THE CHINESE AND HYDRAULIC MINING IN THE FAR WEST

Randall Rohe

Introduction

A COMMONLY HELD image of nineteenth century Chinese mining in the West is that it consisted almost entirely of small-scale, primitive mining techniques. Small groups of independent miners used the cradle or rocker to work deposits abandoned or thought worthless by white miners. (Figure 1) The Chinese, however, played an important role in hydraulic mining--a large-scale, advanced method of mining. Hydraulic mining, invented in California in 1853, utilized a jet of water issuing under high pressure from a nozzle to excavate and wash the gravel through sluices that caught the gold and disposed of the tailings. (Figure 2) Hydraulicking enabled four or five men to do the work of fifty men using the traditional methods. It was mass production applied to mining.[1]

Mining Ditch Construction and Chinese Labor

Almost all forms of placer mining required water. Diversion of water for mining purposes occurred early in the development of most Western mining districts. The construction of mining ditches typically coincided with the introduction of the long tom. Tomming required only small quantities of water and short, inexpensive ditches proved adequate. The expanded demand for water generated by hydraulic mining necessitated the further extension and enlargement of ditches to larger streams and finally to small lakes and even the construction of sizeable reservoirs. Water and canal companies became an important branch of the mining industry, and employed a great many people, including many Chinese.[2] (Figure 3)

By 1867 California contained over 6,000 miles of mining ditches. Euroamerican mining companies began hiring Chinese laborers to construct mining ditches in the 1850s but apparently the number of Chinese ditch diggers or tenders remained small until 1870. Large, heavily capitalized companies and large-scale operations dominated hydraulic mining after that date. Such companies built huge water supply systems, including miles and miles of ditches and canals. Some of them contracted with Chinese companies to build these ditches, others employed both whites and Chinese. In the latter case there was usually a strict division of labor, Chinese did the digging and whites the blasting and trimming up of the ditch. The laborers lived in temporary and separate camps along the projected line of the ditch.[3]

The North Bloomfield Gravel Mining Company, one of the largest hydraulic mining companies in California, offers a good example of the use of Chinese labor by a Euroamerican company. The company incorporated in 1867 and immediately spent $350,000 to buy up abandoned claims, ditches, flumes, and reservoirs. Initially it operated with water purchased from the Eureka Lake Ditch Company. In the summer of 1868 the company decided to begin construction of its own water supply system. The company surveyed a ditch from its mines to the South Fork of Poorman Creek in July 1868 and contracted J. R. Myers of San Francisco to construct a ditch some twenty-three miles long. By early August the firm already had about fifty men at work on the ditch. The *Grass Valley Union* claimed that the company needed another 1000 more workers and it was hiring all "the Chinamen" they could get.[4]

H. G. Prince, the agent of Meyers, who superintended the construction soon had hired 700 Chinese to

RANDALL ROHE teaches at the University of Wisconsin-Waukesha and has published several earlier articles on hydraulic methods and the Chinese miner.

work on the ditch. He procured most of them from various towns in Nevada County and some from Sierra and Placer counties. A few consisted of recent arrivals from China. The Chinese received wages of $35 per month. Besides a force of 700 to 800 Chinese, the company hired 300 white men.

The company completed the Poorman Creek ditch in less than five months.[5] It then immediately put its workforce on another ditch, seven miles long, from North Bloomfield to Columbia Hill and completed it within a week. Between August 29, 1868 and January 1, 1869, the North Bloomfield Mining Company constructed almost thirty miles of ditch, with substantial flumes from ten to seventy-two feet high and forty to seventy-two inches wide, and two iron pipes, each twenty-seven inches in diameter and 1200 feet long. The *Nevada City Transcript* wrote "The entire ditch is built in the most substantial manner."[6]

The first installment of water from the Little Canon-North Poorman Creek ditch reached North Bloomfield in late March 1869. A local newspaper noted that "Without the labor of Chinamen it is probable the ditch would not have been attempted." The paper further noted that in this instance, as well as many others, the use of Chinese labor created a demand for additional white labor because the completion of the ditch meant steady employment for a large number of white men in the mines along it."[7]

Despite all the work of the North Bloomfield Company, its water supply proved insufficient the following year. Accordingly, the company pushed the ditch about ten miles farther to Big Canon Creek, a tributary of the South Fork of the Yuba. Here they purchased land for a reservoir and in the same year built the Bowman Dam, over seventy feet high and later raised to a hundred. In mid-May the *Transcript* announced the company's plans to extend the ditch to Big Canon and stated that it "hope[d] to complete [it] in sixty days" and "will put 100 white men and as many Chinese as they can get upon the work." Again most of the Chinese laborers came from surrounding towns like Nevada City, Grass Valley, and Colfax.[8] A correspondent of the *Transcript* described activity along the ditch in late August as follows:

"In the evening, from the opposite side, they may be seen scattered all along the mountain line busily engaged at work, and about sundown blast after blast is discharged, the loud reports ringing among the crags as though an artillery salute were repeated in every echo."[9]

The ditch was five feet wide (at the bottom), three and a half feet deep, and almost ten miles long. The company completed much of its work that fall and finished the final part, mostly fluming, the following summer. It employed gangs of laborers on each end of the ditch to finish the work as fast as possible. Its completion required the use of 350 laborers--200 Chinese and 150 whites, the latter carpenters, bosses, etc. With the completion of the Big Canon Creek extension, the company had forty miles of ditch, built at a cost of about $500,000, and described as "the best constructed and most substantial one in the State."[10]

Low water in the fall of 1871 exposed a large amount of driftwood that had lodged along the shoreline of Bowman Reservoir. In October the company sent some men up to the reservoir to burn it. On the night of October 13, a mass of burning wood drifted away from shore, floated to the dam, and burned about fifty feet of it. The company spent about $14,000 to temporarily repair it. Unusually heavy rains in December completely swept away the repaired portion of the dam. Despite the lateness of the season, the company sent sixty Chinese and thirty whites to repair the dam again. Even though snow storms dumped as much as twelve feet of snow on the area, the workmen managed to repair thirty feet of the dam (at a cost of $16,000) - sufficient to hold some water in reserve until the following season. By June of the following year, the company had a force of forty-five whites and 150 Chinese cutting timbers, blasting rock for ballast, tearing down the remains of the old dam, laying tracks, building cars and making other preparations to completely rebuild the dam.[11]

All this construction work and the working of its various mining claims required the North Bloomfield Company to employ a large work force. By November 1872 the company had 450 men on its payroll, and since it expected to extend its ditch into Bridgeport Township, it planned to add considerably to this force.[12] Unlike many white mining companies, the North Bloomfield at this date showed no bias in its hiring practices:

"They give employment to every man that wants to work, regardless of his color, nationality or qualifications. They have every kind of work to be done, and when men are incapable for one class of work they try them on another, and so on until they get them in the right place. They would give employment to a great many more men if they could get them."[13]

The North Bloomfield was just one of the many large California hydraulic companies to use Chinese labor for ditch construction. In 1874 the Milton Company employed 400 Chinese on its ditch, the following year the Hobson Gravel Mining Company and the Auburn Gravel Mining and Ditch Company used 90 and 125 Chinese respectively in ditch construction. In 1876 the Blue Tent Mining and Water Company had 750

Chinese constructing a ditch, and E. J. Davis had 200. And so on! The Chinese laborers, at least sometimes, had their own tools and dump carts. With the completion of a project, they took their equipment and returned to their base of operations, usually a larger mining town or supply center.[14]

California was not the only state where many Chinese found work digging mining ditches. Oregon especially was the scene of such activity. One of the better known and more important of these ditches was the Sterling ditch. For some twenty-five years, a large number of miners worked the gravels of Sterling Creek on a small-scale using the traditional methods. During nearly the entire period, the scarcity of water hampered their operations and prevented any large-scale attempts at mining. David P. Thompson acquired claims along the creek in June 1877 for $25,000 and by 1878 he had completed a ditch twenty-three miles long, seven feet wide at the top, and four feet wide at the bottom. Besides a large number of whites, Thompson employed over 200 Chinese on the ditch's construction at $2.40 per day. The Chinese came from northern California and various parts of Oregon. One local newspaper editor claimed the ditch's construction occupied nearly all the Chinese in Jackson Coutny. The Chinese completed their portion of the work in October and Thompson turned them over to a company excavating a ditch to Big Applegate Creek. The first cleanup at the Sterling Mine yielded $27,987 with an operating expense of $7,408. For a time it was largest hydraulic mine in Oregon.

When Euroamerican mining companies contracted for Chinese labor to build a mining ditch, they often did so with a Chinese agent or company. Only limited information survives on these agreements. In a very early one that was executed in Mariposa County in 1857, the Chinese contractor received $25 per month for every Chinese laborer and held a mortgage on the ditch equal to the cost of labor with an interest rate of 12% per annum. In the 1870s white mining companies using contracted Chinese labor for ditch construction paid anywhere from $3.10 to $4.75 per foot. Wah Kee and Company, merchants of Portland and San Francisco, was one of a number of companies that supplied laborers to Euroamerican mining companies. Some individual Chinese contractors like China Fawn in southwestern Oregon and Chin Poo in central California became quite well known.[16] (Figure 4)

Most Euroamerican mining companies that utilized Chinese labor for ditch construction found their work quite satisfactory. In fact in some cases they praised the quality of their work. In most cases the only problems with Chinese labor had to do with their refusal to work in the rain or on religious holidays. The only negative comment on the use of such labor that was found in hundreds of reels of period newspapers concerned the claim of L. B. Grider near Happy Camp, California. A correspondent of the *Yreka Journal* claimed the mine did not produce as expected because the Chinese improperly graded the ditch and constructed poorly-made flumes. It may have been simply a case of racism. Like other Chinese laborers, those engaged in ditch construction found themselves the targets of racial hatred. When Chinese cleared $2,000 for excavating three miles of ditch for the Auburn Gravel Mining and Ditch Company, the editor of the *Placer Herald* remarked, "We were very anxious, for the good of the country, that white men would get this job, but when it comes to bidding they stand no show. John Chinaman, the worst John that ever cursed this country, will cut under him every time, and still make money."[17]

Chinese Labor and Bedrock Tunnels

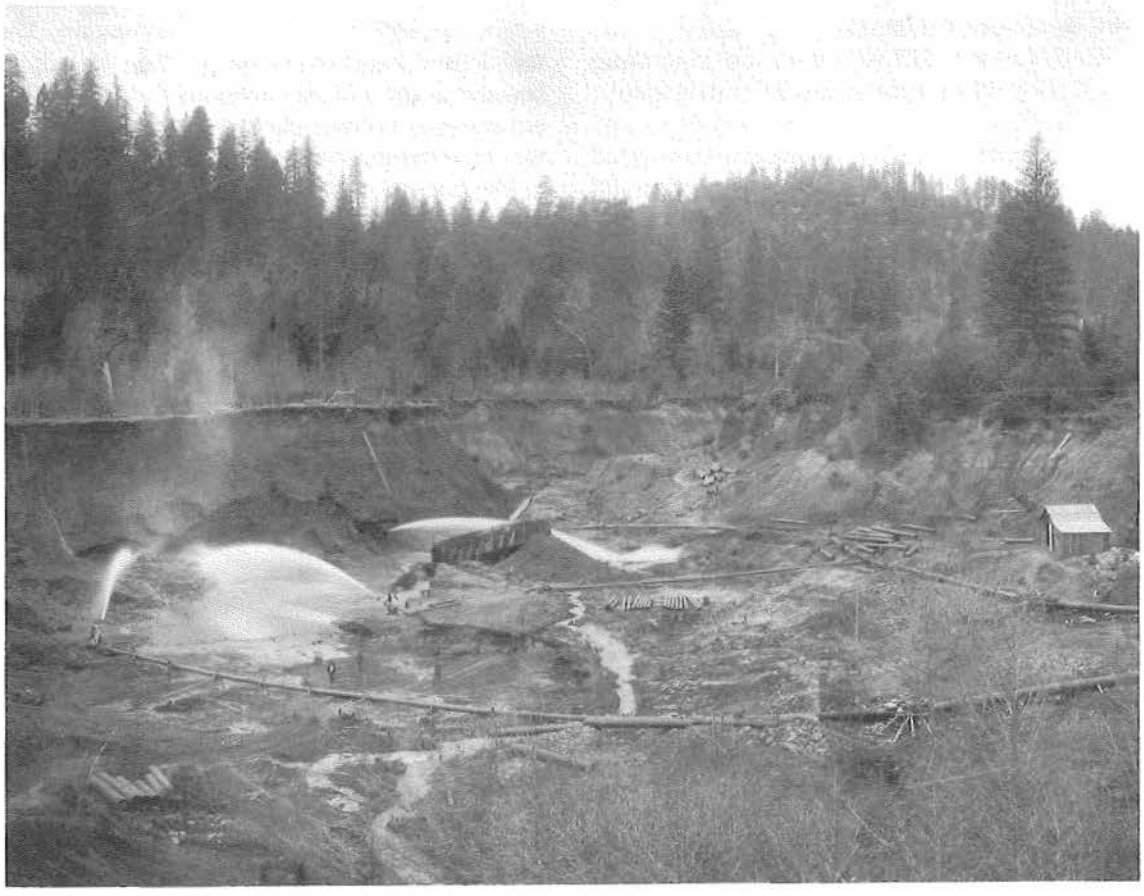
Besides the construction of water supply systems, white hydraulic companies sometimes hired Chinese laborers for other construction projects, including the construction of dams, the repairing and cleaning out of mining ditches, blasting and grading of flume lines, and the excavation of bedrock tunnels. Chinese employed in such construction projects typically earned lower wages than those employed as miners. They received their wages through a headman or contractor. During the middle and later 1860s the problem of tailing disposal became acute in many areas of California. The upland streams had become choked with tailings. The solution was to construct bedrock tunnels that led from a shaft at the bottom of the hydraulic pits and discharged the tailings into adjacent ravines and valleys. Many Chinese had gained considerable experience in the construction of tunnels on the Central Pacific Railroad, and some found work constructing bedrock tunnels in hydraulic mines.[18]

The number of Chinese engaged in such projects varied greatly. The Gold Run Ditch and Mining Company at Gold River, California (Placer County) employed twelve men, including seven Chinese, to construct a bedrock tunnel in 1874. Records of the El

TOP OF PAGE 76. *Fig. 1. The Chinese became so associated with small-scale operations using the rocker/cradle that it overshadowed their use of large-scale, complex methods like hydraulicking. Sketch from Borthwick's* Three Years in California. *Courtesy California State Library.*

BOTTOM. *Fig. 2. This view of a hydraulic mine in southern Oregon graphically shows the large-scale nature of this form of mining. Courtesy Southern Oregon Historical Society.*

CHINAMEN W[illegible] WITH A CRADLE.



Dorado Water and Deep Gravel Mining Company show that from May 6 to June 30, 1875 the company employed at various times between 500 and 800 Chinese in a tunnel project. In some cases the Chinese excavated these bedrock tunnels with hand drills. More often they utilized Burleigh air drills, the most up-to-date method of excavating tunnels available.[19]

Chinese Laborers in White Mines

In addition to hiring Chinese temporarily for construction projects, some Euroamerican hydraulic mining companies kept a force of Chinese at work in their mines on a more or less permanent basis. (Figure 5) While the Chinese never constituted more than a third of the miners employed in the hydraulic mines during the period 1867-1880, they stood out because of their cultural distinctiveness, and the important role that they played. A gang of Chinese, hired under contract, often carried out the basic, unskilled labor of the hydraulic mines, "drudgery which it would be difficult to get competent white labor to perform." Among the tasks the Chinese performed at some hydraulic mines was to carry away the large boulders with poles and slings. (Figure 6) Some white hydraulic mining companies used Chinese to drive powder drifts and break up and dispose of the pipe-clay. If washed with a hydraulic nozzle, the pipe-clay turned into a tough, pasty substance instead of dissolving. It had to be blasted out and picked into pieces that would run through the flumes. In some hydraulic mines not all of the gold-bearing gravels could be worked by hydraulicking. At the Story claim near Poverty Bar, California, for instance, the Chinese utilized a whim and car to remove the gravel on the bedrock and transport it to the dump box.[2]

The Euroamerican hydraulic mines that employed Chinese typically had a strict division of labor. The Sears Union Water Company at Chandler, California employed five whites and forty-five Chinese in 1872. The white men managed the water and the Chinese performed the rest of the labor. At the Dutch Flat Blue Gravel Mining Company in 1872 there were forty white laborers and some thirty Chinese. The whites ran powder drifts, made and set flumes, sawed and hauled blocks, and did "such things as are necessary to be done by white labor." The Chinese leveled the ground for pipes and wagons, cut ditches, and did the picking, packing and other menial work. In later years, Chinese handled the giants in some white operations. (Figure 7)

The number of Chinese employed in individual white hydraulic mines varied greatly from two or three up to 100. (Figure 8) Generally the white hydraulic companies that used Chinese laborers had more whites than Chinese. For instance, in 1875 the North Bloomfield Mining Company employed about fifty laborers, probably half of them Chinese. In 1877, the company worked sixty-five whites and thirty Chinese and the following year had ninety men on its payroll, forty of them Chinese. There were a few instances where the Chinese made up most of the work force. S. S. Richardson, for instance, who operated a mine near Happy Camp, California for a number of years apparently began employing Chinese in the late 1860s. In 1869 he used a "large gang of Chinamen, with two white men as overseers." By 1874 Richardson "employed 70-75 mongolians and two whites as overseers" and kept a "force of ten Chinamen patrolling day and night in the line of the ditch." to prevent any interruption of his water supply. Some ten years later he still had about thirty Chinese working for him. He utilized two or three giants that required six men to keep them running twenty-four hours. While the pipeman worked eight hour shifts, the others worked ten hours a day. Six Chinese kept the ditch in repair, six cut and blasted rock, and six made sluice boxes, etc.[22]

While the Chinese never accounted for more than a third of the laborers working in the hydraulic mines of the West, they did dominate some regions and mining districts. In 1879 the hydraulic mines of the Yuba River gave employment to 1500 men, probably three-fourths of them Chinese, "white men being engaged only for the higher grades of labor." Grant County, Oregon in 1882 had sixteen hydraulic mines which employed 140 men, 120 of them Chinese.[23]

For whatever period, the Chinese who worked in Euroamerican hydraulic mines received lower wages than their white counterparts. In California the Chinese made $1.00-$1.25 per day before 1868. After 1868 their wages went up to $1.75-$2.00, or even $2.30 for the skilled workers and $1.50 for the unskilled laborers. In 1870 whites generally received $2.50 to $3.00 a day. The wages changed little in the next twenty years. Wages in the rest of the West approximated those in California. The highest wages of Chinese ever received apparently were in Montana. In 1872 Strickland, Green and Pounds at Carpenter Bar, Montana paid its Chinese workers $3.00 per day and its white laborers $4.50-$5.00 per day.[24]

While it is difficult to measure the importance of Chinese labor to the development of hydraulic mining in the West, it is obvious that some hydraulic mines could not have operated economically without it. J. R. Hewitt, a partner in the Oroville Mining Company, reported to the *Oroville Mercury* in 1882 that "he found it absolutely impossible to obtain reliable white labor." Similarly the South Yuba Company could not get white labor even at $2.25 a day because whites refused to live in tents and do their own cooking. The Blue Tent mine, which ceased mining for over a year to complete some dead work, hired Chinese to do it

Euroamerican Employment of Chinese In Ditch Construction
Selected Examples

Figure 3

Date	Location	Name of Ditch/Company	Number of Chinese	Number of Whites
1875	Oregon Gulch,CA	Weaverville Ditch & Hydraulic Mining Co.	250	-
1877	Cow Creek, OR	Tolman Ditch	36	40
1877	Sterling Creek, OR	Sterling Ditch, D. P. Thompson & Co.	>200	-
1876	Dogtown, CA	E.J. Davis Dry Creek Claims	150	0
1880	New River, CA	New River Ditch	50	75
1880	Morristown, CA	Unknown	60	30
1880	Nevada City, CA	Mazanita Ditch	60	-
1882	Wolf Creek, OR	a Roseburg, Or. company	21	-
1878	Star Gulch, OR	Hamilton, Chappel & Co.	45	-
1872	Grand Ronde, OR	Carson & Clark	50	4
1876	Galice Creek, OR	Yank Hydraulic Co.	30	-
1886	Sucker Creek, OR	unknown	30	40
1878	Elliot Creek, OR	Klippell, Hanna & Co.	70	34
1875	Elk Creek, MT	Turner & Kennedy	10	6
1879	Kanaka Gulch, OR	Grand Applegate Ditch Co.	25	-
1880	Butte County, CA	Mineral Slide Hydraulic Mine	40	10
1886	Kerbyville, CA	California Company	30	40
1874	French Corral, CA	Milton Company	400	-
1869	Burnt River, OR	Big Ditch	400-700	-
1876	Scott River, OR	Scott Bar	24	12
1875	Clipper Gap, CA	Auburn Gravel Mining & Ditch Co.	125	-
1876	Blue Tent, CA	Blue Tent Mining & Water Co.	750	250
1877	Thompson's Flat, CA	E. J. Davis	200	0

Euroamerican Employment of Chinese in Ditch Construction
Selected Examples

Figure 3

Date	Location	Name of Ditch/Company	Number of Chinese	Number of Whites
1857	Mariposa, CA	Mariposa & Merced South Fork Canal	1000-2000	-
1870	Auburn, CA (?)	Hobson Gravel Mining Co.	90	30
1880	Grass Flat, CA	Morgan & Donohoe	100	-
1878	Whisky Flat, CA	Shepard Ditch	120	30-40
1875	Galice Creek, OR	English company	100-200	-
1871	Indian Bar, Tuolumne River, CA	unknown	800	200
1878	Big Flat, Del Norte County, CA	Big Flat Mining Company	200	-
1878	Haynes Flat, CA	Jackson & Farrell	87	30
1873	New York Flat, CA	J. L. Gibson	over 100	-
1872	Chany's Flat, CA	Siskiyou & Del Norte County Gravel Mining Co.	50	-
1870	Cement Hill, CA	Rolfe & Co.	27	-
1879	Taylor Flat, CA	unknown	140	25
1879	Stuart Fork of Owens Creek, CA	Buckeye Ditch	230	70
1876-1877	Trinity Center, CA	Coffee Creek Ditch	200-500	-
1869	Shasta District, OR	Carter and Packwood	200	-

because "the Chinese are the only persons who will work week after week getting their board only and waiting till the new bedrock tunnel completed and other dead work done before receiving the remainder of the wage due." The mine's superintendent claimed that without Chinese labor the work would have to cease immediately. The editor of the *Transcript* in turn implored its readers: "Don't employ Chinamen. Every Chinaman at work in the mines should be discharged and then we would have prosperous times." Despite the economic necessity of using Chinese workers in some hydraulic mines, such anti-Chinese sentiment occurs again and again in period newspapers.[25]

Chinese Hydraulic Mines

The initial development costs involved in hydraulic mining were beyond the means of most Chinese companies. The Chinese, however, were quick to learn its techniques by observation and by working for Euroamerican owners and purchased such mines after the mines became too marginal for the original white

Employment of Chinese in White Hydraulic Mines
Selected Examples

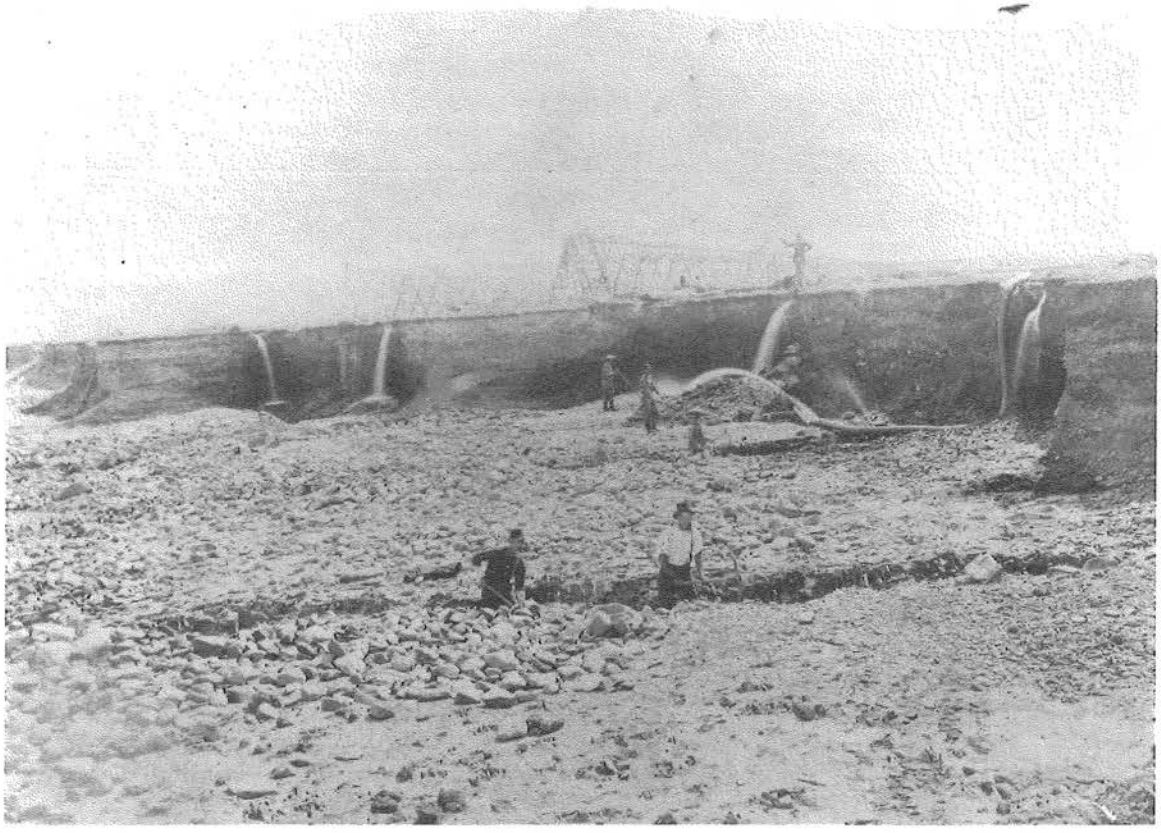
Figure 4

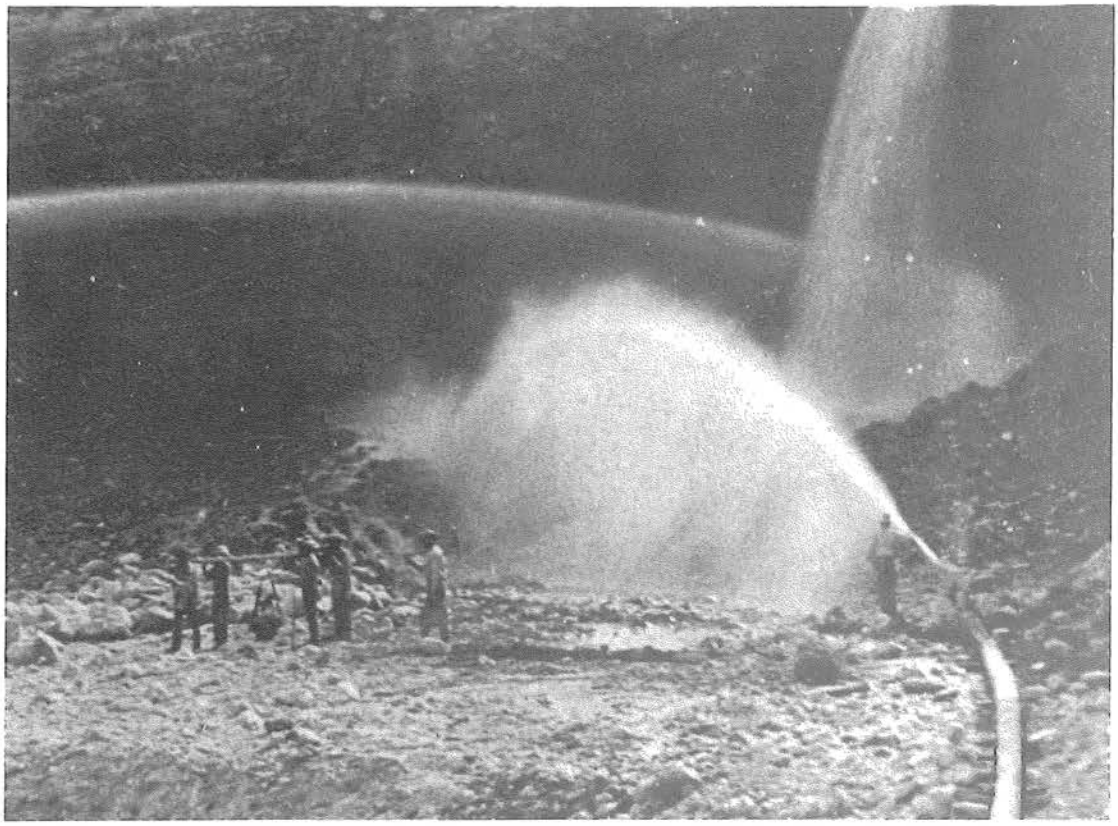
Names of Mine/Company	Location	Date	Number of Chinese	Number of Whites
Marselus & Mattman (Mazanita Claim)	Nevada City	1870	15	4/5
Alpha Co.	Washington, CA	1882	10 or more	3/4
Birds-eye Creek Mining Co.	You Bet, CA	1876	30	10
Strickland, Green & Pounds	Carpenter Bar, MA	1872	27	-
Billingsley & Halsey	Mountain House, CA	1880	50	-
Spring Valley	Cherokee, CA	1876	100	100
Cedar Creek Co.	Little York, CA	1879	23	23
Cedar Creek Co.	Christmas Hill, CA	1879	8	4
Cedar Creek Co.	Liberty Hill, CA	1879	5	15
Hathaway Gravel Claim	Washington, CA	1879	30	8
Dutch Flat Blue Gravel Mining Co.	Dutch Flat, CA	1872	30	40
Sears Union Water Co.	Chandlerville, CA	1872	45	5
Nevada Consolidated Blue Gravel Co.	Nevada City, CA	1869	13	14
Milton Mine	French Corral, CA	1880	50	50
English Company	You Bet, CA	1880	20	20
Derbec Mine	Nevada City, CA	1880	24	80
Yreka Creek Mining Co.	Yreka, CA	1880	25	150
Blue Tent Mine	Nevada City, CA	1882	54	8
North Bloomfield Gravel Mining Co.	North Bloomfield, CA	1875	25	25
Del Norte Mine	Happy Camp, CA	1879	30	2

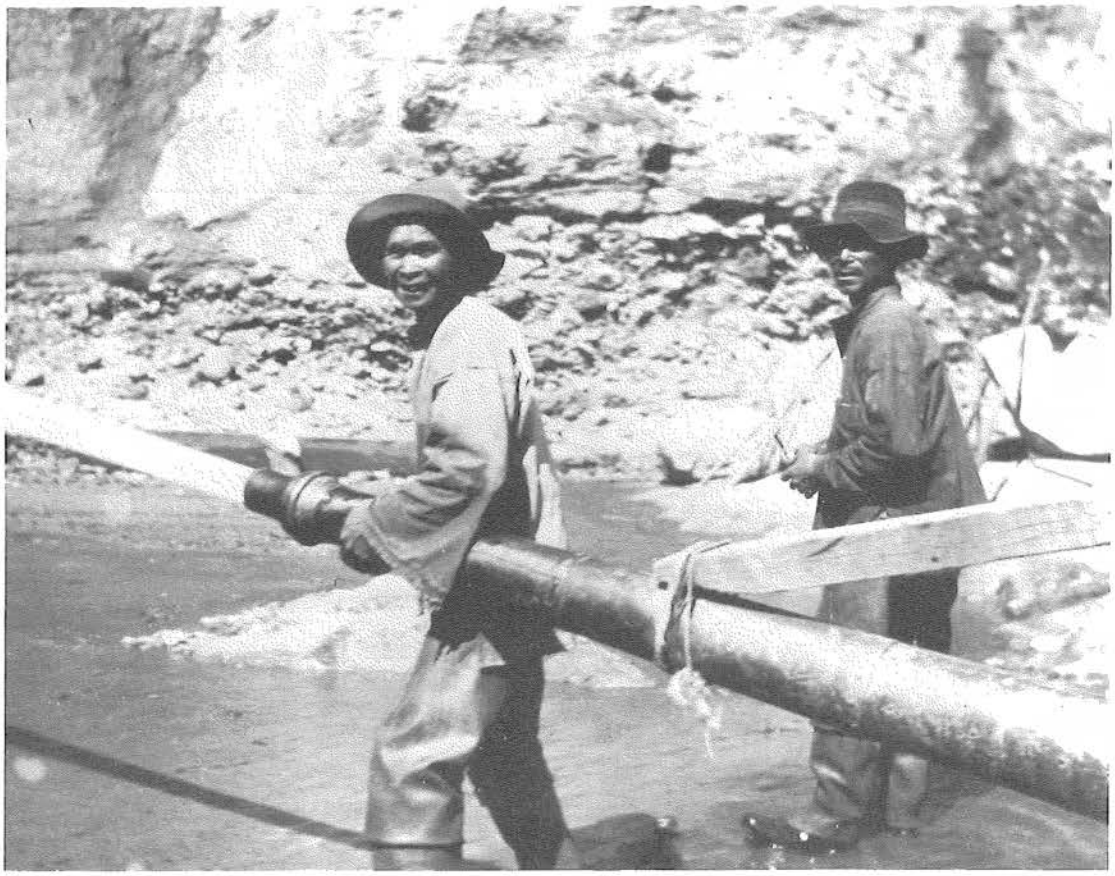
Fig. 4. Employment of Chinese in White Hydraulic Mines, Selected Examples.

owners to continue mining. By reworking the tailings and extending the operations into adjacent ground, the Chinese successfully continued to mine. When the Chinese first utilized hydraulicking is unknown. Since hydraulicking originated in California and had its greatest development there, it seems logical that California with its large Chinese population would be the location of the first Chinese hydraulicking. The earliest known use of hydraulicking by Chinese, however, is at Bridge River (Lilloet), British Columbia in 1863. Hittell in his *Resources of California* published in 1867 claimed that the Chinese owned no hydraulic claims or hydraulic equipment in that state. That year, however, a Chinese company began hydraulicking on Yreka Flats in Siskiyou County, California. In the next few years, the historical record contains increasing mention of Chinese hydraulicking not only in California but in British Columbia, Idaho, Oregon, and Montana.[26] (Figure 9)

In the later 1860s hydraulicking was employed along







TOP OF PAGE 81. *Fig. 5. This small white hydraulic operation in the Lillooet area of British Columbia c1880 employed a number of Chinese. Courtesy Provincial Archives of British Columbia.*
BOTTOM. *Fig. 6. This hydraulic mine at Spokane Bar near Winton, Montana was one of the many cases where a white mining company employed Chinese to do the heavy, manual labor. Courtesy Montana Historical Society.*
TOP OF PAGE 82. *Fig. 7. At the Humboldt Mine, Canyon City, Oregon, hydraulicking left behind large granitic boulders that interfered with the recovery of finer-sized gold. The company employed gangs of Chinese laborers of up to twelve men to carry boulders away using poles equipped with a rock sling. Courtesy Southern Oregon Historical Society.*
BOTTOM. *Fig. 8. A Chinese pipeman directing a "Little Giant" at the Royal Placer, a white mining operation near Rocky Bar, Idaho, probably late in the 19th century. Courtesy Idaho Historical Society.*

the entire California gold region, as far south as Techaihipi Valley in Kern County and as far north as Oro Fino, Siskiyou County, but was most commonly used in the counties between El Dorado and Plumas. Hydraulicking, however, experienced a period of stagnation in the late 1860s. "It is a interregnum in which mere labor has nearly exhausted its efforts and capital has not yet come to its assistance. Enterprises of great magnitude requiring capital and engineering skill, must be prosecuted..." The gravels often became increasingly compacted with depth. In many parts of California, the most easily worked banks of gravel already had been piped. Drainage problems because of the accumulation of tailings forced many smaller hydraulic companies, who couldn't afford to excavate expensive bedrock tunnels, out of business. This period of depression and abandonment of hydraulic claims corresponded with the completion of the Central Pacific Railroad which released thousands of Chinese laborers.[27]

There was increasing mention of the formation of Chinese mining companies for the purpose of hydraulicking in the period 1867-1880. The bulk of these companies employed 15-20 workers and owned a claim worth two to three thousand dollars, exclusive of equipment. The *Mining and Scientific Press* made passing references to such companies in the California counties of Butte, Calaveras, Nevada, Placer, Sierra, Siskiyou, and Yuba. By the mid-1880s the Chinese operated among the largest and most profitable hydraulic mines in some locations. In a few localities they were even the first miners to introduce hydraulicking. Some Chinese hydraulic mines operated well into the 1890s. From scattered references a composite picture of these operations can be drawn.[28]

Chinese individuals, companies, and co-operatives all worked hydraulic mines. Sometimes they owned the mines, other times they worked on shares or leased them. The lease sometimes included all the machinery, pipe, giants, etc. previously used by the company that owned the mine. In the 1880s and 1890s Chinese leased a number of hydraulic mines in northern California. For instance, after running the Del Norte Mine for quite some time with Chinese labor, S. S. Richardson leased it for many years to them. The State Mineralogist in 1887 ranked it as the most productive mine in the county over the previous twenty years, with a total production of $1,000,000. The Chinese utilized three No. 2 Giants and moved two and a half acres a season. They ran the mine around the clock, using coal oil to light it at night. Twelve men worked the day shift, and thirteen at night. Their wages ranged between $1.00-$1.25 per day. The mine had 2400 feet of sluices with wooden blocks and flat iron bars and riffles.[29]

The Chinese hydraulic mines ranged in size from eight acres to almost 400 acres. The great majority of these mines had a single nozzle, a few used two or three and a couple had four or five. Most period accounts fail to mention the type of nozzle the Chinese used. When they do, it was usually a monitor or Little Giant--generally considered the most up-to-date nozzles. The Chinese usually worked their hydraulic claims day and night, most often by the light of pitch pine. They employed anywhere from ten to thirty of their countrymen and generally paid wages of $1.00-$1.25 per day. Their water usually came from a ditch that they owned or leased. Sometimes, however, they purchased it from a ditch company or from another mining company. A few depended entirely on free water or waste water from adjoining claims. Since the Chinese generally purchased existing hydraulic mines including their water supply system, they usually did not construct their own ditches.[30]

Some of the Chinese hydraulic operations were quite impressive. The Wa Yen Company purchased the Piute claim at Moore's Flat, California for $2,000 in 1869. Initially the company's work force consisted of about twenty-five of their countrymen. A report in 1876 claimed that the Chinese mine was the only one in the Moore's Flat district that made any money that year. At this time the company began driving a bedrock tunnel using hand drills.[31]

The company entered its most successful period of operation in the late 1870s. By 1878 the claim employed up to forty men.[32] Even the editor of the *Transcript* recognized its success and the entrepreneurial ability of its owner.

"Yong Yen is the proprietor and a very wide-awake Mongolian everybody gives him the credit of being. The

Earliest Documented Chinese Hydraulicking Operations

Figure 9

Date	Locality	State/Province
1863	Bridge River (Lillooet)	British Columbia
1867	Yreka Flats	California
1869	French Coral	California
1870	Williams Creek (Cariboo)	British Columbia
1870	Canon City	Oregon
1871	Owyhee	Idaho
1871	German Gulch	Montana
1872	Dutch Flat	California
1872	Carpenter Bar	Montana
1873	Wild Horse Creek (Kootenay)	British Columbia
1873	Silver Bow	Montana
1874	Woods Flat	Montana
1876	Pioneer	Montana
1877	Sterling Creek	Oregon
1877	Boise Basin	Idaho
1878	Big & Little Applegate	Oregon
1884	Fairplay	Colorado
1886	Waldo	Oregon
1886	Grand Applegate	Oregon
1889	Susanville	Oregon

Fig. 9. Earliest Documented Chinese Hydraulicking Operations.

celestial capitalist never makes any great mistakes in buying and selling, even if he does look childlike and bland. For every dollar he plants, he generally reaps several. He bought the mine at Moore's Flat from a white company, and has made much money from it. A clean-up a little over a week ago realized between $16,000 and $17,000 for him, and the expense of production is said to have been very light.[33]"

By 1880 the Wa Yen Company employed about fifty Chinese and ran two monitors. That year the company obtained a Burleigh drill to complete their tunnel as rapidly as possible. The new drill enabled them to excavate at a rate of twenty-five to thirty feet a day and by March 1881 the almost-completed tunnel had been driven nearly 1000 feet. During this period, the company made several other improvements in its mine. The water supply system included small storage reservoirs at the end of the main supply ditch. From these reservoirs distribution ditches carried the water via a pressure box to the penstock (at the head of the pipeline), which delivered water under pressure to the hydraulic nozzles. The pressure box (bulkhead/sand box) consisted of a large, enclosed trough which removed sediment, calmed the water and eliminated air from the water before it was delivered to the nozzle via pipes. In late 1880 the

company contracted with George E. Turner for a hydraulic rig consisting of a sixty-five-inch diameter bulkhead and 1,700 feet of twenty-two-inch pipe; 600 feet of twenty-six-inch pipe, and 300 feet of thirty-inch pipe. It was "one of the finest hydraulic rigs in the county." Early in 1881 the company had W. D. Long construct a "fine lot" of flumes and under-currents in the canyon below their claims. By this date the Director of the Mint credited the company with an annual production of $50,000.[34]

In California the Northern Mines (Trinity, Siskiyou, Del Norte, etc. counties) were the scene of considerable Chinese hydraulicking between 1867 and 1895. (Figure 10) One of the better-known of these operations was the Spring Gulch mine at Yreka Flats. In the fall of 1867 a Chinese company purchased the Blake claim for $4,500. They had a less than asupicious beginning. Cold weather prevented them from working the claim all winter and a fire destroyed their house and winter stock of provisions. At the time, they still owed not only for the claim, but several hundred dollars for water, lumber, and provisions. They expected to lose the claim for their debts. As soon as the weather improved, however, they worked feverishly. By April they were making about $500 per week and had nearly paid off their debts.[35]

This was the first attempt at hydraulicking in this area and the editor of the local paper wrote "From the success realized in this claim, we cannot see why hydraulic mining would not pay in many places on the flats or in the gulches West of town...all the mining ground in this section has been worked with the pick, shovel and sluices, while the advantage of a powerful hydraulic, would pay to wash out the old tailings, as well as realizing immense fortunes from the undisturbed side hills."[36]

When the company had sufficient water, it made as much as $1,100 to $1,200 per week. In order to secure a year-round supply of water, the company leased the Big Ditch in 1874 and cleaned it out to its head, a distance of seventy miles. Thereafter, the company annually sent out a large gang of men to repair flumes and clean out the ditch which enabled the company to get a supply of water from the Shasta River when the local feeders gave out during the summer.[37]

When the Chinese ran the Big Ditch to capacity, an immense body of water came down the gulch. The Chinese sold what water they didn't need to other miners but often they used it all themselves. The company had nearly a mile of sluices, worked three shifts of hands, and ran their hydraulics night and day.[38] The *Yreka Journal* noted that:

"From the great energy displayed and the large force employed, we are inclined to believe the Chinese hydraulic claim on Spring Gulch...is one of the richest paying claims in the county [and is] worked on a larger scale each succeeding year by increased facilities, and all the latest improvements for hydraulic mining.[39]"

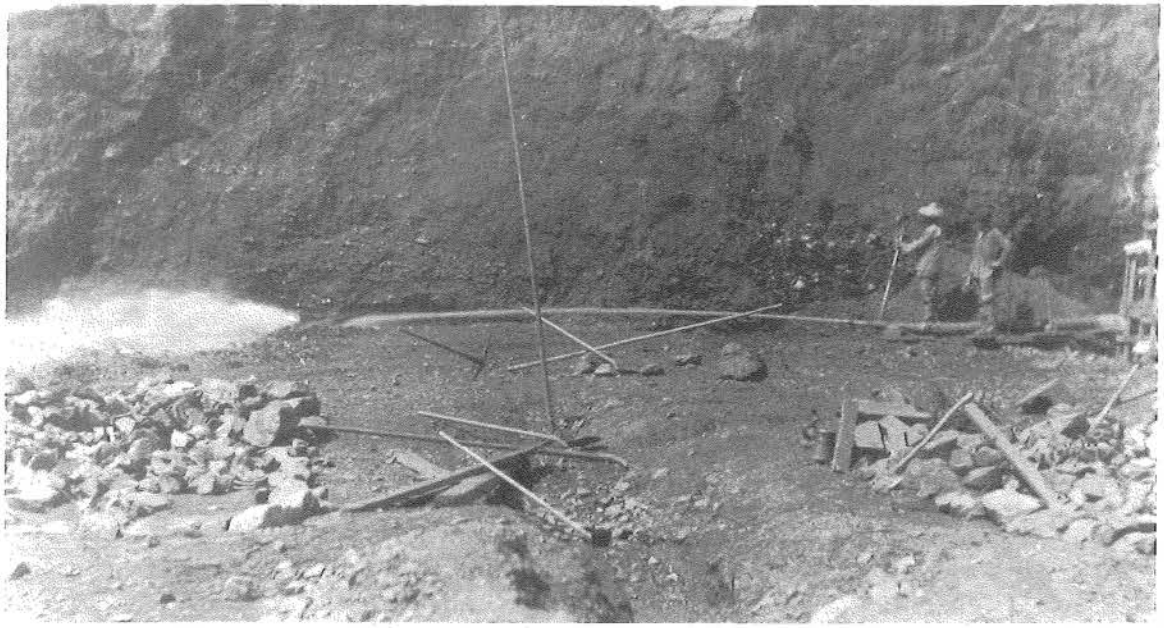
Initially the Chinese used a tail race to dispose of their tailings and waste water, but eventually the debris encroached on some orchard land. In response the company constructed a long flume, built several feet above the ground and supported by heavy framework, to carry the tailings to Yreka Creek. The *Journal* described it as "one of the largest and finest flumes in the country" and felt that the "Chinese Company must be taking out good pay to justify this undertaking."[40]

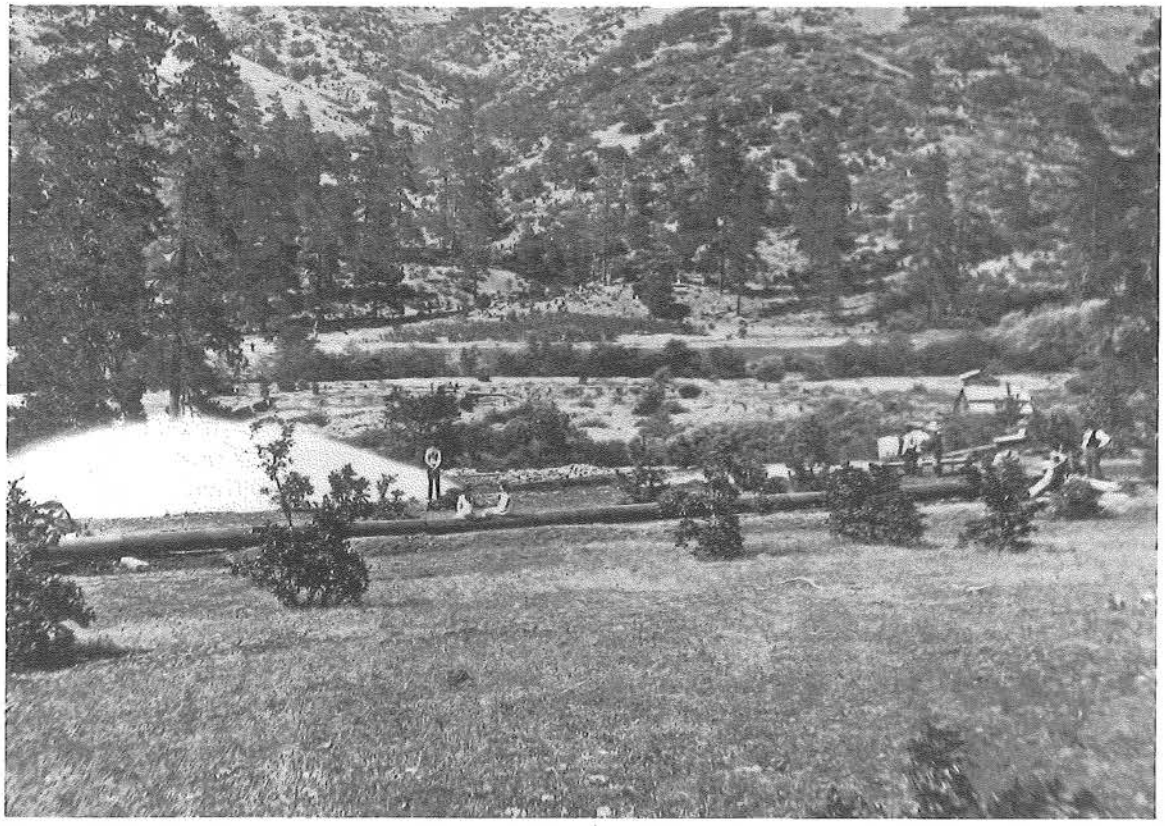
In the summer of 1880 the company purchased the Knapp claim which gave them enough ground for several years more work. About the same time, it acquired the Greenhorn Ditch and began working another part of their claim which necessitated the construction of another flume. The report of the Director of the Mine for 1884 described the Chinese operations as the most extensive on Yreka Flats and estimated that the Chinese had made $400,000 since taking possession. As late as 1890, the mine produced $6,000 for a run of two months. The Chinese had abandoned the mine by 1892.[41]

The Chinese had mined only the "pay-gravel" streaks and had not gone through the cement to the bedrock. This cement had paid well in many sections of California. In fact, the gravel under the cement near the bedrock often proved the richest of all. As a result in 1892, the Ballarat Mining Company acquired the abandoned Chinese mine, cut through the hardpan, or cement, and found rich gravel. This is just one instance where a white company took over a Chinese claim and worked it successfully; just the reverse of the often-cited pattern of Chinese and white mining.[42]

The Chinese engaged in hydraulic mining in many parts of the West besides California. (Figure 10) Oregon, in particular, was the scene of considerable Chinese activity in this form of mining. Perhaps indicative of the nature of Chinese hydraulicking in Oregon during the 1870s-1880s was the Lum Sing Company's operations in the Mormon Basin. The mine was "worked by 20 Chinese through 16-inch sluices, using hydraulic hose, under 60 feet pressure and a 2-inch nozzle." In 1882, with two hydraulics, the company "cleaned up" almost $15,000.[43]

Gin Lin, a prominent Chinese mining entrepreneur, was associated with a number of hydraulic operations in southwestern Oregon. (Figure 12) Lin supposedly first worked as a contract labor broker in the United States. In 1864 he purchased a large parcel of claims along the lower Little Applegate River. Initially he worked with a single small hydraulic, yet still made over $100 a day at times. He added a second hydraulic in 1878. By 1879 he





TOP OF PAGE 86. *Fig. 10. This Chinese hydraulic operation near Hawkinsville, California is probably typical of the smaller of such operations of the 1880s and 90s. Courtesy Siskiyou Historical Society.*
BOTTOM. *Fig. 11. This view of Gin Lin's Little Applegate hydraulic mining operation shows the hydraulic pipe leading down to one of his "Little Giant" nozzles. Courtesy Southern Oregon Historical Society.*
TOP OF PAGE 87. *Fig. 12. Gin Lin of Jacksonville, Oregon was probably one of the best-known Chinese mining entrepreneurs in Oregon, and perhaps in the West. Even local newspapers, if grudgingly, respected his initiative and business acumen. He maintained a good relationship with the white community by employing a few whites in his claims and by curtailing his operations so local farmers could use the water for irrigating. Courtesy Southern Oregon Historical Society.*
BOTTOM. *Fig. 13. Peter Lum, a well-known Chinese miner in the Wildhorse Creek area of British Columbia operated a hydraulic mining during this century. Courtesy Provincial Archives of British Columbia.*

had about twenty men and two Little Giants at work and in 1881 arranged to add a third one. Gin had his hydraulic pipe made locally and obtained the hydraulic nozzles from California. He was one of the first mine operators of any nationality in the area to adopt the Little Giant. China Bow, another Chinese boss, brought Lin's hydraulic equipment from Crescent City via pack train.[44]

Local newspapers commonly noted how successfully the mine operated and the large cleanups it yielded. In April 1880, for example, Gin made a cleanup of over $2,000 for about a twenty-day run. Such production led the *Oregon Sentinel* to proclaim "That "heathen" has one of the best mines in Jackson county," and the *Democratic Times* to claim Gin has "some of the best diggings in Southern Oregon." Gin Lin normally cleaned up every ten to twenty-four days, but after someone tried to rob his sluices he decided to do it more frequently. Gin even armed his workmen to discourage another such attempt.[45]

His success on the Little Applegate prompted Gin to expand his area of operation. In August 1879 he prospected an area on Palmer Creek and subsequently purchased it from the Palmer Creek Mining Company. After working it for a season, he decided to improve his water supply by constructing a seven-mile-long ditch. He used fifteen to twenty Chinese in its construction. In 1885 Gin again decided to acquire another mine and that spring along with "other Chinese mining experts" examined the English Company mines at Galice Creek. He purchased those mines the following fall.[46]

Chinese and the Sawyer Decision

Hydraulic mining in California created huge amounts of tailings which were piled nearby or dumped into adjacent streams. Winter rains carried much of this mining debris down into the Sacramento Valley where the debris covered and destroyed thousands of acres of valuable farmland. After a series of bitter suits between 1881-1884, the farmers of this region finally succeeded in curtailing the dumping of tailings into the streams with the Sawyer Decision. This decision effectively curtailed hydraulicking in much of California. However, many of the mines were illegally operated under leases obtained by the Chinese who "through recourse to their peculiar methods, manage to escape arrest, or, if arrested, manage, by these same methods, to keep their leased claims, and also those they purchase, running all the same."[47] The *Transcript* described one such method in 1887.

"The Chinamen, so we learn from an intelligent Mongolian, are devising ways and means of making Yuba county disgusted with arresting Chinese for hydraulicking...The plan under consideration, and Chinamen being plenty, is to set twenty or thirty Mongolians to work on the same claims and if arrested they will refuse to pay any fine imposed upon them. In that event they would be sent to the county jail. After that is done they will send a still larger number of their countrymen to work the claim, and as fast as they are taken to Marysville a new crew will be on hand ready to take their places. They think they can flood the Marysville jail, and in the end bankrupt Yuba county."[48]

Reports, both true and false, of Chinese violations of the Sawyer Decision are scattered through California papers in the 1880s.[49] An example of the latter appeared in the *Oroville Mercury* in June 29, 1883:

"Just across the river and a little below town, Chinamen have turned loose against the bank about 500 inches of water, using a hydraulic "Chief" with a three inch nozzle, and the gravel is flying in all directions. They are mining in the Powers claims, and it is said they are doing well. Powers himself was compelled to stop mining there through fear of an injunction; but the Chinamen go ahead with impunity, though they are putting two tons of gravel into the river where Powers put one. In a little while they will have a complete dam of tailings clear across the river."[50]

Subsequently, the following letter from Jenkin Morgan appeared in the *Mercury*.

"I am now the owner of the property mentioned, and

have been in possession thereof since December 9th, 1882. You have been grossly misinformed in the premises, and having committed an error which has found its way into many other papers, and one which is liable to cause litigation, I trust you will make due and proper correction. There has not been a monitor or chief of any kind used on the premises since I took possession; nor has any stream of 500 inches of water been turned loose against the bank. No mining has been done thereon, except what is known as ground sluicing. Only one company is working, and they are mining in the style last named, and the small amount of earth they move is deposited on my own land, and does not find its way into Feather river, and no damage is being done or threatened to any one. Upon taking possession I forbid any hydraulic mining and do not intend to allow any."[51]

When the Sawyer Decision curtailed hydraulicking in much of the central Sierra Nevada, some used it as an opportunity to rekindle the anti-Chinese movement. One writer in 1886 claimed that the small claims, which were mostly owned by poor men, and who employed white labor, had generally shut down and obeyed the law. In contrast he alleged that the large claims, which were owned by rich men or companies, did the most damage, and employed Chinamen and Portugese, continued to work.[52] Two years later, W. H. Lee, an agent of the Anti-Debris Association purported that:

"Fully one-half or more of the hydraulic mines now in operation are worked by Chinamen, but the mines are generally owned by white men, who lease them for a certain amount of gold taken out, and as all Chinamen are similar in motion, form, face and clothing, their identity becomes more difficult. In instances where Chinamen have been detected hydraulicking in one mine, they have changed to another, and all Chinamen thus engaged seem to be in copartnership."[53]

Undoubtedly, the Chinese, like some whites, did operate some hydraulic mines illegally. Some Chinese mining companies, likewise, continued to hydraulic legally by constructing debris dams.[54] The Sawyer Decision did not actually ban hydraulic mining, only the disposal of tailings by dumping them into streams. The Chinese, who operated the Omega claim in Washington Township, California, complied with the Sawyer Decision as follows:

"To hold back the debris there is in the main outlet a timber dam 175 feet long and 18 feet high, and above this at intervals [there are] three brush dams each approximating 125 feet in length and 6 feet in height. There are two other brush dams in branches of the stream through which the tailings might otherwise escape. These structures impound the tailings effectually, and anti-miners who have been there to observe the operation cannot help admitting it."[55]

The Chinese continued to mine by the hydraulic method in various parts of the West into the 20th century. (Figure 13) In 1903, for instance, California contained 3000 Chinese miners. Most of them were employed by Chinese companies in the large hydraulic mines in the northern counties.[56]

Chinese use of large-scale hydraulic methods represented an extremely rapid adoption of a largely Euroamerican mining technique. Although some Chinese may have had mining experience, the mining methods that they had previously used differed substantially from hydraulicking. But while the Chinese borrowed almost wholesale the technology of hydraulic mining, they did make some modifications to that technology and added some elements of their own. The Chinese, for instance, with a long tradition of irrigated agriculture possessed skills applicable to water diversion and storage, something essential for hydraulic mining. Their use of tamped-earth dams to impound and store water for hydraulicking is but one example. It's possible that they manufactured their own hydraulic cleanup nozzles, modified Euroamerican rubber boots for improved traction by driving hobnails into them, and shortened and squared the blades of Euroamerican shovels to produce "chopped" shovels for "pulling in" the auriferous gravel.[57]

Conclusion

The historical record clearly refutes the idea that the Chinese were incapable of large-scale mining. They had an important and long-lasting role in hydraulic mining in the West. The Chinese involvement in hydraulicking took many forms. The tremendous supplies of water demanded by hydraulic mining required the construction of an elaborate system of reservoirs, flumes, canals, and ditches. Hydraulicking produced huge amounts of tailings, sometimes disposed of into adjacent canyons or valleys through construction of bedrock tunnels. Great numbers of Chinese often worked in the construction of such projects. White mining companies sometimes employed Chinese laborers to carry out the basic unskilled labor of their hydraulic mines. Moreover, the Chinese operated hydraulic mines themselves, sometimes quite large ones utilizing the most up-to-date equipment and methods, and producing tens of thousands of dollars worth of gold annually. The Chinese, in fact, operated the largest, most important hydraulic mines in some mining localities.

ENDNOTES

[1]A number of works on Chinese mining mention their involvement in hydraulicking only briefly or not at all. See, for instance, Ping Chiu, "In the Mines, 1849-1880," pp. 10-39 in *Chinese Labor in California, 1850-1880* (Madison: State Historical Society of Wisconsin, 1963); David V. Du Fault, "Chinese in the Mining Camps of California 1848-1870," *Historical Society of Southern California*, 44(June 1959): 155-70. Randall Rohe, "After the Gold Rush: Chinese Mining in the Far West, 1850-1890," *Montana, Magazine of Western History*, 32(Autumn 1982): 2-19. A number of more recent studies provide more insight. Several works by Jeffrey M. LaLande, "Sojourners in the Oregon Siskiyous: Adaptation and Acculturation of the Chinese Miners in the Applegate Valley, California 1855-1900," MA thesis, Oregon State University, 1981, and "Sojourners in Search of Gold: Hydraulic Mining Techniques of the Chinese on the Oregon Frontier," *Journal of the Society For Industrial Archaeology* 2(1985): 29-52 provide a detailed look at Chinese hydraulicking at a specific location. Randall Rohe, "Hydraulicking in the American West: The Development and Diffusion of a Mining Technique," *Montana: Magazine of Western History* 35(Spring 1985): 18-35 [provides a brief overview of Chinese hydraulicking as part of a larger study of hydraulic mining in the West. This study builds on and expands these previous studies.

[2]On the origin and development of hydraulic mining see: Robert L. Kelley, "Forgotten Giant: The Hydraulic Gold Mining Industry in California," *Pacific Historical Review*, 23(April 1954): 343-56; Phillip Ross May, *Origin of Hydraulic Mining in California* (Oakland: Holmes, 1970); Rohe, "Hydraulicking in the American West," 18-35.

[3]Chiu, op. cit., 15; J. Ross Browne, *Resources of the Pacific Slope* (New York: D. Appleton, 1869), 200. *Butte Record*, 5May1855, 8August1874; *Alta California*, 4August1857, 23August1857; *Trinity Journal*, 21March1874, 23May1875, 27September1879, 20December1879; *Rogue River Courier*, 30July1886, 1October1886; *Ashland Tidings*, 21September 1876, 5October1887, 4January1878; *Idaho Signal*, 16November1872; *Helena Independent*, 19February1875; Nevada City *Daily Transcript*, 1 December 1870, 21July1874, 15September 1880; *Democratic Times* (Jacksonville), 22October1875, 20September1878, 8November1875, 14February1879, 3February1882, 15February1882, 21July1882; *Oregon Sentinel*, 10October 1887, 6February1878; *Yreka Journal*, 29July1874, 2June1875, 14June1875, 19July1876, 2June1877, 4August1880; *Marysville Appeal*, 18October1873, 31July1874, 21April1875; *Weekly Mercury*, 16June1875, 25March1881; *Mining & Scientific Press*, 1May1875, 14August1875, 4May1878, 16October1880, November1880, 2April1881, *Yreka Union*, 23October1880, 25September1880 31July1869, 14August1869, 11September1869; *Placer Herald*, 24April1875, 29May1875; *Oregon Herald*, 25July1869, 26August1869; *Crescent City Courier*, 6March1873, 5June1878, 25June1879; *Grass Valley Union*, 30December1870; *Sacramento Daily Union* 23October1873; Eric Ritter, "The Historic Archaeology of a Chinese Mining Venture Near Igo in Northern Califonia," *Cultural Resources Report Archaeology* (Redding: Bureau of Land Management, 1986), 7; Rossiter W. Raymond, Statistics of Mines and Mining..., *Ex. House Doc. No. 211*, 42d Cong. 2d Sess., serial 1513 (Washington, 1875), 159. *Ex. House Doc. No. 207*, 41st Cong., 2d Sess., serial 1424 (Washington, 1870), 229.

[4]*Nevada Weekly Gazette*, 15August1868; *Mining & Scientific Press*, 12September1868; *Nevada City Daily Transcript*, 27August1868, 3September1868; *Grass Valley Union*, 29August1868, 19November1868; *North San Juan Times*, 15July1876.

[5]*Nevada Weekly Gazette*, 23August1868, 10October1868; *North San Juan Times*, 15July1876; *Grass Valley Union*, 9September1868.

[6]*Nevada City Daily Transcript*, 13December1868, 20December1868; *Nevada Weekly Gazette*, 27March1869.

[7]*Nevada City Daily Transcript*, 3July1869; *Nevada Weekly Gazette*, 27March1869.

[8]*Mining & Scientific Press*, 29May1869, 10July1869; *Nevada City Daily Transcript*, 19May1869, 30June1869, 3July1869, 22July1869, 25August1869; *North San Juan Times*, 15July1876.

[9]*Nevada City Daily Transcript*, 25August1869.

[10]Ibid., 16December1869, 27July1870; *Grass Valley Union*, 13July1870.

[11]*Nevada City Daily Transcript*, 14May1872, 26June1872, 15August1872, *San Francisco Evening Bulletin*, 20October1871; *North San Juan Times*, 15July1876.

[12]*Nevada City Daily Transcript*, 1November1872.

[13]Ibid., 30November1872.

[14]Ibid., 17June1874, 21July1874, 9April1876; *San Francisco Evening Bulletin*, 27April1875, 11April1876, 3January1877; *Mining & Scientific Press*, 19June1875; *Weekly Mercury*, 20December1876; *Marysville Appeal*, 18November1873.

[15]*Democratic Times*, 5September1879; *Oregon Sentinel*, 27July1877, 22August1877, 29August1877, 3October1877, 14November1877; *Oregonian*, 20July1877; *Ashland Tidings*, 29March1894; *Yreka Union*, 21July1877; *Mining & Scientific Press*, 17November1877.

[16]*Democratic Times*, 5September1879; *Rogue River Courier*, 23July1886, 1October1886; *Sacramento Union*, 22March1875; *Yreka Journal*, 2August1872, 26December1874, 17March1875, 10July1880; *Ashland Tidings*, 30July1886; *Alta California*, 4August1857; *Mining & Scientific Press*, 9January1875, 24June1876; *Idaho World*, 22June1869; *San Francisco Evening Bulletin*, 3August1857, 3January1877; *Idaho Signal*, 29July1869; *Weekly Mercury*, 20December1876; *Oregon Herald*, 25July1869, 26August1869; *Placer Herald*, 17January1871; Chiu, op. cit., 36-37.

[17]*Trinity Journal*, 2May1875, 23May1875, 27January1877; *Butte Record*, 5May1855; *San Francisco Evening Bulletin*, 3January1877; *Yreka Journal*, 13January1875; *Weekly Mercury*, 20December1876; *Crescent City Courier*, 2January1875; *Nevada City Daily Transcript*, 21July1874, 29November1874; *Placer Herald*, 12June1875; Rossiter W. Raymond, "Statistics of Mines and Mining...," 42d Cong. 1st Sess. House Ex. Doc. 10, serial 1470, (Washington, 1871), 4.

[18]California State Mining Bureau, *Eighth Annual Report of the State Mineralogist*, (San Francisco, 1888), p. 610; *Nevada City Daily Transcript*, 23February1878, 23October1885; *Mining & Scientific Press*, 11November1876, 28April1877; *Placer Herald*, 24April1875, 29May1875; *Trinity Journal*, 20September1873; *Yreka Journal*, 10June1869, 24June1869, 9September1869.

[19]*Mining and Scientific Press*, 18April1874, 2March1878; *North San Juan Times*, 7October1876; *Butte Record*, 8January1876; Chiu, op. *cit.* 36.

[20]Ibid., 37; Taliesin Evans, "Hydraulic Mining in California," *Century Magazine*, vol. 25 (January 1883), p. 335; California State Mining Bureau, *Tenth Annual Report of the State Mineralogist*, (San Francisco, 1890), p. 483. *Nevada Weekly Gazette*, 15January 1870, 10July1881; *Calaveras Chronicle*, 14February1874.

[21]*Nevada Weekly Gazette*, 15January1870; *Mining and Scientific Press*, 22January1870; *Nevada City Daily Transcript*, 12March1872; *Mountain Messenger*, 22June1872.

[22]*North San Juan Times*, 15May1875; *San Francisco Evening Bulletin*, 27May1875, 27June1878, 19May1878; *Mining and Scientific Press*, 22May1875, 29May1875, 17May1879, 3July1880; *Nevada City Daily Transcript*, 16May1875, 21February1877, 29June1878, 23March1880, 14July1880, 18May1882; *Crescent City Courier*, 17October1874, 16July1879, 25July1879; *Nevada Weekly Gazette*, 3July1869, 15January1870; *Yreka Journal*, 28October1869, 28October1874, 10July1880, 7February1896; *Del Norte Record*, 10July 1880; *Sacramento Union*, 13February1875; *Weekly Mercury*, 7April1876; California State Mining Bureau, *Eighth Annual Report of the State Mineralogist*, (San Francisco, 1888), 611.

[23]*San Francisco Evening Bulletin*, 4November1879; H.C. Burchard, "Report of the Director of the Mint..., 47th Cong., 2d Sess., House Ex. Doc. No. 106, serial 2113 (Washington, 1883), 41, 187; 48th Cong., 1st Sess., House Ex. Doc. No. 177, serial 2211 (Washington 1884), 214; *Del Norte Record*, 28July1883; Baker City Weekly Herald, 21July1875; California State Mining Bureau, *Eleventh Annual Report of the State Mineralogist*, (San Francisco, 1893), 443.

[24]*Nevada City Daily Transcript*, 4April1880; Chiu, op.cit., 35; Du Fault, op. cit., 161; Rodman W. Paul, *California Gold* (Lincoln: University of Nebraska Press, 1947), 351; *Weekly Independent* (Deer Lodge), 8June1872; Raymond, op. cit., (1871), 5; California State Mining Bureau, *Eighth Annual Report of the State Mineralogist* (San Francisco, 1888), 596, 599, 602, 607, 614.

[25] *Weekly Mercury*, 15November1878; *Nevada City Daily Transcript*, 19July1881, 9May1882, 6December1882; *Report of the Royal Commission on Chinese Immigration* (Ottawa, 1885), xxix, 294; *Butte Record*, 8January1876; *North San Juan Times*, 15April1876; *Nevada City Herald*, 25May1878.

[26]*Alta California*, 29June1863; John S. Hittell, *The Resources of California* (San Francisco, 1867), 41; *Yreka Journal*, 17April1868, 11December1868; Raymond, op. cit., (1871), 139, 188, 206; *Trinity Journal*, 24December1870; *Idaho World*, 4May1877, 13March 1877, 19March1878, 9April1878; *Ashland Tidings*, 29March1878; *New North West*, 27June1874; *Fairplay Flume*, 26June1884, 17July 1884; *Idaho Avalanche*, 19May1873; *Rogue River Courier*, 12November1886.

[27]Rohe, "Hydraulicking in the American West...," op. cit.,. 22-23.

[28]Chiu, op. cit., 31; Burchard, op. cit., (1883), 185; *Trinity Journal*, 27January1877; *Mining and Scientific Press*, 13April1872, 19May1877, 7August1880, 14January 1882; H.C. Burchard, "Report of the Director of the Mint...," 48th Cong., 2d Sess., House Ex. Doc. No. 268, (Washington, 1885), 88; *Nevada City Daily Transcript*, 4February1869, 7February1881; *Dutch Flat Forum*, 10May1877; *Elko Free Press*, 25April1884; Waldemar Lindgren, "The Gold Belt of the Blue Mountains of Oregon," *U.S.G.S. 22d Annual Report, 1900-01. Pt. 2.* (Washington, 1901), 657, 717; *Helena Weekly Independent*, 25May1876; *Weekly Independent* (Deer Lodge), 3July1873; *Daily Standard* (Victoria, B.C.), 26August1873; *British Colonist*, 19June1870.

[29]California State Mining Bureau, *Eighth Annual Report of the State Mineralogist* (San Francisco, 1888), 219, 598-603; *Tenth Annual Report of the State Mineralogist* (San Francisco, 1890), 701; *Twelfth Annual Report of the State Mineralogist* (San Francisco, 1894), 280-81, 286, 288-89, 290-93, 309; *Thirteenth Annual Report of the State Mineralogist* (San Francisco, 1896), 360, 398-99, 403, 412, 418, 429-30, 453; *Mining and Scientific Press*, 8May1880; *Trinity Journal*, 31January1891, 25February1893, 12September 1896; *Yreka Journal*, 12February1897, 16February1897, 23February 1897; James P. Kimbal, "Report of the Director of the Mine...," 49th Cong., 2d Sess., *House Ex. Doc. No. 200*, serial 2484, (Washington, 1887), 153; *San Francisco Evening Bulletin*, 21November 1876; *Nevada City Daily Transcript*, 4February1887; *Butte Record*, 18November1876; *Weekly Bedrock Democrat*, 1April1889; *Ashland Tidings*, 5December1885, 19March1886, 25June1886.

[30]California State Mining Bureau, *Eighth Annual Report of the State Mineralogist* (San Francisco, 1888), 219, 595, 598-601, 603, 618; *Twelfth Annual Report of the State Mineralogist* (San Francisco, 1894), 288-89, 309; *Thirteenth Annual Report of the State Mineralogist* (San Francisco, 1896), 360, 388, 398-99, 403, 412, 429-30, 451, 453, 461, 463; *Yreka Journal*, 14February1896, 16February1897, 23February1897; *Mining and Scientific Press*, 13April1872, 14January1882; *Scott Valley News*, 30March1895; *Nevada City Daily Transcript*, 7February1883; *Trinity Journal*, 25February1893, 12September1896.

[31]*Nevada City Daily Transcript*, 7January1869, 25June1876.

[32]Ibid., 5September1878.

[33]Ibid.

[34]H.C. Burchard, "Report of the Director of the Mint...," 46th Cong., 3d Sess., *House Ex. Doc. No. 99*, serial 1978, (Washington, 1881), 62; Ibid., (Washington, 1884), 191; *Mining and Scientific Press*, 1January1881, 5March1881, 26March1881; *Nevada City Daily Transcript*, 11August1880, 16September1880, 20March1881, 26February1881.

[35] *Yreka Journal*, 17April1868.

[36]Ibid., 11December1868.

[37]*Mining and Scientific Press*, 15April1876; *Yreka Journal*, 12March 1869, 17February1870, 5April1876, 18March1874, 24June1874, 28October1874.

[38] *Yreka Journal*, 16September1874, 28October1874; *Trinity Union*, 11July1874.

[39] *Yreka Journal*, 28October1874.

[40]Ibid., 16September1874, 17October1877, 28November1877.

[41]Ibid.,17March1880, 21April1880, 15September1880, 20March1886, 17April1886, 30April1890, 25June1890, 2March1892; Burchard, op.cit., (1883), 158.

[42].*San Francisco Evening Bulletin*, 14July1879; *Yreka Journal*, 2March1892, 13November1896, 18December1896, 12November 1897, 18December1897; *Coeur d'Alene Press*, 14August1897.

[43]Burchard, op. cit., (1883), 184.

[44]LaLande, "Sojourners in the Oregon Siskiyous...," op. cit., 31; *Democratic Times*, 23August1878, 8November1878, 6December 1878, 19September1879, 19December1879, 25February1881, 25December1885; *Ashland Tidings*, 29March1878; *Oregon Sentinel*, 30October1878; Chuck Sweet, "Gin Lin and the Mountain of Gold," *Table Rock Sentinel* (December 1987), 6. For more detail on the operations of Gin Lin see LeLande, "Sojourners in the Oregon Siskiyous...," op. cit., and "Sojourners in Search of Gold...,"

[45]*Democratic Times*, 8March1878, 18July1879, 1August1879, 23April 1880; *Oregon Sentinel*, 3April1878, 3May1879, 7August1878, 28January1880, 28April1880; LaLande, "Sojourners in Search of Gold...," op. cit., 40.

[46]*Mining and Scientific Press*, 21May1881, 1April1882; *Democratic Times*, 1August1879, 13May1881, 3March1882, 17March1882, 29May1885, 18September1885.

[47]*Engineering and Mining Journal*, 12September1885.

[48]*Nevada City Daily Transcript*, 14May1887.

[49]Ibid., 22April1883, 29April1883, 11February1886, 25February1886, 24April1887, 30April1887, 29May1887, 1Jun31887, 10April1888; *Mining and Scientific Press*, 31August1889, 10May1890; California State Mining Bureau, *Ninth Annual Report of the State Mineralogist*, (San Francisco, 1890), 23.

[50]*Oroville Mercury*, 29June1883.

[51]Ibid., 6July1883.

[52]*Nevada City Daily Transcript*, 31December1886, 28September 1887, 11May1888.

[53]Ibid., 11May1888.

[54]Robert I. and Grace I. Slyter, *Historical Notes of Early Washington, Nevada County, California Mining District* [1974?], 103, 105.

[55]*Nevada City Daily Transcript*, 12May1887.

[56]*Mining and Scientific Press*, 11April1903.

[57]LaLande, "Sojourners in Search of Gold...," op. cit., 29, 31, 46; Laban Richard Steeves, "Chinese Gold Miners of Northeastern Oregon, 1862-1900," MA thesis, University of Oregon, 1984, 104, 127, 140-42.