved into the Saline Valley area as part of the Cerro Gordo boom during the late 1860s and early 1870s, they brought with them the techniques of organized agricultural practices which the Indians readily adopted. Thus, the Indians in Saline Valley moved their principal valley settlement a mile or so to the north and west where there was a relatively large area of fertile, level, tillable soil. The agricultural prospects of this land would be developed into the Saline Valley Indian Ranch, which at its peak may have had 125 inhabitants. A simple but effective diversion dam and canal system redirected the Hunter Canyon waters away from their historic channel across the alluvial fan and back into a wash that then carried the water down to the new farm fields and settlement. The water was collected and distributed by means of a system of catch basins, reservoirs, and channels to irrigate the various fields and orchards. A secondary channel system was constructed to tap the nearby Beveridge Canyon watercourse, a more variable and thus only intermittent water source for the ranch.

William L. Hunter, whose mountain ranch land abutted the southeast corner of Saline Valley, befriended the Saline Valley Indians. He introduced the Indians to horses and mule breeding, and he shared his grazing lands with them to the exclusion of others. He advised them in business matters, and initiated action on their behalf for obtaining from the federal government a Homestead Land Grant to their ranch land in Saline Valley. On June 30, 1892, a 160-acre land grant, consisting of two separate grants, was issued under the signature of President Benjamin Harrison. One 80-acre grant was deeded to Tom Hunter, head of the Indian Hunter family. As was customary at the time, Tom Hunter (the Indian) and his family undoubtedly took the Hunter name out of respect for their friend and benefactor. The other 80-acre parcel was deeded to Caesar, head of another family and clan.[269]

269. Homestead Certificate No. 273, Application No. 463, signed by President Benjamin Harrison, June 30, 1892 (copy on file in Saline Preservation Association Collection, Los Angeles, California). Also see, U. S. Department of the Interior, Bureau of Land Management, *Soil Survey of the Saline Valley Area, Inyo County, California*, by James C. Wardlaw, 1979, p. 26. In less than a century following American independence, Native Americans, by a long series of treaties, ceded enormous tracts of land to the United States. The old Indian Country on the Great Plains was reduced to the Indian Territory (later the State of Oklahoma), while the extinguishment of Indian titles proceeded rapidly from the Rocky Mountains to the Pacific coast. In 1869 a Board of Indian Affairs was established to exercise joint control with the General Land Office of the Department of the Interior over appropriations for Indian land cessions, and to control the ceded trust lands not a part of the public domain, along with the reservations with their valuable natural resources. The Dawes General Allotment (Severalty) Act, enacted into law on February 8, 1887, provided for the dissolution of Indian tribes as legal entities and the division of tribal lands among individual members — 160 acres to each head of family and 80 acres to each adult single person. The government retained a 25-year trust patent on such lands; upon its expiration, full ownership would devolve upon the individual and U. S. citizenship would be conferred. Morris, ed., *Encyclopedia of American History*, pp. 643-44.

The combined 160-acre property was laid out as two offset (by 40 acres) 80-acre tracts (instead of as a square) to encompass the principal areas of cultivation, habitation, and use. However, the land area that the ranch and its inhabitants occupied and utilized was considerably larger.

Accounts of the extent and nature of the Saline Valley Indian Ranch operations are impressive. According to an article in the *Inyo Independent* on May 20, 1882, the ranch was "in a superior state of cultivation being largely devoted to the production of onions, pumpkins, cabbage and all such."[270] In October 1891 E. W. Nelson provided a more detailed description of the ranch in an article published in the *American Anthropologist*:

> In this latter locality the Indians all live at one place on the west side of the valley, at the base of the Inyo mountains and near the border of the salt-bed which covers the sink of the valley. A small stream of water flows out of Hunter's cañon, in the Inyo mountains, about a mile from the Indian village, and furnishes them with water for irrigating purposes.
>
> They have about one hundred acres of land enclosed, and some of it planted in alfalfa, and they are increasing their acreage of this crop during the present season. They also grow melons, squashes, corn, beans, barley, and wheat.
>
> The alfalfa, barley, and wheat raised they sell readily to the [Conn and Trudo] Borax Company, whose borax works are located less than a mile from the Indian village.
>
> This company pays the Indians a small royalty for the use of water during the irrigating season. These Indians have four American plows and seven scythes, and say they are going to buy a mowing machine next year.
>
> Some of them find continuous employment, at fair wages, at the borax works.
>
> Their houses are both square and dome-shaped, and made of wattled straw or brush laid over a frame-work. They also have a small grape and peach orchard.

Nelson also referred to the "Cottonwood Creek people" that numbered "only two or three families, except during the grass-seed or piñon-nut gathering seasons, when many of the Saline Valley people go over there for a time." The "supply of water" was "very limited" in the Cottonwood Creek area, and "only a few melons" were raised with "an occasional effort at corn and beans on a little enclosed patch of ground."[271]

In 1893 a promotional pamphlet publicizing the resource potential of Inyo County noted that "a small tribe of Indians" was located at the mouth of the stream that flowed out of the Inyo Mountains to provide water for the Conn and Trudo Borax Works in Saline

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270. *Inyo Independent*, May 20, 1882.

271. Nelson, "Panamint and Saline Valley (Col.) Indians," pp. 371-72. In addition the ranch had a horse and mule breeding operation, undoubtedly patterned after that of the Hunter Mountain Ranch. Moyer, "Rise and Fall of the Saline Valley Indian Ranch," p. 35.

Valley. The Indians used "the water for irrigation" and produced "garden vegetables the year round." "Watermelons ripen about the beginning of April, and these and other produce are packed on ponies up and over the mountains to Cerro Gordo mining camp, near the summit of the Inyo range."[272]

During the summer months, most of the people living on the Saline Valley Indian Ranch, as well as their animals, moved to their traditional Hunter Mountain encampment area. Only an intermittent or token presence was maintained at the ranch. In the fall, after the summer heat had abated, the people returned to the valley. The remains of their layover corral may still be seen in lower Grapevine Canyon. In later years they made use of the Hunter family corral located in Upper Grapevine Canyon.

The organization of the ranch was centered around the extended Tom Hunter and Caesar families. Originally, Tom and Caesar, as family heads, functioned essentially as dual "chiefs" of the enclave, although they had no official status nor formal role. Upon the death of Tom Hunter, his son Johnny assumed the ranch leadership role. Caesar's heirs and the succession within his family are unknown. Family members of former residents of the ranch remember that during the 1930s Johnny purchased a Town Car, hired a chauffeur, and took Sunday afternoon drives on the Saline Valley road. Earlier in 1892, Caesar gained notoriety when he and several residents of the ranch captured an Indian who had fled to Saline Valley after killing five whites at Kernville. Caesar, Beveridge Hunter, and a man named McDonough took the fugitive to Independence and turned him over to the authorities for arraignment. As a result, Caesar became a celebrity and was invited to San Francisco to attend an awards banquet in his honor, but the large monetary reward that he expected never materialized.[273]

During the 20th century, the Saline Valley Indian Ranch slowly declined. Euro-American diseases, such as tuberculosis, influenza, and venereal disease, took their toll. The construction and pavement of California State Highway 190 during the late 1920s that extended from Lone Pine/Olancha to Panamint Valley and on to Death Valley and the east essentially cut Saline Valley from the mainstream transportation arteries in the area. Mining activities declined, and the salt tram ceased operation in 1930, thus eliminating mining-related jobs. The spurt in the area's mining activities during the Depression years of the 1930s consisted primarily of small operations or individuals seeking their "pot-of-gold" during difficult economic times, and did not create jobs for local people. The nearest public school was in Darwin, some 50 miles distant. The valley children were boarded in Darwin in order to obtain formal education, thus causing disruption to the close-knit Indian families. As a result, a number of families moved to Darwin and other communities.

Other factors relating to the demise of the Saline Valley Indian Ranch were more subtle. The valley had no modern amenities because of its isolation. During operation of the salt tram, electricity and phone service were available in the valley, and the telephone line

272. Mulholland, *Inyo County: Its Lands, Water, Soil Climate, Mines, Scenery, and Other Resources*, pp. 28-29.

273. (Draft) Transcribed Oral Interview of Silas Ness by Richard Potashin, March 26, 1991, ECM OH 84, and (Draft) Transcribed Oral Interview of Silas Ness by Richard Potashin, October 13, 1992, ECM OH 225, Eastern California Museum, Independence.

extended to the Upper Beveridge Canyon mining camp. However, the ranch was not connected to the "grid." Two world wars lured people away from the valley to obtain good-paying "city jobs" and to serve in the armed forces. Thus, by the mid-1940s, the ranch had dwindled to three or four families, and the area under cultivation had diminished to less than 40 acres.

During the post-World War II years of late 1940s, the Hunter Canyon Mill Site Claim, consisting of the land at the mouth of Hunter Canyon through which all of the Saline Valley Indian Ranch water flowed, was purchased by Colonel A. E. Montieth, a mining enthusiast from Los Angeles who wanted to develop the property into a vacation retreat. Montieth built two or three cottages on the property for use by him and his Los Angeles friends, and he employed a full-time caretaker to look after his place. Montieth obtained a Domestic Use Water Rights Claim from the State of California for use of Hunter Canyon water, which legally entitled him to only 200 gallons a day. Nevertheless, he believed he was entitled to all of the water and he enhanced the ambience of his desert paradise by damming up the flow of water to construct some ponds and pools, thus cutting off the water to the Indian Ranch located a mile or so down the hill.

The Indians legally owned the bulk of the Hunter Canyon water by virtue of the California State Water Rights Grandfather Clause, based on proven ownership and use prior to 1914, but Montieth ignored their claims. The Indians, led by Johnny Hunter and his wife Sarah, turned to the Hunter family for help. Beveridge Hunter, and his son Roy, reportedly opened Montieth's sluice gates on several occasions, but Montieth and his associates soon closed them, thus effectively cutting the ranch off from its vital water supply.

The situation festered for a period of time. Finally on January 26, 1952, two young Indian boys, Phillip Hunter, the 15-year-old grandson of Johnny, and his friend, Irving Miller, age 13, took guns and walked to Montieth's compound. Johnny Chavez, the 22-year-old caretaker and the only person on the property, was shot by Hunter in the chest. After Chavez retreated to a bunkhouse on the Montieth property, the boys set fire to the building, resulting in the death of Chavez. The two teenagers were subsequently arrested, tried, and convicted for what the *Inyo Register* called "the most heinous crime in the annals of Inyo County."[274]

Soon after this incident, the remaining Indians left the ranch and moved out of Saline Valley. The Caesar family's 80-acre parcel was sold to Fred Rosser, an Inyo County attorney who periodically purchased "distressed" properties, on September 19, 1952. By the early 1990s Moyer owned 40 acres of this parcel. The other 80-acre parcel continues to be owned by the descendants of the Tom Hunter Family. According to Inyo County land

274. *Inyo Register*, February 22, 1952, and *Inyo Independent*, February 22, 29, 1952. Because of their ages, the two boys received relatively light jail sentences. Phillip, for instance, was paroled after some five years of incarceration, and, as a condition of his parole, he was banished from Inyo County for the remainder of his life.

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records, title to those 80 acres was transferred from Sarah Hunter to her son Phillip on January 4, 1961.[275]

RECOMMENDATIONS FOR NATIONAL REGISTER OF HISTORIC PLACES EVALUATION STUDY

It is recommended that further study and evaluation be given to the Saline Valley Indian Ranch for the purpose of nominating the property for listing on the National Register. The property is the most significant example of Native American ranching in the lands added to Death Valley National Monument in 1994, and the site possesses a vast number of archeological resources that merit study and protection. Because the property is privately-owned, the evaluation process should be conducted in cooperation with the landowners.

It is also recommended that further study and evaluation be given to the numerous Euro-American ranching-related sites associated with the historic Hunter Grazing Allotment, such as cabins, sheds, building foundations, corrals, water catchment basins, water tanks, and pipelines in the Hunter Mountain-Grapevine Canyon-Nelson Range-Lee Flat area, preparatory to determination as to whether to proceed with nomination of appropriate portions of the area to the National Register as a rural historic landscape. Whether or not it is determined to proceed with such work, it is recommended that a formal oral history research project be initiated to interview Roy Hunter for the purpose of establishing an oral documentary record of grazing operations on the Hunter Grazing Allotment. The oral history project should not only focus on the historical development of ranching in the area but also on the developed ranching-related sites in the allotment.

275. Caesar to Fred Rosser, United States of America Patent No. 1136465, September 19, 1952, and Deed, Sarah Hunter to Phillip Hunter, Inyo County, January 4, 1961, CA No. 144, Folio 303, Land Records, Recorder's Officer, Inyo County Courthouse, Independence, California.

EPILOGUE

INCREASING VISITATION AND RECREATIONAL USE

Automobile visitation and tourism in the Death Valley region began during the 1920s and was facilitated by completion of California State Highway 190 from Lone Pine to Death Valley in 1937. That same year, William and Agnes Reid began construction of a small resort at Panamint Springs (located in the lands added to Death Valley National Monument in 1994), consisting of a motel, cafe, service station, and swimming pool.[276] However, the improvement of roads and automobiles, as well as the increasing demand for recreation by the expanding population of the southwestern United States, has subjected the lands added to Death Valley National Monument in 1994 to increasing recreational use since World War II. These recreational uses include sightseeing, camping, picnicking, touring, photography, hiking, bird-watching, rockhounding, and off-road vehicle adventuring. The expanding public use of these lands has resulted in increasing regulation by federal and state land management agencies that have been forced to confront the complex problems associated with the need to protect significant natural and cultural resources while responding to the call for expanding recreational opportunities.[277]

The increasing public recreational use of the new lands during the post-World War II era has had significant impacts on their natural and cultural resources. The impact of recreational use on the resources in Saline Valley, for example, is described in the reminiscences of a faculty member of Deep Springs College who periodically visited the valley during the 1940s and 1950s. Reflecting on his past association with the valley, the author stated:

> I was first in the valley in the spring of 1940. Two of us on the faculty and fifteen or twenty students of Deep Springs College camped there on the annual student spring trip. . . .

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276. For accounts of early automobile travelers to the Death Valley region during the 1920s and 1930s, see Edna Brush Perkins, *The White Heart of Mojave: An Adventure with the Outdoors of the Desert* (New York, Boni and Liveright, 1922); Margaret Long, *The Shadow of the Arrow* (Caldwell, Idaho, The Caxton Printers, Ltd., 1941); Walt Wheelock, *Gentlewomen Adventurers in Death Valley* (Death Valley, California, The Death Valley '49ers, Inc., 1986); and Johnston, "To the Roof of the Panamints," pp. 20-23, 37-38, 40, 42, 44. A guide to principal highways and rough roads in Death Valley and surrounding areas may be found in Federal Writers' Project of the Works Progress Administration of Northern California, *American Guide Series, Death Valley, A Guide* (Boston, Houghton Mifflin Company, 1939), pp. 27-69. The museum collection in the Reference Library at Death Valley National Park has motion pictures of automobile travel experiences taken by a Mr. Frasher during the 1930s. The film depicts scenes and highlights of auto travel from Owens Valley to Saline Valley and Death Valley National Monument (DEVA 14035).

277. Warren, Knack, and von Till Warren, *A Cultural Resource Overview For The Amargosa-Mojave Basin Planning Units*, p. 246, and Richard H. Brooks, Richard Wilson, and Sheilagh Brooks, Archeological Research Center, University of Nevada, Las Vegas, Museum of Natural History, with sections by Joseph King, Matthew McMackin, Margaret Miller, Ralph Roske, and Arnie Cunningham Turner, *An Archaeological Inventory Report of the Owlshead/Amargosa-Mojave Basin Planning Units of the Southern California Desert Area*, Prepared for the U. S. Department of the Interior, Bureau of Land Management, California Desert District, Riverside, California, Contract No. YA-512-CT7-250, October 1981, pp. 40-41.

We went into the valley from the south end, over an amazing road hacked into an old waterfall at the entrance into the valley. We had the school's old ton-and-a-half truck, with dual wheels on the rear. I have a picture taken at one spot on that road where we had to take off one of the rear wheels on the right and let the outside wheel on the left hang over the edge in order to get around a sharp turn. . . .

We camped on the floor of the valley, just off the road on the east side, where Jimmy Hunter had set up a semi-permanent camp [Saline Valley Indian Ranch] . . . . Hunter Creek ran under the road then, with a fairly good flow in the spring. Jimmy had dug out a little pool as a reservoir since the creek often went dry in the summer. And he had built a table and a small platform where he could pitch a tent. The camp was in a mesquite grove that had once been used by one of the native tribes for tree burials. The washes under the trees were still sprinkled with beads, many fused by fire, blue and green glass and red and white Lewis and Clark trading beads. . .

Jimmy was gone when we camped there on my first trip, but his spot was very comfortable. . . . And I remember a lot of noise from the wild burros that seemed to get active at night. One night the whole herd charged through the camp while we slept, managing to miss trampling on us and doing little damage. On our last day, however, the burros were standing around near our camp, and two of the students got a notion that it would be good to have a pack burro for camping trips. They spotted a young colt and spent most of a morning chasing burros around the valley until a couple of them finally managed to tackle the colt and get a rope on him. The trip home was interesting, with fifteen or twenty boys and one recalcitrant young burro crowded in the back of the truck. The burro never got trained as a pack animal and finally became a real nuisance bothering the horses and cows on the [college's] ranch. He disappeared eventually.

There was an old mine with some buildings at the foot of Hunter Canyon, and at one time I remember an old caretaker there, but I think that was on a later trip. The canyon was beautiful, and we climbed up into it several times, up to a fine waterfall. . . .

As I remember, the cliff [not far from the salt lake] with petroglyphs was about a mile south of Hunter's camp and the creek crossing, on the right west of the road. The writing was visible from the road, many of the common figures for men and deer and water, some of them weathered but many of them sharp and clear. I remember that the cliff was intact after we had moved to Reno and spent a spring vacation in the valley with Ray and Alma Pflug about 1946. But when a group of us were there in the spring of 1947, the cliff had been dynamited and only broken remnants of the petroglyphs were scattered around. We picked up a few of the less damaged pieces, and a couple of them eventually appeared in the center of Laird's fireplace in his new house.

During that trip I also remember that we saw our first tourist activity in the valley. A school bus loaded with students from a junior college stopped at the creek and obviously considered being friendly. But we were a fairly disreputable

looking lot and we did our best to appear ominous, and they moved on. We had a kind of unexpressed feeling that we owned the valley and casual visitors didn't belong. . . .

The floor of the valley around Hunter's camp was generally barren except for the mesquite and some creosote bushes. There were wild flowers in the canyons and some willows along the creek. But a little farther south, near the cliff with the petroglyphs, desert holly flourished, the biggest and healthiest bushes I remember anywhere.

The lake at the lowest part of the valley, south of Hunter Creek, had water in it, but was mostly a salt flat. Some of the trestles and platforms of the old tram from the valley to Keeler were still standing and there were a lot of ceramic insulators lying around and lengths of insulated wire. . . .

The road — or the track — to the hot springs took off to the east somewhere between Hunter Creek and the lake, but was pretty nearly impossible for an ordinary car. We went up there in the ranch pickup in 1941 and got to the second spring [Palm Spring]. The springs were running, mostly trickling off into the bushes. We couldn't make in on the road beyond the second spring, and I have never been to the third. Sometime later, maybe in the late 1950s, Johnnie Belle and I took a chance on breaking an axle of the Volvo and went np to [Lower Warm] the spring to camp. By that time somebody had hauled up a couple of sacks of concrete and built a little pool and a kind of drainage ditch that kept the ground dry around the spring and conserved water. And later that night another couple, from California I think, came in and joined us camping there. We risked the drive up to the springs partly because somebody had diverted the creek, and it no longer served Hnnter's camp. Also hunters had set up barbed wire fences in a V-pattern with a corral at the end so that they could drive burros into an enclosure and easily get them on trucks for the dog-food market. Civilization had started to move in. . . .[278]

BLM RESOURCE MANAGEMENT AND PRESERVATION EFFORTS

Areas of Critical Environmental Concern

Responding to the increasing public visitation and demand for expanded recreational opportunities on public lands in the eastern California desert region, the Bureau of Land Management initiated efforts to preserve the area's natural and cultural resources while simultaneously making provision for their recreational use. As part of the *California Desert Conservation Area Plan: Final Environmental Impact Statement and Proposed Plan* (CDCA) in September 1980, the Bureau of Land Management adopted special interim management prescriptions for designated "areas of critical environmental concern [ACEC]." Among the ACECs that would be included in the lands added to Death Valley National Monument in 1994 were:

278. "Saline," ca. 1970s, pp. 1-6, Saline Preservation Association Collection, Los Angeles, California.

1. Eureka Valley Dunes — nominated to protect flora, fauna, and scenic values
2. Saline Valley — nominated to protect wildlife habitat and prehistoric and historic cultural resources
3. Darwin Falls/Canyon — nominated to protect scenic and biotic values
4. Surprise Canyon — nominated to protect scenic quality, wildlife habitat, unique vegetative resources, prehistoric values, and the historic mining settlement of Panamint City
5. Greenwater Canyon — nominated to provide protection for prehistoric occupation sites and petroglyphs

In addition *The California Desert Conservation Area Plan* identified other natural and cultural sites and areas that were determined to have less significance than ACECs. These sites and areas were designated for less restrictive regulation to protect their resource values.[279]

Following adoption of the CDCA plan, the Bureau of Land Management prepared management plans for the "areas of critical environmental concern" that were designed to protect their significant resources while providing for their recreational use and enjoyment. On October 22, 1982, for instance, the BLM approved "A Sikes Act Management Plan for the Saline Valley Area of Critical Environmental Concern (ACEC) (CA-06-ACEC-4) and the Saline Valley Marsh Wildlife Habitat Management Area (WHMA) (CA-06-WHA-4). According to the management plan, the Saline Valley ACEC, consisting of some 9,000 acres including the salt marsh and sand dunes in the valley, had been identified in *The California Desert Conservation Area Plan* to "provide timely, protective management of significant wildlife habitats (sand dune, mesquite-thicket, meadow and wetland), and prehistoric and historic cultural resources." The corresponding wildlife habitat management area in Saline Valley, also identified in the CDCA plan, was established "to provide further protection and enhancement of wildlife resources through the development and implementation of a wildlife habitat management plan." This plan was developed and implemented jointly with the California Department of Fish and Game which had recognized the ecological importance of the Saline Valley marsh in the mid-1970s and purchased 520 acres of private land in the area with the aid of the State Wildlife Conservation Board.[280]

To protect the diverse fauna and wildlife habitat in the Saline Valley area, the management plan closed the low-lying dunes in the center of the valley and the Saline Range on the north edge of the valley to vehicular use and stipulated that a fence be constructed to keep feral burros out of important wildlife habitat. Unrestricted camping and vehicle parking in portions of the valley which contained essential habitat for a variety of wildlife, especially in the mesquite thickets adjacent to surface water and the

279. U. S. Department of the Interior, Bureau of Land Management, *The California Desert Conservation Area Plan*, Appendix, Volume C, Appendix IV, "Areas of Critical Environmental Concern," pp. 1-72 ff.

280. About 1950, Paul Wopschall, a painting contractor in the Los Angeles area, purchased land around the freshwater spring and lake adjacent to the salt lake marsh. Several cabins were constructed near the lake to provide weekend and vacation accommodations for Wopschall and his friends. Duck hunting was a favorite pastime of those who visited the Wopschall property. Allegedly, Wopschall also used the facilities on the site to rehabilitate alcoholics. The spring was enclosed with cutstone and mortar in November 1970. Wopschall's son sold the property to the State of California for use as a game refuge during the mid-1970s. Personal communication from Alan Akin of Keeler, California, on October 19, 1996.

marsh, were having an adverse impact on wildlife resources. Thus, the plan stipulated that the marsh would be accessible to the public on a day-use basis only. A path would lead to the stone-lined reservoir from a designated camping/parking area adjacent to the Saline Valley road to allow access to the water. The path would cross the burro enclosure fence through an "angler access."

The artesian well near the salt marsh was another major source of water and thus had become a popular camping area. To curtail adverse impacts to this resource resulting from unrestricted camping activities, an area was established in the mesquite area approximately 100-200 yards from the well. A path and "angler access" gate would permit access through the burro enclosure and to the water source.

Day-use parking would be available within 100 feet of designated vehicle routes throughout Saline Valley. Vehicular-oriented camping, however, would be limited to designated areas.

Abundant water in portions of Saline Valley had provided for the buildup of a high-density burro population. Burro concentration areas included the marsh, mesquite thickets, artesian well, and Hunter Canyon stream. Approximately 1,500 burros had been removed by the BLM from the Saline Valley, Hunter Mountain, and Panamint Springs areas in 1981. At the end of the removal, only 35 burros were observed in Saline Valley, but the number of animals observed in the vicinity of water sources indicated to BLM officials that the population was of sufficient size to impact adversely the wildlife habitat surrounding water sources in the valley. Even though the CDCA plan had specified that 169 burros would be retained in the Saline Valley region, BLM officials now determined that management and protection of the marsh, water sources and surrounding habitat, and cultural resources required that burros be excluded in selected areas and that their overall population be limited. Burro population control would be accomplished through burro capture with traps placed near water sources on an as-needed basis.

To protect habitat for the benefit of native wildlife and archeological resources which were usually associated with water sources, approximately 5 miles of fence would be constructed to exclude burros from significant wildlife habitat. Three miles would be located at the marsh and two at the artesian well. The fencing would be five strand, barbed-wire livestock fence. Habitat/water sources would be developed, exotic vegetation would be removed, and steps would be taken to protect, preserve, and interpret cultural and natural resources.[281]

Although ranger patrols were initiated by the Bureau of Land Management to enforce provisions of the management plan for Saline Valley, limited funding and personnel curtailed the effectiveness of the bureau's resource protection services. Nevertheless, BLM law enforcement officers attempted to protect the area as best they could. As a result of an investigation by Mike Hubbard in December 1992, for instance, three persons pleaded

281. U. S. Department of the Interior, Bureau of Land Management, California Desert District, Ridgecrest Resource Area, "A Sikes Act Management Plan For the Saline Valley Area of Critical Environmental Concern (ACEC) (CA-06-ACEC-4) and the Saline Valley Marsh Wildlife Habitat Management Area (WHMA) (CA-06-WHA-4), October 22, 1982. A copy of this plan may be found in the "New Lands Files" in Caven Clark's office in the Resources Management Division at Death Valley National Park.

guilty to one count "of defacing a known historic resource" for removing 14 tram wheels and other pieces of equipment from the Saline Valley salt tram and paid a combined $1,800 line.[282]

Less than one month after the Saline Valley management plan was adopted, the Bureau of Land Management approved "A Sikes Act Management Plan for the Eureka Dunes Area of Critical Environmental Concern (ACEC) (CA-06-ACEC-3) and the Eureka Dunes Wildlife Habitat Management Area (WHMA) (CA-06--WHA-3) to protect the cultural and natural resources and wilderness and scenic values of the area. Prior to adoption of the management plan, the bureau had closed the Eureka Sand Dunes to vehicular traffic to eliminate motorized vehicle conflicts and to preserve the Eureka dune grass, an endemic grass found nowhere else in the world. Subsequent to approval of the management plan, the Eureka Sand Dunes were designated a National Natural Landmark in 1983 by the Secretary of the Interior, thus identifying the 4,200-acre area as one of America's unique natural heritage sites. Extending over an area some 3.3 miles in length and 1.5 miles in width and reaching a height of nearly 700 feet, the Eureka Sand Dunes, which consist of both star-shaped and crescent-shaped dune configurations, is one of the largest and most significant dune systems in the United States.[283]

One of the more recent ACEC management plans adopted by the Bureau of Land Management was the *Management Plan for Greenwater Canyon Cultural Area: An Area of Critical Environmental Concern* approved in September 1988. As stated in the plan's preface, the Greenwater Canyon Cultural Area contains one of the "finest known collections of painted (pictographs) rock art sites" in the California desert region. In addition the canyon contains "excellent examples of carved (petroglyph) rock art sites, rockshelters with dry deposits yielding basketry, surface sites with diagnostic artifacts dating to at least 8,000 years BP, and pack-rat midden sites ideal for environmental reconstruction back into the Pleistocene Era." According to the management plan's introduction, the purpose of the plan was to "develop management prescriptions for the Greenwater Canyon ACEC that allow the cultural properties of the area to be recorded through nondestructive means and to be preserved as long as possible for future scientific investigation and spiritual use by Native Americans." Accordingly, a number of management actions were prescribed, including: (1) a documentation program for rock art sites; (2) a conservation program to preserve deteriorating rock art panels; (3) continuation of motor vehicle exclusion from the area; (4) prohibition of camping in the area; (5) erection of vehicle and pedestrian barriers at cultural properties; (6) posting of identification, interpretation, and regulatory signs; and (7) prohibition of use of chemical fire retardants in the area. A site monitoring program

282. *Inyo Register*, January 13, 1993.

283. U. S. Department of the Interior, Bureau of Land Management, California Desert District, Ridgecrest Resource Area, "A Sikes Act Management Plan for the Eureka Valley Dunes Area of Critical Environmental Concern (ACEC)(CA-06-ACEC–3) and the Eureka Dunes Wildlife Habitat Management Area (WHMA) (CA-06-WHMA-3), November 19, 1982. A copy of the management plan may be found in the "New Lands Files" in Caven Clark's office in the Resource Management Division at Death Valley National Park. Also see, "Eureka Sand Dunes National Natural Landmark," Dedication ceremonies brochure, April 28, 1984, in Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area, and Lew and Ginny Clark, *High Mountains & Deep Valleys: The Gold Bonanza Days* (San Luis Obispo, California, Western Trails Publications, 1987), p. 95.

and ranger patrols were established to ensure that the management prescriptions were enforced.[284]

Historic Mining Trail Network in the Inyo Mountains

In 1989 "Friends of the Inyo Wilderness" BLM volunteers began assisting Richard S. (Steve) Smith, Chief, Recreation and Wilderness, in the bureau's Ridgecrest Resource Area office, with a multi-year project to map and evaluate the historic mining trails and canyons in the Inyo Mountains immediately to the west of lands added to Death Valley National Monument in 1994. Although these mining trails are outside of the park, they are associated with mining operations in or near the expanded park boundaries. Prior to establishment of this group and program, individuals and members of the Desert Peaks Section and the Desert Survivors, organizations concerned with protection of desert resources and the pursuit of desert recreation experiences, had begun exploring this extensive, yet largely-forgotten network of trails traversing the Inyo Mountains, which were part of a proposed 205,000-acre Inyo Wilderness area. The area would be formally designated in the California Desert Protection Act of 1994. Thus, more resource-related information was necessary for interim management and future wilderness management planning. In addition the bureau wanted more information on the Inyos so that it could provide such data to the growing number of visitors who were requesting information on access and backpacking opportunities in the area. Hence the volunteer organization conducted a variety of projects, including trail condition inventories and evaluations, alignment mapping, limited directional signing, and light maintenance work on some segments. Several cabins, including the Beveridge, Frenchy's, Big Horn, and Keynot, were stabilized, visitor use was documented, significant cultural and natural resource values were recorded, and two cleanup projects at the Keynot Mine were conducted.

By July 1994 12 major trails in the Inyos, totalling approximately 112 miles in length, had been identified and inventoried. These trails included Daisy Canyon, Upper Hunter Canyon, Long John Canyon, Burgess Mine-Mt. Inyo, Forgotten Pass (French Spring-Beveridge Millsite), Upper Beveridge, Cove Springs, Snowflake, Union Wash, Keynot (Saline-Forgotten Pass Trail), McElvoy, and Lonesome Miner. The latter trail, which forms the heart of the Inyo trail system, was given its name by volunteer Wendell Moyer, who prepared the aforementioned history of the Saline Valley Indian Ranch. This trail, a 40-mile historic mining trail which traverses the crest of the Inyos from a trailhead near Reward in Owens Valley to a trailhead in Hunter Canyon west of Saline Valley, connects most of the canyons and trails to form the 112-mile interconnecting network. Ongoing work by the volunteers includes identification and inventory of other trails in the Inyos, including the Union Wash Ridge-Mt. Inyo, Upper McElvoy Canyon-Lonesome Miner, Beveridge Ridge-Snowflake Trail, and Trepier Mine.[285]

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284. U. S. Department of the Interior, Bureau of Land Management, California Desert District, Barstow Resource Area, *Management Plan for Greentwater Canyon Cultural Area: An Area of Critical Environmental Concern*, September 1988. A copy of this management plan may be found in the Reference Library at Death Valley National Park.

285. Steven Smith, "Historic Trail Network, Inyo Mountains, Update Report," *Desert Sage*, July 1994, pp. 14-16; Memorandum, Steve to Lee [re Inyo Mountains Wilderness — Features and BLM Volunteer Management Work], March 15, 1995; "Summary of Wildland Route and Trip Information, Bureau of Land Management -

Adopt-A-Cabin Program

During the late 1980s, the Bureau of Land Management also initiated an "Adopt-A Cabin" program, the purpose of which was to utilize backcountry cabins on public lands under its administration as destination points for vehicular- and non-vehicular-based visitor camping sites. The program was designed to set up memoranda of understanding with individuals or organizations so that volunteers could maintain cabins which were selected and approved for the program. The BLM would assist with materials and tools to help with maintenance of the cabins.

Use of the cabins under the Adopt-A-Cabin program was on a first-come, first-served basis with no reservation system. Users were encouraged to stay no more than three days and two nights, but the standard maximum camping limit of 14 days for public land in the California Desert Conservation Area was applied. Visitors were responsible for maintaining and cleaning the cabins after use.

By February 1994 maintenance/preservation activities under the program had been initiated on several cabins in or near lands added to Death Valley National Monument later that year. These structures included the Nelson Range Cabin located on the north side of Lee Flat on the west slope of the Nelson Range; the Keynot Mine Cabin; the Beveridge Ridge Cabin on the east side of the Inyo Mountains; and the Barker and Neumana cabins in the Goler Wash and Goler Canyon areas on the west slope of the southern Panamints. Cabins that were considered to have potential for the program included the Hall Canyon Cabin located at the upper end of the canyon; the Panamint City cabin, a modern structure in Surprise Canyon near the historic Panamint City smelter smokestack; the Inyo Crest Salt Tram Cabin, a 5-room historic cabin on the crest of the Inyo Range; the Burgess Mine Cabin on the Inyo crest at the north end of the Inyo Crest Road; the Jail Canyon Cabin at the upper end of the road in Jail Canyon; Frenchy's Cabin in upper Beveridge Canyon; the Upper Keynot Cabin; and the Hunter Canyon Cabin.[286]

MISCELLANEA

The lands added to Death Valley National Monument in 1994 have also been the site of events and activities that are associated with some of the themes that have characterized American history during World War II and subsequent decades.

Ridgecrest Resource Area, Inyo Mountains," n. d., pp. 19-22; and Bureau of Land Management, "Lonesome Miner Trail, Inyo Mountains Wilderness," n. d.; Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area Office. At the present time, Thomas S. Budlong, a resident of Los Angeles who has been involved with the volunteer trail program, is preparing a book on the historic mining trails in the Inyo Mountains.

286. Memorandum, Steve Smith to Steering Committee, [re Ridgecrest Adopt-A-Cabin Program — Guidelines, Status and Planned Actions] February 1, 1994, Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area Office.

Military Aircraft Crashes

During October 1944, a B-24 Liberator bomber from Muroc Army Base crash-landed in the salt marsh in Saline Valley while engaged in target practice. The plane had been delivered from the Ford Motor Company's aircraft factory in Willow Run, Michigan, to the U.S. Army Air Force on June 17, 1944. After acceptance by the Army Air Force the airplane was delivered to Muroc Army Air Base in the Mojave Desert on June 20. On July 1, the aircraft was converted to a TB-24J for use in training aerial gunners. The training exercises were conducted over the desert region north of Panamint Valley where air-to-air gunnery practice could be carried out without fear of firing down on populated areas. During the exercises, the target tow ship, an Air Force A-24, better known as the "Douglas Dauntless" dive bomber, flew by at about 12,000 feet, towing typical sleeve targets of the era. The waist gunners, as well as the turret gunners, would blaze away at the white-colored sleeve, learning the techniques of leading their targets and the deceptive distances associated with air-to-air gunnery. This training continued almost daily from early July until late October 1944. During the latter part of that month, the crew of the TB-24J was conducting target practice over Saline Valley when two of its engines quit. Even at full power, the two remaining engines did not provide sufficient thrust to lift the bomber over Saline Valley's surrounding mountains. Seeing the flat valley floor below, the pilot flared in for an emergency landing, but unfortunately for the crew the aircraft was too close to the soft salt marsh. When the airplane touched down, the salt crust collapsed, and gray subsurface mud exploded from the force of the plowing landing gear, covering the plane inside and out. Fearing an explosion, the crew hastily scrambled out of the plane. In his haste Corporal Robert Dunlap, the aircraft's engineer, slipped into a still turning propeller and severed a leg. The crew slogged to the shore of the lake, carrying the injured engineer in the nearly 100-degree heat. After a time the fighter plane towing the bomber's target noticed the downed plane and called for a vehicle to drive into Saline Valley to retrieve the crew and take Corporal Dunlap to the hospital at Lone Pine. Because of his massive loss of blood, Dunlap died in the hospital. After the war someone managed to salvage a large portion of the bomber by cutting it into sections with an acetylene torch, but components of the plane, as well as its landing track, may still be seen in the salt marsh.[287]

During recent decades, several other notable aircraft crashes have occurred in or near the lands added to Death Valley in 1994. An SA-16 crashed in the vicinity of Towne Pass on January 24, 1952, while on a covert training mission from Mountain Home Air Force Base near Boise, Idaho, to San Diego. This mission was flown by the 580th Air Resupply and Communications Squadron, a unit which had been established by the U.S. Air Force at the behest of the Central Intelligence Agency to penetrate foreign borders for the purpose of infiltrating agents and equipment to countries friendly toward the United States but under the control of Communist governments. Later on August 15, 1990, a Navy F-18 training aircraft exploded and crashed on Hunter Mountain, starting a forest fire that eventually burned 200 acres of piñon woodland during the next several days. The impact site was a crater 20 feet in diameter and 8 feet in depth. Carbon fibers, aircraft parts, and 2-3 inches

287. R. W. Koch, "The Mystery of the Saline Valley Liberator," *Air Classics*, pp. 31-35, Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area Office, and Thomas S. Budlong, "Penecircumambulation of Lake Saline: Desert Exploration in Two Parts," *California Explorer* (November/December 1995), pp. 6-7.

of ash were strewn over a wedge-shaped area 3/4 mile by 1/2 mile in extent north of the impact site.[288]

Warm Springs — Saline Valley

Although events surrounding the early recreational use of the Warm Springs in Saline Valley are somewhat obscure, local Euro-Americans had begun visiting and soaking in the springs by the early 1940s. For instance, Gordon Newell, a sculptor living in Darwin, made repeated visits to the Warm Springs during the 1940s.[289] Although other area residents probably visited the springs, Newell observed that no one was at the springs during his visits. According to current users of the springs, a young man named Walt (nickname Wizard) and a companion who were roping burros in Saline Valley chased several burros up an arm of the valley in 1947. Riding their horses over a rise, the men found a green area of relatively lush vegetation near the springs. Thus, they "rediscovered" the lower of three warm springs (about one-half mile above Lower Warm Spring is Palm Spring, sometimes referred to as Middle Warm Spring, and approximately 3 miles farther up the canyon is Upper Warm Spring). A concrete tub, approximately 2 feet deep and 4 feet in diameter, had been constructed at the Lower Warm Spring, presumably by a cattleman or a sheepherder, to catch the runoff. As of 1947, there were reportedly no other improvements at the springs and no "signs" that anyone was visiting or using them.

During the post-World War II era, people began visiting Lower Warm Spring intermittently to camp and soak in the warm water. Like other remote unpatrolled areas in the desert, the warm springs slowly became "trashed." Some visitors built fire rings indiscriminately and left their trash lying on the ground when they left. Other visitors routinely soaked and washed their dishes in the source of the water for the springs — the natural pool from which the water for the Lower Warm Spring flowed.[290]

Despite the gradual "trashing" of the Warm Springs vicinity, some visitors wrote accounts describing the natural beauty of the area. In an article in *Westways* in April 1961, for instance, Dorothy Robertson described the adventure of a three-vehicle caravan from Olancha to Saline Valley. After a lengthy journey through the barren desert Robertson noted:

> Suddenly ahead of us we saw Lower Warm Springs, its two natural hot springs fringed with date palms. One of the pools was much too hot for comfort, while the other was a pleasant 85 degrees. A small man-made pool caught the overflow.

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288. R. W. Koch, "The CIA's Death Valley Albatross," *Air Classics*, pp. 68-73, 98, Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area Office, and U. S. Department of the Interior, National Park Service, *An Archeological Survey of a Navy F-18 Crash Site, Hunter Mountain, Death Valley National Park, California*, Jeffrey F. Burton, August 1996, pp. 1-2. Another Navy plane crashed in Saline Valley in June 1997 during preparation of this study.

289. Kief Hillsbery, "Paradise Lost," *California Magazine* (September 1983), p. 102.

290. Unless otherwise noted, material for this section on the Warm Springs area has been extracted from Joseph M. Weiss, "Observations on User Management at the Saline Valley Warm Springs, Ca.," Senior Thesis, Spring 1982, pp. 1-46. (Copy on file in Saline Preservation Association Collection, Los Angeles.)

> Some miner had homesteaded the oasis, for a neat tent-house awaited its owner's return.
>
> The spring sun was warm, for the elevation was only 1,100 feet, but we discovered that the nights could be chilly. This delightful place would be much too hot during the summer.
>
> Half a mile eastward is Middle Warm Springs, also date-fringed. This one was a warm 115 degrees, about four feet deep, clear as a mirror and untenanted. . . .
>
> Another three and two-tenths miles brought us to upper Warm Springs, a large straggling oasis. This pool was well hidden with mesquite, willow and brush. It was about ten feet wide and twenty feet long, waist-deep, pleasantly warm and circled for some twenty feet by rank grass.
>
> The sparkling water was crystal clear but we were to discover later, when some of us took a dip, that the bottom of the pool was inches deep in soft, squishy mud. . . .[291]

During the fall of 1964, an unidentified man and his wife, who had sold their home in Los Angeles to camp in the desert while he wrote a religious book, reportedly arrived at Lower Warm Spring to spend the winter. This couple began to gather the trash, destroying what would burn and dumping the remainder into a nearby gully that was later covered by fill. The couple encouraged other visitors to aid in cleaning up the area. Many of the informal fire rings were dismantled and replaced by a central fire pit which all campers began to share.

While cleaning the area, the couple began to construct a new and larger tub for soaking, soliciting contributions from those who visited the warm springs. By early 1965 the new tub, 3 feet deep and 10 feet in diameter, was constructed. It was large enough for a dozen people to soak in at one time. The couple left Saline Valley that spring, never to return.

Upper Warm Spring, the most isolated and difficult of the three springs to reach, have no man-made soaking facilities. During the early 1980s, however, the Bureau of Land Management constructed a fence around the spring to prevent feral burros from having access to the water. Desert pupfish were introduced in the springs, but they did not long survive. Thereafter, Upper Warm Spring was used as a soaking site by those who wanted to get away from the more easily-reached and popularly-used springs below.

Palm Spring is less protected from the wind and sun than Lower Warm Spring, because it is not surrounded by mesquite trees. Nevertheless, it became increasingly attractive as an alternate soaking area, partly because of the panoramic view of the surrounding valley and mountains that it provided. Like Lower Warm Spring, Palm Spring has a source pool of its own. People soaked in the source pool until 1968 when a group of users built a small retaining wall around the pool, laid a buried pipe to it, and constructed the first soaking pool.

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291. Robertson, "At the End of a Back Country Trail," pp. 16-18. Also see ibid., "Three Pools In the Desert," pp. 29-31, for an account of a return visit to the springs.

By the late 1960s the Warm Springs had become a mecca for "hippies" and those preferring hedonist lifestyles characteristic of the era. Reportedly, the notorious Charles Manson family visited the springs periodically during its desert wanderings. The requisite peace symbol of the era still adorns one red volcanic mountainside in the valley near the springs. Since that time, the Warm Springs have been the focus of steadily increasing visitation as a result of word of mouth recommendations and listings in popular hot springs literature. Whereas one party a week was common during the early 1960s, visitors began to stay at the springs for longer periods of time. Often parties of two or more began to camp at the springs for weeks or months, particularly during the winter season, but the greatest use of the springs came from "regulars" who began to make short but frequent trips to the springs.

Although both Palm Spring and Lower Warm Spring provided clean drinking water and pools to soak in, the lower spring continued to attract the majority of soakers. In 1971 a group of regular users constructed a larger four-foot-deep soaking pool at the lower spring. Besides the pipe, concrete, and nearby rocks which were used in its construction, sand was brought from the Eureka Valley sand dunes via a small aircraft operated by one of the regulars, using the "rough-and-ready" airstrip that had reportedly been laid out near the springs in 1967.[292] Thereafter, the runoff from the soaking pool, which has a constant flow of hot water pouring into it, watered a palm-tree lined lawn and filled a large goldfish pond. Water flowed into the soak via a buried pipe at water level or through an old standing water pump which sent the hot water cascading down an artificial waterfall, thus cooling the water before it entered the new soaking pool. In addition to the soaking pools at each of the springs, separate pools of water were constructed for washing dishes.

A fourth soaking pool at Lower Warm Spring was constructed by Walt, who had become a building contractor, and some 25 other "regulars" in March 1978. This hexagonal soaking pool was built flush with the ground, surrounded by a stone deck, the overflow trough serving as a foot wash. Later, a stone and wood bench was added to the deck and palm trees were planted downhill from the footwash. The pool, which could be drained for cleaning, seated more than a dozen soakers.

During the past two decades, "regulars" to the Warm Springs, "consisting of an eclectic collection of bohemians, loners, individualists, tourists, and others who simply share a love for hot springs and a desire to escape from the complexities of modern life," have developed an informal self-policing community that maintains and cleans the springs and their vicinity. Beginning in the 1960s, the springs slowly became an informal "clothes are optional" resort, and by the early 1980s nudity had become the norm. By 1980 the Bureau of Land Management estimated that an average of 53 people visited the springs on a daily basis. On holiday weekends, according to the bureau, off-road or four-wheel-drive clubs would meet at the springs, swelling the population to as much as 150. Regular users, however, believed that the daily average of visitors to the springs was closer to 30

292. Hillsbery, "Paradise Lost," p. 105.

persons. Thanksgiving, Christmas, and New Year's holidays attracted the largest crowds of the year, some 200 people often arriving for large holiday festive celebrations.[293]

During the period from the late 1960s to the early 1980s, the Lower Warm Spring area witnessed the layout of several rough aircraft landing strips, construction of a crude, rustic cabin, deployment of 12 quasi-permanent trailers, and installation of three pit toilets. In 1983 Rich Baldwin, who had lived at the site since the mid-1970s and had located the "Lucky Rich mill site claim," filed a plan of operations for the site in August 1983 that was approved by the Bureau of Land Management.[294] By November 1984, however, Baldwin had left the area, and the bureau commenced efforts to remove a 30-foot trailer, automobile, camper, and other debris from the site.

Several months earlier, the bureau, which had initiated efforts to establish federal government presence in the valley by installing signs and a temporary ranger station during the late 1970s, authorized deployment of a year-round volunteer on-site to assist the agency in managing and maintaining the Warm Springs area. In 1985 the bureau designated the Warm Springs vicinity as a "Special Management Area" with a 180-day camping limit. In September 1985 the bureau began efforts to enforce the 180-day camping limit, removing the rustic cabin and the trailers and vehicles that violated the new regulations. During the following year, the bureau established new regulations prohibiting stays at the springs exceeding two weeks in length between October and April. These efforts to regulate activity in the valley brought the bureau and users of the springs into increasing conflict, because the latter wished to maintain the springs as a self-policing community free from publicity and federal restrictions.[295]

The 1990 issue of *The Hot Springs Gazette* contained a description of the features, facilities, and lifestyles at Warm Springs in Saline Valley. The publication noted that the "dirt roads" to the springs were "absolutely horrendous." On the "plus side," however, there were two

293. Weiss, "Observations on User Management at the Saline Valley Warm Springs," pp. 1-46; Hillsbery, "Paradise Lost," pp. 51-54, 102-05; *Los Angeles Times*, November 24, 1992; and Mara Smith, "Saline Valley Warm Springs: A Place Like No Other," *Nude & Natural*, XV (No. 4, 1996), pp. 46-48.

294. Baldwin also helped stranded motorists in the valley, oversaw cleanup activities and initiated efforts to preserve the peace at the springs, and established a citizen band emergency radio network for the isolated valley. Don Dwiggins to Tom Evans, editor, *Newsbeat*, February 19, 1977, Sophia A. Merk Collection, Ridgecrest, California. Automobile travel through Saline Valley continued to be hazardous. One notable event occurred in August 1968 when two men and a teenage boy were found dead some 4 miles from where they had abandoned their vehicle after transmission problems had caused it to break down on the Saline Valley road in 120-degree heat. *Inyo Register*, August 14, 1968, and Daniel Cronkite, *Death Valley's Victims: A Descriptive Chronology, 1849-1977* (Morongo Valley, California, The Sagebrush Press, 1977), p. 39.

295. Tom Evans, "User Conflict Clouds Remote Saline Valley," *B.L.M. Newsbeat*, February 1977, pp. 1-10; U. S. Department of the Interior, Bureau of Land Management, California Desert District, IMP Action Report, "Occupancy and Recreation Use, Warm Springs, March 26, 1985, "WSA 117, Saline Valley, Rich Baldwin Occupancy Use Records," Mining Files, Resources Management Division, Death Valley National Park; and *Los Angeles Times*, November 24, 1992. In 1992 the Bureau of Land Management rejected a request to locate a mill site at Lower Warm Spring for the purpose of cleaning quartz crystals removed from a nearby "rockhounding pit." U. S. Department of the Interior, Bureau of Land Management, Impact to Wilderness Values, Evaluation under Non-Impairment Standard, Ridgecrest Resource Area, Project — Defrain Crystal Mining Plan of Operation (CAMC 241816), July 1, 1992, "WSA 117, 120, Crystal Mine and Millsite, Defrain Saline Valley Site," Mining Files, Resources Management Division, Death Valley National Park.

airstrips — "one airstrip and one strip which is strictly for Maules and Supercubs." The "half-hour flight from Big Pine," was "a nice alternative to the bone-jarring road trip." The article stated:

> The ambiance of the lower spring is, to say the least, unique. Sometimes downright loony! There is a community area which has a large soaking pool lined with smooth glacial stones and concrete, a dishwashing area with hot running water, a shower, a library, a large table for the great pot-luck meals that happen from time to time, a fire pit complete with benches for the wild songfest parties. It is set among the palms and other trees and has all the charm of a desert oasis, with a bonus of HOT water. . . .
>
> The source of the spring is up the hill about a hundred feet and is reminiscent of some of the geothermal phenomena of Yellowstone Park. It surfaces as two deep interconnected caves full of hot and very clear water. The source is sacred — no dipping. Water is piped from there to the various pools, etc. Just to the east of the source is the "Sunrise Pool" which provides a little more privacy than the main pool. It too is concrete and glacial stone. (It actually gives a better view of sunsets. . . .)
>
> The whole area around the lower springs is lush with trees and other vegetation and actually provides good privacy for campsites. Adding to the charm is the "little house," a tuholer with one pink seat and one blue . . . and the greatest collection of cartoons and graffiti around!
>
> The middle spring at Saline is about a twenty-minute walk up the road. There are three pools here, all concrete and rock lined, ranging in temperature from about 105 [degrees] to around 85 [degrees]. The cooler ones are warmer in summer. The "Wizard Pool" is the warmest and is a masterpiece of workmanship, complete with a nice stone deck around it and two masonry benches. Built in 1978, it is a true work of art. The atmosphere here is a bit more laid back and most of the folks who are not regulars (or residents) seem to prefer this area to all the comparative "wild-and-crazy" of the lower springs. . . .
>
> Further up the road is the "Upper Upper Pool." The road deteriorates beyond the middle spring and one has the choice between a vehicle-beating, bone-jarring 20 minute ride or a nice hour's walk. . . . The UUP is a tad more primitive with grass around it and a bottom which can run from sandy to squishy. But it is generally long on privacy. The view of the valley is restricted somewhat but the mountains more than make up for it. . . .[296]

As a result of the increasing concern of springs' users that federal land management agencies, such as the Bureau of Land Management and the National Park Service, would regulate activities at the Warm Springs, the users have formed two organizations to

296. Roger Phillips, ed., *The Hot Springs Gazette*, Issue No. 15 (Helena, Montana, Silvertip Publishing Company, 1990), pp. 8-16. Also see Jayson Loam and Marjorie Gersh, *Hot Springs and Hot Pools of the Southwest* (n. p., 1994), pp. 136-37, and Neil Ratzlaff, "Saline Valley Hot Springs Trip, March 4-6," *The Survivor* (Spring 1994), pp. 25-26.

protect their interests against federal encroachment. The Saline Preservation Association (SPA), begun in 1986 by valley residents Sheri Cosgrove and Glenn Young with a newsletter, is currently led by spokesperson David Bybee of Los Angeles. The Saline Organization and Kindred Spirits (SOAKS) was formed during the early 1990s, electing five individuals to serve on its leadership team.[297]

Charles Manson Family

Beginning in the summer of 1967, the Death Valley region and surrounding areas in the eastern California desert became the focus of a mass migration, calling college students, runaways, "nature children," and other individuals who identified with "counter-cultural" groups. For the most part, these young people were long-haired, blue-jeaned "hippies," seeking isolation and freedom from the norms of American society which they abhorred.

In October 1967 a group of 17 young adults and two babies, led by Charles Manson, left a temporary camping spot at the dilapidated Spahn Movie Ranch in the Santa Monica Mountains northwest of Los Angeles and headed for Panamint Valley in an old reconditioned bus in which the seats had been removed and mattresses, curtains, and psychedelic accoutrements had been installed. One of the young women of the group, that would later become known as the notorious "Manson Family," was the granddaughter of Mrs. William Myers, owner of the aforementioned Myers Ranch in Goler Wash just outside the pre-1994 boundaries of Death Valley National Monument. Her favorable description of the scenery and isolation of the ranch prompted the group to travel to Goler Wash. Manson found the "mystique" of the aforementioned adjacent and largely vacated Barker Ranch (except for an occasional prospector who spent a night there while wandering through the Panamints) appealing, and after gaining the assent of a Barker family member, who was living at the Indian Ranch in Panamint Valley, the family moved into the deteriorating buildings on the ranch property.

The "Manson Family" soon gained access to other vehicles in addition to its bus, and the "family" members began periodic forays throughout the desert country. Small parties camped in virtually every major canyon in the Panamints, and periodic trips were made throughout the Death Valley region, including the communities of Shoshone, Tecopa, and Trona, as well as towns in Owens Valley and the Warm Springs in Saline Valley. Members frequently returned to Los Angeles to renew supplies of marijuana, hashish, and acid, and most spent the winter months in the Los Angeles area. By generally avoiding contacts with the public, their presence in the isolated desert country was little noticed by area residents or law enforcement agencies. Their mode of living, rough appearance, and frequent nudity, however, served as a "repulsive buffer" against desert travelers and some of the prospectors with whom they came in contact. The presence of other "hippie" groups in the desert country, however, diminished observation or continuing identification of the "family."

297. Steven Smith, "Saline Valley Warm Springs," n. d., pp. 46-48, Richard S. (Steve) Smith Files, Bureau of Land Management, Ridgecrest (California) Resource Area Office; *Bakersfield Californian*, November 26, 1994; and Michael Parfit, "California Desert Lands: A Tribute to Sublime Desolation," *National Geographic*, CLXXXIX (May 1996), pp. 76-79.

Following the Tate and La Bianca murders in the Beverly Hills section of Los Angeles on the night of August 9-10, 1969, 26 members of the "Manson Family," including their leader, were arrested at the Barker Ranch on October 10 and 12, 1969, pursuant to a collaborative investigative effort by the National Park Service, Inyo County District Attorney's and Sheriff's Offices, and California Highway Patrol. Subsequently, those arrested were incarcerated in the county jail in Independence, and after further investigation seven members were charged with the nine murders. The extensive media coverage of the murder investigations and the arrest of the "Manson Family" members, as well as their conviction at the widely-heralded trial, focused world-wide attention on the "counter-cultural" movement in southern and eastern California and the Death Valley region.[298]

CALIFORNIA DESERT PROTECTION ACT OF 1994

After a lengthy 20-year political battle to provide increased federal protection to the desert lands in southern and eastern California, the California Desert Protection Act (Public Law No. 103-433) was enacted into law on October 31, 1994. Section 2 of the act stated that Congress "finds and declares that –

(1) the federally owned desert lands of southern California constitute a public wildland resource of extraordinary and inestimable value for this and future generations;

(2) these desert wildlands display unique scenic, historical, archeological, environmental, ecological, wildlife, cultural, scientific, educational, and recreational values used and enjoyed by millions of Americans for hiking and camping, scientific study and scenic appreciation;

(3) the public land resources of the California desert now face and are increasingly threatened by adverse pressures which would impair, dilute, and destroy their public and natural values;

(4) the California desert, embracing wilderness lands, units of the National Park System, other Federal lands, State parks and other State lands, and private lands, constitutes a cohesive unit posing unique and difficult resource protection and management challenges;

(5) through designation of national monuments by Presidential proclamation, through enactment of general public land statutes. . . . and through interim administrative actions, the Federal Government has begun the process of appropriately providing for protection of the significant resources of the public lands in the California desert; and

(6) statutory land unit designations are needed to afford the full protection which the resources and public land values of the California desert merit.

298. For further data on the "Manson Family," see Bob Murphy, *Desert Shadows: A True Story of the Charles Manson Family in Death Valley* (Morongo Valley, California, Sagebrush Press, 1993).

Thus, the California Desert Protection Act was designed "to secure for the American people of this and future generations an enduring heritage of wilderness, national parks, and public land values in the California desert." Under the legislation, "appropriate public lands" were included in the National Park and National Wilderness Preservation systems to

(A) preserve unrivaled scenic, geologic, and wildlife values associated with these unique natural landscapes;

(B) perpetuate in their natural state significant and diverse ecosystems of the California desert;

(C) protect and preserve historical and cultural values of the California desert associated with ancient Indian cultures, patterns of western exploration and settlement, and sites exemplifying the mining, ranching and railroading history of the Old West;

(D) provide opportunities for compatible outdoor public recreation, protect and interpret ecological and geological features and historic, paleontological, and archeological sites, maintain wilderness resource values, and promote public understanding and appreciation of the California desert; and

(E) retain and enhance opportunities for scientific research in undisturbed ecosystems.

The California Desert Protection Act tripled federal park and wilderness acreage in the southern and eastern parts of the state to more than 9,000,000 acres — a patchwork almost as large as the states of Massachusetts, Connecticut, and Rhode Island combined. Two national monuments — Joshua Tree and Death Valley — were redesignated national parks, the former being expanded by 234,000 acres to approximately 1, 026,000 acres and the latter being increased by nearly 1,300,000 acres to 3,336,000 acres. The expanded Death Valley National Park is nearly double the size of the State of Delaware. The legislation also provided for establishment of a new unit in the National Park System — 1,600,000-acre Mojave National Preserve, formerly managed by the Bureau of Land Management as the East Mojave National Scenic Area. In addition the legislation designated 69 wilderness areas on lands administered by the Bureau of Land Management, and certain lands in the Havasu and Imperial national wildlife refuges under U. S. Fish and Wildlife Service administration were designated as wilderness. Approximately 95 percent of the expanded Death Valley National Park was designated as wilderness, and approximately one-half of Mojave National Preserve and Joshua Tree National Park were similarly designated.[299]

299. Parfit, "California Desert Lands," pp. 54-79, and Public Law No. 103-433, October 31, 1994 (108 Stat. 4471-4525).

PHOTOGRAPHS

Photo 1: Panamint City, ca. 1877. File No. 5130, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

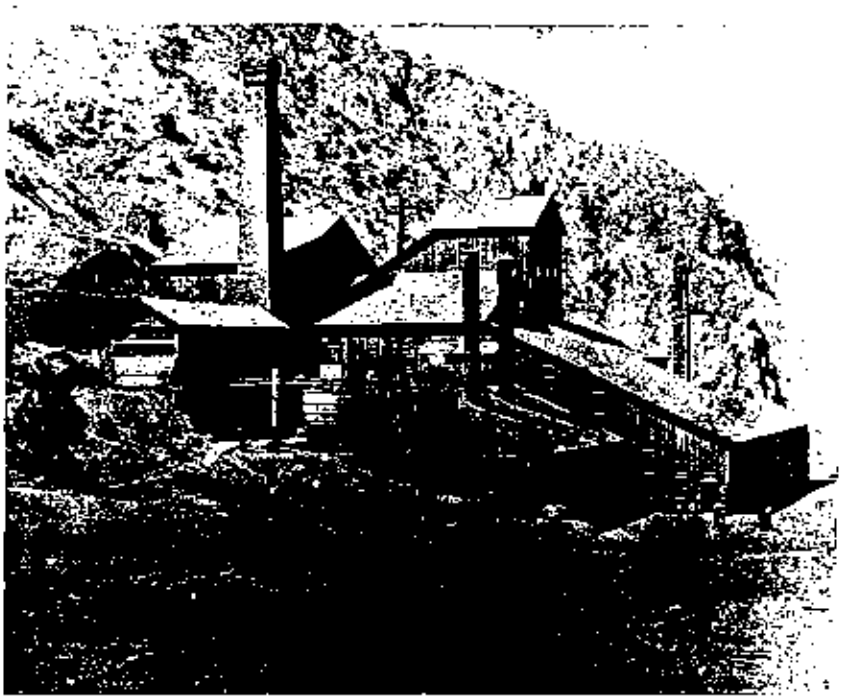

Photo 2: Mill, Surprise Valley Mill and Water Company, ca. 1877. File No. 3581, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 3: Mill, Surprise Valley Mill and Water Company (West View), ca. 1877. Accession DEVA No. 1429, File No. 27003, Museum Collection/File No. 4191, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 4: Old and New at Panamint City, September 1946. Photographer — Alberts. File No. 1388, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

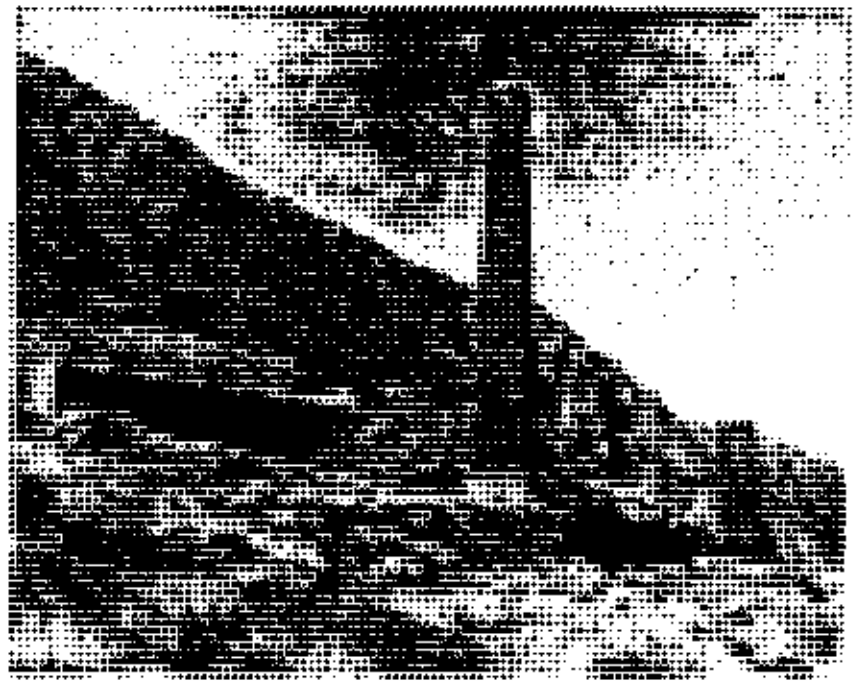

Photo 5: Remnants of Mill, Panamint City, March 1960. Photographer — Menning. File No. 2262, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 6: Main Street, Greenwater, ca. 1906. Photographer — Larson, Palm Studio, Goldfield, Nevada. File No. 4820, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park. Courtesy, Nevada State Historical Society, Carson City.

Photo 7: Greenwater and Death Valley Mining Company, Copper Queen Mine, ca. 1906. Photographer — Larson, Palm Studio, Goldfield, Nevada. File No. 4821, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park. Courtesy, Nevada State Historical Society, Carson City.

Photo 8: Darwin Mining Camp, ca. 1916. File No. 3039, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 9: Darwin Mining Camp, March 1936. Photographer — Frasher. File No. 3221, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

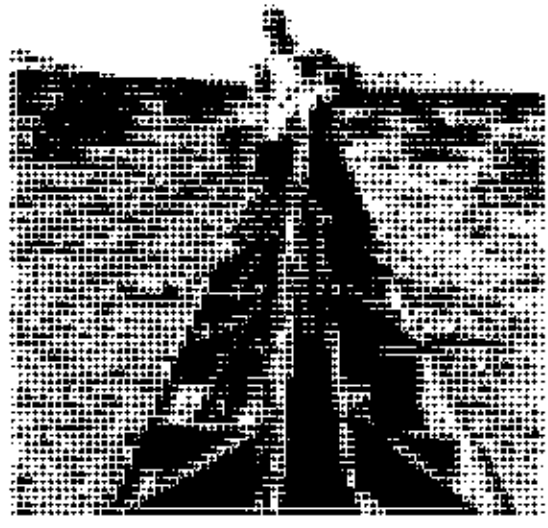

Photo 10: Monorail, Wingate Pass, ca. 1935. File No. 1468, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 11: Ruins of Chris Wicht's Saloon, Ballarat, September 1946. Photographer — Alberts. File No. 1248, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 12: Main Street, Ballarat (Looking North), September 1946. Photographer — Alberts. File No. 1249, Historic Photograph Collection, Research Library and Museum Collection, Death Valley National Park.

Photo 13: Main Street, Lookout, n.d., Accession DEVA No. 1897, Box 9, Museum Collection, Death Valley National Park.

Photo 14: Modoc Furnace/Mill, Lookout, n.d., Accession DEVA No. 1897, Box 9, Museum Collection, Death Valley National Park.

Photo 15: Cerro Gordo, ca. 1930s-40s. Photographer — M. Rice. Jim Caton Accession, Museum Collection, Death Valley National Park.

Photo 16: Cerro Gordo, ca. 1930s-40s. Photographer — M. Rice. Jim Caton Accession, Museum Collection, Death Valley National Park.

Photo 17: Indian George's Ranch, Panamint Valley, September 1946. Photographer — Alberts. Accession DEVA No. 1431, File No. 27003, Catalog DEVA File No. 25802, Museum Collection, Death Valley National Park.

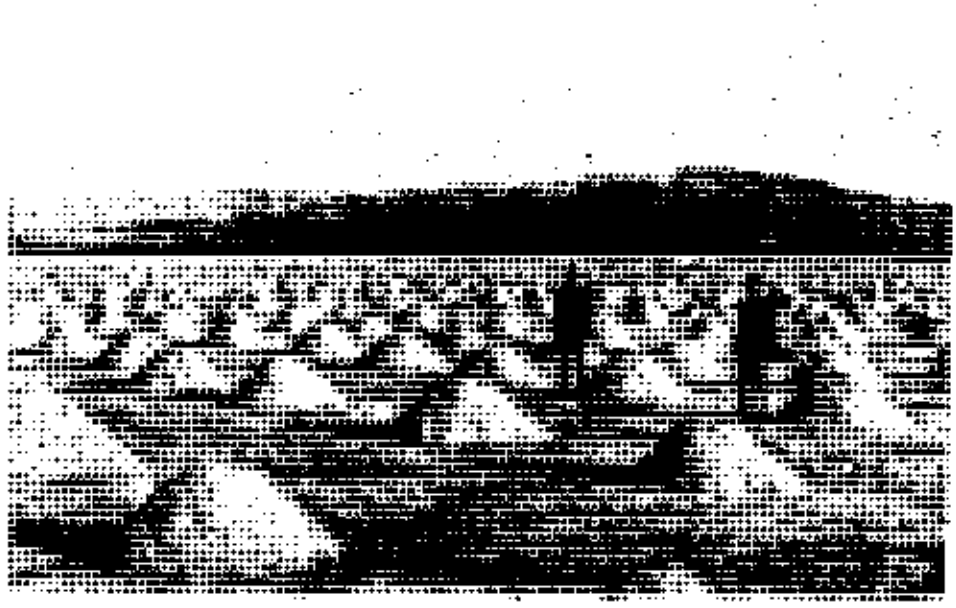

Photo 18: Salt Field, Saline Valley, September 1912. Courtesy Richard McCutchan Collection, Diamond Bar, California (Photograph supplied to author by Thomas S. Budlong, Los Angeles).

Photo 19: Zig-Zag Trail, Daisy Canyon, Inyo Mountains, ca. 1912-13. Pack train of six or seven mules can be seen descending near the top of the zig-zag. Photographer — Miles O. Bolser. Courtesy Richard McCutchan Collection, Diamond Bar, California (Photograph supplied to author by Thomas S. Budlong, Los Angeles).

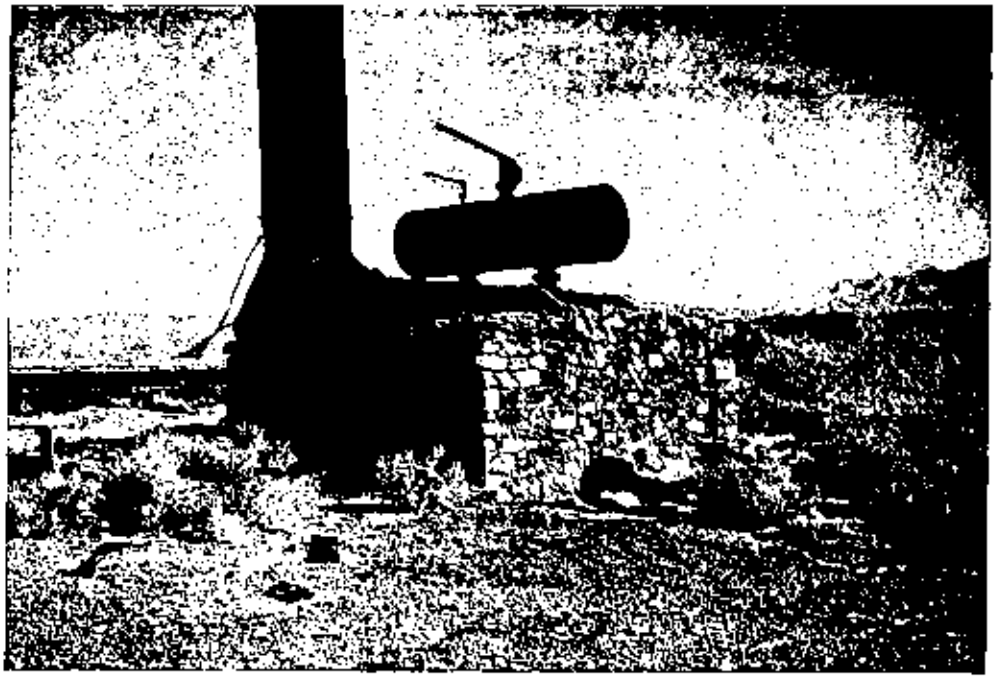

Photo 20: Boiler near Tram Loading Area, Saline Valley Salt Tram, ca. 1930s-40s. Photographer — L. Fox. Accession DEVA No. 2096, File No. 2507, Museum Collection, Death Valley National Park.

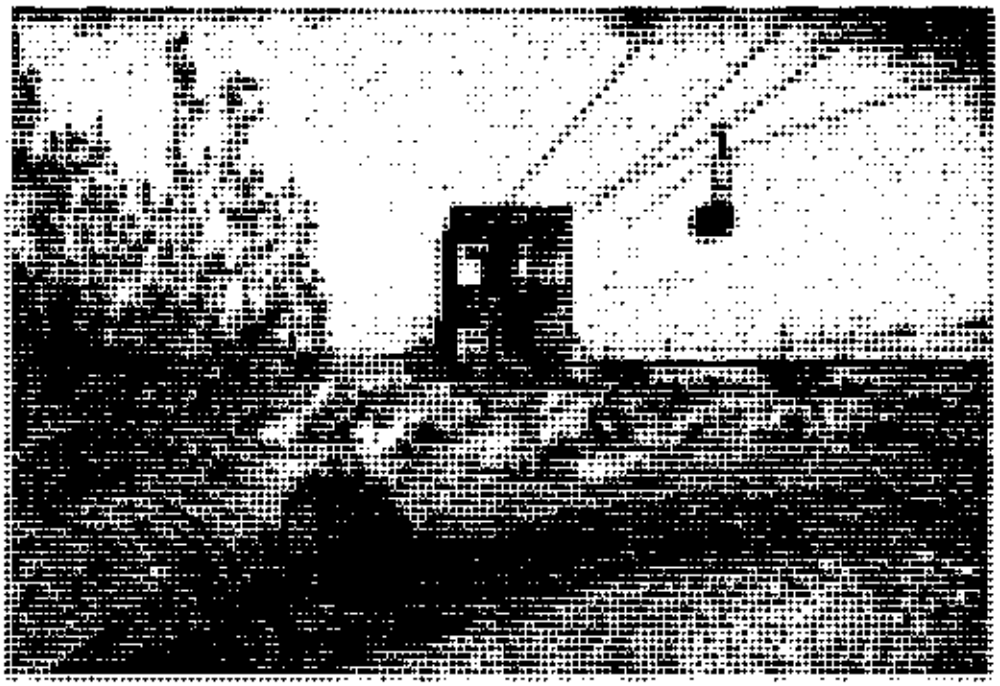

Photo 21: Tram Tower and Bucket near Bunkhouse and Office area, Saline Valley Salt Tram, ca. 1930s-40s. Photographer — L. Fox. Accession DEVA No. 2096, File No. 2506, Museum Collection, Death Valley National Park.

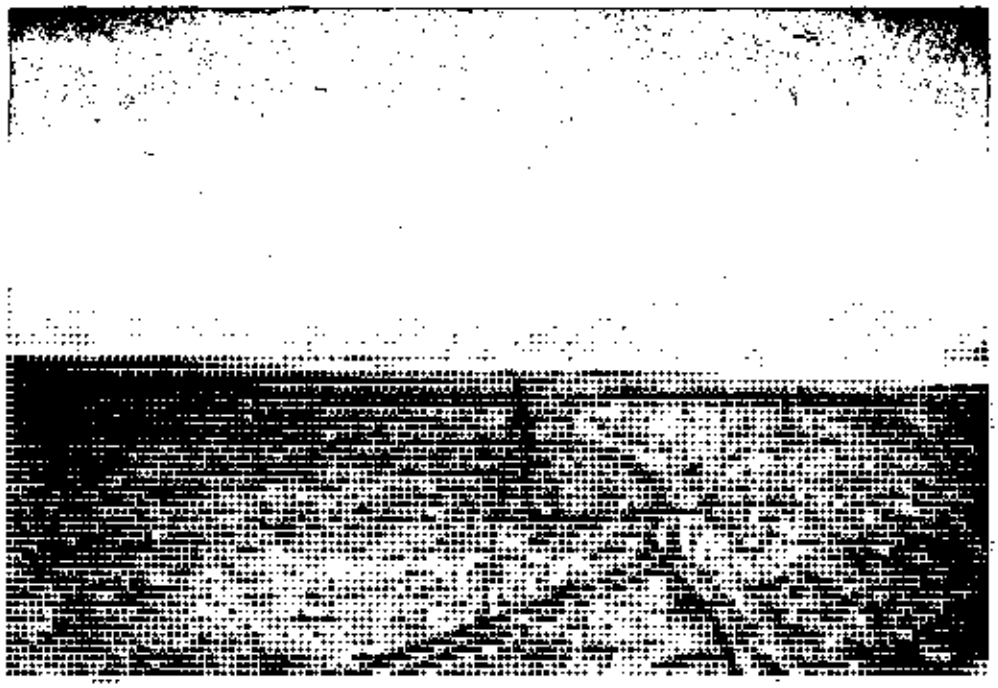

Photo 22: Tram Towers and Cable, Saline Valley Salt Tram, ca. 1930s-40s. Photographer — L. Fox. Accession DEVA No. 2096, File No. 2508, Museum Collection, Death Valley National Park.

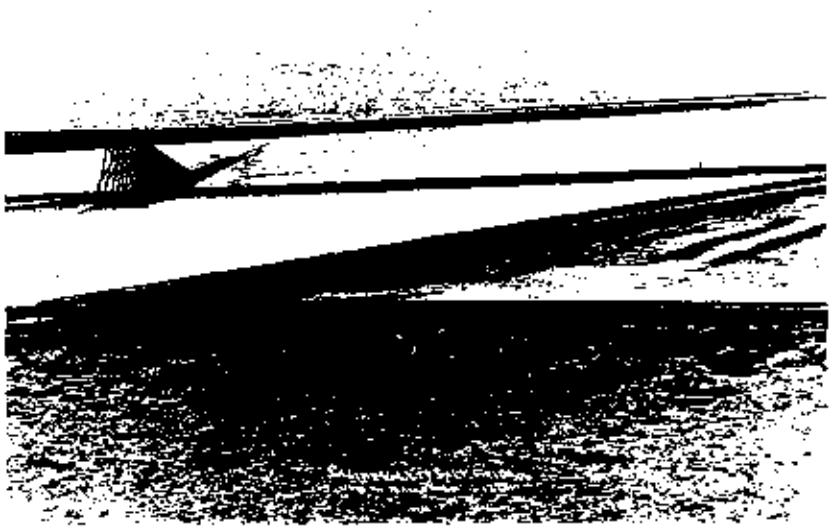

Photo 23: Saline Valley Salt Fields, n.d., Museum Collection, Death Valley National Park. Courtesy Leonard Brumund, Barstow, California.

Photo 24: Tram Towers, Saline Valley Salt Tram, n.d., Museum Collection, Death Valley National Park. Courtesy Leonard Brumund, Barstow, California.

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LIST OF REPOSITORIES CONSULTED BUT WHERE RESEARCH WAS NOT CONDUCTED

Matarango Museum, Ridgecrest, California.

San Bernardino County Museum, Redlands, California.

U. S. Department of the Interior, Bureau of Land Management, Barstow Resource Area Office, Barstow, California.

U.S. Department of the Interior, Bureau of Land Management, California Desert District Office, Riverside.

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