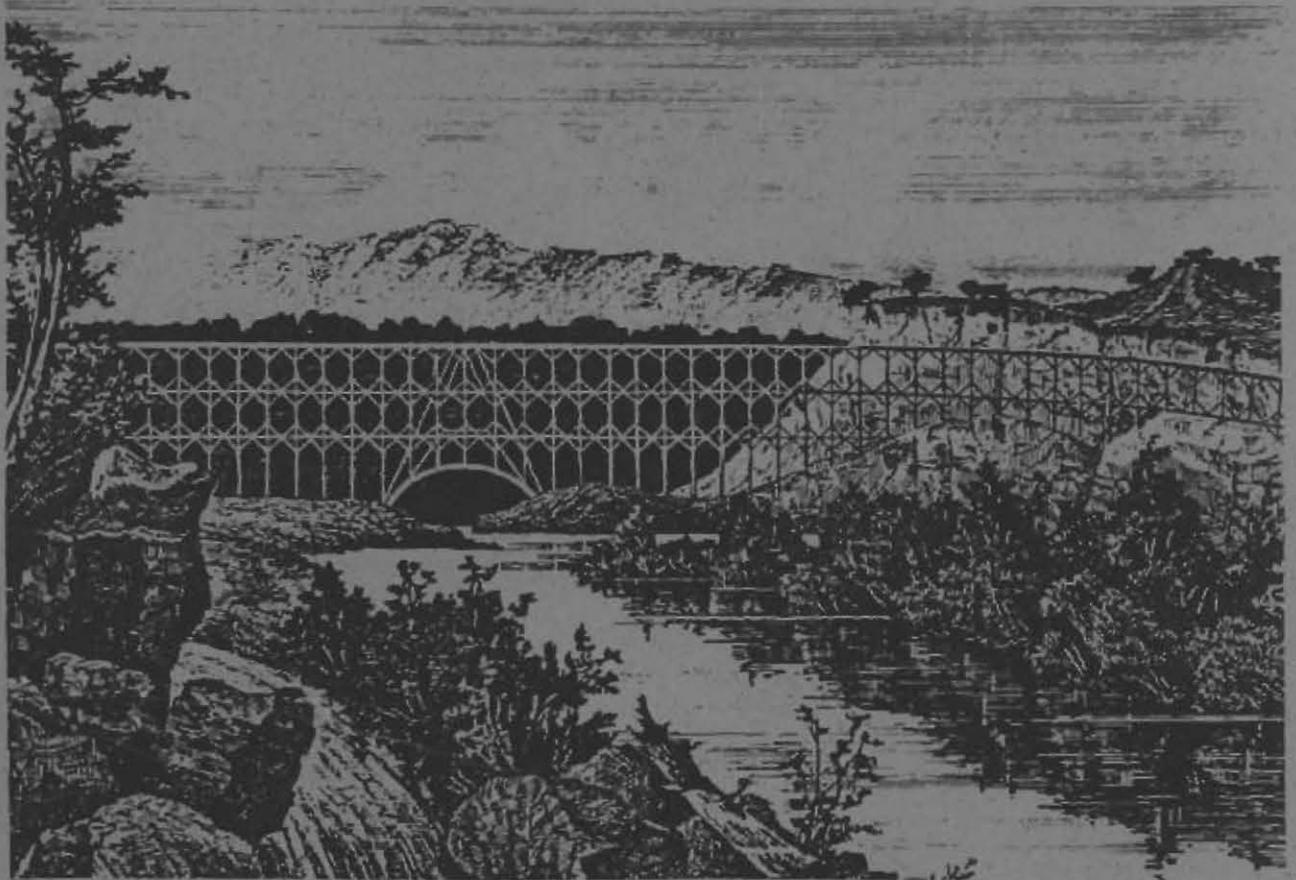




# Gold and Lumber: Two Papers on Northern California History and Archaeology



Historical and Archaeological Investigations of the  
Horsetown Mining Complex, Shasta County, California

by

Trudy Vaughan and Eric W. Ritter

and

The Historic Blue Ridge Flume of Shasta and  
Tehama Counties, California

by

Dottie Smith

**cultural resources publications  
history-archaeology**

Frontispiece: 1876 drawing of the Blue Ridge Flume at its crossing of Inks Creek as it enters the Sacramento River in Tehama County, California.

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**Paper 1**

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**By**

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**Paper 2**

**The Historic Blue Ridge Flume of Shasta  
and Tehama Counties, California**

**By**

**Dottie Smith**

**Eric W. Ritter, Ph.D.  
General Editor  
Bureau of Land Management  
Redding, California**

**1992**



## FOREWORD

Management responsibilities on public lands involve a diverse array of resources. Among these resources are vestiges of the post-contact period when exploration, trapping, gold mining, lumbering, homesteading, livestock ranching, railroad construction, agriculture and other aspects of historic life were undertaken by the Euroamericans, Chinese, Indians, and others. Relatively early in the historic period came the Gold Rush and the attendant need for lumber for various mining features. As mining waned and settlement expanded an even greater need for lumber arose, lumber mostly available in largely undeveloped tracts quite distant from population centers and economical transportation networks. Flumes temporarily helped overcome these logistical problems. In this regard these two papers are related, although they deal with features and locations not directly intertwined.

The first paper in this volume is an archaeological study of mining features with historic documentation. These features are located near the Gold Rush community of Horsetown in Shasta County. This study was precipitated by a modern-day miner's patent application under the 1872 Mining Law for a piece of public land thought to still contain mineral values. Historic mining activities and what seemed to be unique mining features were found here. As the Bureau of Land Management's local archaeologist it was my opinion that mapping and a brief historic study were in order. Such a study would also help the Bureau to define the historic record of mining on the property necessary for the patent application mineral report. The study resulting in the first paper was conducted cooperatively between BLM and archaeologist Trudy Vaughan of Coyote and Fox Enterprises of Redding, California.

The Blue Ridge Flume has been a largely forgotten enterprise of major proportions by late nineteenth century northern California standards. Traces of this flume were discovered in the mid 1980s by this writer during a field survey of newly acquired public lands in the vicinity of the mouth of Inks Creek in Tehama County. With my curiosity whetted, I sought more information on this enterprise's remnants, seeking its history and historical significance and believing that remnants of the flume retained public interpretive value as local trails are scheduled to be developed along portions of its course. Dottie Smith, a Shasta County historian and BLM volunteer gladly contributed her assistance to the Bureau in this study, resulting in the second paper in this volume.

These two papers are published here to bring the studies' results to a wide audience. By doing this, the publication represents a component of the Bureau's Heritage Education Program.

Eric W. Ritter, Ph.D.  
General Editor



HISTORICAL AND ARCHAEOLOGICAL INVESTIGATIONS  
AT THE HORSETOWN MINING COMPLEX,  
SHASTA COUNTY, CALIFORNIA

by

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and Eric W. Ritter

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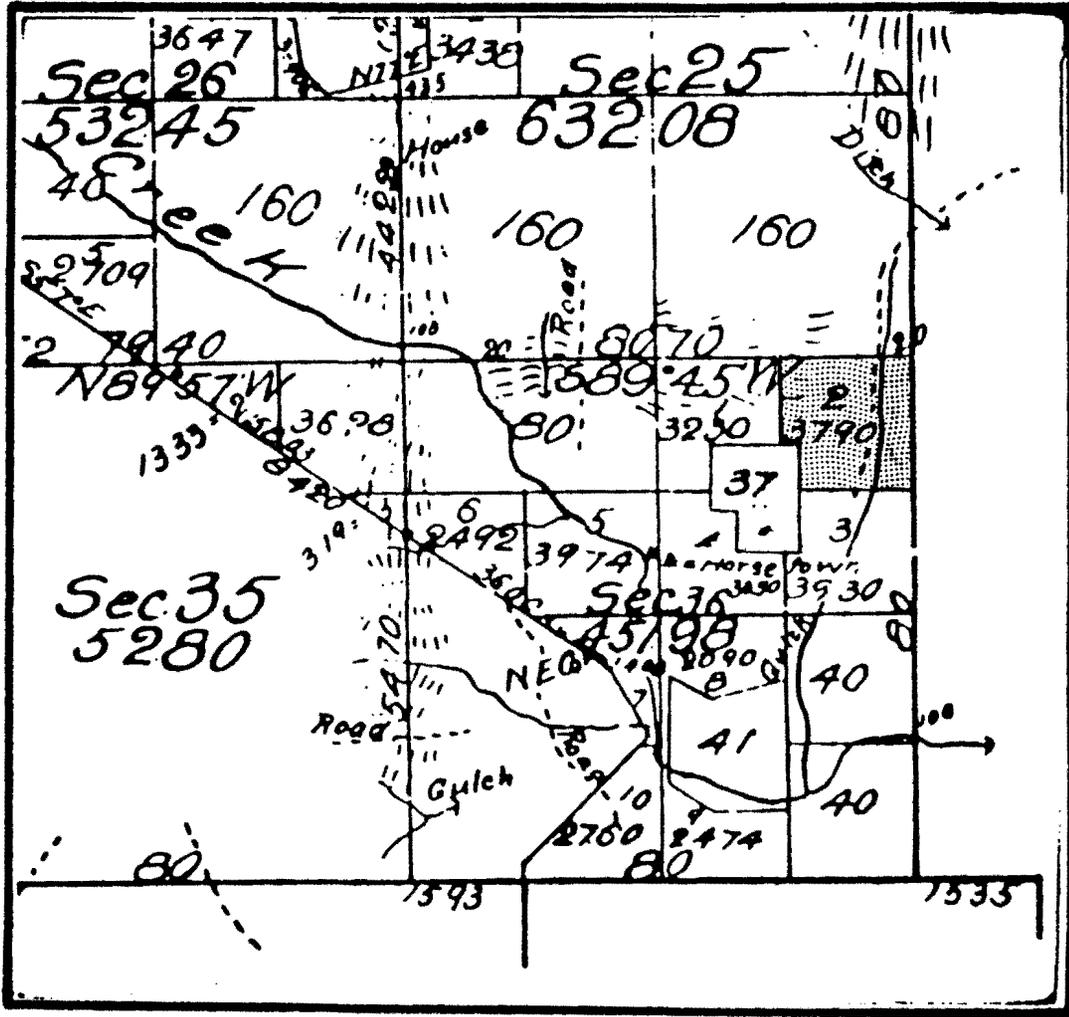
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# **PAPER 1**





Portion of historic plat map showing study area  
 (Lot 2, NE 1/4 Section 36 T.31 N., R.6 W.).  
 Map approved June 16, 1876, Surveyor General's  
 Office, San Francisco.



## ABSTRACT

In the spring of 1991, historical and archaeological investigations were conducted on approximately 40 acres of federal land managed by the Bureau of Land Management (BLM) in southwestern Shasta County. The project area lies in the vicinity of the historic community of Horsetown, settled in 1849. The study area, BLM Site CA-030-475, represents a microcosm of gold mining history in northern California. Physical remains from all major mining techniques in the north state are present. Features recorded include an extensive system of trenches and associated rock work, a rock dam, ditches, a granite quarry, adits, and tailings.

The trench system includes 24 trenches cut by hand through a soft geologic formation known as Nomlaki tuff. While drainage systems for placer mining are common, this geologic structure within gold-bearing beds facilitated construction of this web of narrow trenches. The miners took advantage of these soft tuffaceous beds to carve narrow, sometimes very deep trenches; and it appears the miners used these beds to good advantage, economizing their use of water and perhaps accelerating local gold production.

The site area has the potential for eligibility to the National Register of Historic Places under criteria "a" and "c"; and it possesses good integrity of location, design, setting, materials, workmanship, feeling, and association. The trench system, in the context of its temporal placement and cultural associations, appears to be an unusual feature, one unique or at least rare in the region and, perhaps, in California. Should other tuff-cut drainage trenches be located, it is felt that this system will probably remain as an outstanding example due to the local mining history and unique geologic situation, coupled with the topographic setting, the large number of trenches, and the good integrity of the trench system.

## ACKNOWLEDGEMENTS

Ron Rogers, BLM Geologist, coordinated the project; and, in addition to the authors, the following persons assisted. Archival research was conducted in part by Andy Skucas, BLM Archaeological Technician; and field recordation was aided by Merla Clark and Mabel Foster, CFE archaeologists. Mapping was completed by BLM engineers Gary Mullett, William Rus, David Scheffey, and Lori White; and White produced the final maps. Joe Molter, BLM Natural Resource Specialist, conducted the tree ring studies; and Adam Bodine, BLM Archaeological Technician, completed the artifact drawing. The authors are extremely grateful for the assistance of all involved on this project.

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## CHAPTER 1 INTRODUCTION

In the spring of 1991, historical archaeological investigations were conducted on approximately 40 acres of federal land managed by the Bureau of Land Management (BLM) in southwestern Shasta County (Map 1: Project Vicinity Map). The project was conducted at the initiation of Eric Ritter, BLM Archaeologist, and Ron Rogers, BLM Geologist, Redding Resource Area. A mining patent application for the parcel has been filed with BLM, and as part of the approval process, the known historic mining features in the area were to be recorded and evaluated. BLM contracted with Coyote & Fox Enterprises (CFE) of Redding to conduct archival research, recordation, and mapping of the historic features in the area. Ritter then supplemented the principal study.

Features recorded in the project area include an extensive system of trenches and associated rock work, a rock dam, ditches, a granite quarry, adits, and tailings. The area has been assigned BLM site number CA-030-475. As discussed in the concluding chapter, the trench system, in the context of its temporal placement and cultural associations, appears to be an unusual feature, one unique or at least rare in the region and, perhaps, in California.

This report provides historical background on the area, a description of the various features, and a preliminary evaluation of the site with recommendations for additional work.

### PROJECT DESCRIPTION AND ENVIRONMENTAL BACKGROUND

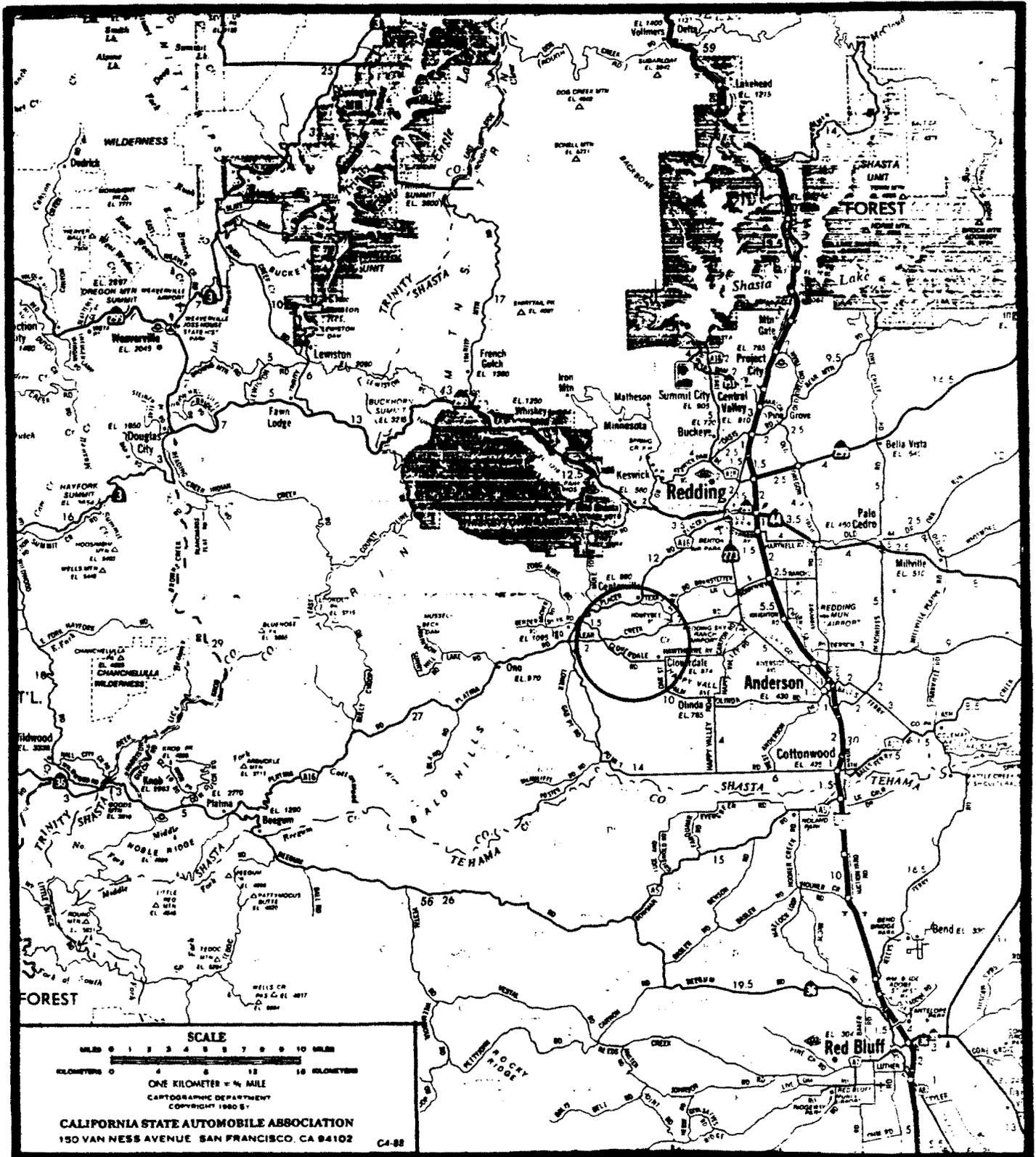
The project area is located in Township 31 North, Range 6 West, a portion of NE 1/4 of NE 1/4 of Section 36, Mount Diablo Meridian (Map 2: Project Location Map). The parcel encompasses 37.9 acres and is identified as Lot 2, a designation by which it has been recorded since the late 1800s. The lot designations are shown on the map on the inside cover of this report, and some lot numbers will be referred to in the historical background below.

This area is in southwestern Shasta County north of Clear Creek Road between the historic communities of Briggsville and Horsetown. Elevation within the project area ranges from approximately 630 to 700 feet above mean sea level. An unnamed drainage flows south through the eastern edge of the parcel and connects with Clear Creek. Clear Creek, the major permanent drainage in the vicinity, flows easterly approximately one-half mile south.

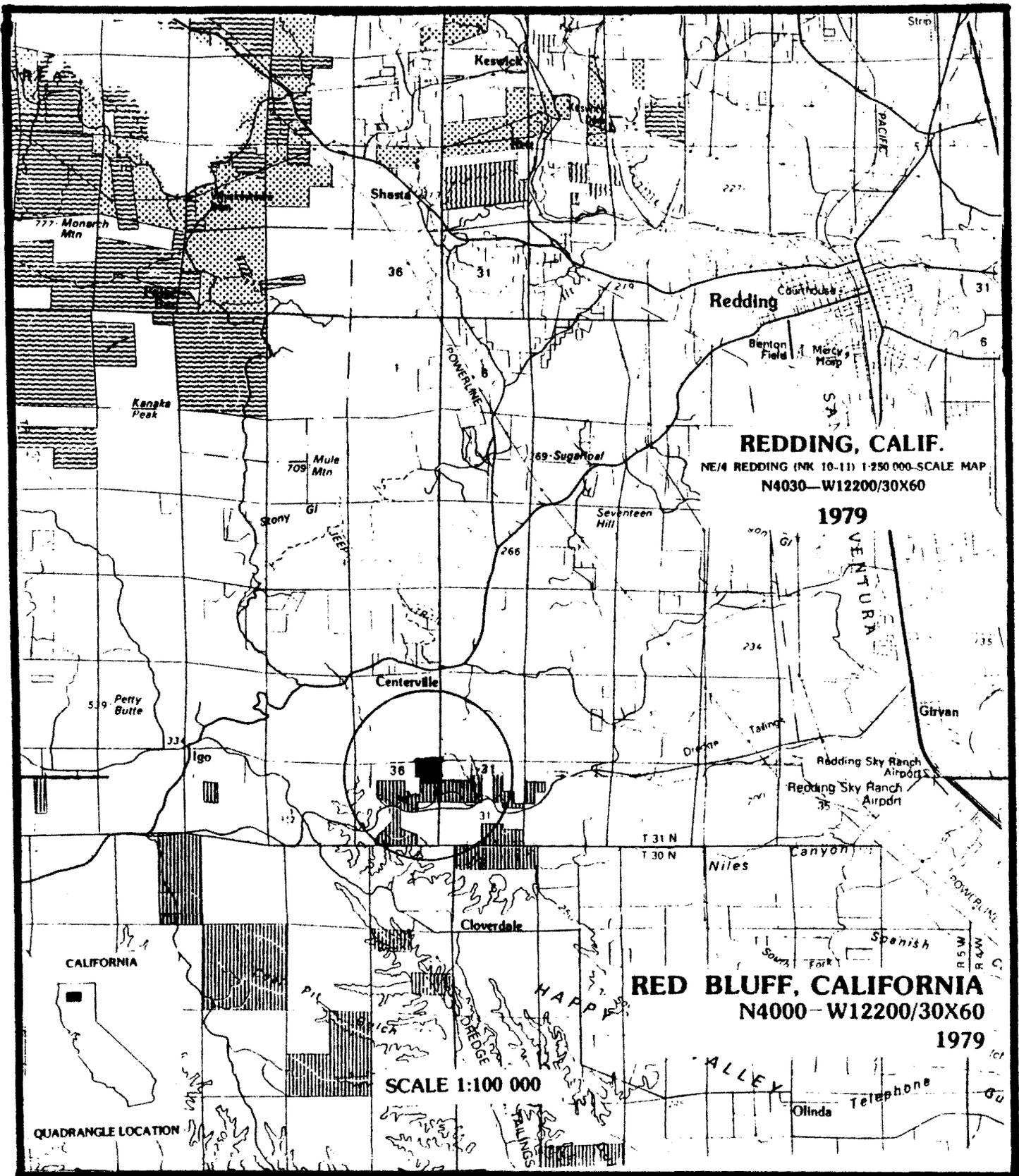
The project area occurs within the Foothill or Digger Pine/Chaparral Belt vegetation zone, as defined by Storer and Usinger (1963:28). The primary tree species are ponderosa pine, gray pine, and blue oak; and the understory consists primarily of manzanita and buck brush.

Geologically, the project area is located at the contact between the Shasta Bally batholith and Copley Greenstone. Partially overlying both these formations are undifferentiated Cretaceous sandstone and graywacke; and partially overlying these is Nomlaki tuff interbedded with the Red Bluff Formation (Hollister and Evans 1965; Murphy et al. 1969). This relatively soft tuff is the formation in which the majority of the trenches were cut.

The merging of so many geological formations within this zone is reflected in the diverse mining and quarrying techniques and features noted during this project. These features reflect not only an evolution in mining techniques and technology, but also a changing demographic pattern with the development of Shasta, then Redding, and points beyond.



MAP 1: Project Vicinity Map



MAP 2: Project Location Map

CHAPTER 2  
HISTORICAL BACKGROUND

Archival research was conducted at Shasta Historical Society and Shasta County Courthouse. At the Redding BLM office, the Government Land Office Survey Plats, Master Title Plats, and Historic Indices were reviewed. Applicable patent files were obtained from the National Archives, Washington, D.C. This chapter discusses site specific references to the project area, followed by a general history of mining and occupation of the Horsetown and Briggsville area along Clear Creek.

SITE SPECIFIC HISTORICAL REFERENCES

No positive identification of the previous owners of the Lot 2 historic claim could be located, although time did not permit an exhaustive review of all permits for mining claims and water rights at the Shasta County Courthouse. Following are the references found to claims in the immediate vicinity of Lot 2. References from the Shasta County Courthouse are listed as SC with the Book and Page. All other references are from BLM files. (Note the changing names for the mining districts in the area).

The names E. M. Dixon and C. H. Cooper were noted in several instances as having claims in the vicinity of Lot 2.

(a) In 1874, Dixon and Cooper filed a claim for the Dixon and Cooper Placer Mine in the Horsetown Mining District on Lot 37 located southwest of Lot 2 in the center of the NE 1/4 of Section 36.

(b) In 1875, they filed a claim for Horse Town Placer Mine, comprising 34 36/100 acres in the NE 1/4 of SW 1/4 of Section 36 (Lot 40).  
E

(c) In 1884, they claimed land in Section 35 to the west (SC Misc. Records Book 2, pg 561); and

(d) In 1885, a five-acre claim was recorded for Dixon and Cooper in the Squaw Flat Mining District immediately adjacent to Lot 2 on the east (W 1/2 of NW 1/4 of NW 1/4, Sec 31, T.31 N., R.5 W.) (SC Misc. Records Book 3, pg 31).

In 1891, Mineral Entry Patent #18515 was filed for Edwin Volentine on lands including the latter parcel mentioned above. This parcel, known as the James Walton Placer Mining Claim, was recorded in the Texas Springs Mining District and included 71

29/100 acres of T.31 N., R.5 W.: NW 1/4 and W 1/2 of NE 1/4 of NW 1/4 of Section 31, and S 1/2 of S 1/2 of SW 1/4 of SW 1/4 of Section 30.

In 1901, Mineral Entry Patent #39689 was filed for the Hope Consolidated Placer Mining Claim by Princess Hydraulic Mining Company of Leadville, Colorado. Portions of this document are included as an appendix to this report. This patent consolidates 14 claims located in T.31 N., R.6 W., Section 25 and the NE 1/4 of Section 26. One of these claims, the Happy Thought borders the subject parcel on its northeast edge, and the Gold Hill Claim is one-eighth mile directly north.

Another reference to mining in and/or adjacent to the project area is noted in Hollister and Evans (1965), although no date is provided for the operation. The Winchester Placer Mine is located in the vicinity of the pond (see Map 3).

The granite quarry noted in the northwest portion of Lot 2 is probably part of the Jewel Claim reported as located in Section 25, T.31 N., R.6 W. The claim, with an "undetermined" owner, is described as "active prior to 1906; rock used to limited extent in Redding for tombstones, street curbing and doorsteps. Small quarry. Long idle" (Lydon and O'Brien 1974:154).

#### CLEAR CREEK, HORSETOWN, AND BRIGGSVILLE

The study area represents a microcosm of gold mining history in northern California. Physical remains from all major mining techniques in the north state are present, as well as what appear to be unusual mining-related features. The parcel exhibits the remains of mining ventures, but not mining settlement, as found nearby. In the vicinity of the parcel, on terrace remnants, several cabin foundations from the latter half of the 19th century are existing. There is later evidence of Depression-era housing (foundations and trash dumps) both within this study parcel and within one-quarter mile distance.

Clear Creek played an important role in the early economy of Shasta County following the discovery of gold by Major Pierson B. Reading and his Indian laborers in 1848 at Reading's Bar on Clear Creek. Clear Creek, along with its many tributaries, became the southern boundary of the most important gold mining district in the county, and the Clear Creek mines provided the initial gold mining impetus in the area (Petersen 1965:22).

In October 1849, emigrants came in over the Lassen Trail to the Clear Creek Diggings. It was certainly not an advantageous time to arrive and start looking for gold. It was near the end of the dry period, and the days were hot. There was no water in the washes and gulches. They were ill prepared (really not prepared) for mining. Many used spoons and knives. A few finding pockets made strikes. During this hard period of tired muscles and

discouragements, they fanned out far and wide, up all the ravines. The going was tough, rocky, and brush covered. None were well acquainted with the area, so it was a matter of exploration all the time (Nielsen 1968: 36).

When the rains came, the picture changed, although many had already left.

The mines in what are now known as the Horsetown, Muletown, Piety Hill, Watson Gulch, Bald Hills, Gas Point, Roaring River and Arbuckle districts, were extensively and successfully mined from 1850 to 1860. Horsetown was the principal mining town of Southwestern Shasta for a number of years and was the headquarters of the miners of neighboring districts (Frank and Chappell 1881:17).

Horsetown was settled in 1849 and was originally called Clear Creek Diggings, then One Horse Town. On an 1851 map of California, Shasta and One Horse Town were the only towns in northern California (Steger and Jones 1966:39). With over 1,000 residents at one time, the town covered 36 acres and included plank sidewalks, two hotels (the Union and Spencer's), several stores, blacksmith shops, a butcher shop and bakery, ten pin, football and hand ball alley, a Catholic church, a newspaper (The Northern Argus) and 14 saloons. The post office operated from 1852 to 1876 (Smith 1991:71).

In 1850, a "road of sorts" ran between Red Bluff and Shasta via Briggsville and Horsetown (Nielsen 1968:33). Briggsville, a smaller community approximately one mile east, also along Clear Creek, was located by Ben Briggs about the same time as Horsetown. It was originally called Breechesburg because the miners wandered around without their breeches; but when Mrs. Briggs, the first woman resident, arrived, she insisted the men keep their pants on. Briggs Toll Bridge operated across Clear Creek in the early 1850s, and the Lean Hotel was reported here in 1860 (Smith 1991:19). The only evidence remaining of this community are two wood-burning stone kilns which produced lime, several cabin foundations, and remnants of mining. The dates of operation of the kilns are not known.

The Chinese entered the area in the early 1850s and began mining; but quickly, by at least 1854, anti-Chinese animosity was quite evident in the region. In a December 2, 1854 letter to the editor of the Shasta Courier, it was stated that everyone in the vicinity of Horsetown was against the Chinese and that a group of them had been chased out. Some remained, however, and continued excavating in the Horsetown District (Chiu 1967:18-19).

Tordoff and Seldner (1987:27) have discussed in some detail the plight of the Chinese in the region. The agitation against the Chinese continued well into the 1860s with periods of relative calm and even some accommodation of the Chinese labor force by

certain white interests. An article in the Shasta Courier from March 5, 1859 states:

The first of March removal of the Chinese. Horsetown, Middletown, and Texas Springs plan to execute their local rules and regulations to prevent Chinese from mining in said districts. March 1st miners went to Chinatown in Horsetown and Texas Springs and told the Chinese to pack up, they even hired wagons to transport the Chinese miners' belongings, and they marched 400 Chinese to Middletown and then to Shasta.

Despite the march, the Chinese persevered in the Horsetown District. As summarized below by Tordoff and Seldner (1987:28), the Chinese were quite active in the 1860s within the immediate vicinity of the subject parcel, if not within the parcel itself.

Articles published in the Courier in 1867 and 1868 described the successful mining endeavors of a Chinese company in Briggsville. . . . The June 2, 1866, issue announced that "Briggsville . . . now belongs entirely to the Chinese, and the ground heretofore used as a town site is being more profitably used for mining purposes" (Boggs 1941(4):3946). On October 19, 1867, it was reported that after paying \$1100 for the site and clearing away the buildings and trees, the owners had realized several thousand dollars (Boggs 1941(5):4286). On June 29, 1867, and August 10, 1867, the Shasta Courier confirmed the good fortune of this company, stating that after paying only \$1100 they would probably take out \$11,000 (Boggs 1941(5):4232).

The Chinese also continued to live in Horsetown in the 1860s (Tordoff and Seldner 1987:28). Beginning in 1869, many left the area for the railroads, while others stayed on in the region (i.e. Piety Hill, Redding) until the turn of the century (cf. Ritter 1986), even after Horsetown was abandoned in the late 1870s. The research conducted for this project suggests the Chinese were not present in any number in the parcel vicinity after this time. In fact, while the parcel may never have been patented because of Chinese control, it is just as likely Euro-American miners were the operatives after the 1860s judging from the mineral patent records for surrounding parcels. The white miners may simply have not chosen to apply for patent due to declining gold recovery.

While the placer deposits within the creek beds were probably mined quite early, the mining of older terrace alluvium, whether by ground sluicing or through hydraulic methods, necessitated moderate amounts of water obtainable from water diversions and delivery systems. The principal early system for the Horsetown District was the Clear Creek Ditch. A company was formed in 1854 (Shasta Courier, February 25) to build this ditch to bring water to the various mining districts, including Horsetown. This ditch, with its associated flumes and tunnels, was completed in

1855. It ran from the Tower House in the present Whiskeytown National Recreation Area south along Clear Creek to Horsetown and the mines of Middletown, Muletown, Texas Springs, and Jackass Flat. This ditch was four feet wide at the bottom, and six feet wide at the top, with water three feet deep.

In October 1855, the proprietors of the ditch, including local resident J. B. Smith and partners from Sacramento and San Francisco, wrote the following in the Shasta Republican:

The entire length of the main trunk to Olney Creek (north of Horsetown about three miles), is upwards of forty miles, to which has been added ten miles of side ditches, and a reservoir, capable of containing a sheet of water about four acres in extent. The whole undertaking, when complete, will rank among the most costly and durable of the kind in our State. The canal will carry a volume of water equal to fourteen square feet. The descent is a little more than seven feet per mile, giving a current on the surface about four miles an hour. It may be a year before the ditch tightens sufficiently to hold its full volume of water, but when it becomes impervious by a coating of sediment, it will supply a clear stream to about one hundred and fifty sluices.

A side branch of this ditch served the Horsetown area (Smith 1991:35) and likely served the workings in the subject parcel before the ditch was abandoned about 1882.

Tordoff and Seldner (1987:36), through a review of an article in the Alta California (September 9, 1856), believe the small mining companies were the most frequent business arrangement in the Horsetown area.

According to this report, claims that cost \$1500 cash, or \$2000 with terms, were yielding \$500 to \$2,800 per week, which was divided between three or four partners (Boggs 1941(4):2077). This is supported by the 1860 and 1870 censuses, where EuroAmericans are either enumerated singly or with one or two other miners (U.S. Bureau of Census 1860, 1870).

Toogood (1978:24) discusses the decline of placer mining in the general region by the end of the 1850s to mid 1860s. She notes, "In 1861 one or two companies industriously flumed Clear Creek from Horsetown north to Oak Bottom . . ." As discussed above, Dixon and Cooper filed on a number of claims around the study parcel in the mid-1870s to mid-1880s suggesting continued, albeit perhaps limited, mining interest in the area at this time. Certainly, there was considerable interest in hydraulic mining during this period, until this technique was outlawed in 1884 unless certain debris controls could be initiated. This interval (mid-1860s to mid-1880s) was perhaps a time of some limited hydraulic mining in the parcel as suggested by the bank features.

As noted below, however, there also appears to have been a later renewal of local hydraulic mining.

Paul (1947:xii) looks at the 1860s as a good cutoff date between the general exhaustion of the placer mines throughout the West and the consequent re-shifting of the mining population to areas where work could more readily be found. Unquestionably, gold mining continued, but generally with more limited expectations without the mechanisms for large-scale recovery operations (hydraulic techniques). A change in operations included drift mining for gold-bearing quartz and older consolidated gold-bearing gravels reached by adit and shaft. Looking at the Horsetown District and surrounding areas, there appears to have been a resurgence of company-related operations in the 1890s until just after the turn of the century, as exemplified by mining claims and mineral patent applications on lands surrounding the study parcel.

The patent record for the 1901 Mineral Entry Patent filed for the Hope Consolidated Placer Mining Claim (478 acres) by the Princess Hydraulic Mining Company of Leadville, Colorado (see Appendix) offers pertinent insights to somewhat late mining activities immediately adjoining this parcel, and perhaps within it as well. There was a renewed interest in hydraulic mining in the vicinity. Toogood (1978:73) notes that this company also had extensive operations along Clear Creek, particularly within and near what is now Whiskeytown National Recreation Area to the north. The company was actively making extensive additions to its water rights and ditches. In the patent application, it states that labor and improvements amount to \$30,000, consisting of a 14-mile long ditch with a capacity of 1500 miner's inches of water which, with syphon and 22-24" pipeline, convey water from Brandy Creek and Boulder Creek to the operation. Also noted are three dams, other pipes, giants and equipment, a house, barn, blacksmith shop, shafts, open cuts, sluices and sluice boxes, and two acres of land mined to a depth of 25 feet.

The key to this operation is obviously the ditch and water rights. It is likely the old Clear Creek Ditch was used in part to supply water to the Hope Consolidated Placer Mine, and it is from the direction of this mining property that feeder ditches passed which served the mining property under study. Most likely, early and later operations fed off of this larger water system.

About the same time as various companies were participating in the last throes of the hydraulic mining venture, dredging operations began. The tailings from dredger activity are very apparent in Clear Creek and in many of the smaller drainages in the vicinity. Toogood (1978:73) notes, "Dredging river and creek bottoms for placer gold came into fashion in Shasta County around 1895 and continued intermittently through the 1950s." Dredging in the Horsetown area began circa 1905, and, when it ended circa 1930, almost all of what remained of Horsetown had been destroyed (Smith 1991:71).

Both dragline and dry-land dredging techniques were used. Large bucket dredges appear to have washed the creek deposits just to the southeast of the subject parcel as well as Clear Creek itself. However, the confining nature of the topography within the parcel and the nature of the tailing piles (smaller, not in long strips) suggests doodle-bug activity or a small drag-line dredge operating perhaps into the 1950s judging from post-operation vegetation growth. It also seems that because of the adit conditions, drift mining continued well into the 20th century within this parcel, probably during the Depression, and even later.

### SUMMARY

From the evidence at hand, the following mining history for the parcel can be summarized. Initial work began in the early 1850s as miners branched out from Clear Creek into the side drainages, especially during wet periods, undertaking small-scale panning, sluicing, and rocker activities. When Clear Creek Ditch reached the area in 1855, larger scale ground sluicing was initiated and continued off and on into the 1870s. There was some hydraulic mining also during this time, especially in the 1860s and 1870s. The Chinese were active nearby if not within the parcel, and in the late 1860s, they may have been responsible for the extensive artificial drainage system developed within the tuff deposits.

One of the myths surrounding gold mining sites in California is that extensive rock works (and presumably trenches such as these), especially wall-like features, could only have been the result of the industrious, hard-working Chinese. Generally speaking, however, this is a falsehood, although there are many accounts attesting to the industriousness of the Chinese miner (DuFault 1959:161). While it is tempting to ascribe the interesting trench features to Chinese laborers, the evidence is equivocal in this regard. The apparent lack of records concerning this unusual adaptation to a given geologic bed fortuitously associated with gold-bearing gravels may be the result of Chinese use. There were, however, many mining adaptations throughout the west; and this one was quite localized, probably relatively short-lived, and most likely not of any special interest to the media. Furthermore, the few artifacts within the parcel and nearby are of Euro-American vintage, circa 1860s-1870s. The bottom line is that one simply cannot rule out manufacture of these hand-dug trenches by white miners.

The 1880s may have been the period when drift-mining was initiated within the parcel, followed in the 1890s and first few years of the 20th century by hydraulic mining, although probably of very limited extent within the parcel. Most likely in the 1920s and 1930s, and perhaps into the 1950s, there was limited dredging and continued working of the drift mines.

There is no evidence of 19th century occupation within the parcel with the exception of a possible well, which also could be associated with a Depression-era structure. It is also feasible that such evidence has been destroyed by subsequent mining. Most likely, the area was worked by inhabitants of Horsetown and Briggsville and those living in scattered cabins or tents in the vicinity.

In sum, the parcel exhibits a varied and complex history of gold mining dating from at least the 1860s-1870s, if not before, until modern times.

## CHAPTER 3 METHODOLOGY AND RESULTS

### MAPPING

The project area was mapped during the feature recording process. Locations of features were plotted in relation to other features and to contours. Map 3 shows the project area and the features by name as described below.

The trench system was mapped separately using an Electronic Distance Measuring Device with a prism target. Trenches were arbitrarily numbered beginning at the south end and moving clockwise. Reference points were established across the area which involved extensive brush cutting. This aspect of the recordation took three persons three days, but the job could not have been accurately completed using compass and pacing techniques. The map was then generated by computer using an Autocad program. Map 4 shows the final result of this mapping process.

### TREE RING STUDIES

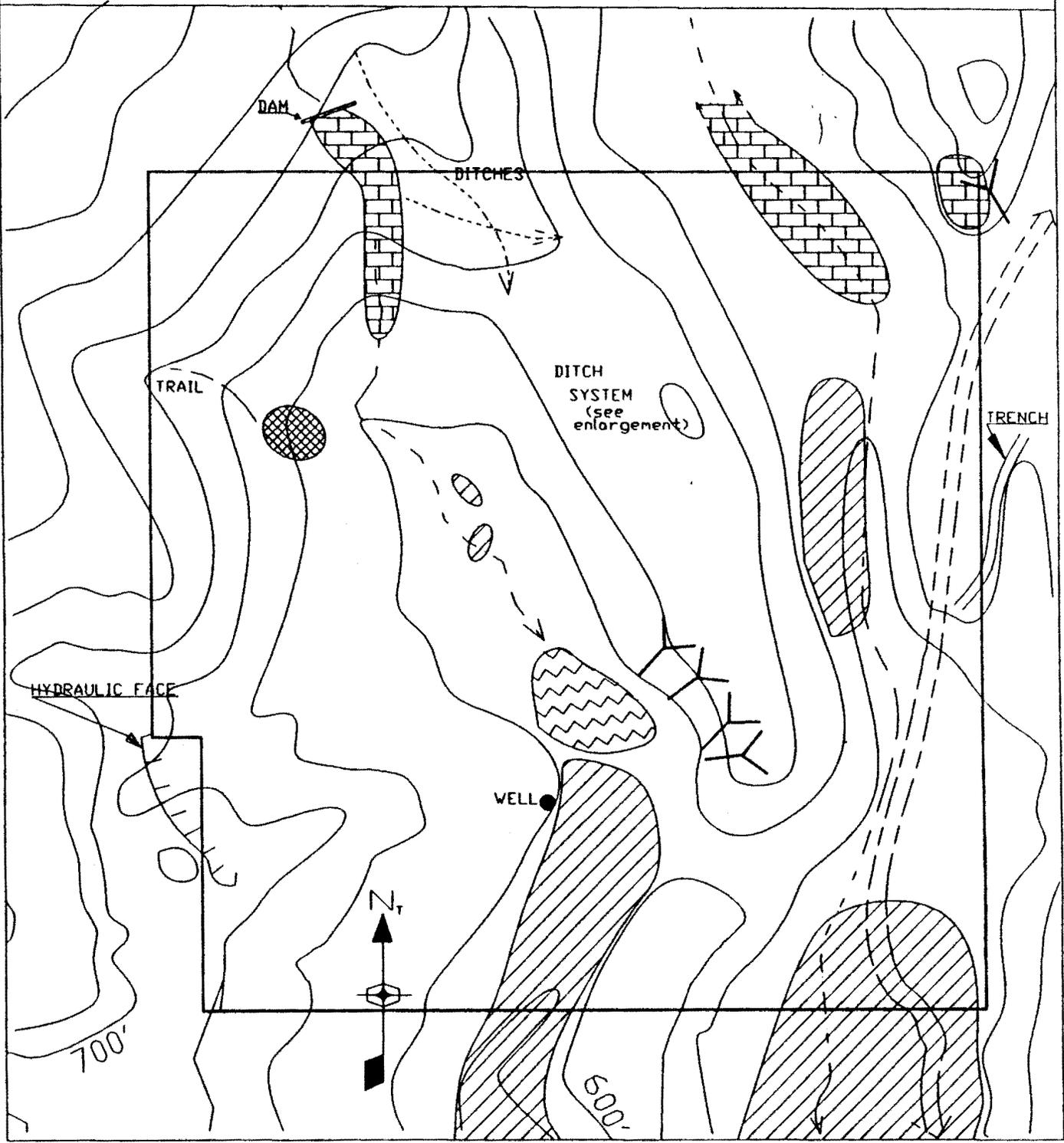
Tree ring dating was used at the Horsetown Mining Complex in an effort to date the period when the trenches were used for placer mining. This method was selected due to the lack of specific archival references for Lot 2 and also the absence of time-sensitive diagnostic artifacts on the site. Cores were taken with a standard Swedish Increment Borer. Each tree was bored to its center, the core removed, the rings counted, and the core replaced.

The trees selected for sampling were located within the trench system area and adjacent tailings and were believed to have become established since the cessation of mining activity. Fifteen trees were sampled: six gray pines, seven ponderosa pines, one knob cone pine, and one oak. No accurate count could be obtained from the oak core. The knob cone pine measured 27" dbh, the digger pines ranged from 22" to 26" dbh, and the ponderosa pines from 24" to 35" dbh. The larger diameter trees, however, were not necessarily the oldest.

Of the 14 pine trees sampled, eight (57%) dated between 78 and 88 years old (1903-1913). Three trees dated at more than 100 years old: 108 years (1883), 126 years (1865), and 135 years (1856). Two trees were 63 (1928) and 67 (1924) years old, and the youngest tree, in dredger tailings, was 32 years old (1959). Based on these results, it appears that the mining activity

# HORSETOWN MINING COMPLEX

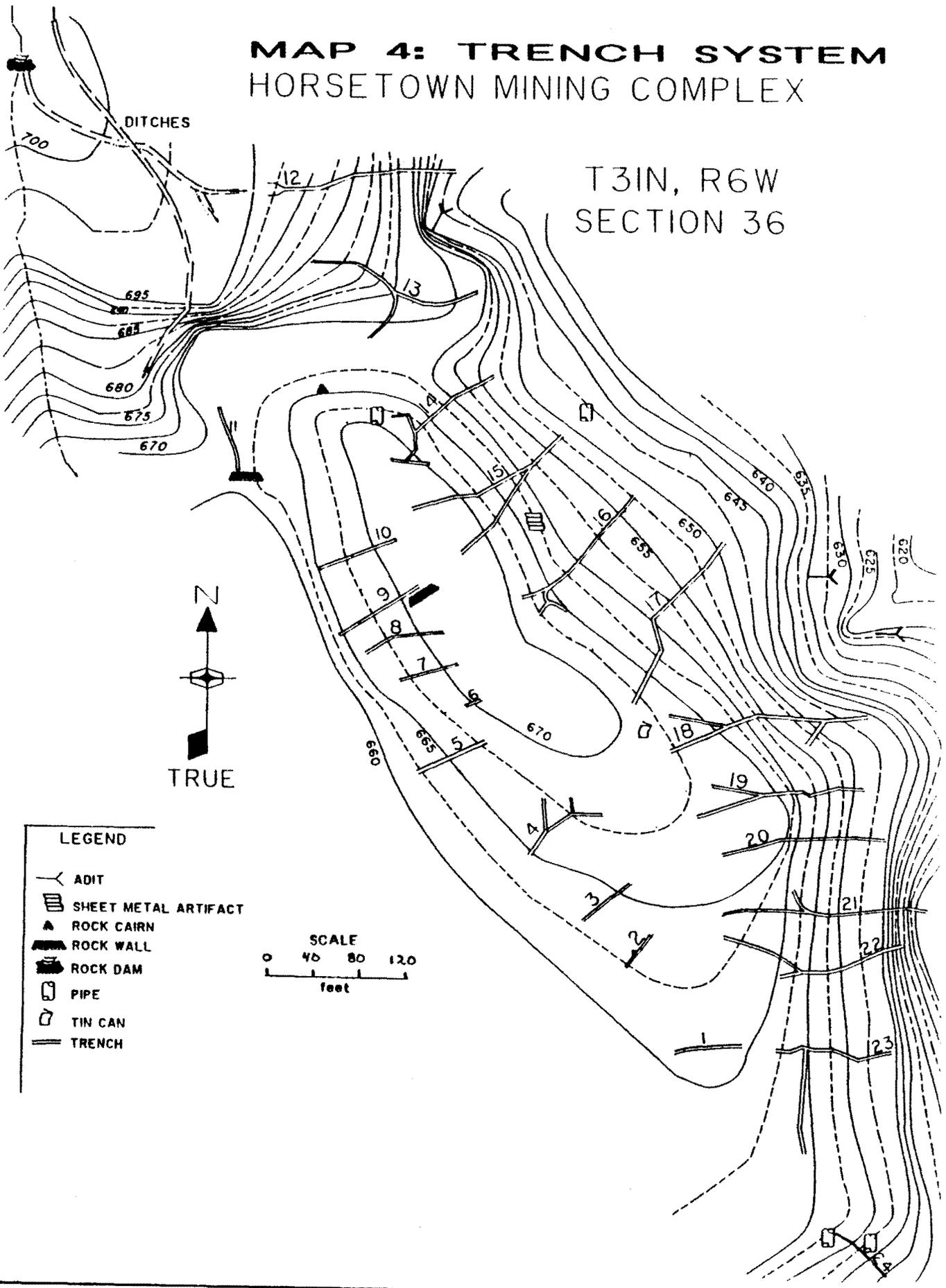
## MAP 3 (LOT 2 FEATURE MAP)



BREDGE TAILINGS		POND		PLACER WORKINGS		GRANITE QUARRY	
ROAD		ADITS		PROJECT BOUNDARY		STREAM	

# MAP 4: TRENCH SYSTEM HORSETOWN MINING COMPLEX

T31N, R6W  
SECTION 36



## LEGEND

-  ADIT
-  SHEET METAL ARTIFACT
-  ROCK CAIRN
-  ROCK WALL
-  ROCK DAM
-  PIPE
-  TIN CAN
-  TRENCH



probably occurred during a period ranging prior to 1903-1913, with the unknown factor being the number of years it took the trees to establish themselves in this harsh, rocky, denuded soil. Discussion with Joe Molter, BLM Natural Resource Specialist, indicates that it may have taken anywhere from one to fifty years for these trees to become established, depending on local conditions.

FEATURE DESCRIPTIONS

TRENCH SYSTEM

As shown on Map 4, 24 trenches were mapped within the site. With the exception of Trenches 12 and 13, all trenches flow down-slope generally perpendicular to the ridgetop. Trenches are generally straight-sided. Based on sample measurements taken from several trenches, they are 21" to 32" wide and up to 6.5 feet deep. Figures 1 through 5 illustrate some of the trenches. Figure 4 shows a constructed balk on Trench 1, possibly used for water control. As can be noted on Map 3, the upper end of several of the trenches forked. Figure 5 shows one of these forked junctions.

The trenches are believed to have been constructed by hand with picks and shovels. Pick marks are evident on the sidewalls of several of the trenches (Figures 6 and 7). In some trenches, the pick marks extend to the base of the extant trench, while in other trenches, the trench is one foot or more deeper than the last pick marks. During the period when these trenches were used for mining, water probably deepened the trenches. Since use of the trenches ceased, it is difficult to judge how much the trenches may have deepened from flooding during heavy rains and/or how much the trenches have filled with silt. Erosion (widening and deepening) is evident at several trenches, and most trenches now contain some vegetation.

Three trenches were mapped with tape and level to provide measurements of length and drop in elevation. Trenches 4, 16, and 22 were selected as providing a representative sample of trenches of varying lengths that are still well-defined. Although all three of these trenches have forks, the forks were not mapped. Table 1 provides comparative measurements for these three trenches, and Figures 8 through 10 illustrate the measurements.

-----  
 TABLE 1: MEASUREMENTS OF THREE TRENCHES  
 -----

TR #	LENGTH (ft)	ELEV DROP (ft)	SLOPE (%)
4	105	24.2	23%
16	145	22.3	15%
22	197	43.9	22%

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FIGURE 1: Looking up through  
Trench 4. Orien. N25°E.

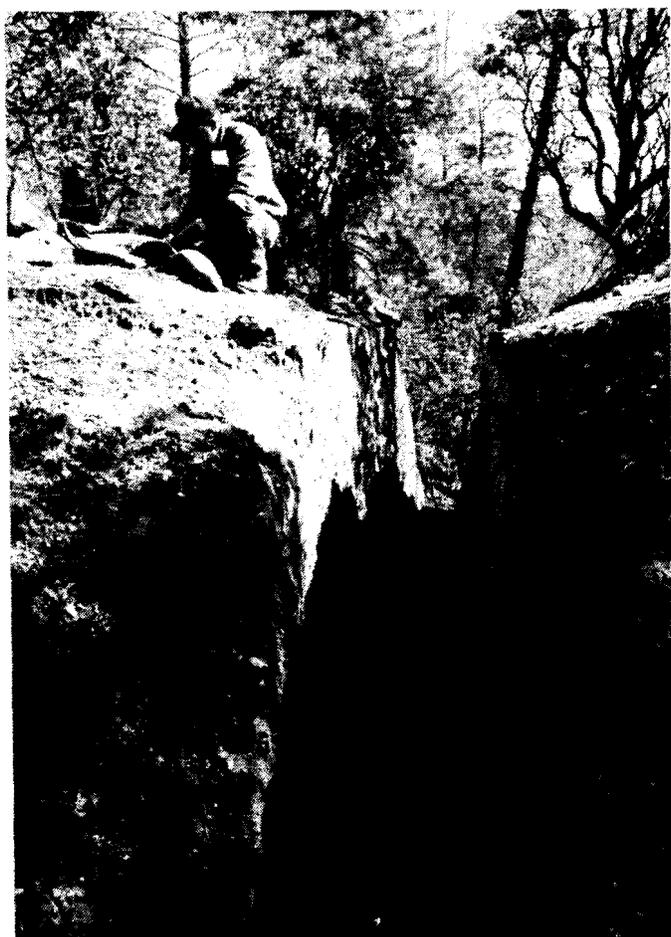


FIGURE 2: View down Trench 22.  
Orien. N80°E.

FIGURE 3: Taking measurements in Trench 4.

FIGURE 4: Balk in Trench 1. Orien. N60°E.

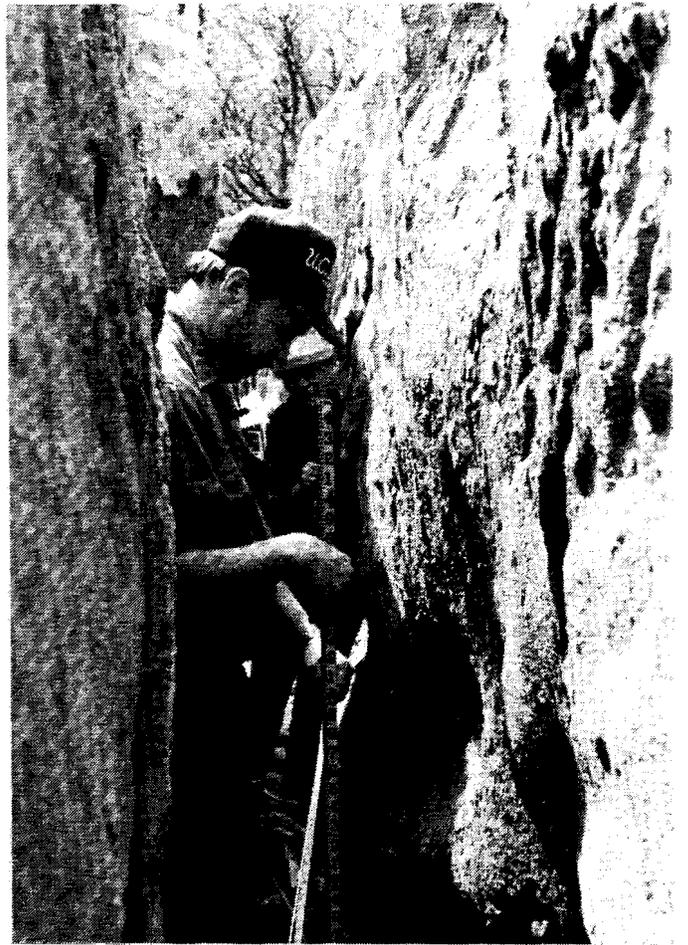
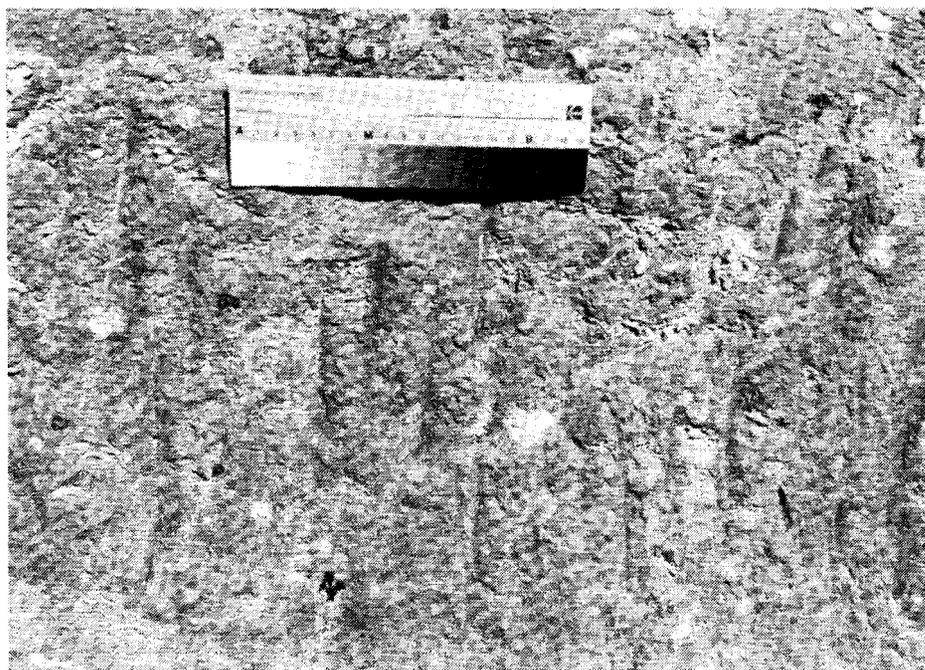


FIGURE 5: Forks at Trench 21.

FIGURE 6: Close-up of pick marks, Trench 21.

FIGURE 7: In Trench 4 looking up at pick marks.



# TRENCH 4

Scale: Horizontal-1"=20'  
Vertical-1"=10'

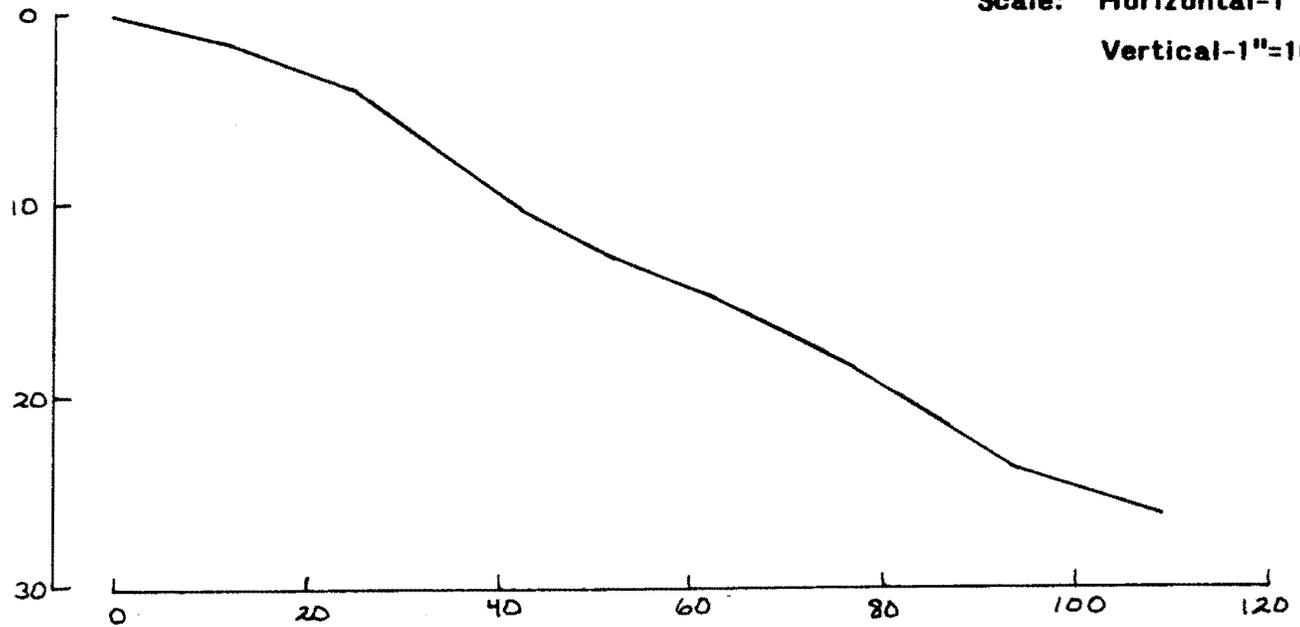
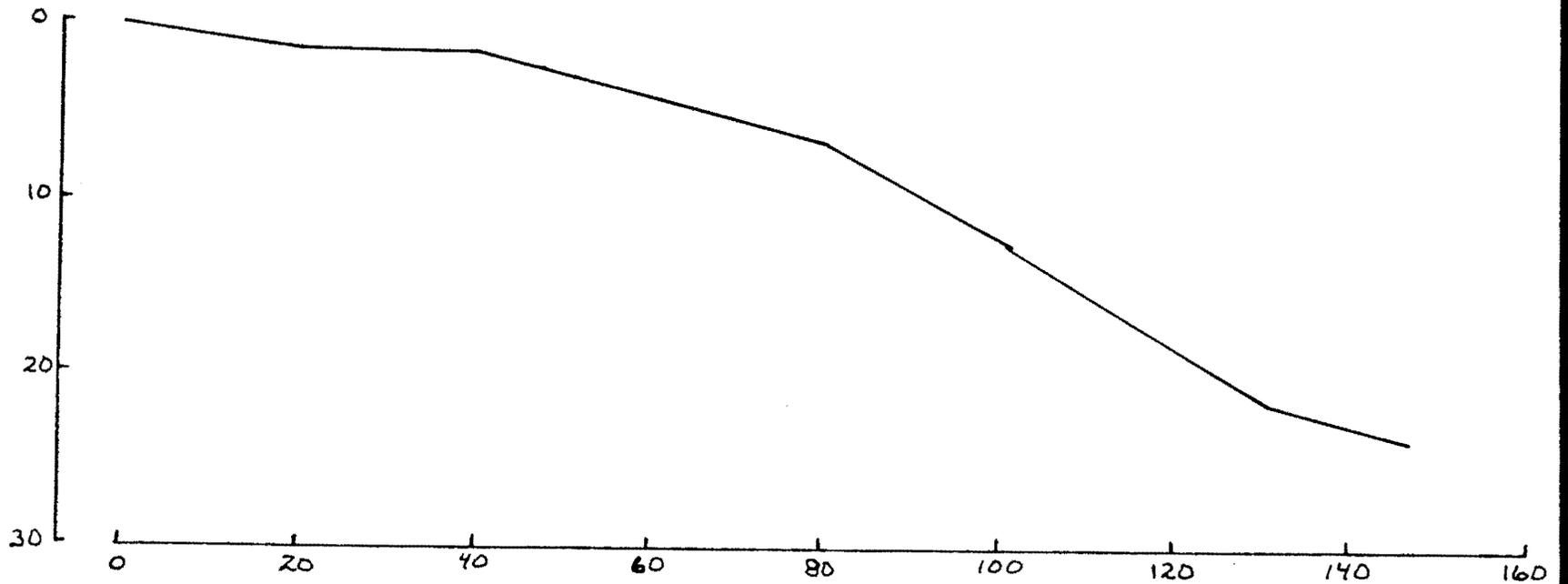


FIGURE 8: DIAGRAM OF TRENCH 4

# TRENCH 16

Scale: Horizontal-1"=20'  
Vertical-1"=10'



23

FIGURE 9: DIAGRAM OF TRENCH 16

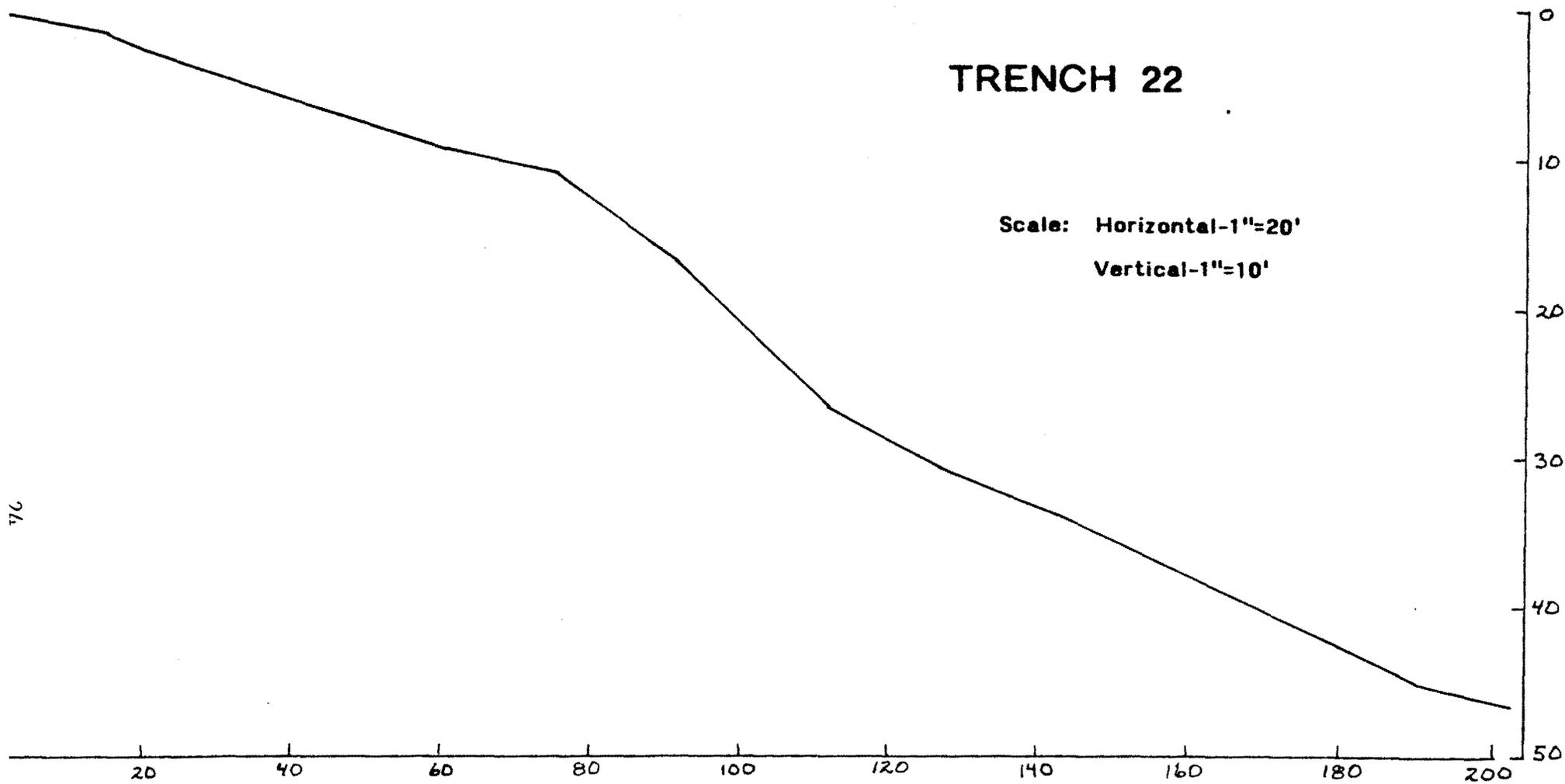


FIGURE 10: DIAGRAM OF TRENCH 22

An old road presently runs northwest/southeast along the ridge line, and there is evidence of rock alignments and depressions along this road, as well as boulder tailings. Based on this evidence, it is hypothesized that small ponds may have been constructed along the top of the ridge to supply water for placering and subsequent runoff into the trenches. Figure 11 shows one section of rock wall.

Other features within the area of the trench system are a rock cairn and an earthen/rock wall. The cairn is located at the northwest end of the ridge at the head of Trench 13. It measures approximately 5' diameter and 9" high, and in the center of the cairn is a 1-foot diameter hole. West of the cairn, a road cuts through what is believed to have been an earthen/rock wall which controlled the flow at Trench 11 and/or served as part of another catchment basin.

Artifacts noted in the trench system area were very limited. A few sections of riveted pipe, 12" diameter and approximately 12" to 24" long, were noted scattered in the area. One common cut nail was noted along Trench 22, a piece of sheet metal was found between Trenches 15 and 16, and a solder seam can was collected at the head of Trench 18. This can (CA-030-475-1) is tentatively identified as a kerosene/oil can and is illustrated in Figure 14. It measures 6 1/2" high with a base diameter of 5 1/4". It has a 1" opening in the center of the top with a screw cap and a 3/8" diameter spout opening at one edge. A chain or bail handle was connected on either side of the screw cap.

#### ROCK DAM AND DITCHES

In the northwestern portion of the project area is a rock dam in an open rocky field. The dam is constructed of large angular rocks from the local area. It measures approximately 53 feet long and is 5.4 feet high at the center (Figures 12 and 13). A ditch runs through the dam and flows southeasterly, but no clear evidence remains at the site to indicate how water intake and outlet was controlled at the dam.

The ditch from the dam crosses a major ditch which flows generally south. This ditch is shown on the 1876 Plat Map on the inside cover of this report. Measurements taken at three points along the ditch from north to south are from 32" to 22" wide and from 9" to 18" deep.

In the area of the dam and ditches, tailings were noted, as well as what appear to be more recent prospect holes and small workings dating circa 1930s.

FIGURE 11: Section of rock wall on ridgeline.  
Orient. North.

FIGURE 12: Rock dam and feeder ditch. Orient. N80°E.

FIGURE 13: Portion of dam wall. Orient. N20°W.



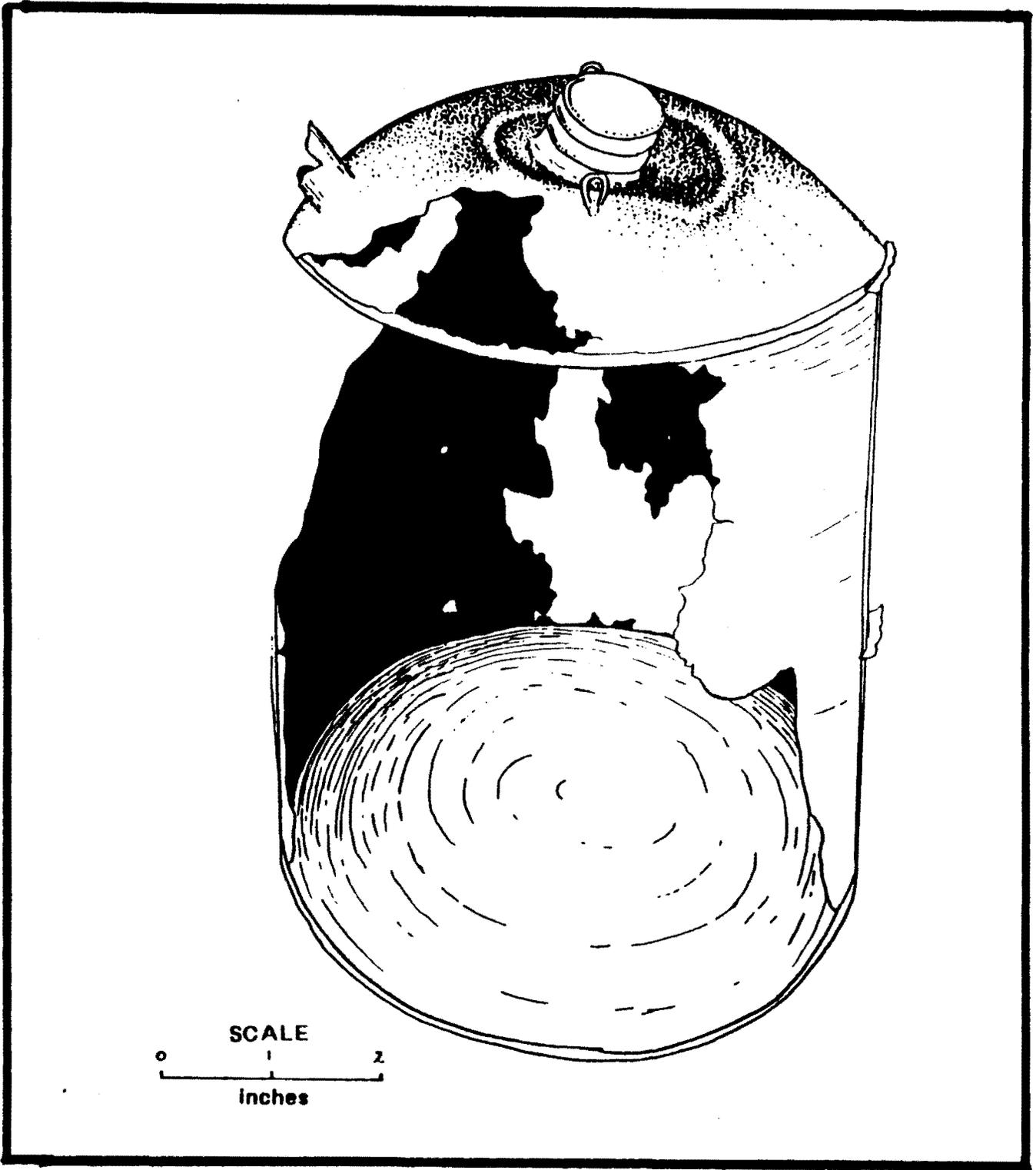


FIGURE 14: Solder seam can, #CA-030-475-1

## GRANITE QUARRY

A granite quarry is located on the western edge of the parcel. As discussed previously, it is probably related to the historic granite workings listed as being in Section 25 to the north. A large granite outcrop has been broken off, either by blasting or drill and wedge work, and the depression has filled with water (Figure 15). An iron wedge was noted in a crack of the large outcrop. It measures 1 1/4" wide and 3/4" thick and tapers on all four sides.

Large granite boulders cover the area, many of which show the drill marks for blasting (Figure 16). The drill holes are 1/2" diameter, 4" to 4 1/2" apart, and extending into the boulder approximately 3".

Evidence of a trail was noted between the dam and the granite quarry. The path has been leveled by rock support on the downhill side.

## ADITS

At the very northeast edge of the parcel is a terrace remnant with a tuff stratum into which has been carefully excavated an adit about 6-7 feet wide. The unique aspect of this adit is a shelf about three feet wide. The height from the shelf to the curved ceiling is about five feet and the resulting trench is about three to four feet deep. The back of the adit, at about 50 feet, contains a mound of alluvium and behind it a chamber which was not entered due to access problems. This adit is mostly on private land but may cross into the public parcel.

Two large adits and two smaller collapsed adits are located at the southeastern end of the project area on the east side of the reservoir (Figure 17). The openings of the large adits are approximately six feet up the hillside. The portal of the most northerly one measures approximately 18.5 feet wide and 5.6 feet high. Inside the chambers extend both to the north and south. One milled plank board was noted inside.

## OTHER FEATURES

Other historic features within the parcel reflect two differing gold extraction techniques. The westerly edge of the parcel includes remnant terrace sections that exhibit 15 to 20 relatively fresh escarpments that appear to be the vestiges of small scale hydraulic mining. Sections of riveted pipe were found nearby, obvious remnants of a past water conveyance system. This hydraulic evidence extends off the parcel to the west. Another face on the westerly end of the trenched ridge may be from limited hydraulic mining.

Relatively recent mining activity from the turn of the century, perhaps into the 1950s, is evidenced by mechanical dredge

tailings and excavation of a depression now containing a pond. The dredge, probably a doodle bug and/or small bucket dredge, mined the stream alluvium.

There is also a suggestion of small scale placer mining in the upper drainages with small piles of "fresh-looking" tailings and small ditches. Such small scale placering operations continue to this day in the general area.

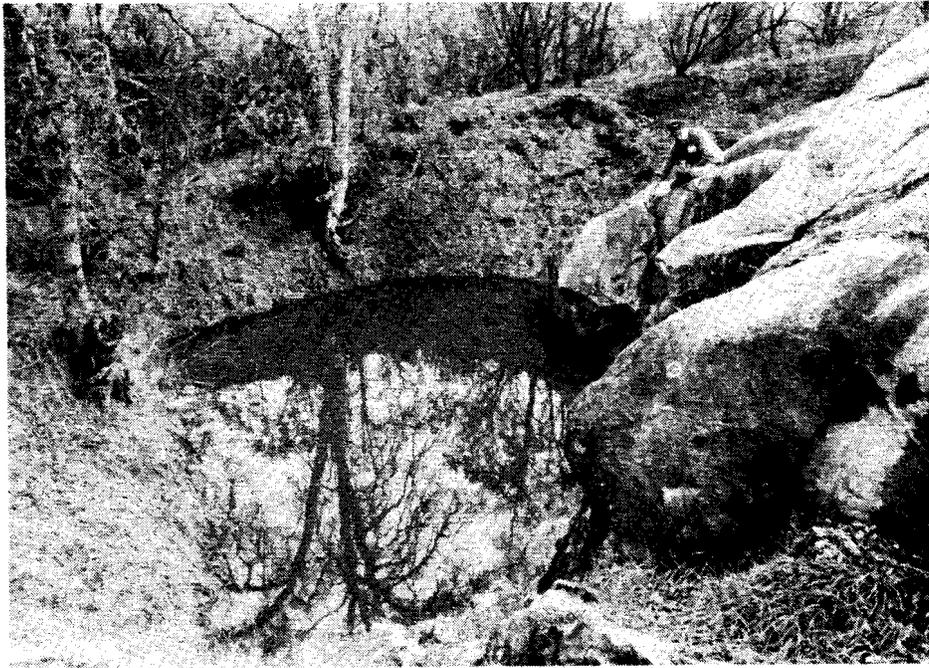


FIGURE 15: Granite quarry and pond, wedge in rock by Eric. Orien. S 45°E.

FIGURE 16: Drill holes  
in granite boulder.



FIGURE 17: View of adits looking east across reservoir.



## ADDENDUM TO HORSETOWN REPORT

Since the Horsetown Mining Complex report was finished and shipped to the printer, new discoveries were made regarding the tuff-cut trenches that deserve mentioning. These observations bear on the distribution and significance of the trench systems, and supplement information presented in the Site Evaluation and Recommendations chapter that follows. Fortunately, we were able to complete this addendum prior to the actual printing of the report.

A passage in the 11th Annual Report of the State Mineralogist of 1892 (California State Mining Bureau, San Francisco) contains relevant information:

South of Cottonwood the gravel thins out, and has been mined over a large extent of country west of Gas Point. Near Gas Point they (shale outcrops) are covered by volcanic ash, which is in turn covered by gravels. The ash is very loose and soft and in sluicing off the gold-bearing gravels on top, ditches were dug into it...A gravel ridge runs east and west for several miles between the north and middle forks of Cottonwood, and it also has been largely mined over.

Two BLM employees, Francis Berg and Ron Rogers of the Redding office, conducted informal surveys in 1992 of areas of tuff where our prior information was lacking (lower Clear Creek) or where archaeologists had not observed such trenches (Gas Point area). In fact, trenches were found in both locations. About one mile or so below the Horsetown locality and within 50 yards of Clear Creek tuff-cut trenches were observed along the stream. Extensive and sometimes deep trenches with side cut channels were found widely dispersed in the Gas Point-Roaring Creek vicinity. The largest trench (exhibiting parallel pick marks) was at least 250 feet long and between 25 and 35 feet deep.

Clearly, the tuff-cut trench systems associated with placer mining in southern Shasta County are more extensive than previously thought and discussed in the main body of this report. On this basis the trench system at Horsetown cannot be considered unique. While this diminishes the significance of the Horsetown trenches somewhat, they do represent part of a broader method of placer mining water diversion within a geological stratum confined to the southern Shasta County gold fields. As such, they represent a regional human-made landscape feature of note. Engineering variability was not studied in detail, but there appear to be general similarities in their layout, construction and use. Since many of these features are threatened with destruction from various activities, a representative sample should be preserved.



## CHAPTER 4 SITE EVALUATION AND RECOMMENDATIONS

The historic features within Lot 2 of Section 36, T.31 N., R.6 W., have been documented in this report and represent a portion of a larger mining complex that includes at least 200 acres or more. The study parcel, recorded as BLM Site CA-030-475, exhibits a varied and complex history of gold mining dating from at least the 1860s-1870s, if not before, until modern times; and the tuff-cut drainage system appears to be an unusual feature. The site has the potential for eligibility to the National Register of Historic Places (NRHP) under criteria "a" and "c"; and it possesses good integrity of location, design, setting, materials, workmanship, feeling, and association.

Criterion "a" applies to sites that are "associated with events that have made a significant contribution to the broad patterns of our history." The Gold Rush and post-Gold Rush mining ventures in northern California were instrumental in the development of Shasta County and Euroamerican-dominated California. The gold discovery on Clear Creek in the vicinity of this project was the earliest in the region, resulting in the establishment of Horsetown and its mining district. Horsetown is a registered historic site, among the earliest towns in northern California.

The historic mining features in the project vicinity make up part of a notable mining milieu, despite the lack of standing structures. This would be considered commonplace in the region with the very conspicuous exception of the mining trenches. While drainage systems for placer mining are common, an atypical geologic structure within gold-bearing beds facilitated construction of this web of narrow trenches. The miners took advantage of these soft tuffaceous beds to carve narrow, sometimes very deep trenches; and it appears the miners used these beds to good advantage, economizing their use of water and perhaps accelerating local gold production. Drainage may have been the principal rationale for trench construction, but the trenches probably also expedited use and placement of sluices, channeling of greater amounts of water, and resulting redistribution for varying stages of placer mining. To summarize, the project area represents part of an important historic landscape associated with (1) the discovery of gold on Clear Creek, (2) the Horsetown Mining District, and (3) intensifying development of northern California.

Criterion "c" applies to sites that "embody the distinctive characteristics of a type, period, or method of construction." The trench system appears to be an unusual feature, one unique or at least rare in the region and, perhaps, in California. There is

no evidence in the literature of similar narrow, deep, tuff-cut drainage systems, although mining drainage networks are commonplace in the gold fields within other, less consolidated geologic units. Another known nearby area of tuff deposits is the Dutch Gulch Reservoir area of the Cottonwood Creek drainage, eight to ten kilometers south of the project area. Historically, extensive mining was undertaken in this area, and, more recently, extensive historical archaeological work has been conducted in the area.

Johnson and Theodoratus (1984:64-66) recorded 52 historic sites with ditches, but none were reported to have been constructed through tuff beds. According to Dr. Judy Tordoff and Steve Dondero (personal communication, 1991) who worked extensively in the Dutch Gulch Reservoir area, no tuff trench features were encountered. They remember one ditch passing through tuff, but without extensive excavations, as at Horsetown. One adit was also recalled that entered a tuff bed. Tordoff and Dondero suggested possible reasons for the lack of tuff trenches as (1) the tuff occurred at higher elevations relative to much of the mining, as on second terraces; (2) mining was perhaps not as extensive on these terraces; or (3) the local topographic situation was different. Other possible reasons include the depth and extent of individual tuff deposits, the value of the gravels above the tuff beds, water availability, and/or ethnic mining patterns.

Should other tuff-cut drainage trenches be located, it is felt that this system will probably remain as an outstanding example due to the local mining history and unique geologic situation, coupled with the topographic setting, the large number of trenches, and the good integrity of the trench system.

The following recommendations are made for additional work in this area: (1) The study area has been assigned a BLM site number, but the formal site boundary must be established and a site record prepared using the data from this report. (2) Due to the difficulty of dating the trench system either by time-sensitive artifacts or by tree ring studies, additional archival research at Shasta County Courthouse and in historic newspapers and mining journals is recommended to complete review of the mining records. This task, however, must be weighed against other factors. The uniqueness of the trench system feature perhaps is sufficient to warrant a determination of eligibility to the NRHP for this site area.

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APPENDIX  
MINERAL ENTRY PATENT INFORMATION  
FOR THE PRINCESS HYDRAULIC MINING COMPANY







The said Hope Placer Mine is in conflict with the Oregon Gulch Placer Mine to the extent of 3.03 acres, as shown by the Field Notes herein referred to, and the Official Plat filed herewith.

The said 'Bolder' Placer Mining Claim embracing the South Half of the South East Quarter of the North East Quarter of Section Twenty Six, Township Thirty One North, Range Six West, Mount Diablo Meridian, and described as to notes and bounds by the Official Plat and the Field Notes of Survey thereof, heretofore referred to, as beginning at a post marked B.1-P.M.3879 (identical with  $\frac{1}{4}$  Sec. Cor. between Sects. 25 and 26, T. 31 N., R. 6 W., M. D. M. and Cor. No. 1 of Hope Placer Mine of this Survey) thence the variation of the magnetic needle being 18° 10' East, along the  $\frac{1}{4}$  S. line and South boundary of this claim, West 1300 ft. to Cor. No. 2, a post marked B.2-P.M.3879; thence deflecting 88° 43' to right, along West boundary of this claim, N. 1° 17' W. 560 ft. to Cor. No. 3, a post marked B.3-P.M.3879; thence deflecting 91° 17' to right, along the North boundary of this claim, East 1299.5 ft. to Cor. No. 4, a post marked B.4-P.M.3879, (identical with Cor. No. 2 of Hope Mine, this Survey); thence deflecting 88° 40' to right, along the Section line and East boundary of this claim, S. 1° 20' E. 660 ft. to point of beginning, and containing 19.69 acres.

The said Bolder Placer Mine is in conflict with the Oregon Gulch Placer Mine to the extent of 10.03 acres, as shown by the Field Notes herein referred to, and the Official

The said 'Justice' Placer Mining Claim embracing the North Half of the South East Quarter of the North East Quarter and the South Half of the North East Quarter of the North East Quarter of Section Twenty Six, Township Thirty One North, Range Six West, Mount Diablo Meridian, and described as to notes and bounds by the Official Plat and the Field Notes of Survey thereof, heretofore referred to, as beginning at a post marked J.1-P.M. 3879, being Cor. No. 2 of Hope and Cor. No. 4 of Bolder Claims, this Survey, thence the variation of the magnetic needle being 18° 10' E., West 1299.5 ft. to Cor. No. 2, a post marked J.2-P.M.3879; thence deflecting 88° 43' to right along the West boundary of this claim, N. 1° 17' W. 1520 ft. to Cor. No. 3, a post marked J.3-P.M.3879; thence deflecting 91° 17' to right along North boundary of this claim, East 1299.5 ft. to Cor. No. 4, a post marked J.4-P.M.3879; thence deflecting 88° 40' to right along Sec. line and East boundary of this claim, S. 1° 20' E., 1520 ft. to point of beginning, and containing 39.39 acres.

The said Justice Placer Mine is in conflict with the Oregon Gulch Placer Mine, to the extent of 35.01 acres, as shown by the Field Notes herein referred to, and the Official Plat filed herewith.

The said 'Golden Gate' Placer Mining Claim embracing the South Half of the North West Quarter of the North West Quarter and the North Half of the South West Quarter of the North West Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and described as to notes and bounds by the Official Plat

and the Field Notes of Survey thereof, heretofore referred to, as beginning at a post marked G.G.1-P.H.3879, being Cor. No. 2 of Hope, Cor. No. 4 of Bolder and Cor. No. 1 of Justice locations; thence the variation of the magnetic needle being 18° 10' East, along the Sec. line and West ~~line~~ boundary of this claim, N. 1° 20' W., 1320 ft. to Cor. No. 2, a post marked G.G.2-P.H.3879; thence deflecting 90° 9' to right along the North boundary of this claim, N. 88° 49' E. 1316 ft. to Cor. No. 3, a post marked G.G.3-P.H.3879; thence deflecting 90° 14' to right along the East boundary of this claim, S. 57° E. 1309.3 ft. to Cor. No. 4, a post marked G.G.4-P.H.3879; thence deflecting 89° 18' to right along the South boundary of this claim, S. 88° 21' W., 1305 ft. to point of beginning, and containing 39.53 acres.

~~The said Golden Gate Placer Mine is in conflict with the Oregon Gulch Placer Mine to the extent of 8.61 acres, as shown by the Field Notes herein referred to, and the Official Plat filed herewith.~~

The said "Gold Hill" Placer Mining Claim embracing the South East Quarter of the North East Quarter of the South West Quarter, the North East Quarter of the South East Quarter of the South West Quarter, the South West Quarter of the North West Quarter of the South East Quarter, and the North West Quarter of the South West Quarter of the South East Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing forty acres.

The said "Forget Me Not" Placer Mining Claim

embracing the North Half of the North West Quarter of the South West Quarter and the North Half of the North East Quarter of the South West Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing forty acres.

The said "Last Chance" Placer Mining Claim embracing the North East Quarter of the North East Quarter and the South Half of the North West Quarter of the North East Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing sixty acres.

The said "Placer" Mining Claim embracing the North East Quarter of the North West Quarter and the North Half of the South East Quarter of the North West Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing sixty acres.

The said "Reade, Stevenson and Reade" Placer Mining Claim embracing the North Half of the South East Quarter of the North East Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing twenty acres.

The said "Forsaken" Placer Mining Claim embracing the South Half of the South East Quarter of the North East Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing twenty acres.

The said "Little Molly" Placer Mining Claim embracing the South West Quarter of the North East Quarter of Section Twenty Five, Township Thirty One North, Range Six West,

Mount Diablo Meridian, and containing Forty acres.

The said "Sun Light" Placer Mining Claim embracing the North Half of the North West Quarter of the South East Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing Twenty acres.

The said "Happy Thought" Placer Mining Claim embracing the East Half of the North East Quarter of the South East Quarter and the East Half of the South East Quarter of the South East Quarter of Section Twenty Five, Township Thirty One North, Range Six West, Mount Diablo Meridian, and containing Forty acres.

An Official Survey was made of the said "Hope" Placer Mining Claim, the said "Holder" Placer Mining Claim, the said "Justice" Placer Mining Claim, and the said "Golden Gate" Placer Mining Claim, under the direction of the United States Surveyor General for the State of California, for the reason that the said surveyed claims conflict with the "Oregon Gulch" Placer Mine, Lot No. 39, as shown by the Plat and Field Notes herein referred to and filed herewith, but the said conflict is not to be excluded from this Application, as the Application for said Lot 39 has been abandoned.

Deponent further states that the facts relative to the right of possession of the said The Princess Hydraulic Mining Company, to the said HOPE CONSOLIDATED PLACER MINE and surface ground, so surveyed, platted and applied for, are substantially as follows, to wit:

By location notices duly recorded in the Miscellaneous

Records of Shasta County, State of California, in the Recorder's Office of the said County, as follows, to wit:

The said "Justice" Claim, in Book 6 at Page 405; the said "Golden Gate" Claim, in Book 6 at Page 405; the said "Gold Hill" Claim, in Book 6 at Page 421; the said "Forget Me Not" Claim, in Book 6 at Page 514; the said "Last Chance" Claim, in Book 6 at Page 626; the said "Placer" Claim, in Book 7 at Page 269; the said "Reade, Stevenson and Reade" Claim, in Book 7 at Page 256; the said "Foreakon" Claim, in Book 9 at Page 167; the said "Hope" Claim, in Book 8 at Page 200; the said "Holder" Claim, in Book 8 at Page 220; the said "Little Nelly" Claim, in Book 8 at Page 327; the said "Sun Light" Claim, in Book 8 at Page 327; and the said "Happy Thought" Claim, in Book 8 at Page 593, and by various transfers thereof from the original locators and their grantees, which more fully appear by reference to the copies of the original records of location and the Abstract of Title herewith filed and made a part of this affidavit.

The value of the labor done, and the improvements made upon said HOPE CONSOLIDATED PLACER MINE, by the said The Princess Hydraulic Mining Company and its grantors exceeds the sum of \$6500, and amounts to the sum of \$30,000. The said improvements consist of a ditch constructed by said Company and its grantors, 14 miles in length, with a capacity of 1500 minor's inches of water, which, together with the syphon and pipe line herein mentioned, conveys water from the South Fork of Brandy Creek and Boulder Creek to the said Hope Consolidate

Placer Mine, and which cost the said Company \$14,000.00; also, a syphon 2000 feet in length, composed of pipe 24 and 22 inches in diameter, with a capacity of 2400 miner's inches of water, and which cost the said Company the sum of \$5000.00; 3 dams which cost \$500.00; other pipes, giants and equipments on the mine which cost the said Company the sum of \$5000.00; house, barn and blacksmith shop, worth \$500.00; 5 shafts which cost \$500.00; open cuts which cost \$500.00; sluices and sluice boxes which cost \$500.00; and 2 acres of said premises have been mined to a depth of 25 feet, at an expense of \$3500.00.

Said Mine is situated about 11 miles from the California and Oregon Railroad and there is a good wagon road running from the town of Redding on said Railroad, thereto.

The said premises are all placer ground and there are no known quartz lodes or ledges therein and the nearest known quartz lode of value is more than 3 miles therefrom.

The composition of the ground is gravel and there is very little timber on said premises, what there is being scrubby pine, oak, manzanita and chapparal and there is practically no other vegetation thereon.

There are no streams running through said premises, the water used for mining the same being brought thereon by a ditch, syphon and pipeline, as aforesaid.

Each and every subdivision contains gravel bearing gold in paying quantities and it is all well adapted for placer mining and the same is now being actually worked as a placer

In consideration of said facts and in conformity with the provisions of Chapter Six, of Title Thirty Two, of the Revised Statutes of the United States, Application is hereby made for and in behalf of the said The Princess Hydraulic Mining Company, for a patent from the Government of the United States for the said HOPE CONSOLIDATED PLACER MINE and the surface ground as officially surveyed and described herein.

*W. J. Wood*  
Subscribed and sworn to before me, this 10<sup>th</sup> day of September, 1901, and I hereby certify that I consider the above deponent a credible and reliable person, and the foregoing affidavit was read and examined by him before his signature was affixed thereto and the oath made by him.

*James E. Isaacs*  
Notary Public in and for the County  
of Shasta, State of California.

R E P O R T.

The HOPE, GOLDEN GATE, BOLDER and JUSTICE Placer Mining Claims are situated 8 miles southwest of Redding, California, the nearest point to the California and Oregon Railroad, the nearest post office is Igo, a village of 50 population 3 miles southwest, the altitude is 900 feet above sea level; the surface is slightly rolling hills, covered with a scant growth of grass and chaparral, poison oak and Manzanita brush, with scattering pine and oak trees.

The formation embraced within the claims consists of decomposed mineral-bearing granite and gravel and boulder deposits and auriferous sand, well adapted for placer mining purposes, inasmuch as the contour of the surface and character and nature of the soil are such that they can be most advantageously and cheaply worked by hydraulic giants and the tailings readily disposed of.

The improvements upon the said locations are as follows, viz:-

On the HOPE, No.1 Open Cut 100 ft. long by 95 ft. wide, averaging 4 ft. deep, the N.W. corner of same bears N.85°E. 1470 ft. dist. from Cor. No.1, Value \$1500.00

No.2 Open Cut 400 feet long by 50 feet wide and averaging 3 feet deep the west end of same bears N.86°E.1590 feet dist. from Cor. No.1, Value \$2000.00

Worked by ground sluicing.

On the BOLDER, No.1, Open Cut 100 feet by 50 feet wide average 4 feet the N.W. corner of same bears N.25°W. 581 feet distant from Cor. No.1 Value \$1500.00

Worked by ground sluicing.

On the JUSTICE, No.1, Open Cut 325 feet long, by 250 feet wide and averaging 20 feet deep, the north east corner of same bears N.42°W. from Cor. No.1. Value \$10000.00

Worked by hydraulic giants.

No.2, Boarding house 20' X 30' bears N.4°W. 890 feet dist. from Cor. No.1, Value \$300.00

No.3, Blacksmithshop (and tools) 16' X 20' bears N.12°W. 800 feet from Cor. No.1 Value \$300.00

No.4, Stable 12' X 20' bears N.15°W. 890 feet dist. from Cor. No.1. Value \$100.00

No.5, Reservoir 300 feet long by 50 feet wide and 0 to 6 ft. deep, bears N.45°W. 7.50 feet dist from Cor. No.1.

Value \$300.00

On the GOLDEN GATE, No.1, Open Cut 175 feet long by 155 feet wide, and averaging 30 feet deep, the N.W. corner of same bears N.23°E. 860 feet distant from Cor. No.1.

Value \$7000.00

No.2, Open Cut 110 feet long by 40 feet wide averaging 3 feet deep bears N.12°E. 1100 feet dist from Cor. No.1, Worked by hydraulic giant.

Value \$500.00

A Ditch 5 ft. wide, at top, 3 ft. wide at bottom and 2½ ft. deep with fluming and pipe where necessary to convey water from Boulder creek and Brandy creek in Township 32 N., R.6 W., to the mines, a distance of 14 miles, constructed by applicant at a cost of \$30,000.00 with head at mines of an average of 150 feet, and water ordinarily in sufficient quantity to work six months each year.

Average value of the ground 12½¢ per cubic yard.

There are no mines, salt licks, salt springs or mill seats upon the claim.

The boundaries of Oregon Gulch Placer Mine, lot No.39, are shown, on plat, the same having been surveyed some 25 years ago, I am advised that owners failed to comply with the requirements of the mining laws and regulations, their rights have lapsed.

Dated, Redding, Cal. April 5th. 1901.

Alfred Baltzell,

U.S. Deputy Mineral Surveyor.

Subscribed and sworn to before me

this 22nd. day of May 1901.

W. D. Tillotson,

Notary Public in and for the County of Shasta,  
State of California.





United States of America ss.  
State of Colorado.

*I, ELMER F. BECKWITH, Secretary of State of the State of Colorado, do hereby certify that*

the annexed is a full and true and complete transcript of the

CERTIFICATE OF INCORPORATION  
OF  
THE PRINCESS HYDRAULIC MINING COMPANY,

which was filed in this office the FOURTEENTH day of MARCH,  
A. D. 1896, at 1 5 o'clock, A. M., and admitted to record.



In Testimony Whereof,  
I have hereunto set my hand  
and affixed the Great Seal  
of the State of Colorado, at the  
City of Denver this TWENTY-SIXTH  
day of DECEMBER, A. D. 1900.

*Elmer F. Beckwith Secretary of State*  
By *J. H. Adams* Deputy

## **PAPER 2**

THE HISTORIC BLUE RIDGE FLUME OF SHASTA  
AND TEHAMA COUNTIES, CALIFORNIA

by

Dottie Smith  
Post Office Box 1147  
Cottonwood, California 96022

With Contributions by Eric W. Ritter  
Bureau of Land Management, Redding



## ABSTRACT

The Blue Ridge Flume was a 42-mile V-flume initially constructed in 1872 to transport rough-cut lumber quickly and safely from the remote Manton and Viola area sawmills of Shasta and Tehama counties to a Red Bluff planing mill. From the time it was built, and throughout its short history (1872-1878) before its abandonment and eventual destruction by lumber and hardware thieves, it was looked upon with awe and wonderment.

Today, the Blue Ridge Flume is largely a memory. There are no standing remains of this massive structure, although scattered remnants can be found along its route, including rock piers and scattered boards, hardware and other artifacts.

The Blue Ridge Flume played a very important role in the development of the north state's lumber industry, Tehama and Shasta counties, and the city of Red Bluff. It appears to be part of a system of National Register of Historic Places quality. Management of portions of the system's route by the Bureau of Land Management will help in presenting the story of this flume's history and value to the public through eventual interpretive displays and other means.

## ACKNOWLEDGEMENTS

I would like to thank Dr. Eric Ritter and the Redding Resource Area of the Bureau of Land Management (BLM) for offering me the opportunity to research and write this report. Credit must also be given to Dr. Ritter for assistance in the report creation, especially the maps, charts, and editing of the final draft, and for writing the sections on local environment and flume archaeological remains and values.

Additional thank you's are extended to Clifton (Tip) Wilson, his wife Alice, and Alva Forward for taking the time to sit and talk to me for hours. In the process they filled me with priceless historical information. My gratitude is extended to now deceased "Hutch" Hutchinson who in his unique way gave me inspiration; to "Cousin" Larry Cox, a BLM volunteer who was always there and ready and willing to help me scour through microfilm at the Tehama County Library; to BLM employees Joe Molter and Julie Pfilf who took the time to prepare some of the illustrations; and lastly to Michael and Donna Fox for helping with last minute details.

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## FOREWORD

In 1987 the Bureau of Land Management (BLM) acquired property at the mouth of Inks Creek on the Sacramento River in Tehama County. During a routine archaeological survey of the area, remnants of the Blue Ridge Flume were discovered. Because of its importance to the early lumber industry in northern California and since it is a relatively well-known and famous landmark with public education and interpretive value, a decision was made by BLM to research its history.

In the spring of 1988 I was taken to the Inks Creek property and shown remnants of the flume by Dr. Eric Ritter, BLM's local archaeologist. Because of my interest in regional history and because of the excitement I knew I would encounter in researching such a massive early-day project of awe-inspiring proportions - a structure which once proudly stood defying almost all odds, I eagerly accepted his offer to perform the research on this system. This work was accomplished while I was enlisted as a BLM volunteer resulting in this report.

It is hoped that this document, bringing together many earlier accounts and descriptions, will fill a small void in the region's history. There is undoubtedly more to the Blue Ridge - Flume's history than brought out in this account. But the substance of the flume's development and use and its significance to historical changes in the local and regional economy and infrastructure are contained in these pages.

## INTRODUCTION

Lumbering was the story of empire building and, along with mining and agriculture, was of paramount importance in the growth and history of Shasta and Tehama counties through which the Blue Ridge Flume was built. The discovery of gold in 1848 brought thousands of men into the area who had an immediate need for wood. Wood was required as fuel for their fires, and logs and cut lumber were needed to build their cabins, stores, saloons, and various other buildings. As time went on, more and more wood was needed to meet this growing demand. A cheaper, faster and more reliable method of transporting lumber from the mountain sawmills to the valley planing mills was desperately needed. The answer came in the form of the V-flumes.

The Blue Ridge Flume was a "V-flume", so named because of its "V" shaped trough. Interestingly, the word "V-flume" could not be found in early dictionaries even after flumes had been in use for nearly ten years. And today, according to my Webster's Dictionary, there is still no such word.

The origin of the name Blue Ridge is uncertain. The place names of Blue Lake, Blue Lake Canyon, and Blue Mountain are all mentioned by Steger and Jones (1966:18) as being located in the general vicinity of the Blue Ridge Flume:

"Blue Lake, Blue Lake Canyon - Glacial lake about one mile south of Loomis Peak, an intense and beautiful blue. Headquarters for Hollingsworth and Trapper Smith in the 80's. The canyon, named for the lake, is cut by the North Fork of Bailey Creek".

My map shows Blue Ridge and Blue Ridge Springs in T.29N, R.2E and T.30N, R.2E north of Snoqualmie Gulch and west of Sugar Pine Flat in Tehama County. These, too, are located in the general vicinity of the Blue Ridge Flume, but it is not certain what came first - the places or the flume, and what inspired the name.

I have relied heavily on various manuscripts available through the Tehama County Library and the Special Collections, Meriam Library at California State University, Chico to research this flume. W. H. Hutchinson's California Heritage - A History of Northern Lumbering (1983) has been a major source of information. The Tehama County courthouse displays a map of the route which was used for reference. The Bureau of Land Management office in Redding contains archaeological and historical documentation, and several old timers provided valuable insights.

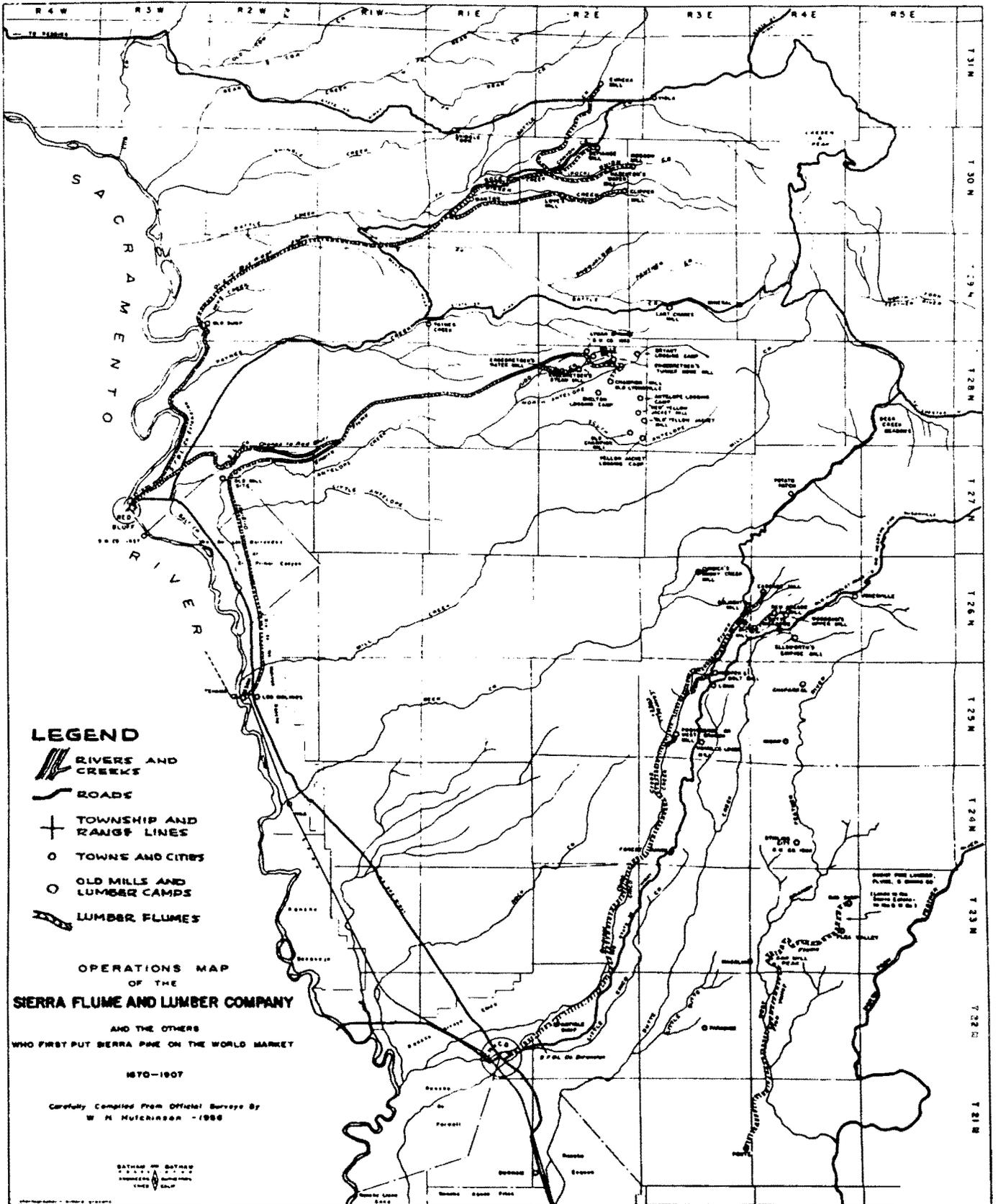
## ENVIRONMENTAL SETTING

Eric W. Ritter, Ph.D.

It is not difficult to imagine the variety of terrain and vegetation communities transgressed by a flume system beginning in the Cascade Mountains, passing through foothills and low canyon country, and terminating near the north end of the Sacramento Valley (Map 1). Since the only purpose for the flume's construction was a more economical means of transporting lumber to the market, it is quite obvious that the starting point was in the Northern Yellow Pine Forest (see Barbour and Major 1977 for reference). As the flume descended down ridge tops it passed through chaparral (mostly manzanita and Ceanothus) and Blue Oak - Digger Pine Forest until it reached the Sacramento River. Here, the Riparian Forest (e.g. cottonwoods, willows) community is present in places bordered by Valley Oak Savannah and Blue Oak - Digger Pine Forest. By the time the flume reached Red Bluff, the edge of the California Prairie was breached.

Geologically, the flume transgresses various Pliocene volcanic units, including pyroclastic rocks near the higher mills, Pleistocene non-marine beds near the mouth of Inks Creek and Bend, and Pliocene basalts within the lower Sacramento River Canyon. There are a few areas of Quaternary stream channel deposits near Inks Creek and Red Bluff. The greatest engineering challenges, where a low gradient was ideal, included steep ridges in the higher elevations, various stream crossings where small canyons and large gullies were present, and the steep sided Sacramento River Canyon. Other environmental problems faced in flume construction decisions included winter snowfall at the upper elevation and winter and spring flooding at lower elevations.

# MAP 1



(from Hutchinson 1983)

## IMPORTANT DATES & EVENTS

- 1844 First known logging takes place near the Shasta/Tehama county line by Samuel Hensley and his woodcutting crew; logs floated down river to Sutter's Fort.
- 1848 First sawmill in the Sierra Nevada erected at Coloma.  
January 24. Gold discovered in the Coloma sawmill tailrace by James Marshall.  
Gold Rush begins creating influx of gold miners.
- 1850 First Shasta County sawmill built on Rock Creek near Shasta.
- 1851 First Shingletown area sawmills built.
- 1852 Shingletown area sawmills begin hauling lumber to the Sacramento River and floating it to Sacramento.
- 1860 Civil War and an Idaho Gold Rush erupt resulting in a "rush" into the forests for desperately needed resin and turpentine.  
Sugar Pine Mill built in the 1860's.
- 1870 July 2. California & Oregon Railroad arrives in Chico.
- 1872 Construction begins on the first Tehama County flume (Empire Flume) by C. F. Ellsworth at Lyman Springs.  
Construction begins on the first Shasta County flume at the Clipper Mill by Kellum Powell (Map 2).  
September 1. California & Oregon Railroad arrives in Redding and begins giving dependable lumber transportation to major cities.  
Blue Ridge Flume & Lumber Company established.  
Clipper Mill and accompanying uncompleted flume acquired by Blue Ridge Flume & Lumber Company (Mill #1) (Map 2).  
Sugar Pine Mill purchased by Blue Ridge Flume & Lumber Company (Mill #2).
- 1873 18 miles of Blue Ridge Flume completed and operating.



- 1874 May 9. Defiance Mill and Hazelton's Water Mill purchased by Blue Ridge Flume & Lumber Company (Mill #3 and #4).
- May 30. Construction of the Blue Ridge Flume completed to Inks Creek Dump.
- July 4. Red Bluff lumber yard and planing mill completed on Jefferson Street. Flume materials transported here from Inks Creek either on wagons or floated down the Sacramento River.
- November. Blue Ridge Flume & Lumber Company begins breaking up.
- 1875 Blue Ridge Flume & Lumber Company amalgamates and opens lumber yard at Princeton. Lumber rafts floated down Sacramento River to supply yard.
- 1876 January. Blue Ridge Flume & Lumber Company suspends operations.
- February 1. Blue Ridge Flume & Lumber Company files bankruptcy.
- Sierra Flume & Lumber Company purchases the defunct Blue Ridge Flume & Lumber Company and expands operations.
- Moscow Mill constructed (Mill #5).
- July 1. Eureka Mill purchased (Mill #6).
- Construction begins on a new Red Bluff planing mill and sash and door factory on the sand bars, east side of Sacramento River.
- Construction begins to extend flume from Inks Creek to the new planing mill and sash and door factory under construction at Red Bluff.
- Sierra Flume & Lumber Company provided timber to build Centennial Free Bridge across Sacramento River and secured franchises to operate steam locomotive and build a private railroad to connect with the California & Oregon main line.
- March 17. Sierra Flume & Lumber Company controls the pineries from Shingletown Ridge south to the Feather River.
- Sierra Flume & Lumber Company has all mills and flumes linked to their valley terminals by telegraph lines making the company the largest private communications

network in the state, and, perhaps, the nation.

Sierra Flume & Lumber Company is the most complex lumber operation in the world.

1877 February 3. Blue Ridge Flume extension to Red Bluff completed.

Sierra Flume & Lumber Company begins to fail.

Red Bluff planing mill and Blue Ridge Division discontinue operations due to a dispute with creditors; operations and machinery moved to Lyonsville area.

1878 July. Sierra Flume & Lumber Company forced into bankruptcy.

November 1. Sierra Flume & Lumber Company reorganizes as Sierra Lumber Company. All operations on Blue Ridge Division dropped and machinery moved to Lyonsville area.

November 1. Blue Ridge Flume abandoned as a result of reorganization and almost immediately becomes ravaged by settlers who begin stealing boards, timbers, and nails.

1891 Sierra Lumber Company is one of the largest pine manufacturing plants in the world.

1905 June 1. Sierra Lumber Company finally acquires title to Blue Ridge Division acreage and Blue Ridge Flume, but the too-long-idle flume had been too severely ravaged by thieves and is now useless.

1907 March 19. Sierra Lumber Company sold to Diamond National Corporation. Included in the sale is the broken-down and useless Blue Ridge Flume.

1911 Diamond National Corporation closes the Red Bluff factory thus bringing to an end four companies who had supplied lumber, employment, and income to Tehama County residents for over 40 years.

## LUMBER INDUSTRY BEGINNINGS IN SHASTA AND TEHAMA COUNTIES

Logging was the first industry in Shasta County according to Johnson (1978:1). "The history of Tehama County lumbering was the story of an empire. It was of significant importance in the growth and history of Red Bluff as well as Tehama County" states Brown in his undated term paper.

The earliest known person to perform lumbering and/or logging was Samuel Hensley in 1844. Hensley and his crew of woodcutters cut trees near the Sacramento River in the vicinity of what is today the Shasta and Tehama County line and rafted the logs downriver to John Sutter's sawmill for the building of New Helvetia, states Hutchinson (1983:3). "This was the first attempt to tap the northern Sierra Nevada for timber..." (1983:3). But Sutter needed more wood than Hensley could provide, and in 1848 he contracted with James Marshall to erect a water-powered sawmill at Coloma, the first in the Sierra Nevada. However, fate stepped in and on January 24, 1848 Marshall found gold in the tailrace of the uncompleted mill. This, of course, led to the Gold Rush which in turn created a demand for lumber (1983:3). Later in the same year a new gold discovery was made in Shasta County which caused an influx of gold seekers into that area and a desperate need of wood for cabins and stores (Shuford 1957:34).

In 1849 Abraham Cunningham arrived in Shasta County as a goldminer. The following is his description of the forests as told by his grandson, Leo Cunningham (1965:17):

The dense forest stretched for miles in every direction with great trees six and eight feet through and one hundred feet to the first limb. From the Manton area to the Whitmore country and from Inwood to the base of the High Sierras stretched a forest primeval, the greatest stand of pine and sugar pine that the world has ever known.

The Gold Rush of 1848 was probably the event most responsible for developing the lumber industry states Shuford (1957:34), who goes on to say that the need for lumber to meet the mining boom grew to such an extent in the 1850's that "...mills sprang up everywhere in every settled corner of the county."

The first Shasta County lumber mill was established in 1850 by owners Jonathan Otis and a Mr. Truett (first name unknown). It was called the Otis and Truett Lumber Mill (Johnson 1978:1). Their sawmill "...was simply a sawpit where two men cut logs into boards with a straight cross cut saw..." It was located near the south fork of Rock Creek about one mile northwest of Shasta. On the other hand, Frank and Chappell (1881:128) state that the pioneer mill company in Shasta County was McCumber, Benton & Co. This company built or began the first mill in the "Sierra Nevada

mountains" (really in the Cascade Range) within the limits of Shasta County in the spring of 1851 on what is known as Millseat Creek. They further indicate that Rudolph Klotz "...though beginning to build some weeks later, began making lumber about the same time". According to Hutchinson (1983:4), the first Tehama County sawmill was located on Mill Creek in 1851 by a Mr. Payne (first name unknown).

The 1852 State Census shows eight mills in Shasta County and one in Tehama County; the 1860 State Census shows twelve mills in Shasta County with a total production of 4,930,000 board feet and two mills in Tehama County with a total production of 1,000,000 board feet. As noted by Grimes (1983:38), the two 1860 Tehama County mills were the Nome Lackee Mill on Thomes Creek and the Antelope Mill on the Job Dye Ranch. A Government Land Office plat from 1873 shows Powell's Mill plus road and flume, Hazelton's Water Saw Mill, and Hazelton's Steam Mill in T.30N, R.2E (Map 2).

Oxen were first used to haul the cut trees from the woods to the mills, states Shuford (1957:34), who further declares that "...later horses and mules were used as well as oxen because they were much faster." Johnson (1978:1) also states that logging "...was done by oxen, then later with horses. The difficulty of getting logs to the mill made it necessary to build the mills near the forests..." Additionally, "If the mill was close, a chain was fastened to the log and it was dragged to a chute which led directly to the mill. Chutes were built by placing peeled logs lengthwise in a trough, with sides high enough to hold the log in place. Any kind of grease that was available was used to grease the chute so the logs would skid. Young boys on their first logging job were given the task of greasing the chute. They ran in front of the oxen with a bucket of grease and a swab." Following Shuford (1957:34), the traction engine and the big wheels came next. "The big wheels consisted of two big wheels, sometimes eight feet or more in diameter, connected by an axle, under which logs were slung for skidding. The donkey engine was also being used to haul logs to the landings..."

Lumbermen were always plagued with high hauling costs from the mountains to the valley (Hutchinson (1983:7), and cheap transportation was needed from the mountain mills to the valley floor (Hutchinson 1983:2). Shuford (1957:34) indicates lumber was being hauled from the mountain mills to the valley on wagons pulled by horses or mules, usually by a twelve to sixteen horse or mule team. Johnson (1978:1) states that by 1852 Shingletown area mills were manufacturing lumber, hauling the lumber to the Sacramento River, and rafting it downstream to Sacramento. Shuford (1957:34) relates that lumber was let loose at the north end of Iron Canyon, allowed to drift through the canyon, then gathered on the other side and rafted to Red Bluff where steamboats hauled it to Sacramento.

In 1860 the Civil War and an Idaho Gold Rush created another dash to the forests of Shasta and Tehama counties. Hutchinson (1983:5) says "The lumber industry of the northern Sierra still was trying to solve the problem of dependable, economical transportation when the Civil War and a gold strike in Idaho became a part of its history. The secession of South Carolina virtually deprived the Union of the vital 'naval stores', turpentine and resins, that were essential to sea power in a day of wooden ships." Grimes (1983:38) states "The North's need for turpentine and resin brought men into the pineries...", while Hutchinson (1983:5) says the virgin forests of the Sierra Nevada were invaded by men who gouged great holes in the bases of Ponderosa pines in order to collect pitch that would be made into turpentine and resin. And, according to Johnson (1978:65), "All that was left to commemorate the California effort were the rocks embedded in the trees, where they had been placed to plug the holes through which the pitch had been gathered."

The above-mentioned Idaho Gold Rush helped solve the ever-present transportation problem. Two roads to Susanville, the Tehama Wagon Road and the Chico and Humboldt Wagon Road, were constructed as all-weather supply routes to the Idaho mines. These two roads helped to open the virgin forests in the area with access roads that up until then "...no single sawmill or lumberman could afford to build,..." and the lumber industry began to grow. Hutchinson (1983:6) indicates, however, "The opening up of these virgin forests simply aggravated the old problem of getting lumber to the city markets."

The California & Oregon Railroad arrived in Chico on July 2, 1870 and in Redding on September 1, 1872 and began giving dependable lumber transportation to the major cities of Marysville, Sacramento, and San Francisco (Hutchinson 1983:7). The railroad also provided a local market for cord wood to fuel the locomotives. However, cheap transportation was still needed from the mountain mills to the valley floor (Hutchinson 1983:7).

THE FIRST FLUME:  
THE EMPIRE FLUME OR ELLSWORTH'S FOLLY

The key that finally unlocked the treasures of the sugar and yellow pine forests was the building of a V-flume. Grimes (1983:38) states "As the forests opened up and markets for timber expanded, it became necessary to find a cheap, reliable method to move the timber from the mountains to the valley floor. The solution to this transportation dilemma was a wooden structure called the V-flume."

According to Hutchinson (1983:7), the first V-shaped flume in this area was built in 1872 by C. F. Ellsworth, a woodsman from Maine. His flume became widely known as Ellsworth's Folly, was forty miles long, was located on the east side of the Sacramento River in Tehama County, began at Lyman Springs, and ended at the Sacramento River where it met with the railroad (1983:7) (Map 1). Grimes (1983:39) also indicates that "...Charles F. Ellsworth and the Empire Lumber Company developed the V-flume to carry lumber from Belle Mill to the railroad at Sesma. It took almost three years to construct the 40-mile flume...the first flume on the west side of the Sierras."

Hutchinson (1983:7) describes Ellsworth's flume in detail:

...16 inches wide at the bottom, 48 inches water-width, with 32-inch sloping sides. 'Drag boards' were used on the bottom and sides at points of extreme wear, such as curves. Each mile of flume required some 135,000 board feet of lumber which shows why a sawmill that built a flume was its own best customer during construction. The flume was made in sixteen-foot sections, called 'boxes', and the desired grade was one inch of fall per 'box' or twenty-seven feet to the mile. This desired grade could not always be maintained. At the spot called Grecian Bend...the fall was so abrupt that lumber attained a speed of fifty miles an hour before the flume leveled off again. Building down the valley to Sesma, Ellsworth had a hard fight to keep a fall of ten feet to the mile...

The flume reached Sesma in August of 1873 and a planing and molding mill was erected to handle the 40,000 feet of lumber that soon began being shipped daily down the flume (Hutchinson 1983:7). However, Ellsworth never saw the end results of his great accomplishment because he fell off his flume while superintending final construction and died from the injuries (Hutchinson 1983:8). Later in the same year construction began on the Blue Ridge Flume. Andrews (1960:65) notes that in the three years it took to construct the Empire Flume, it cost about five thousand dollars per mile, or \$200,000, quite an expense in those days.

## THE BLUE RIDGE FLUME

The Blue Ridge Flume was "a colossal and important work... one of the wonders of the last decade" (Elliott and Moore 1880:78, 80) (Figures 1, 2), larger and more complex than the Empire (Hutchinson 1956:11).

The Blue Ridge Flume "was as fine a piece of engineering as was ever consummated in the northern part of California up to the days of electric power lines", states McNamar (1990:125).

The Blue Ridge Flume was referred to by local people and the press as "Marvels of the Age" (Hutchinson 1983:7).

The single purpose of the flume was to provide fast and cheap lumber transportation from the mountain sawmills (Figure 3) to the valley planing mills. The Blue Ridge Flume was a V-flume, so named because of the "V" shape of its trough and considered more profitable than the traditional square-box flumes previously used in other parts of the state. According to Hutchinson (1983:6), "the V-flume was reasonably self-clearing; if a jam started, the backhead lifted the planks into the widening top of the flume. Additionally, it took less lumber to construct and, more important, less water to operate than the conventional square-box flume".

McNamar (1990:124) gives the following detailed flume description as told to her by George Tuggle, an old-timer from Shingletown who lived near Battle Creek and the Benton Mill:

It was a V shape with two foot wide boards forming each side, the crack between the two boards was battened to prevent leakage. A six inch wide board at the bottom formed a floor and conserved water. Each 16 foot lap of this flume rested on a trestle, with braces between and many cleats prevented the two boards of each side from warping. In crossing canyons or low places, in many cases these trestles were 50 feet high. In other places the flume fairly rested on the ground.

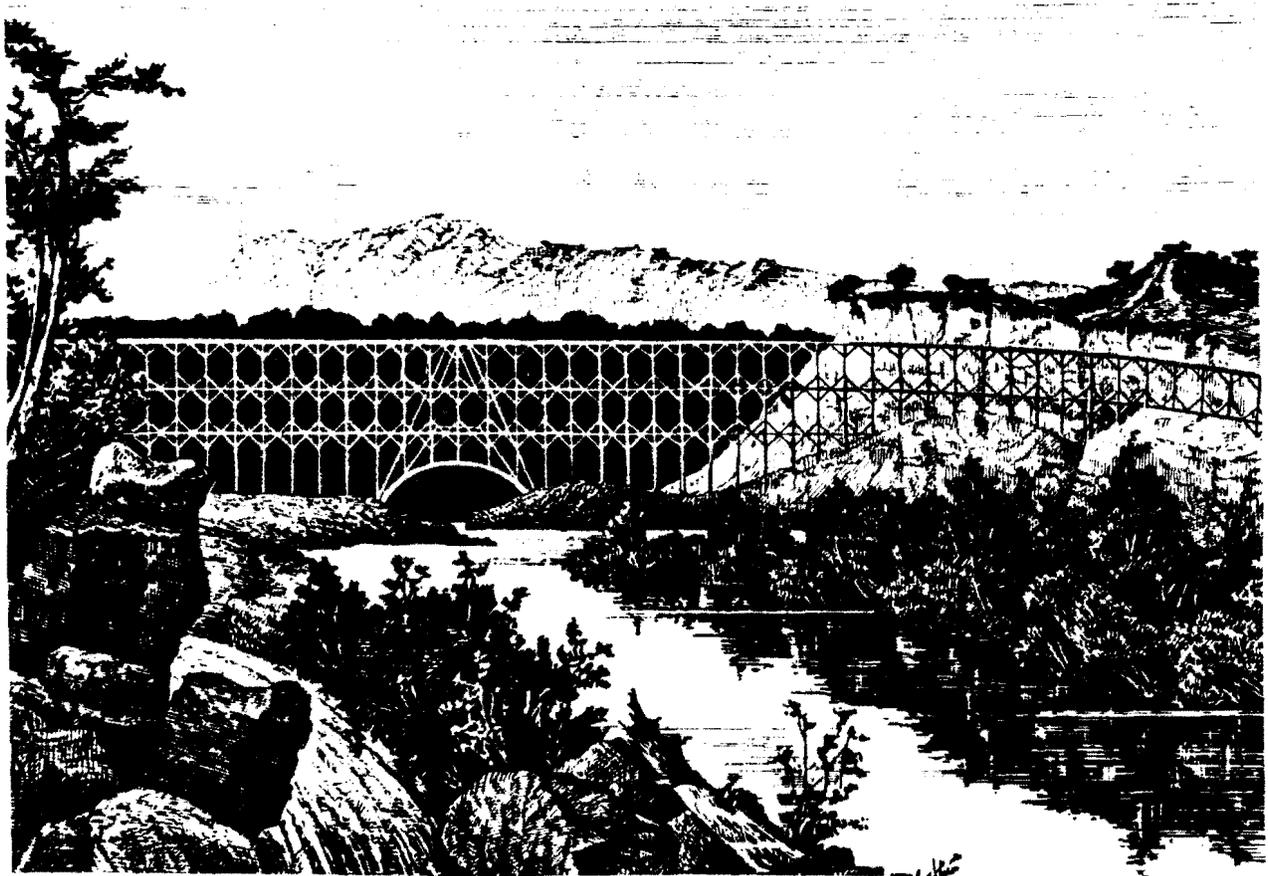
According to Johnson (1978:11), the flume reached a height of 150 feet where it crossed over Battle Creek. And, according to McNamar (1990:125), "...the Moscow Mill section was 112 feet high at the point where it received the lumber directly from the saws of the mill and stretched out to the opposite side of the Defiance Canyon."

Lumber was usually flumed loose, or, plank by plank. However, the more valuable grades were clamped together in rafts or bundles or sent down as the top layer of a raft of common lumber (Hutchinson 1983:7). The flume was wasteful beyond belief in that "All lumber for flume transportation was but well overlength to permit the battered ends to be trimmed off to standard size after fluming. What this loss meant in thousands

## Figure 1

Reproduction of 1876 drawing by Will L. Taylor of San Francisco of the Blue Ridge Flume crossing at the mouth of Inks Creek. These drawings were commissioned by the Sierra Flume and Lumber Company and were incorporated in a volume by Norton Parker Chipman. The original volume is now at the Herbert Kraft Free Library (Tehama County Library) in Red Bluff. This reproduction was provided courtesy of Special Collections, Meriam Library, California State University, Chico. A crude laminated arch was a feature of this construction and was used in other contemporary flumes in this general northern Sierra Nevada-southern Cascade pine region.

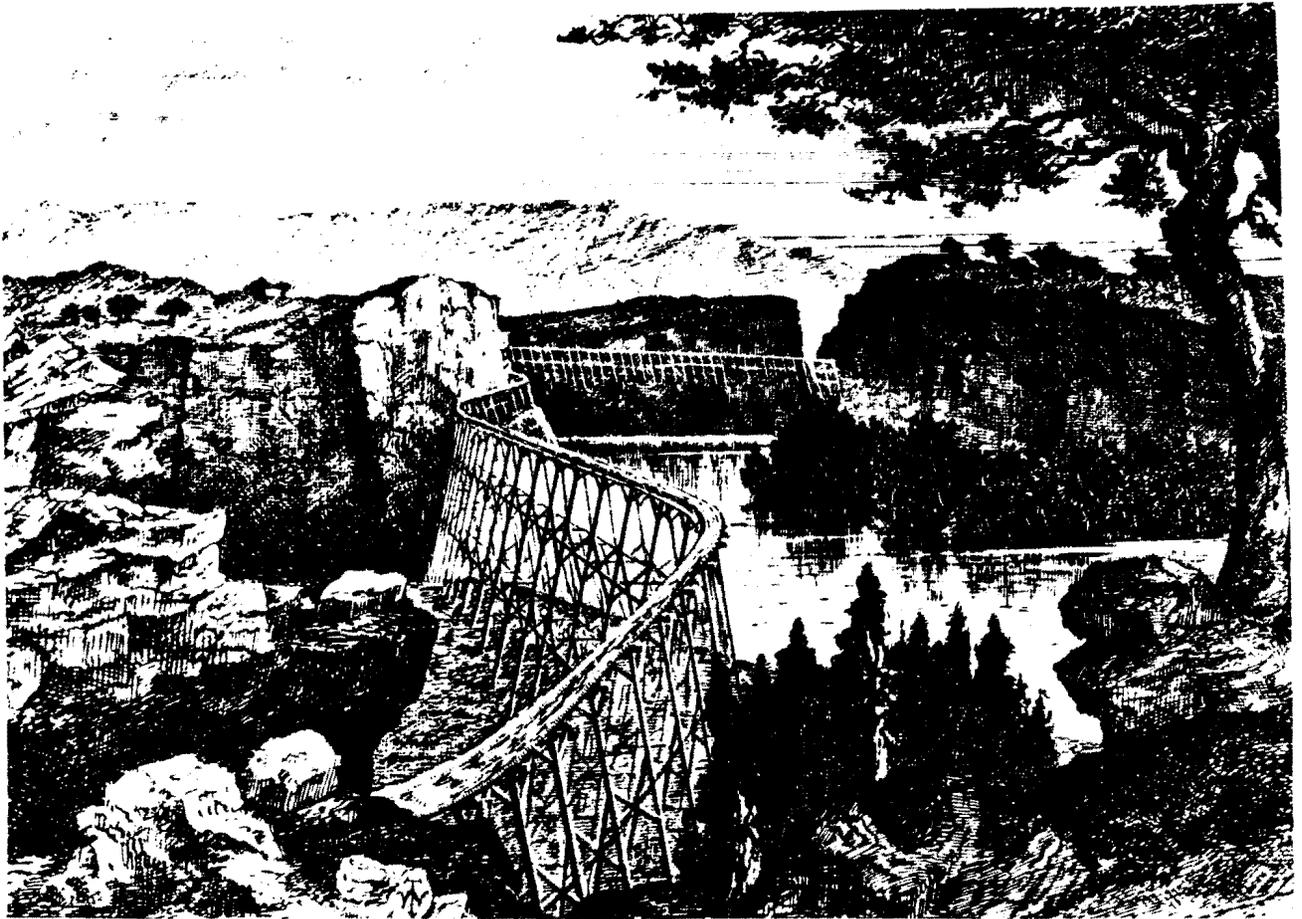
FIGURE 1



## Figure 2

Drawing by Will L. Taylor of the Blue Ridge Flume (see caption for Figure 1). This portion of the flume is along the Sacramento River near the mouth of Inks Creek. Reproduction courtesy of Special Collections, Meriam Library, California State University, Chico.

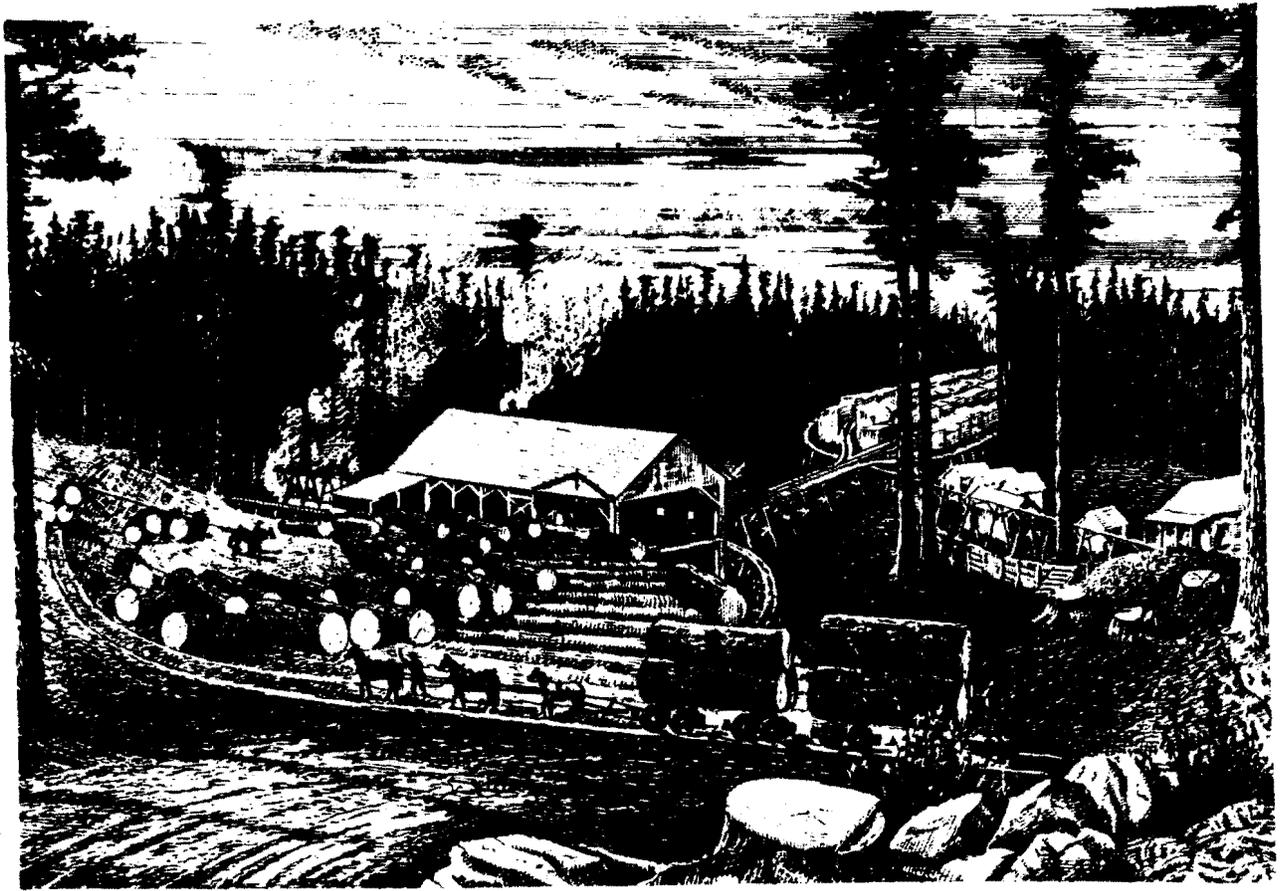
FIGURE 2



### Figure 3

Drawing by Will L. Taylor of the Moscow Mill. A caption for this drawing in Hutchinson (1956) says this print "shows the essential details of handling logs and lumber at the head-rig. The open-pit burner to the mill's left may explain why forest fires were common occurrences." Also note the tramway for log cars, stacked lumber, and the flume running around the lower side of the mill and past the lumber. Where the flume left this mill it was 112 feet off of the ground.

FIGURE 3



of board feet per year was never calculated but it contributed to the initial waste of forest growth" (Hutchinson 1983:13). Andrews (1960:67), in his account of the Empire Flume, indicates "that many thousands of pieces and bundles never arrived at Sesma. Unable to get around some of the bad curves, they tumbled over the sides of the flume, to split and splinter on the rocks far down in the bottom of the chasm." Whether the engineers for the Blue Ridge Flume learned any lessons in this regard is not revealed in the material examined.

Walkways were built alongside the "V" portion of the flume for use by the flume-tenders who walked on it to clear jams and make repairs. The flume-tenders lived in small houses or cabins built alongside the flume that were located at every junction as well as regular points in between (McNamar 1990:125).

Alva Forward, grandson of Walter Forward, Sr. who settled in the Manton area in the 1860's, related the following information to the author as told to him by his Uncle Frank:

My uncle saw the lumber come down and he would talk to the foreman or the separator about it because if they didn't do everything just right, they'd have lumber jams, and then they'd have to unplug those jams, and that was quite a lot of hard work. So they'd want to be sure to keep that lumber moving so it would flow evenly down the flume.

Alva also remembered his Uncle Frank talking about "...climbing up on the flume when he was 12 years old to watch the lumber go by."

Lumber wasn't the only product that came down the flume. According to Hutchinson (1983:13), timber, cordwood, supplies of all kinds, food, including boxes of trout and quarters of venison packed in snow, were all transported down the flume. Also, "...huge timbers, twelve-by-twelves and twelve-by-sixteens up to thirty-six feet long, came down the Blue Ridge Flume. Barrel-stave bolts, slabs for sash and door manufacture and cordwood for fuel were other flumed commodities." In addition, supply requests from the mountain mills came down the flumes before the telegraph lines were strung.

Even people were transported down the flume. When someone became sick or was injured, the victim was placed on a "flume boat" and speeded to the valley to receive medical attention, sometimes alone, or sometimes with friends or family in attendance (Hutchinson 1983:13). The flume was also used for personal business as well as pleasure. "Walking the flume" was also a favorite pastime. According to Clifton "Tip" Wilson (personal communication 1990):

Granddad would put the kids in the flume for fun and catch them as they came out the end - he did it once to

my grandmother, but never again because it scared her to death...

Workers rode down the flume in home-made boats which were used consistently. But this was not acceptable company policy. According to Hutchinson (1983:16), Blue Ridge Flume & Lumber Company General Manager Norton Chipman published a manual of instruction in which appeared the following excerpt:

Employees of the company will not be permitted to ride in any of the flumes, except to make repairs or in case of emergency where the business of the company requires someone to go quickly to the valley.

Andrews (1960:68-72) relates in some detail the excitement of a ride down the Empire Flume, certainly not for the faint of heart.

### Construction

The flume builders were faced with many engineering and construction problems because of the ruggedness of the terrain as well as high construction costs (Hutchinson 1983:12). Considering the excellent reviews they received when the flume was finished, there is no doubt they did their job well (see Figures 1, 2).

The estimated amount of lumber needed to build a flume such as this was approximately 130,000 feet per mile (Johnson 1978:11). McNamar (1990:125, 126) further states:

...no labor saving devices were at hand for the construction of this flume. It was man and horse power in the most primitive sense. And to commute the material that went into this flume--Four ply of foot wide boards over that winding course of 50 miles, to say nothing about the trestling, the floor, the braces, and the separator's houses. Also the nails...This structure was put together with square cut, iron nails, some of them eight inches long and as big as spikes for the heavier timbers...

The first section of what was to become the Blue Ridge Flume was built by Kellum Powell in 1872 at the site of his Clipper Mill on Digger Creek (Johnson 1978:9) (Map 2). Upon formation of the Blue Ridge Flume & Lumber Company in 1872 and the acquisition of the Clipper and Sugar Pine mills from Powell, flume construction continued toward the Sacramento River, and by Christmas of 1873, 18 miles of the Blue Ridge Flume was operating (Hutchinson 1983:9).

By the spring of 1874 over 30 miles of flume (main flume and branches) were completed and operating to the "dump" at Inks Creek (Hutchinson 1983:9) (Map 1).

An article from the Red Bluff Weekly Sentinel dated August 1, 1874 tells us:

...two of these mills are connected by a large flume some forty-five miles in length which runs to the Sacramento River and it only requires two miles more to connect the other two mills to the main flume on which they already have men at work. Their main flume has a capacity for running 100,000 feet every twelve hours.

#### Inks Creek - The Original End-of-the-Line

The original end-of-the-line or "dump" site for the Blue Ridge Flume was where Inks Creek empties into the Sacramento River (or actually just upriver). Inks Creek received its name from cattleman C. Jackson Inks who homesteaded the area in 1857 at the young age of 22 years (Tehama County Tax Rolls). Inks died in 1859 but earlier sold his property to brothers Jacob, Isaac and Mark Rambo (Moulton 1987:17) leaving his name attached to the creek, ranch, and valley.

The land located where Inks Creek meets the Sacramento River was leased by the Blue Ridge Flume & Lumber Company from the brothers in approximately 1873 for the Blue Ridge Flume "dump" site. By the spring of 1874 over 30 miles of flume had been completed and were operating to the "dump" at Inks Creek (Hutchinson 1983:9).

According to the following excerpted article from the Red Bluff Weekly Sentinel of August 1, 1874, operations were running very smoothly:

...their arrangements are so complete at the dump that the lumber is dropped into the raft form, properly fastened and slid into the river as fast as it comes down. Within six hours from the time it is dropped into the river it is delivered at the company's dock in Red Bluff where it is sent to the factory by Central Pacific Railroad cars...There is no rest for the lumber from the time it is cut till it is in the factory.

Alva Forward (personal communication 1990) related the following to the author as told to him by his father:

...the flume came out at the big flat at Inks Creek where it discharged the lumber. They piled it out in the sun where it dried. Then they'd bundle it up - there was no remanufacturing, you see. They tied them together, made rafts out of them, and put them in the river and shipped them to Sacramento. They would put people in the river in rowboats to herd it all the way to Sacramento to keep it from getting on sandbars and hanging up - if it did get on a sandbar it would get shoved off the bars to keep it in the river and keep it

going. That's how they got it out of here.

Another story was told to the author by Clifton "Tip" Wilson (personal communication 1990), who stated:

Lumber was bundled at Inks Creek and sent on down to Red Bluff. Stacked and tied together. There was a holding pond at the junction of Inks Creek and the river. Tents, shacks, camps, at Inks Creek Dump. My mother was born there. The flume was pretty low there.

However, troubles were looming. The California & Oregon Railroad tracks lay on the west side of the Sacramento River and Inks Creek emptied into the river on the east side. For reasons unknown, (possibly flooding problems and distance across the river and floodplain), the flume could not be built across the river at Inks Creek to make a vitally important rail-flume connection (Hutchinson 1983:10). Because they could not cross the river at Inks Creek, the better grades of sugar pine clears and uppers were hauled by wagons to Red Bluff via Jelly's Ferry and the common grades were floated down the Sacramento River to the planing mill at Red Bluff resulting in extensive losses in the river passage through Iron Canyon (Hutchinson 1983:10).

This method of lumber transportation proved too costly for the company resulting in the building of an extension to the flume on the east side of the Sacramento River to Red Bluff. According to Hutchinson (1983:17), the extension was completed and operating by February 3, 1977. The Inks Creek Dump was discontinued upon completion of the extension (McNamar 1990:124).

### Extension of the Flume

In 1876 construction commenced at a feverish pace on the final portion of the Blue Ridge Flume. The extension began at the Inks Creek Dump and ended on the sand bars on the east side of the Sacramento River across from Red Bluff (Map 1). According to Elliott and Moore (1880:79):

...it would seem that Aladdin himself could not have called into existence more rapidly or moved into action more promptly an army of men and material, than was thus suddenly set in motion and intelligently directed, step by step, towards the consummation of these extraordinary movements.

The extension was completed and operating by February 3, 1877 (Hutchinson 1983:17) (Figures 1, 2).

McNamar (1990:124) gives the route of the extension as follows:

...the course of the flume was changed to a southerly direction across the Seven Mile Plain to Paynes Creek, where it met still another flume belonging to the same company and coming down from Lyonsville. The flumes again merged and ran across the plain north of the Red Bluff-Mineral Highway to the sand bar on the east side of the river at Red Bluff (see Map 1).

### Route

The following detailed description of the flume route was given to McNamar (1990:124) from George Tuggle, who lived at Shingletown near Battle Creek and the Benton Mill:

...this flume headed at Eureka mill, on Battle Creek one mile up stream from the point where 44 hi-way crosses that stream four miles west of Viola. Thence it ran over a practically level stretch, in a south westerly direction for about four miles. Thence it entered Bailey creek canyon at a most rugged point (SE 1/4 Sec. 32, Tp. 31 N R 2 E), fairly hanging to the canyon walls it crossed over and worked its way out to another level between Long Hay flat and the same canyon. (W 1/2 Sec. 4, Tp. 30 N R 2 E). Thence it continued over a divide into Rock creek canyon and here, to avoid too much drop to the mile, it circuled (sic) around at various angles until it reached the bottom of the canyon. (Center of E 1/2 of Sec. 17, Tp. 30 N, R 2 E). Here at the confluence of Rock creek and Canyon creek it was joined by a flume of like description coming down through Defiance canyon from Defiance and Moscow mills. From here it ran along in a less anfractuouse course and with less drop for about two miles down the south side of Rock creek to a point where the Manton-Plateau road crosses this stream. This is what was known as the Umphrey place...from the Umphrey place the flume took a southerly course for about two miles and crossed the line of the present time Manton-Viola road along the west end of the Hunsicker place, continued south for another mile and crossed Digger creek 3/4 mile east of Manton. Here the flume was met by another flume, coming about seven miles down Digger creek from the Clipper mill. The flumes merged into one as had the Eureka mill with the Defiance and Moscow mill flume farther east, and now, running through leveler land passed through the point that later became the village of Manton, and continued southwesterly four miles to South Battle Creek where it crossed over the creek and canyon about 1 1/2 miles up stream from the bridge of the Red Bluff-Manton road. From here the flume took a more westerly course across

what was known as the Seven Mile plain to the confluence of Inks creek and the Sacramento river. For several years this was the terminal of the flume. From here the lumber was rafted down the river to points or was hauled by teams to Red Bluff via Jelly's ferry. This was called the "dump,"...this dump was discontinued when the course of the flume was changed to a southerly direction across the Seven Mile plain to Paynes creek, where it met still another flume, belonging to the same company and coming down from Lyonsville. The flumes again merged and ran across the plain north of the Red Bluff-Mineral hi-way to the sand bar on the east side of the river at Red Bluff. At this point the company had a finishing mill and a narrow gauge railroad and donkey engine which transported the finished product across the river bridge to the Red Bluff freight yards...

### Flume Products

The Blue Ridge Flume was built for one reason - to transport rough-cut lumber from the mountain sawmills to the valley planing mills. However, lumber was not the only product transported, as previously mentioned.

The following shipments were made on the Blue Ridge Flume based on information taken from the Red Bluff Weekly Sentinel newspaper:

7-11-1874	10 cars of sugar pine to San Francisco
8-8-1874	100,000 ft. of lumber to Colusa by raft
8-15-1874	100,000 ft. of lumber to Colusa and Princeton with 12,000 dressed lumber, and 4 cars to San Francisco
8-22-1874	130,000 ft. of lumber to Colusa and Princeton
8-29-1874	100,000 ft. of lumber and 12,000 of deck loading to Princeton and Colusa
9-5-1874	100,000 ft. of lumber and 20,000 of deck loading to Princeton and Colusa
9-12-1874	150,000 ft. of lumber and 12,000 of deck loading to Princeton and Colusa
9-19-1874	150,000 ft. of lumber, 12-15,000 of deck loading to Princeton and Colusa, 10 cars to San Francisco
9-26-1874	170,000 ft. of lumber to Colusa and Princeton, 10 cars sugar pine and 1 trunk material to San Francisco
10-17-1874	130,000 ft. of lumber to Colusa and Princeton and 22 cars of lumber to San Francisco
10-24-1874	130,000 ft. to Colusa and Princeton and usual amount to San Francisco with one car of trunk material
10-31-1874	200,000 ft. of lumber by rail and river
11-7-1874	130,000 ft. of lumber, 20,000 deck loading to

Princeton and Colusa with a great quantity of shingles

11-21-1874	1 car of lumber to Sacramento
11-28-1874	1 car of trunk material to San Francisco
12-19-1874	3 cars of lumber to Oakland
12-26-1874	3 cars of lumber to San Francisco
1-2-1875	4 cars of lumber to San Francisco
1-9-1875	8 cars of lumber to San Francisco
2-23-1875	5 cars of lumber to Sacramento, 4 of trunk material to San Francisco
3-6-1875	2 cars to San Francisco
5-8-1875	2 rafts to Princeton and Colusa
6-12-1875	2 rafts of lumber to Princeton and Colusa with some 30,000 shakes
8-28-1875	17 cars sugar pine, 2 door stock to San Francisco, 4 rafts of lumber to Princeton and Colusa
9-11-1875	15 cars lumber, 2 door stock to San Francisco
9-25-1875	29 cars lumber, 4 door stock to San Francisco, one car of lathe to Redding
10-2-1875	24 cars lumber, 3 door stock to San Francisco
10-9-1875	30 cars of lumber to San Francisco, 4 rafts to Princeton and Colusa
10-16-1875	21 cars of lumber, 3 door stock to San Francisco, 2 rafts to Princeton and Colusa
10-23-1875	17 cars lumber, 1 door stock, to San Francisco, 2 rafts to Princeton and Colusa
10-30-1875	15 cars of lumber, 1 trunk material, 3 door stock to San Francisco, 4 rafts to Princeton and Colusa
11-6-1875	10 lumber, 2 of door stock to San Francisco, 3 rafts to Princeton and Colusa
11-13-1875	5 cars lumber, San Francisco, 3 cars to Virginia City, 1 car door stock to San Francisco

### Flume Tender Houses

For the sake of this report, the houses and/or cabins built alongside the Blue Ridge Flume to house the employees who "separated" the lumber to keep it running smoothly down the flume will be referred to as flume tender houses even though they are also referred to as separator's houses and also lumber herder houses. According to McNamar (1990:125),

...The separator's houses were the abodes of the patrolmen who were on duty day and night to prevent the clogging of lumber as it rounded curves or dashed down a swifter incline. There was one of these houses at every junction as well as at regular points in between.

McNamar then mentions a separator's house located at the old Umphrey place:

...about two miles down the south side of Rock Creek to a point where the Main-Plateau road crosses this stream. This is what was known as the Umphrey place, and here, according to Mrs. Virginia (Forward) Bidleman, was what was called a separator's house..."

Following Hutchinson (1983:7):

At various points along the flume, cabins were built for flume tenders, called "lumber herders", who patrolled the flume, keeping it in repair and clearing any jams that might get started. Lumber was flumed "loose", plank by plank. However, the more valuable grades might be clamped together in rafts or "bundles" for the flume passage, and sometimes were sent down as the top layer of a raft of common lumber. When lumber was being flumed at night, the lumber herder hung a coal-oil can from a rope across the flume. As long as the can kept rattling, the lumber was coming down all right. If it stopped rattling, the herder started patrolling up-flume to find out what was wrong. Since the flume often was a hundred feet in the air and the walk-way planks were slick with spray, the lumber herder had to have a certain disregard for his own safety.

Andrews (1960:68) provides a little insight regarding flume tenders' cabins along the Empire Flume. In discussing flume riders, he states that "Should the boat be stranded, with the flow of water cut off, the riders had to climb out and walk like careful cats along the footboard until they reached the next tender's station, where they could descend by a crude ladder to the ground."

### Telegraph System

The first telegraph system was possibly between the Moscow and the Defiance mills. According to McNamar (1990:123), "A telegraph (not a telephone) system carried on communications between this [Moscow Mill] and the Defiance Mill. This was, perhaps, the only telegraph line in Shasta County to run neck and neck in point of time with the railroad companies."

All of the mills and flumes became linked to their valley terminals by telegraph lines while under the ownership of Sierra Flume & Lumber Company which gave the company the distinction of being "...the largest private communications network in the state and, probably, in the Nation. It almost overcame the problems of distance and time resulting from the far-flung operating points" (Hutchinson 1983:18).

From an article in the Red Bluff Weekly Sentinel dated August 1, 1874:

...their telegraph line goes from their mills in the mountains to the dump at the end of the flume to the factory in Red Bluff. It saves valuable time besides avoiding unnecessary delay in the prosecution of work.

An example of the wonderment of the telegraph machine at the time shines through from Elliott and Moore (1880:80):

...A builder finds his work at a stand-still for want of a stick of timber; he goes to the office...his want is telegraphed to the mill; the log is cut, hauled and sawed, and by night his stick comes booming into the yard! This is lumbering in the Sierras!

In 1877, after one year of ownership, Hutchinson (1983:18) states that the Sierra Flume & Lumber Company, among other things, was operating 250 miles of telegraph line.

### Abandonment

The Sierra Lumber Company owned the Blue Ridge Flume when it was abandoned. The Blue Ridge Division was dropped from their operations on November 1, 1878 because of a land dispute with creditors of the previous owners. The Sierra Lumber Company moved the remaining machinery and equipment to the Lyonsville area (Hutchinson 1983:20).

McNamar (1990:126) states the flume immediately began to fall to ruin upon abandonment and paints the following vivid picture of the beginning of the end of the Blue Ridge Flume:

...the materials of this flume did not lose their usefulness when it was abandoned. About this time homesteaders began to flock into this neck of the wood by the score. They found valuable material for home building all free for the taking. Most all of the barns (generally big ones) anywhere near the course of this flume were constructed of lumber therefrom, and many houses were built entirely of these boards. One mile of the flume set up an ordinary home. In fact, this material was plentiful and so generally used that, as a child, ye historian got the idea that any foot wide board was a "flume board".

Alva Forward's father lived in the area of the flume all his life and remembered it well. Alva recalls his father saying "they tore it apart and used it for their own buildings."

When the Blue Ridge Flume was abandoned, its clear sugar

pine lumber was equated by settlers as a "mile of flume for a family house, nails included" (Hutchinson 1956:8). Clifton "Tip" Wilson (personal communication 1990) informed the author that "many houses and barns were built from the timbers of the abandoned flume."

Not only was the wood useful and used by the homesteaders, the nails that once held the flume together were also used by the homesteaders. McNamar (1990:126) states:

...square cut, iron nails, some of them eight inches long and as big as spikes for the heavier timbers... hundreds of pounds of these nails were also salvaged and used again in the building of houses and barns, wagon beds, household furniture and what not? And who, in those days, did not, at one time or another, hear the bidding? "Let's go over to the old flume and get some nails."

The company eventually hired a caretaker to keep watch on the flume and ward off timber thieves (Hutchinson 1983:20). However, the timber thieves always seemed to outsmart him, even going so far as to dynamite his dwelling.

McNamar sadly informs us that at the time of the writing of her book (1952) "...there is not one evidence that it ever existed." (However, see section on archaeology).

### Flume Facts

- Construction began in 1872 on the first section at the Clipper Mill on Digger Creek.
- Construction (including extensions) completed in 1877.
- Type: V-flume, so named for the "V" shape of its trough.
- Purpose: provide faster and cheaper lumber transportation from the mountain sawmills to the valley planing mills.
- Length: approximately 42 miles (includes side branches and extension).
- One-way only. Attempts were made to provide two-way, or, up and down transportation on the flume, but the attempts never materialized.
- Flume workers were called either flume tenders, separators, or lumber herders and lived in small houses or cabins built alongside the flume.
- Abandoned in 1878.
- Upon abandonment, area residents helped themselves to flume materials (boards, timbers, and nails) and used them to build homes, barns, chicken coops, outbuildings, etc.; some are still standing.

## THE COMPANIES WHO USED THE FLUME

### The Rise and Fall of the Blue Ridge Flume & Lumber Company

In 1872, Remembrance H. Campbell, Samuel F. Frank, and Lamson S. Welton acquired the Clipper Mill on the south fork of Digger Creek from Kellum Powell, builder of the mill and an already started flume, for the price of becoming a partner in the firm of Frank, Campbell, & Welton. Adam Grant, a San Francisco capitalist, soon became partner number five (Hutchinson 1983:9). The newly established firm then purchased the Sugar Pine Mill located downstream from the Clipper Mill (Hutchinson 1983:9). The company continued to broaden its horizons and purchased two mills from N. S. Hazelton for \$30,000.00 in gold coin (Hazelton Water Mill and Defiance Mill), leased acreage at the junction of Inks Creek and the Sacramento River from property owners Jacob, Isaac and Mark Rambo for use as a "dump" site, and continued building the flume. Hazelton's Water Mill was located on Rock Creek and possessed 14 miles of completed flume, and the Defiance Mill was located at the head of Canyon Creek in Defiance Canyon.

By 1873, 18 miles of flume were operating. By the spring of 1874, construction on the flume was completed to the Inks Creek "dump" site, making the total flume length 30 miles plus (Hutchinson 1983:9). Meanwhile "An extensive lumber yard and a large planing mill were built in Red Bluff on Jefferson Street between Sycamore and Ash. The operation was in full swing by July 4, 1874..." (Hutchinson 1983:9).

The following article appeared in the Red Bluff's Weekly Sentinel newspaper on August 1, 1874:

...the Blue Ridge Flume & Lumber Company is without exaggeration, the largest and finest arranged lumber manufacturing institution on the Pacific Coast.

First they are the owners of an immense track of the finest sugar pine timber in the state.

Second, in the midst of this immense scope of timber they have four splendid mills, with a capacity for cutting 100,000 feet of lumber every twelve hours.

Third, two of these mills are connected by a large flume some forty-five miles in length which runs to the Sacramento River and it only requires two miles more to connect the other two mills to the main flume on which they already have men at work. Their main flume has a capacity for running 100,000 feet every twelve hours.

Fourth, their arrangements are so complete at the dump that the lumber is dropped into the river in raft form, properly fastened and slid into the river as fast as it comes down. Within six hours from the time it is dropped into the river it is delivered at the company's dock in Red Bluff where it is sent to the factory by Central Pacific Railroad cars.

There is no rest for the lumber from the time it is

cut till it is in the factory.

The flume has a capacity for carrying the largest lumber for use in bridges, buildings, and railroad ties. Already it has brought down pieces fourteen inches square and forty feet long.

Their telegraph line goes from their mills in the mountains to the dump at the end of the flume to the factory in Red Bluff. It saves valuable time besides avoiding unnecessary delay in the prosecution of work.

Then, in November of 1874, Frank, Campbell, and Welton bought out Powell and Grant for \$30,000.00 each (Hutchinson 1983:10). According to Johnson (1978:10), company assets listed on the deed included: "...9,160 acres of timberland, partly in Shasta County and partly in Tehama County. Forty two miles of flume. Forty five miles of telegraph line. All the company sawmills served by the flume."

In 1875 the Blue Ridge Flume & Lumber Company amalgamated with A. A. Jackson who opened a lumber yard at Princeton. Rafts filled with lumber were then floated down the Sacramento River to supply this yard. In November of 1875 Frank sold his interest to Campbell and Welton for a mere \$10,000.00 and the following January (1876) the Blue Ridge Flume and Lumber Company suspended operations (Johnson 1983:10). Hutchinson (1983:10) states "...On February 1, 1876, Campbell and Welton executed a Trust Deed to protect their creditors for debts aggregating \$196,139.82 with interest at one per cent per month." This was the end of the Blue Ridge Flume and Lumber Company.

Later that year Campbell and Welton sold the defunct company to Sierra Flume and Lumber Company for \$275,000.00 which included assumption of their trust deed indebtedness.

### The Rise and Fall of the Sierra Flume & Lumber Company

The Sierra Flume & Lumber Company was established by financier Alvinza Hayward and Norton P. Chipman who combined their talents and built one of the most complex lumber operations in the world (Grimes 1983:40).

In 1876 Hayward and Chipman purchased the defunct Blue Ridge Flume & Lumber Company for \$275,000.00 which included assumption of their trust deed indebtedness (Hutchinson 1983:16). The company immediately went into business - without one serious competitor on the entire Sierra Nevada, according to Elliott and Moore (1880:79).

The new company immediately began expanding, absorbing and consolidating other mills and companies (Elliott and Moore 1880:79) (Figure 3). Moscow Mill was built in 1876 on Rock Creek, the Eureka Mill was purchased, the Blue Ridge Flume was extended from Inks Creek to the sand bars across the Sacramento

River from Red Bluff, and a new factory was built at the end of the flume extension (Hutchinson 1983:17). Meanwhile, the company furnished 289,443 board feet of red fir timbers for the construction of the Centennial Free Bridge across the Sacramento River - the first iron structure across the upper Sacramento - on which they secured a franchise to operate a steam locomotive for \$1,000.00 gold coin and another franchise to build their own railroad from the bridge along the middle of Oak Street to connect with the California & Oregon Railroad main line on the west side of Madison Street (Hutchinson 1983:17).

The Sierra Flume & Lumber Company quickly became an important enterprise to the entire state and illustrated the boldness and daring of California capital, so said Elliott and Moore (1880:78) who also state:

The annals of no country presented a scheme so extensive and varied in its operations, so rapidly brought towards completion, and stepping so suddenly into business competition with old-established concerns, and taking a foremost position among the leading industries of the State.

Sierra Flume & Lumber Company divided its operations into three divisions, the Blue Ridge, Antelope, and Chico and continued to expand in all three divisions (Hutchinson 1983:17). According to Elliott and Moore (1880:81), each division was divided into three branches - the mill branch, the flume branch, and the yard branch, with a superintendent in charge of each:

The mill superintendent has full charge of the manufacture of the lumber and piling it in the mill yards, the employment and discharge of all his men, and the general management of all that part of the business.

The flume superintendent ships, runs through the flume, and dumps the lumber at the yards, keeps his flume in repair, and has all the responsibility relating thereto.

The yard superintendent has charge of the piling and selling of the lumber. His office is the head office of the division; all requisitions for supplies are made upon and filled by him; he directs as to the cut for his local trade, and the shipments through the flume, and has a general supervision of his division.

The company sold over 43,000,000 feet of lumber in their first year of operation including the shipping of lumber around the Horn to New York, to South America, China, and Australia, and made for the first time, lumber from the Sierra Nevada a stable commodity in the major cities of California (Hutchinson 1983:18).

The company employed 1200 men, worked 400 oxen and 100 horses, and paid out an annual payroll that exceeded \$300,000.00 (Hutchinson 1983:18; Grimes 1983:40, 41). As mentioned, all mills and flumes were linked to their valley terminals by 250 miles of telegraph lines making the company the largest private communications network in at least the state, if not the nation (Hutchinson 1983:18). Additionally, the company owned 10 sawmills, 23 miles of logging tramway, 156 miles of flumes, three planing mills, two sash, door and blind factories, three combined wholesale-retail lumber yards (Red Bluff, Sesma and Chico), and a main office and export agency in San Francisco (Hutchinson 1983:18).

Additionally, it is worthy mentioning the following from Elliott and Moore (1880:81) to realize the amount and types of materials used by the company in their expansion process:

...The company also consumed in ordinary uses and for new work, 150,000 pounds of iron, 5,000 pounds of steel; and for flumes and buildings not less than 2,000 kegs of nails were bought. The trams built have required 500,000 pounds of iron. In building flumes and mills during the year 1876, the company used nearly 8,000,000 feet of lumber.

By March 17, 1876, the pineries were controlled by the Sierra Flume & Lumber Company from the Shingletown Ridge south to the Feather River (Grimes 1983:41) and, according to Hutchinson (1983:12), the company had become the most complex lumber operation in the world.

However, problems were arising. Of major concern in 1877 were Chinese labor problems. According to Elliott and Moore (1880:83), Chipman conceived the idea of replacing the Chinese with apprentice [boys] employees. His plan involved, among other things, instruction from skilled workers on how to run various pieces of machinery, housing, and school privileges. Also of major concern was a financial panic in San Francisco, having to deal with two years of drought in the Sacramento Valley, and "...their own headlong progress" (Hutchinson 1983:18).

Eventually the lumber market dwindled down to nothing and interest ate into the vitals of the company making failure inevitable (Elliott and Moore 1880:83). In 1878, "...the unfortunate giant was brought to its knees and forced into bankruptcy" (Grimes 1983:40, 41). In July, the Sierra Flume & Lumber Company was taken over by the Merchant's Exchange Bank of San Francisco who owned 5/8's of the stock (Johnson 1978:13).

### The Rise and Fall of the Sierra Lumber Company

The defunct company was purchased by John C. and Edward Coleman for \$720,000.00. They resumed operations on November 1,

1878 (Hutchinson 1983:19). Sierra Flume & Lumber Company now became known as Sierra Lumber Company under the ownership of the Coleman's who began "...operating the business on a smaller scale, awaiting the return wave of good times" (Elliott and Moore 1880:83). Operating on a smaller scale meant dropping the Blue Ridge Division (which included the Blue Ridge Flume) because it was in dispute with creditors from the previous owners. According to Hutchinson (1983:20), the company then moved much of the machinery and equipment to the Lyonsville area.

When the Blue Ridge Division was dropped, the Blue Ridge Flume became idle and "...immediately began to fall to ruin" (McNamar 1990:126). And, as mentioned earlier, settlers in the area began helping themselves to boards, timbers, and even the nails from the flume in order to build for themselves homes and barns (McNamar 1990:126). A. E. (Edward) Head was hired by the company as a caretaker/cruiser to keep watch and to hopefully protect the idle flume, but the timber thieves outsmarted him, even going so far as to dynamite his home (Hutchinson 1983:20).

Profitable, new markets eventually opened up for the company, i.e., an enormous pine box-shook market in southern California resulting from the burgeoning citrus and dried-fruit industries; new Arizona and New Mexico territories and attendant railroad construction which created a tremendous mining and building demand for pine lumber; and the construction of the railroad northward out of Redding (Hutchinson (1983:19).

By 1891 the company had become one of the largest pine manufacturing plants in the world (Grimes 1983:44). However, severe problems awaited the company after the turn of the century signaling its demise. In 1903 a disastrous fire occurred at the Chico plant, and in 1904 high water caused severe damages at the Red Bluff plant (Grimes 1983:43). On June 1, 1905, the company finally acquired title to the Blue Ridge Division acreage but the too-long-idle Blue Ridge Flume had been ravaged by shake-makers and timber thieves making it completely useless (Hutchinson 1983:20). Two years later, on March 19, 1907, Sierra Lumber Company sold to Diamond National Corporation, broken-down Blue Ridge Flume included (Hutchinson 1983:20).

Diamond National Corporation closed the Red Bluff factory in 1911 because of "...persistent and destructive flooding" (Grimes 1983:43). This action brought to an end four companies who had supplied lumber, employment, and income to Tehama County residents for almost 40 years.

## MILLS CONNECTED TO THE FLUME

### Clipper Mill (T. 30N R. 2E, Sec. 24)

The Clipper Mill was built by Kellum Powell on the south fork of Digger Creek (Hutchinson 1956:6; Johnson 1978:8, 10). The mill was built in 1872 and was the 1st acquisition of the newly formed Blue Ridge Flume & Lumber Company when Powell put "...his property into the pot" (mill included) to become a partner in the company that same year (Hutchinson 1983:9). The mill was water powered and rated at 25M per day, which, according to Hutchinson (1983:6), seemed high and might have been derived from later improvements by later owners.

### Sugar Pine Mill (T. 30N R. 2E, Sec. 21)

The Sugar Pine Mill was also known as the Love Mill and the Alex Love Mill. It was first known as the Alex Love Mill and named for owner and builder Alexander Love. According to McNamar (1990:88), Love built the mill "...in the latter 1860's...on the north side of Digger Creek about four miles east of Manton." Hutchinson (1983:9) describes the location as on the south fork of Digger Creek, downstream from the Clipper Mill. In 1872, the mill was purchased by the Blue Ridge Flume & Lumber Company making it the 2nd company-owned mill (Hutchinson 1983:9).

### Hazelton's Water Mill (T. 30N, R. 2E, Sec. 13)

Hazelton's Water Mill was also known as Hazelton's Old Mill and was built by N. S. (Samuel) Hazelton (McNamar 1990:123, Hutchinson 1983:9). The mill was located on Rock Creek and powered by a turbine wheel (Hutchinson 1983:9). In 1874 this mill and the Defiance Mill (also owned by Hazelton) were purchased by the Blue Ridge Flume & Lumber Company for \$30,000.00 gold coin (Hutchinson 1983:9) becoming the 3rd and 4th company-owned mountain sawmill.

### Defiance Mill (T. 30N, R. 2E, Sec. 2)

The Defiance Mill was built by N. S. (Samuel) Hazelton at the head of Canyon Creek on the west side of the Manton-Viola highway (McNamar 1990:123). McNamar (1990:123) further states the mill was water powered and equipped with circular saws. Hutchinson (1956:5) indicates the mill was built in 1872/73; was steam powered; contained two saws with a 10M per day rated capacity; and had a unique pushcart system to transport logs from the deck to the saw carriage.

According to Alva Forward (personal communication 1990), who remembered the Defiance Mill well, It was built right on top of a

spring and they used that water out of the spring to take that lumber in the flume.

The mill was purchased by the Blue Ridge Flume & Lumber Company from owner Hazelton on May 9, 1874 (Johnson 1983:10) along with Hazelton's Water Mill (also owned by Hazelton), for \$30,000.00 gold coin (Hutchinson 1983:9) thus becoming the 4th company-owned mountain sawmill.

According to Alva Forward (personal communication 1990), a forest fire burned the mill down. However, Mr. Forward could not remember the year.

#### Eureka Mill (T. 31N, R. 2E, Sec. 22)

The Eureka was built by Rudolph Klotz in approximately 1870 (McNamar 1990:122; Hutchinson 1956:6, Johnson 1978:10). According to McNamar (1990:122):

...this mill stood about 300 yards down stream from the point where the old pre-highway Shingletown-Viola Road crossed Battle Creek. It stood on a level piece of ground about eight feet higher than the creek bed. To elevate the water for the intake of the flume, a half mile of ditch was dug on the west side of the stream, and this ditch is still plain to be seen where it crosses the road.

McNamar (1990:122) further states, according to her source Mr. Loomis, that the Eureka Mill had a sort of railroad which brought logs to the mill by horse power hitched tandem fashion. McNamar went on to say the road bed for this railroad contained a wooden track on which ran the iron wheels of a narrow tram car whose capacity was "...about one big load."

Johnson (1978:10) also states the Eureka Mill "...had a tramway made of timbers with iron straps on which log cars were pulled to the head rig by mules or horses."

On July 1, 1876, Rudolph Klotz sold the mill, fixtures, a house, barn, blacksmith shop, and four logging teams of oxen of five yokes of cattle each, to the Sierra Flume & Lumber Company (Johnson 1978:10) thus becoming the 5th company-owned mountain sawmill.

#### Moscow Mill (T. 30N, R. 2E, Sec. 12) (Figure 3)

The Moscow Mill was built by the Sierra Flume & Lumber Company in 1876/77 one mile southeast of the Defiance Mill on Rock Creek (Hutchinson 1956:6; 1983:17). According to McNamar (1990:123), the mill was steam powered and vied with the Eureka Mill in the way of modern machinery. Further, it boasted a

telegraph system between it and the Defiance Mill which was possibly the only telegraph line in Shasta County "...to run neck and neck in point of time with the first railroad companies." Johnson (1978:10) relates the Moscow Mill had, as did the Eureka, "...a tramway made of timbers with iron straps on which log cars were pulled to the head rig by mules or horses." Upon completion, this mill became the 6th and final company-owned mountain sawmill.

#### Red Bluff Planing Mill and Lumber Yard

The first Red Bluff Planing Mill and Lumber Yard was built in 1874 by the Blue Ridge Flume & Lumber Company (Hutchinson 1983:10) and was located on the west side of the Sacramento River on Jefferson Street between Sycamore and Ash streets. The location of this mill proved to be a hardship on the company because it was too far from Inks Creek, the end of the flume, and the transportation method used to get lumber to it proved to be too costly. According to Hutchinson (1983:10), common lumber was put into the Sacramento River at Inks Creek Dump and floated downriver through Iron Canyon (where some of the lumber was destroyed) to the planing mill. The better grade of sugar pine clears and uppers had to be hauled to the mill from Inks Creek Dump on wagons via Jelly's Ferry, resulting in high handling costs.

Two years later, while under the ownership of the Sierra Flume & Lumber Company, construction began on a new planing mill, along with a sash and door factory, at a more easily accessible location on the east side of the Sacramento River, and at the end of the extension of the Blue Ridge Flume, which was also under construction. The above-mentioned planing mill and lumber yard on Jefferson Street was discontinued in 1877 by Sierra Flume & Lumber Company upon completion of their new factory, located on the sand bars of the Sacramento River directly across from Red Bluff (Hutchinson 1983:17). This factory continued to operate until 1911 when it was closed by then owner Diamond National Corporation because of "...persistent and destructive flooding" (Grimes 1983:43).

## THE WORK FORCE

### Human Labor

The number of people and animals used by the companies in their work force varied. In 1876 during the expansion of the Sierra Flume & Lumber Company, Hutchinson (1983:18) and Grimes (1983:40 & 41) state the company employed 1200 men and worked 400 oxen and 100 horses.

In order to realize the amounts and types of foods consumed by the work force (both man and beast), the following partial list of supplies for the 1876 logging season is worthy of mention (Elliott and Moore 1880:81):

...1,000 tons of hay, 500 tons of barley, 140,000 pounds of flour, 140,000 pounds of beef, 10,000 pounds of coffee, 1,500 pounds of tea, 20,000 pounds of beans, 10,000 pounds of rice and hominy, 20,000 pounds of sugar, 40,000 pounds of potatoes, 250 gallons of molasses, 10,000 pounds of dried fruit, 10,000 pounds of butter.

Additionally, it is deserving to mention the following comment made to the author from Clifton "Tip" Wilson (personal communication 1990): "The workers from the mills moved down closer to the river during the winters because of the bad weather in the hills and mountains."

In addition to a Euro-American work force, Chinese workers were also employed. According to Reed (1980:8):

A number of Chinese also lived across the river from Chinatown (in Red Bluff) on the grounds of the Sierra Flume and Lumber Co., where they were employed as laborers at the mill. They worked there in the lumber yard, unloading and stacking lumber brought down by the flume in which it was floated down from the mountain lumber camps, and freeing shingle bolts--split pine chunks--from the eddys and bushes along the river bank.

During the 1880's the Chinese were employed as both laborers and cooks and, additionally, worked at both ends of the flume, as shown in the following excerpt from Reed (1980:10):

Some of the Chinese worked as cooks and laborers in Paskenta, Cascade and Sierra Townships in the 1880s. Those in Sierra and Cascade Townships were employed in lumber camps like that at Lyonsville. Here they worked as cooks (turning out "grub" that was remarkably good according to one old lumberman) and they graded and stacked lumber before sending it down the flume. The Chinese had their own quarters, known as "China Camp", and are said to have kept to themselves except at

payday, when they gambled with white lumbermen.

However, a "tidal wave" of anti-Chinese fervor began surfacing in Tehama County, along with the rest of the state, in the latter half of the 1870's (Reed 1980:14). The Citizens' Anti-Chinese Association of Red Bluff was formed in February of 1886 which joined forces with another anti-Chinese organization from Tehama "...in a boycott of the Chinese and of whites who employed Chinese" (Reed 1980:21). Reed (1980:21) goes on to say:

...the working men of Red Bluff formed their own organization, the Anti-Coolie League. It supported the businessmen's boycott, but wanted even more direct, aggressive means of removing the Chinese. On 2-2-1886 a procession of "at least 2,000" people marched on Red Bluff's Chinatown and went from house to house, ordering the Chinese there and across the river at the lumber yard, to leave within 10 days time. Some Chinese agreed and other openly refused, there was no violence. The League was more bark than bite, however, for few, if any, Chinese left, and they apparently suffered no ill consequences.

In view of the serious circumstances, the founder of Sierra Flume & Lumber Company devised the following plan to replace the unwanted Chinese with apprentice laborers (boys) (Elliott and Moore 1880:83) thus:

...running the two factories by apprentice labor. To a certain extent, labor of this kind has been resorted to in all countries for ages, but nowhere within my knowledge on the plan proposed. The State laws have ample and wise provisions, and fully warrant and securely protect those who enter into such engagements. The two factories at Chico and Red Bluff will each require at least fifty persons at the machines, in light employment, besides the men skilled in the art to manage the repairs and overlook the work, and properly instruct the employees. It is proposed to erect upon the premises of the company at Red Bluff and Chico, a commodious dwelling of capacity to accommodate the working force. Here are to be provided all the comforts of a home for boys. They are to have school privileges and are to be taught the practical business of running all kinds of wood-working machinery, and also of engines. The plan may also embrace the knowledge of certain branches of the saw-mill business...It is to be hoped that it may be made successful, as it will give a number of youths a good home, and enable them to acquire a useful trade.

## Job Descriptions

The following job descriptions are deemed worthy of mention, lest they be forgotten, even though some still apply today while others have disappeared with time.

Choker Setter: Fastened a line (cable) to the log (Johnson 1978:3).

Donkey Doctor: Steam donkey engine mechanic (Johnson 1978:3).

Edgeman: Main job was to separate the clear lumber from the common, then work both clear and common into the most useful and valuable form (Hutchinson 1983:16).

Fallers: Used saws, not axes, with great care and skill to lay the tree where it should go to avoid the tree from being broken or split in the fall. According to Johnson (1983:1):

...trees were cut down by two men pulling a cross cut saw. An undercut was made on the side to which the tree would fall. When this was completed to their satisfaction, and they knew just where the tree would fall, the saw was placed on the opposite side of the tree, and the sawing began. Wedges were placed in the cut to keep the saw from binding, and also to aid in positioning the tree as it fell. Oil was sprinkled onto the saw to cut through the pitch. The tree would snap and the saw was quickly withdrawn and the shout of "TIMBER-R" would ring out.

Flume Tenders: Were also known as lumber herders, separators, and patrolmen. The job included patrolling the flume to keep it in good repair and clearing lumber jams. When lumber was flumed at night, a coal-oil can was hung from a rope across the flume and as long as the can kept rattling, the lumber was moving along alright. If the can stopped rattling, the flume tender then had to patrol up-flume to find the problem, always being very careful because of the sometimes great heights and wet walkways (Hutchinson 1983:7).

Grease Monkeys/Greasers: Usually accomplished by young boys who used almost any kind of grease to grease the chute so that the logs would easily skid. To perform their job they were required to run in front of the oxen with their bucket of grease and a swab (Johnson 1978:1).

Riggers: Same as a Choker Setter.

River Pigs: Retrieved lumber from the Sacramento River in Red Bluff which had been floated down from Inks Creek Dump, loaded it onto wagons, and hauled it up the bank to the Red Bluff Planing Mill (Hutchinson 1983:10).

Spool Tenders: Guided cable onto the spools (Johnson 1978:3).

Whistle Punk: Usually accomplished by boys who were required to watch the Choker Setter fasten lines to logs. When the log was fastened, the whistle punk would tug on the whistle wire to signal the engineer (Johnson 1978:3).

### Animal Labor

Many horses, mules, and oxen, also known as beasts of burden, were used by the mills and were an important part of the work force as illustrated in Figure 3 and described below:

"The company (Sierra Flume & Lumber Company) employed 1200 men, worked 400 oxen and 100 horses..." (Hutchinson 1983:18).

"...Oxen were the prime movers in the woods and the 'shoeing cradle' was in constant use" (Hutchinson 1978:1).

"...It is not economy to work an ox until he is broken down." From the "Manual of Instructions" issued by General Manager Chipman of Sierra Flume & Lumber Company in 1876 (Hutchinson 1983:17).

Included in the 1876 sale of the Eureka Mill to Sierra Flume & Lumber Company were "...four logging teams of oxen of five yokes of cattle each" (Johnson 1978:10).

## ARCHAEOLOGICAL RESOURCES AND HISTORICAL SIGNIFICANCE

Eric W. Ritter, Ph.D.

Despite scavenging and the ravages of time, vestiges of the Blue Ridge Flume remain to this day (Figure 4). Archaeological observations on the central section of the flume, as well as the Empire Flume of the same system, have been conducted by Bureau of Land Management and California State University, Chico archaeologists (Ritter 1986, Hamusek and Kowta 1991).

Flume remains in the foothill sections vary according to the local environmental conditions, whether one is dealing with alluvial flats, hillsides, ridge tops, or drainage crossings. Nowhere is there a standing flume. However, quite common are rock footings and/or foundations where the flume was virtually at ground level (Figures 4,5,6). Various artifacts and timbers here and there remain as well as ancillary features and trash related to construction, repair, maintenance and transportation, and, possibly, dismantling. The location of several flume tender cabins was also discovered. Some of the details of these findings are presented below.

The first feature or segment to be discussed of nine recorded in the Inks Creek area is a 2050 foot long rock wall (53" high, 48" wide at base tapering to 26" at top) northeast of the Inks Creek Ranch that runs uphill and intersects the flume. The flume section downhill from here is a rock wall and pier foundation. Up flume there are only spaced pier supports left and large cut timbers where a small canyon was crossed. The downhill segment which contours along the hillside nearly to the mouth of Inks Creek, is a low wall with spaced piers (Figure 4a,b). Some measurements in addition to those presented on Figure 5 are:

Low supporting rock wall 2' wide by 1' high; supporting rock wall 2' wide by 4'4" high; another segment 30" by 30" with 6' long cobble-boulder pier supports jutting out at 17' intervals. Other intervals for this segment include 16', 15', 13', 12', 10', 11', 6', and 5', sometimes consistent for a given distance, sometimes variable depending on terrain (slope and turn). The flume itself appears to have run at about a 1% fall in this section.

Feature 2 is a possible corral and flume tenders camp. Scattered artifacts listed below suggest occupation. Artifacts here and in other places along the flume suggest that Chinese labor was involved in flume construction and possibly post-construction activities. Such activities were probably by members of the Chinese community in Red Bluff. A field illustration of Feature 2 is included (Figure 6).

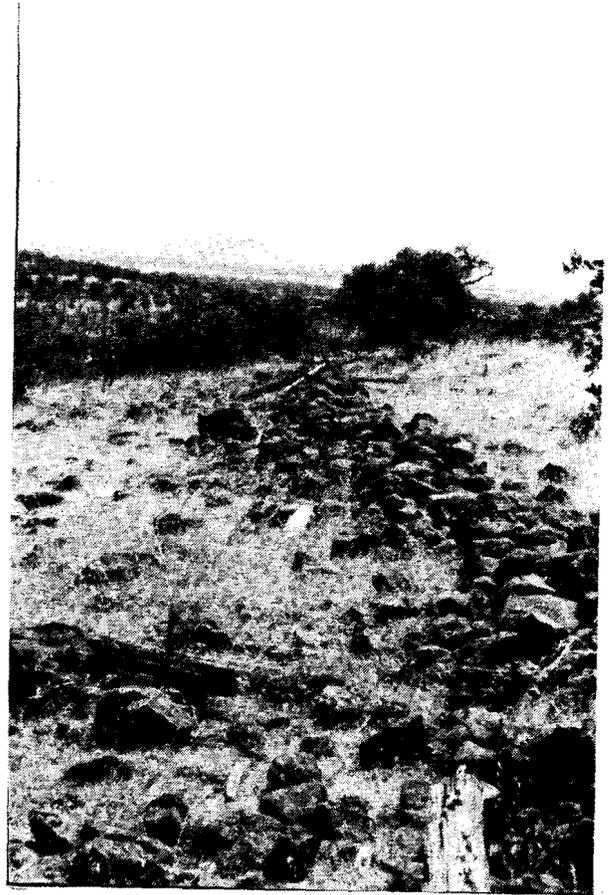
**Figure 4**

- a. Foundation remnants of the Blue Ridge Flume in the Inks Creek vicinity, looking south. Note timbers and boulder support where the flume nearly rested on the ground. Photographs taken in 1986 by Eric Ritter.
- b. Foundation remnants of the Blue Ridge Flume in the Inks Creek vicinity, looking south.
- c. Barely visible pier supports and alignment of the Blue Ridge Flume section that dumped lumber at the mouth of Inks Creek. View is to the north.
- d. Road and rock supports for the Blue Ridge Flume as it headed across the flat at the mouth of Inks Creek.

FIGURE 4



a



b



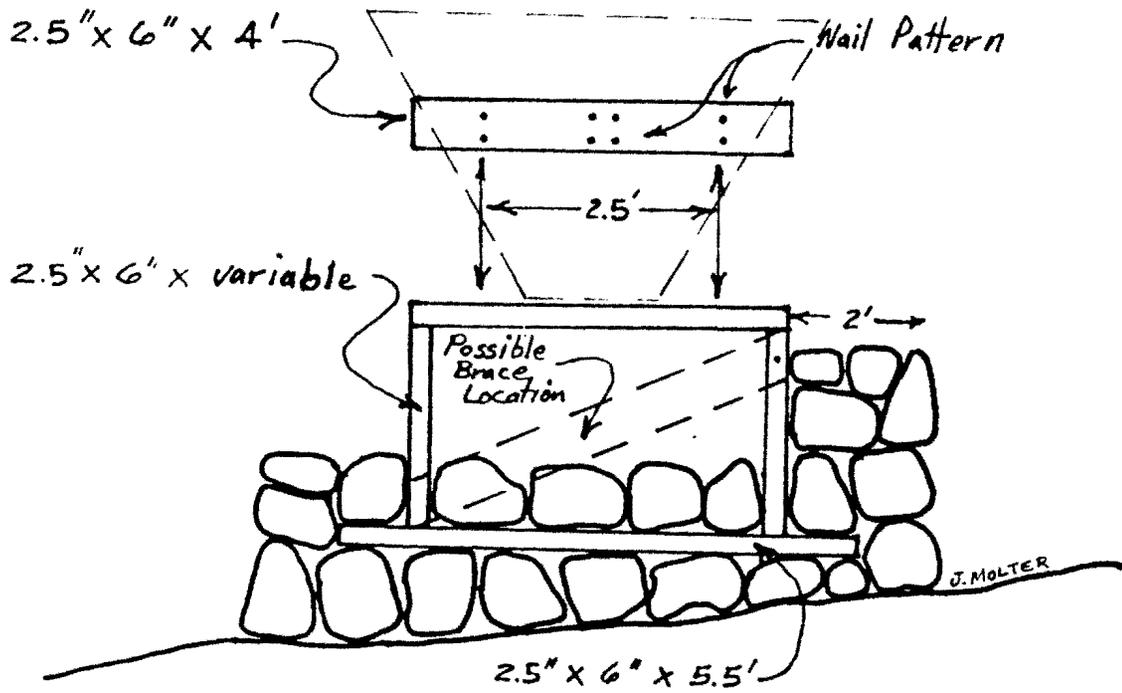
c



d

FIGURE 5

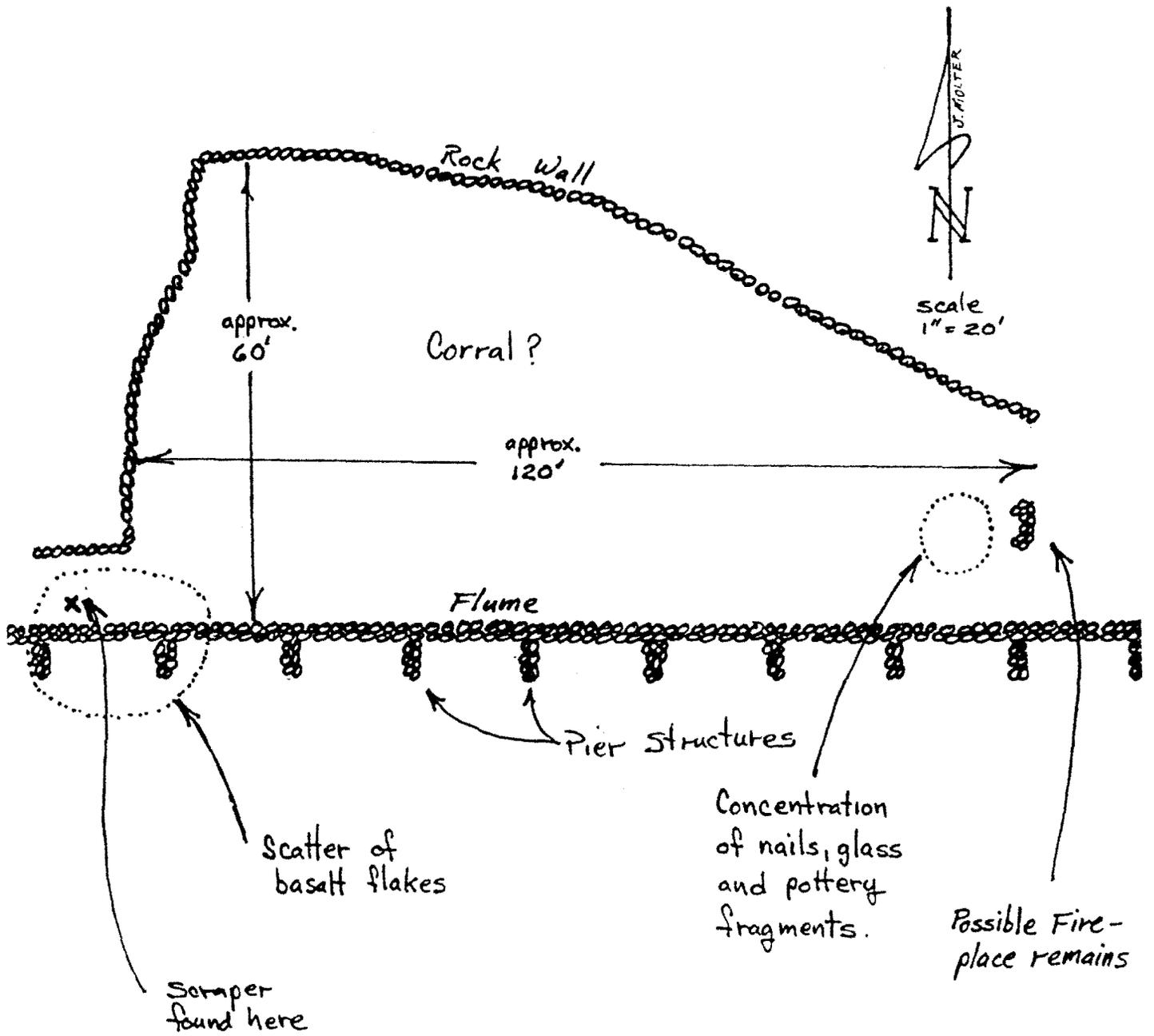
Blue Ridge Flume  
Pier Reconstruction



Pier Structure - (cross section)  
16' apart

Scale:  $\frac{1}{2}$ " = 1 ft.

FIGURE 6



*Blue Ridge Flume Section  
along Inks Creek*

At Feature 2 were found Native American basalt flakes and flake tools. In addition, cores, core tools and flakes were found scattered (isolated) over the hillside, possibly antecedent to flume construction. There is no suggestion of Indian labor involved in the flume history, and it is likely the Indians had been driven from the area prior to flume construction. Historic artifacts here include green bottle glass sherds, 6d and 16d common cut nails, a dark brown glazed earthenware sherd (Chinese), white vitrified earthenware sherds (plates, cup or bowl), tin can fragments, and a 5-1/4" diameter, 6" high seam soldered can perforated on the base for sieving.

Feature 3 is located 30' north of the flume and is a 6'x6'x2' rock pile with a large bolt and spike found in its top. Part of a bucket and wire occur along with a number of 16d nails, possibly a support or anchoring feature. Between here and the next feature were found a 9" diameter, 6" high tin can and a tin wash basin 12" x 3" in size.

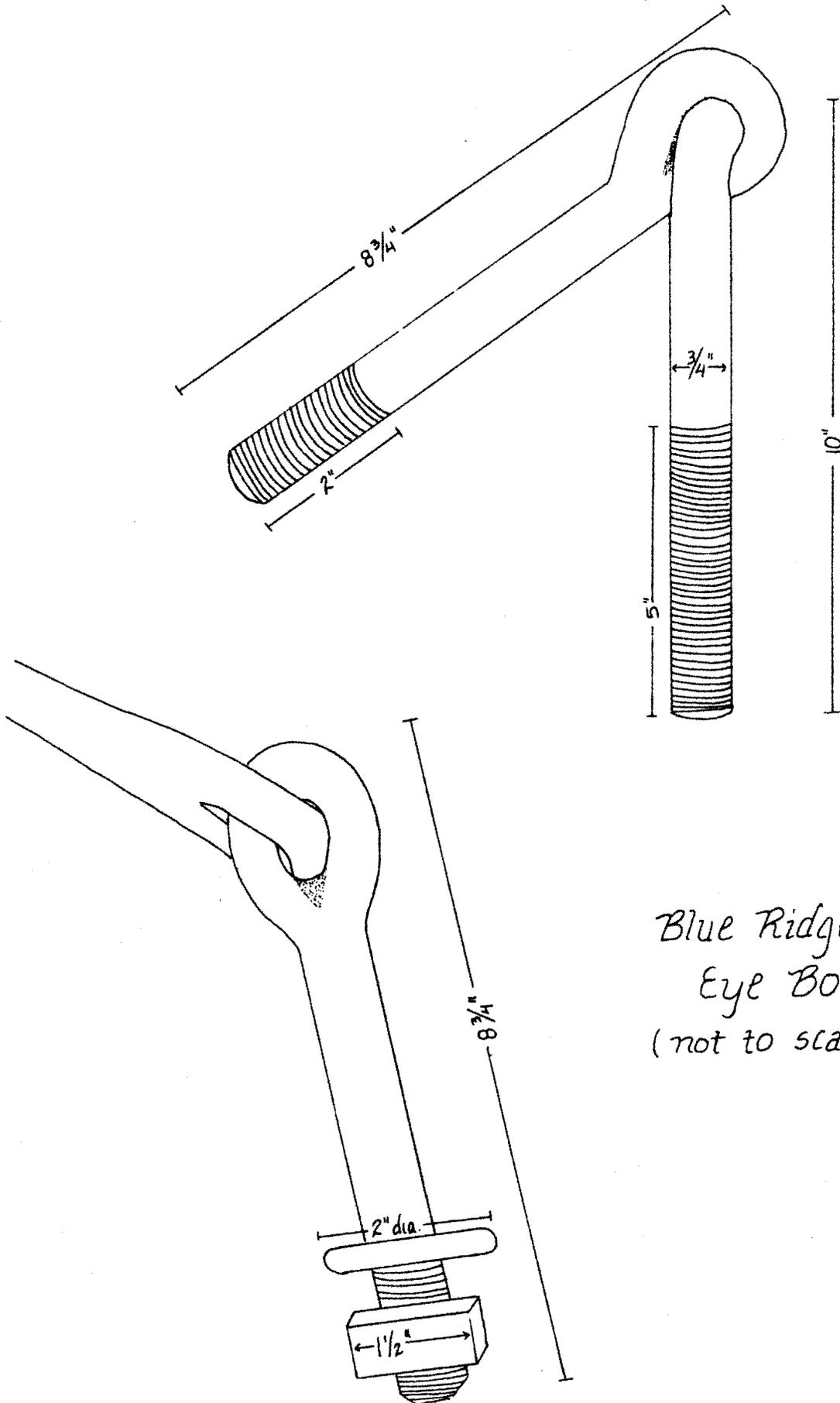
Feature 4 is an intersecting wall similar to Feature 1. This wall is about 500' long. The wall is 50" high, 24" wide at top, 36" wide at the base with 8-1/2" diameter boulders near the top; 20"-26" diameter boulders at the base. A secondary animal (sheep?) control wall intersects this wall and runs below but parallel to the flume. This secondary wall is smaller and may be later than the flume. The main feature wall continues past the flume (upslope) in the form of a hogwire fence. As with Feature 1, where this wall intersects the flume, uphill the rock foundation continues, but downhill, toward the river, a set of cobble-boulder piers is present.

Feature 5 is a major side gully that was apparently spanned by a suspended flume. Associated artifacts included large eye bolts (Figure 7), sheets of metal (galvanized 7" x 10" and copper 10" x 3-3/8"), bracing fixtures (Figure 8), common cut nails (11 30d, 8 12d, 5 18d or 20d, 2 7d, 1 16d), window glass, a 4-1/2" piece of can with a small hole in end, perhaps a mend for flume, flume sheathing of galvanized metal (Figure 9), as well as many pieces of milled lumber.

Feature 6 is a small trash dump located at one of the piers on a steep hillside. Artifacts found include a white vitrified earthenware plate stamped on the base THOMAS HUGHES, BURSLEM (pottery made in England from 1860 to 1894); window glass, a funnel, and used tin cans. This is probably a dump from a nearby flume tender's cabin on the flat below. Its location on the hillside just below the flume also suggests it was deposited by someone walking or riding the flume. However, a flume tender's cabin here on the flume itself is possible and may be worth further archaeological exploration.

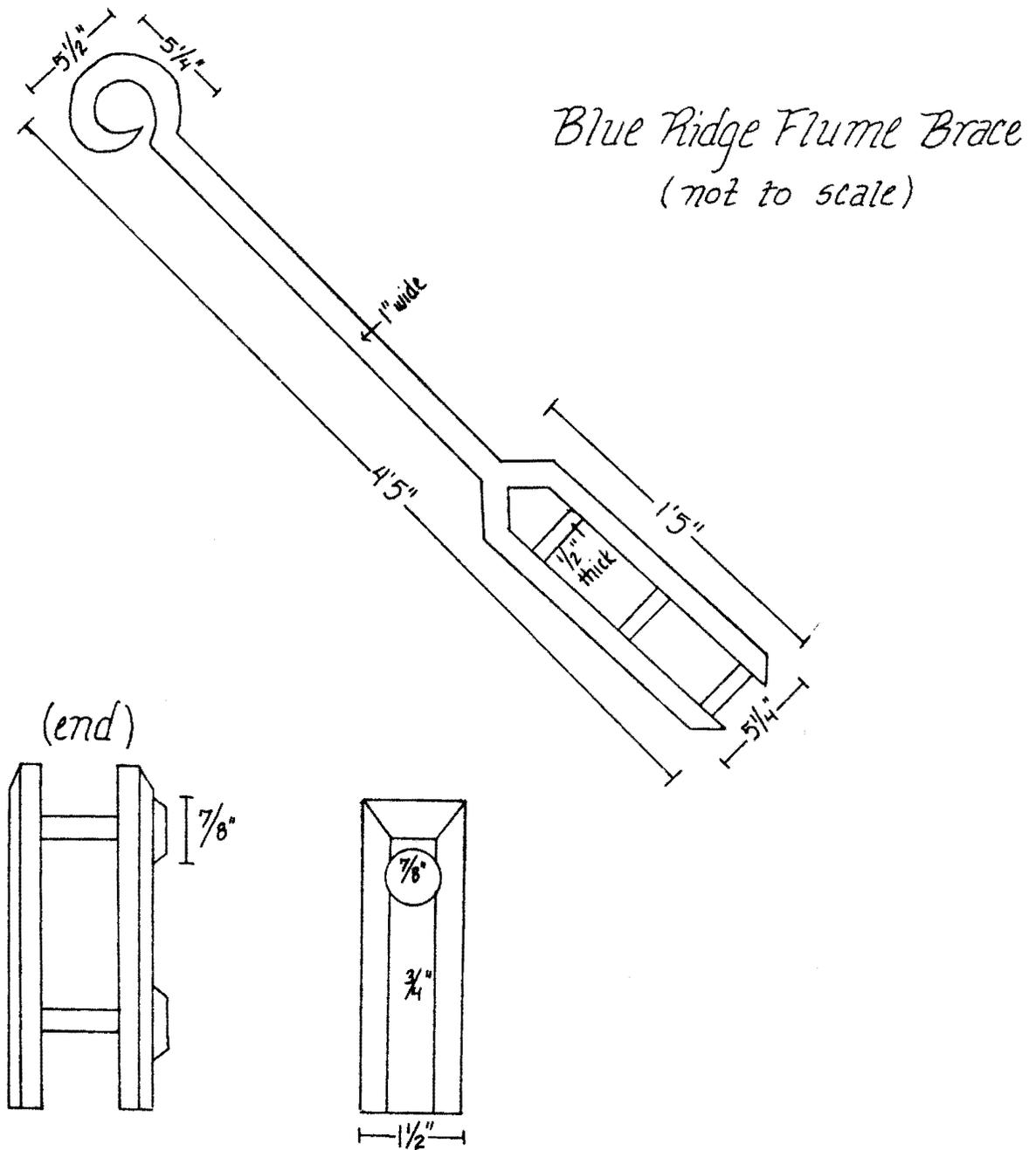
Feature 7 may be the location of the flume tenders quarters mentioned above if it was situated on the flat. An old wagon road and cobble pile are placed adjacent. Living trash was found

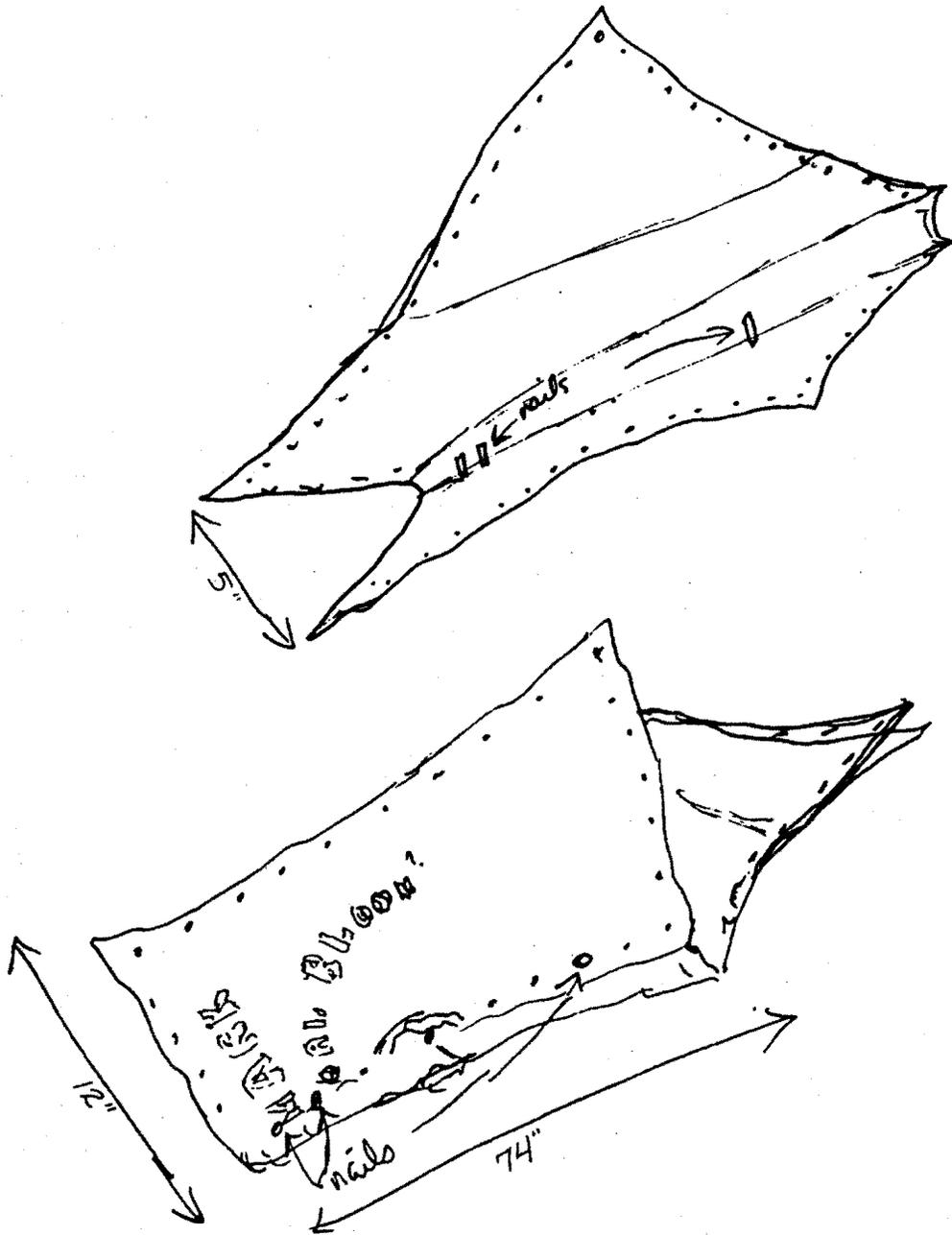
FIGURE 7



Blue Ridge Flume  
Eye Bolts  
(not to scale)

FIGURE 8





Blue Ridge Flume  
Galvanized Metal Flume Bottom Sheathing  
(reuse evident)

scattered, primarily within a small stream bed. This is located where the most recent flume (to Red Bluff) left the hillside and entered the flat. (Perhaps there were two separate flume tender's cabins here in this vicinity from different flume periods). At Feature 7 artifacts recovered include tin can lids of 3-1/2" and 3-7/8" diameter; a 5" diameter spout or funnel; a double soldered 3-1/2" diameter, 4-1/2" high can, window glass, green bottle glass, an aqua swirl pattern bottle neck, a piece of copper, an amethyst glass bottle fragment, sherds of white vitrified earthenware (plate), a salt glazed exterior crock sherd, cast iron stove pieces, other tin cans, an oil ring finish liquor bottle top (green), a portion of a green bottle base, an insulator in a tree and a wire from an old telegraph or telephone line (may be more recent from the nearby ranch), a sherd of Chinese Bamboo ware rice bowl, blue glass pieces, various common cut nails, an aqua glass insulator part, 1-1/2" wide barrel straps, twisted wire, a galvanized round oil can, a tin connector lid (5 gallon rectangular type), and miscellaneous metal scraps.

Feature 8 is apparently where the flume crossed the flat or the mouth of Inks Creek. A small berm was constructed as part of the foundation. This can still be traced across part of the flat. An old lithograph (Figure 2) is an apparent rendition of this high flume crossing.

Feature 9 is a small segment of the original flume that dumped at the mouth of Inks Creek. The older flume, evident by a low rock alignment (and virtually no wood) and occasional cobble pier (Figure 4c), runs south-southwest to an incised channel along the river terrace. This was the apparent initial lumber dump. Occupational evidence is apparent including black walnut trees, scattered glass, cans, boards, pieces of metal, and stove parts.

Unnumbered features also occur in this Inks Creek vicinity including wagon road remnants near the point of old and new flume divergence (Feature 7 area) (Figure 4d); also near here is evidence of water from the flume escaping and washing down part of the hillside. At two locations it appears that small earth and stone check dams had been constructed within small gullies uphill from the flume.

Some further observations regarding artifact and lumber remains along the flume in the Inks Creek vicinity are offered. Almost all the remaining lumber along the flume is milled cedar with some split cedar posts. Nearby oaks in places were cut a long time ago in cases to clear the alignment, in other cases for firewood or other reasons. Some of the beams and post measurements are as follows: 15'3" x 5-3/4" x 3-1/2"; 20' x 3-1/2" x 3-1/2" (deep gulch); 4' x 3" x 3" (pier beam); flat boards 5/8" to 3/4" x 6" to 13" x 8' to 15' long; 30' x 3-1/4" x 1-1/2"; 11' x 3-1/4" x 4-1/2"; split cedar 7' x 4-1/2" x 3-1/4"; 12' 6" x 10" x 5-1/2", beam 16' 3" x 5-1/2" x 2"; beams 42" x 5-1/2" x 3-3/4" and 56" x 5-1/2" x 2-3/4". A beam for the flume across a

gully is 15-1/2' x 5" x 3". Other artifacts found along the flume include a 7/8" wide galvanized strap at a flume segment with cut nails; 9 20d and 3 16d common cut nails at still another location; barrel strap (galvanized, 1" wide, 43" circumference, with 2 rivets; metal can 6-1/2" high and 4-1/4" diameter, side soldered; 5 20d, 3 30d, and 2 16d common cut nails at one spot and 4 20d, 3 30d and 2 16d common cut nails at still another location; and a tin can, 4" diameter by 5" height.

Below the mouth of Inks Creek the flume perched on the side of the easterly bluff along the river before transgressing Massacre Flat between the bluff sections. Little remains of the flume along the bluff edge probably due largely to salvage and erosion.

Within Massacre Flat there are inconsequential remains to identify the flume location save a few cobble piles (footings) and depressions in the ground from possible pier placement, and an occasional common cut nail. However, a probable flume tenders camp is situated along the flume alignment. There is a relatively large depression associated with a variety of historical artifacts, mostly from domestic activities. Artifacts found include cast iron stove parts, stove pipe, a coffee grinder, a gray enamel-ware pan (9" x 4"), a tin fry pan, white vitrified earthenware sherds, a transferware plate edge with gold edging and a floral design, brown bottle glass, aqua glass bottle bases, a 3" diameter tin can with BCM CO 84, wire, and a metal strap (1-1/2" x 1/2"). Most of these artifacts were manufactured about the time the flume was operable, strongly suggesting a linkage. There are also Native American artifacts in the vicinity including flaked stone tools and debris and milling stones. These remains probably pre-date the flume.

At the south end of Massacre Flat there is an entrenched stream with cut platforms in staircase fashion where the flume passed. Similar features have been noted at other stream crossings to the south prior to the Paynes Creek crossing. Large cut beams are present where the flume left the flat and again followed the river bluff.

At the next departure from the bluff opposite Table Mountain, the flume can be followed by a line of common cut nails, a few scraps of wood, a bottle fragment here and there, and a pathway of cobbles and boulders that probably served as footings for beams. In some places, as on hillslopes, there is a channel eroded where the flume course becomes quite obscure, its trace followed by an occasional common cut nail and rock cobble foundation piles where streams were crossed.

Observations were made of a short segment of the Empire Flume on Hogback Ridge just east of Red Bluff. These observations are relevant since they were part of the same system, presumably of the same construction, or nearly so.

The flume alignment varies in its physical remains and includes in places two parallel alignments of cairn supports, in other sections a single alignment of rock support, and in still other locations virtually nothing (possibly it was laid on the ground or bedrock). The double alignment is 206" wide, with one smaller cairn row 48" wide and the larger cairn row 70" wide with 80" in between. The smaller row may have supported a walkway. Distances between each double set of cairns (along the alignment) vary. Sample measurements include the following between the supports: 78", 110", 102", 100", 108", 102", 100", 102", 108", 108", 90", 90", and 96". One support was between 76" and 78" long, although they vary between these figures and 70". Where there is a single rock support, it is 90"-100" in width and 80"-100" apart. In another spot there is a linear support of rock piles 78"-100" apart, each pile about a foot high and cairns about 36"-40" in width. These are on the hillside - on top there is a scattered run of boulders and cobbles 80"-100" wide, mostly boulders and a few small "footing" piles. Old cut oaks occur along the alignment; one support cairn on top is 2' in diameter, another is 35" in width and about a foot or so high. Near the flume alignment several large cairns (4' - 5' diameter and several feet high) were noted.

Artifacts noted along the flume alignment include: various sizes of common cut nails (20d, 16d, 9d), partially burned 4" x 4" beam, cedar scraps, white vitrified earthenware sherds (several), a barrel hoop; one cedar beam 66" long, 3-1/2" x 5"; another 14' long and 6" x 4"; a metal strap, various small pieces of wood, a chain link 3" diameter, 4" long and 2" wide.

The strongest evidence for Chinese construction (and/or possibly dismantling) comes from evidence of a short-lived camp adjoining. At the camp there was a concentration of boulders almost in alignment that could have been tent pad locations or pads for temporary buildings of some sort, although no window glass or nails were noted here.

Artifacts found scattered about down the slope include various sizes of common cut nails, a porcelain button, Bamboo ware sherds, opium tin parts, aqua glass sherds, an amber glass bottle part, Four Seasons sherds, ceramic sherds (soup spoon?), brown ware (Chinese) sherds, blue glass with letters embossed, 1# hole-in-cap tin, brown bottle with ...D BO..., brass harmonica reed, twisted wire, green bottle glass sherds, 3/16" metal wire/rod, 3/4" metal strap, yellowish glass paneled bottle sherds, 1/16" metal strap, cut metal sheet, barrel hoop, metal strap, broken horseshoe with twisted wire through hole, hole-in-cap can 3-1/2" diameter, 3-1/4" height; another can punched in its bottom by an ice pick is 2-1/2" diameter by 4" height; small pieces of wood, small snap-on lid, white vitrified earthenware sherds (one with a Davenport hallmark--1783-1887), greenish-yellow saltglaze crockery sherds, and a turquoise plate with design on exterior, with a white interior.

The historical significance of the Blue Ridge Flume lies with its place in the development of northern California's lumber industry and associated settlements, both rural and urban. Its association with an ethnic work force, the Chinese generally associated with mining, railroading, truck gardening, and laundering, is also of some significance once again illustrating the resourcefulness and flexibility of the Chinese work force, however short lived.

No doubt at the time of construction, these flume systems were architectural spectacles. Today, although only traces remain of these features, the remnants still provide public interpretive value.

The Blue Ridge Flume was associated with numerous investors, both local and more distant, including Remembrance H. Campbell, Samuel F. Frank, and Lamson S. Welton, the latter individual "...who gained a measure of local fame in later years from surviving a shotgun attack by Colonel Charles Cadwalader of the Bank of Tehama County" (Hutchinson 1983:9). However, it would appear that the historical importance of the flume lies less with associated developers and investors and more with its part in the subsequent corporate and urban development. Together, the flume and associated personages, lumber companies, mills, and operations were an integral part of the development of Red Bluff and the north valley, of Diamond International Company, subsumed by Roseburg Lumber and more recently by Sierra Pacific Industries which were and are an economic force in the area and beyond. At one time the lumber plant in Red Bluff was possibly the largest pine manufacturing installation in the world and the second largest sash and door factory in California, in large part owing to the Blue Ridge Flume. Certainly, further research regarding flume development use would better establish such issues as progress in local economic strategies and the interactive nature of regional labor and social relationships. These issues can be studied in terms of both the Euro-American and ethnic groups such as the local Native Americans and the Chinese.

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