

# The Donner Summit

# Heirloom



History and stories of the Donner Summit Historical Society and the most historically significant square mile in California.

July 2024 issue #191

## Tunnel 6 Details

Tunnel 6 was an engineering marvel of the 19<sup>th</sup> Century. Granite is one of the hardest rocks on the planet and the Chinese railroad workers blasted and dug their way through it to finish the longest of the fifteen Sierra tunnels of the transcontinental railroad. End to end the tunnel is 1,659 feet through solid granite the whole way. The granite is so solid that no timber shoring was needed to prevent collapse. Work went on for two years at, literally, inches a day before the first train went through it. Then there was tremendous celebration.

The [Heirloom](#) has focused on Tunnel 6 many times about various aspects of it (check out our article index on any [Heirloom](#) page on our website) and also did a series from May to September in 2012. In addition the DSHS has produced a popular Tunnel 6 brochure (available for download off the brochure page on our website [donnersummit-historical-society.org](http://donnersummit-historical-society.org)), in

summers at the Lamson Cashion Donner Summit Hub (at

the top of the pass) at Nancy O Glass in Soda Springs, at the Donner Memorial State Park, the Welcome Center in Truckee, or at some other purveyors of fine historical documentation. We

also did several exhibits which are also on our website but too large for downloading.

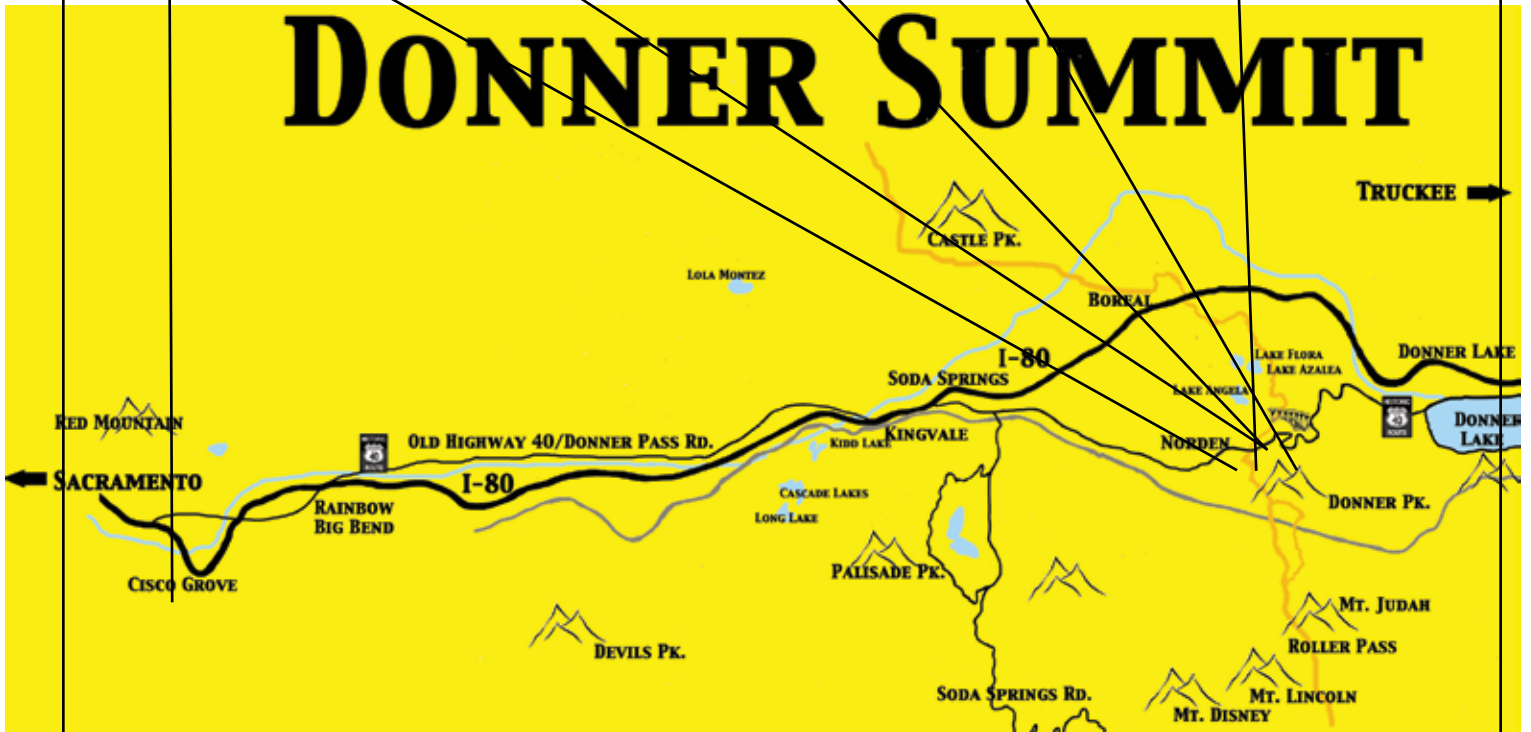


We thought we'd covered every aspect of the tunnel except for some of the questions people, especially railroad aficionados, ask about the details. Then some of our friends at the Truckee Donner Historical Society sent our research department an article, "The Central Pacific Railroad's Summit Tunnel" by Chuck Spinks. He was clearly into detail that we felt sure the railroad buffs would want. That sent us into our picture archives for the pictures that follow as well as our library for some 19<sup>th</sup> Century writing like the 1870 "Tunnels of the Pacific Railroad" by John Gillis who was the chief engineer for the tunnels, or "The Mountains Overcome," a [Sacramento Daily Union](#) article in December 1867.

It's hard for us to imagine what a big deal Tunnel 6, and so, the transcontinental railroad,

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## Finding Your Way Through Donner Summit History

We're closing in on two hundred issues of the Heirloom: thousands of pages, thousands of pictures, and hundreds of subjects. You've probably begun to realize that you cannot keep all the history in your head. Even if you remember it all, retrieval is difficult.

Fortunately one of the choices we made back at the birth of the DSHS was to index all our Heirloom articles and pictures. We've diligently kept up the indices so that they are many pages long, full of alphabetized titles and subjects. Go to our website and to any of the Heirloom pages (one for each year) and you'll find links to the Heirloom indices.

One of the strengths of the DSHS is the incomparable historical photograph collection. The collection is thousands of pictures and again the sheer number makes finding anything in particular, difficult. Avoid the long URL by going to our website and clicking on the "photographs" link and then to the "historic photo collection link." A third link, to the FlickrR URL will take you to those thousands of searchable historical photographs of Donner Summit. Have fun.

Find us on the the DSHS YouTube channel <https://www.youtube.com/channel/UCJenAxPCb47Y14agmVGI-zA>

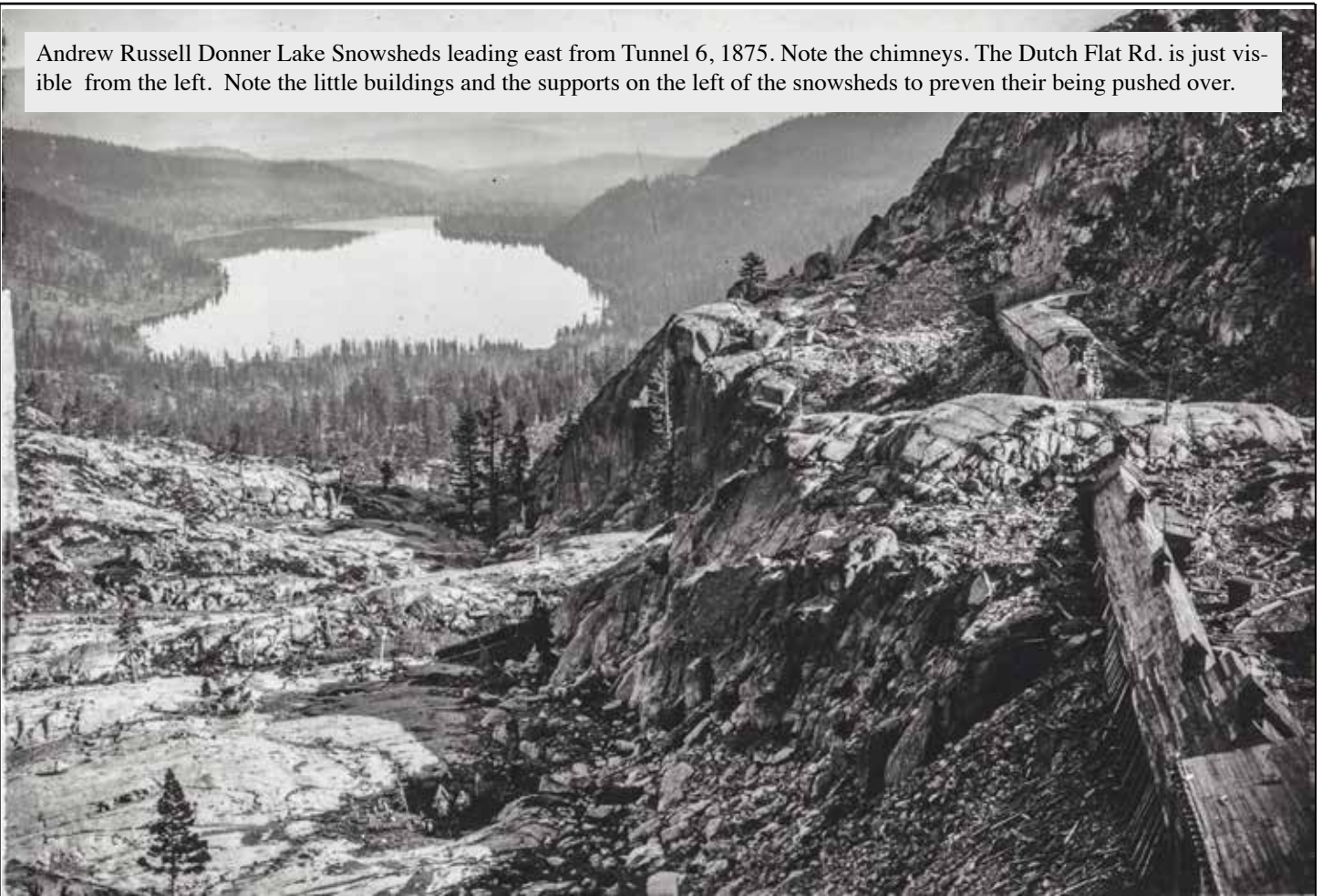
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Andrew Russell Donner Lake Snowsheds leading east from Tunnel 6, 1875. Note the chimneys. The Dutch Flat Rd. is just visible from the left. Note the little buildings and the supports on the left of the snowsheds to prevent their being pushed over.



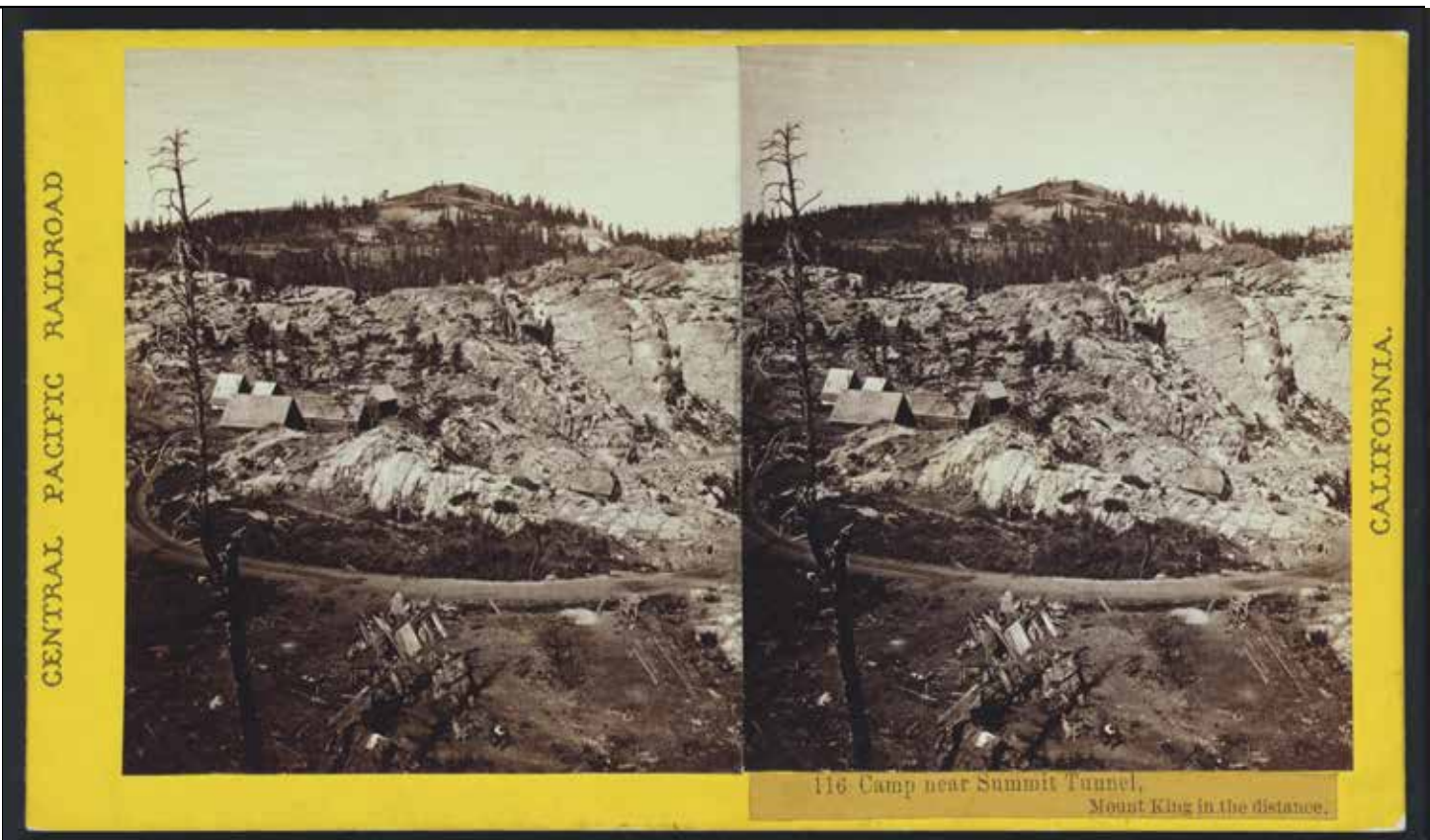
was. [The Sacramento Daily Union](#) (12/2/1867) trumpeted,

“The telegram which, starting from the summit of the Sierras on Saturday afternoon last, flashed across the continent to the shores of the Atlantic and underneath that ocean to Europe, announced an event... the track of the Central Pacific Railroad reached the summit of its grade... The flag of the Union was immediately planted near the spot, fitly signifying that an event had occurred which, more than any other, assures the continued unity of this great republic. For the completion of a railroad across the Sierras removes the only obstacle which has been regarded as insuperable to a vital connection between the Atlantic and Pacific coasts. For California it means much, but it means more for the country at large and for mankind. The people of this continent are no longer severed by mountain barriers which would make of them two nations, diverse and hostile. We may now make certain of a common national life that shall secure not only our own best interests, but the largest and noblest influence upon the nations, from whom, on either hand, we are parted by an ocean, and whose destinies we must seriously affect.”

First, let's get this out of the way. If you have not visited Tun-

nel 6, the engineering marvel of the 19<sup>th</sup> Century, you really need to. Bring along a jacket because even on a warm day it can be chilly as the wind blows through the tunnel. Bring along a flashlight too. Imagine working at the rock face with your teammates six days a week for two years. It was pretty dark working there with just candle or lantern light. Here you might want to put your hand over the flashlight light to get an idea of what working in the near dark was like. Continuing with the imagining, there was rock dust and black powder dust in the air from the last blasts. It's cold, especially in winter. At the end of your eight-hour shift (in the tunnels – shifts were twelve hours a day outside) you can look forward to walking through tunnels in the snow to your un-insulated wooden building in winter completely covered by snow. Fortunately, your group's cook has warm water for tea and even for a bath (if you were Chinese – forget that if you were white). It must have been miserable and of course if you were Chinese you were paid less than the white workers. We'll not cover the Chinese here since the [Heirloom](#) (see the article index) and our website's exhibits page have done that including in a series of articles. There's also a "Chinese Railroad Workers Heroes of the Transcontinental Railroad" brochure on our website.

As you go through the tunnel and get to what looks to be



Alfred A. Hart 116 Camp Near Summit Tunnel Mt. Kind in the distance. Summit Camp was the longest lasting of the many worker camps along the transcontinental railroad. The Dutch Flat Rd. crosses in the foreground. Tunnel 6 runs left to right under the ridge behind the buildings. Mt. King is today's Donner Ski Ranch.

halfway (the entrances at both ends look to be about the same size) look up with your flashlight. You are at the bottom of the central shaft. This provided access for workers to work at two interior faces so that work went from the outside in, from the west and east entrances, and the from the inside out, from the two faces at the bottom of the shaft.

Here you can easily see toolmarks of the Chinese railroad workers from more than one hundred fifty years ago. Look at the north wall with your flashlight and find the drill bores – two and a half inches in diameter for black powder (see right). Imagine, eight hours a day six days a week pounding flat bottomed drill bits into the granite with eight pound sledge hammers in the near dark and the cold. The workers were in teams of three. One man held the drill bit and his partners hit with the sledge hammers. Every two hits the bit was rotated ninety degrees. Bam bam, quarter turn. Bam bam quarter turn all day long six days a week for two years. Those Chinese were amazing. Tunnel 6 is amazing.

With that out of the way what about some of the details of building the tunnel.

Let's put the endeavor in context and see what was on their minds in 1867.

It was a race. The Union Pacific was building from the east and the Central Pacific was building from the west. At some point they would meet and the transcontinental railroad would be done. California's isolation would be over. The Union Pacific was collecting money easily for laying contiguous miles of track. The Central Pacific was stuck in the Sierra. Fifteen tunnels were needed, through solid Sierra granite, to get over the mountains. The Central Pacific was going nowhere





Replicas of drill bits used by Chinese railroad workers. They came in various lengths depending on how deep the drill hole was. The ones at right are three feet long. Drill bits at the Nevada State Railroad Museum were used to make the copies by Auburn Iron Works



except inches a day. So they were tunneling from four faces at once. Supplies came by train to Cisco and were unloaded and then loaded onto freight wagons or sleighs for the trip to the summit on the Dutch Flat Donner Lake Wagon Rd. (below right)

Working year round on Donner Summit is an issue. Consider the difficulties for the workers beyond accident, disease, and winter cold. John Gillis, the engineer in charge of building the summit tunnels described the other issues in an 1870 speech. There were forty-four storms the first full winter of tunnel construction. One storm lasted two weeks. Snowfall from the storm ranged up to ten feet. The storms were “grand” said Gillis. The entrance tunnel through the snow to Tunnel 6 had to be lengthened by fifty feet to reach daylight. Huge drifts piled up. Worker ran out of raw materials because sleighs couldn’t get through the snow. Workers would try to keep access clear anyway. Heavy ox sleds were used for transport but the oxen would

“sink to his waist or shoulders. Into this the oxen would flounder, and when they lay down, worn out, be roused by the summary process of twisting their tails. I saw three in one team so fortunate as to have had theirs twisted clear off, none left to be bothered with.”

The men weren’t treated much better. During storms they were constantly shoveling. Then there were avalanches. Buildings were crushed. People were killed. The tunnels workers dug for access to the work faces had to be repeatedly re dug because the cuts leading to the tunnels filled with snow and the snow tunnel ceilings kept settling and

so needed continual enlarging. Gillis measured one snow bank at twenty-five feet high. The snow lasted until July. “About thirty feet from our windows was a large warehouse; this was often hidden completely by the furious torrent of almost solid snow that swept through the gorge.”

That was outside.

Inside, one of the first questions from railroad buffs who visit Tunnel 6 and the other summit tunnels is how did the engineers do the surveying of the tunnels so that the ends would meet. Gillis said,

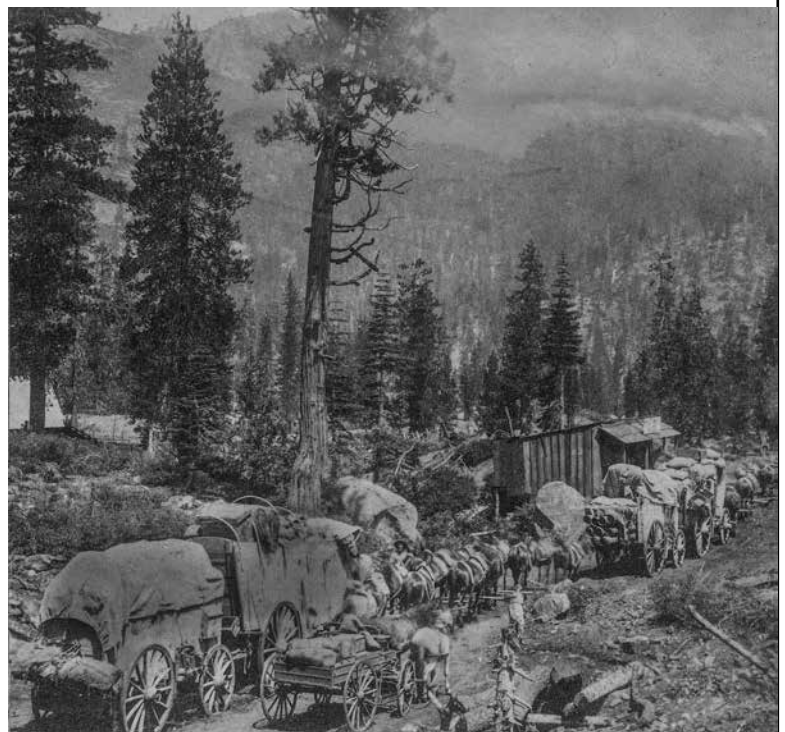
“As soon as each heading became sufficiently advanced, the centre line was secured, generally by small holes drilled in the roof, with wooden plugs and tacks. These points were placed as far apart as length excavated would permit..”

Work was made more difficult because it was done by candlelight and there were many timbers in the way of running the lines.

That was in the tunnels. Outside running the lines had to be done after digging cuts in the snow.

Tunnel 6 went through solid granite which saved some work because no support was necessary to prevent collapse as would have been needed if the tunnels went through dirt.

The tunnel dimensions were 16’ x 11’ up to the bottom of



Carleton Watkins 210 freight from Cisco on the Dutch Flat Donner Lake Wagon Rd.



Chinese railroad workers breaking up rock. Note the sledge hammers and drill bits.

by train to Gold Run. There it went onto a large wagon with foot wide wheels. It took six weeks to get from Gold Run to the summit on the Dutch Flat Rd. On the way the behemoth was so large that oncoming mules had to be blindfolded because the first ones to see the thing stampeded.

The issue of nitroglycerine always comes up when we tour the tunnels. Mostly black powder was used which required drilling 2.5 inch holes. Nitroglycerine was more powerful and only required holes of 1.25 inches. Gillis said,

“Nitro-Glycerine. — This was introduced on the work early in 1867, to expedite progress of the summit tunnel. It was made on the spot by Mr.

James Howden, and used in the four headings of tunnel No. 6 from Feb. 9th, and to some extent in tunnel No. 8, but not enough to give data for comparison. After the headings of these tunnels were through, it was used in the bottoms.”

When nitroglycerine was used it increased worker progress substantially, about 74% according to Gillis. A newspaper reporter from the Sacramento Daily Union visited the summit on April 17, 1867. He reported that nitro glycerine was

the arch that was the tunnel top. Workers started at the top, at the heading, blasting out the tunnel. Once progress had been made on that part of the tunnel workers turned to the bottoms, going down to enlarge the tunnel to the sixteen foot height. Bottom work was much easier because workers were aiming down not forward or overhead. That can be seen from progress. Gillis said that workers made progress of 1.82 feet per day in the headings but 4.38 feet per day when working on the bottoms. Work on the headings went on until they broke through and then attention was turned to finishing the bottoms.

To speed things along the central shaft was built so four faces could be worked at once. It had a building built over it with a hoist and a steam engine inside. The shaft was 8'x12' and then divided into two halves. Large buckets were built to raise and lower materials. As one came up the other went down in the two halves. In the tunnels the buckets rode on tracks as they did when they got to the surface and were rolled off to dump the rock from blasting. Digging the shaft was slow too – progress was only one foot per day so that it took 85 days to excavate. That must have really frustrated those in charge. They wanted to lay rail; they wanted progress but going down didn't make forward progress. Initially a hand hoist was used to get the buckets up and down but that was slow so the fifty-foot square building (see page 12) was constructed on top for the hoisting machinery that was installed and run by a steam engine, which parenthetically had been the first locomotive in California. It was partially disassembled and taken





197. Summit Tunnel, before completion; Western Summit—altitude 7,042 feet.

Alfred A. Hart 197 Summit Tunnel before completion.

superior to black powder in more ways than explosive power. Workers could drill three two and a half foot long holes one and a quarter inches in diameter in the time that it took to make two black powder holes two and a half inches in diameter. In addition drill bits were bought by the railroad by the pound which meant nitro glycerine drill bits saved money. See the sidebar on page 8 for why the railroad went back to black powder and our August, '12 [Heirloom](#) for more about nitroglycerine.

[The Sacramento Daily Union](#) (4/19/67) describes its use, the quote found by Mr. Spinks.

"A hole two and one half feet deep, and of one and a quarter Inches In diameter, is drilled in the rock that is to be blasted, and three and a half ounces of the nitroglycerin ore placed in an appropriately shaped tin box or cartridge. On the top of the compound is placed a small copper top containing a few grains of powder. A hole is left in the cartridge to admit the fuse, connecting with the surface. The apparatus is then lowered to the bottom of the hole, and upon it a plugging of paper is first pressed down, and over that damp sand or earth is tightly rammed down until the cavity is entirely filled. The operators light the fuse and retire, and in about a minute a terrific explosion occurs. The displaced rock is lifted out in clean, large blocks by the nitro glycerine."

This produced no smoke which was much more desirable than black powder. After a black powder explosion it took time for the smoke to "scatter."

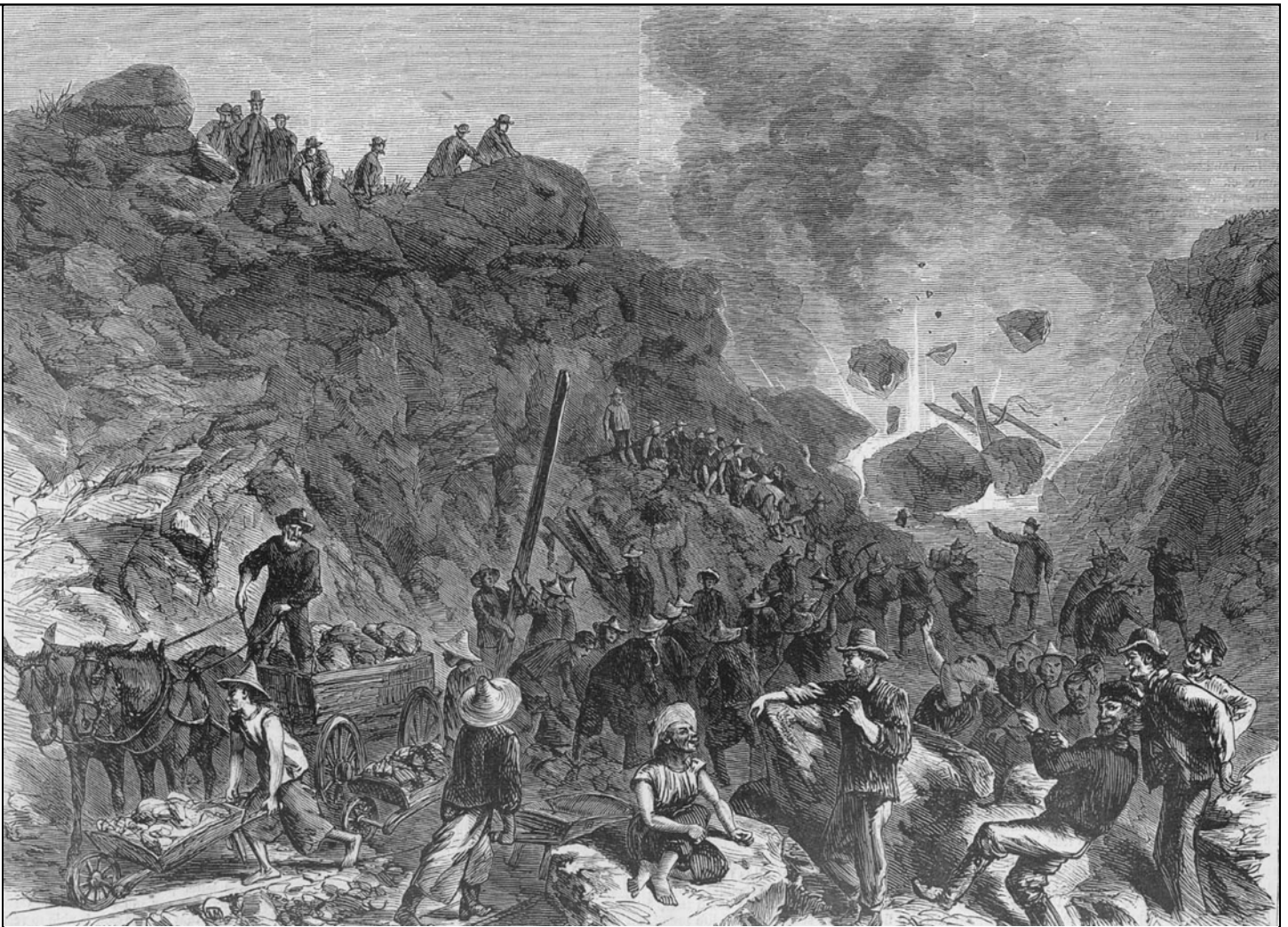
Mr. Spinks went on to say,

"The Nitro holes were 2.5 ft. deep. A plug, probably wood, was installed to keep the nitro in the tube. Black powder was inserted in the tube above the wood plug. The powder was ignited with a lit fuse, although, at the recommendation of Edwin Crocker, the Central Pacific did experiment with electric spark ignition using batteries. But it was too complicated for the work crews, so they returned to fuses. The major advantage of using electricity to fire a charge is that a number of simultaneous charges can be ignited ... with fuses only one charge at a time can be ignited."

Regardless of whether black powder or nitro glycerine was used to excavate the tunnels, imagine what it must have been like on Donner Summit as workers worked on the road between tunnels and the tunnels themselves. Explosions must have been continual in order to remove the rock.

Alonzo Delano was a social commentator of the time and he visited the summit tunnels while under construction. He left a wonderful description in "The Central Pacific Railroad or '49 and '69" printed in 1868.

"...It was a grand sight from the valley of Lake Donner, at eventide, to look up a thousand feet upon the overhanging cliffs, where the workmen were discharging their glycerine blasts. Through the gathering shades of night, immense volumes of the fire and dense clouds of smoke broke from the



Drawing from Beyond the Mississippi, 1867

Here is a nugget that few know of: Why did the Associates [The Big 4 of the CPRR] cease use of nitroglycerine? We KNOW that nitro was used beginning February 9, 1867. On May 1, 1867, Edwin Crocker noted that Tunnel 6 had but 681 feet to go. Nitro was discontinued in November, 1867. So why did the CPRR stop? Money, my friend, money. Alfred Nobel was granted a Swedish patent on Oct. 14, 1863, and an American patent on Oct. 24, 1865. Edwin Crocker, an attorney and later Supreme Court Justice for Calif. was aware of those patents, and he was concerned about patent infringements. On May 3, 1867 in a letter to Collis Huntington, he urged that Huntington pay \$500 for patent use. Charles Crocker however would have nothing to do with nitro outside of railroad construction. In the end, Charles said "Bury the stuff" and nitro use was stopped.

G J Chris Graves, Chairman,  
Committee for the protection of "What is Truth"  
in Railroad History. Newcastle, CA





Left, China Wall - no mortar, only gravity holding it all together. Right, close up of tool marks. The line of vertical marks in the rock are from the wedges pounded into the granite to split it.



mountain side, as if a mighty volcano was rending it to atoms. Huge masses of rocks and debris were rent and heaved up in the commotion; then anon came the thunders of the explosion like a lightning stroke, reverberating along the hills and canons [sic], as if the whole artillery of heaven was in play. Huge masses of rock rolled far down the steep declivity, and pieces weighing two hundred pounds were thrown a distance of a mile. Sometimes the people at the hotel, a mile from the scene of destruction, were obliged to retire to avoid the danger from the falling fragments.”

This went on twenty-four hours a day six days a week. The drawing on the previous page may not be an exaggeration. It came from a book, [Beyond the Mississippi](#) (reviewed on our website) about the wonders out west.

Remarkable as that sight and sound must have been, especially at night, China Wall (above) is another landmark of the railroad’s crossing of the summit. It’s a remarkable piece of work as all the rocks shaped by the Chinese fit together perfectly and supported trains for one hundred twenty-five years. Work your way up close (above) and you can still see the tool marks where the wedges were used to split the rock. The wall is seventy-five feet high with the whole ravine behind it filled

with the insides of the tunnels. We can imagine the construction of the wall just from looking at it but there are other details that make it more remarkable. See page 11 for pictures of the wall under construction. Snowfall stopped work on the wall as the ravine filled with snow. Gillis reported what happened after winter,

“Next spring a snow tunnel was commenced about two hundred feet down the ravine [bottom of the wall], and run in to strike the unfinished foundation. Smaller tunnels were run to quarry stone got out in fall, and a cave dug over the foundation large enough to work in. The culvert was built, and by the time it was finished the depth of snow overhead had decreased to twenty-five or thirty feet; this was excavated by a stream of water, and the retaining wall commenced.”

According to Chuck Spinks, the last heading for the summit tunnel was holed through by September 26, 1867. Removal of the bottoms was completed by November 7, 1867, and track was laid through the tunnel on November 29, 1867. The first locomotive went through on December 1, 1867. In the 4 months until the line down to Truckee was completed, passenger trains stopped at the east end of the summit tunnel on the Dutch Flat and Donner Lake Wagon Road and passengers caught a stage into Truckee. The final connection to Truckee was made at Strong’s Canyon on April 2, 1868. By this time the line below Truckee had been completed to Truckee Meadows in Nevada.



Alfred A. Hart 120 "Summit Tunnel." The wagons are on the Dutch Flat Donner Lake Wagon Rd.



Alfred A. Hart 199 E. Portal Tunnel 6

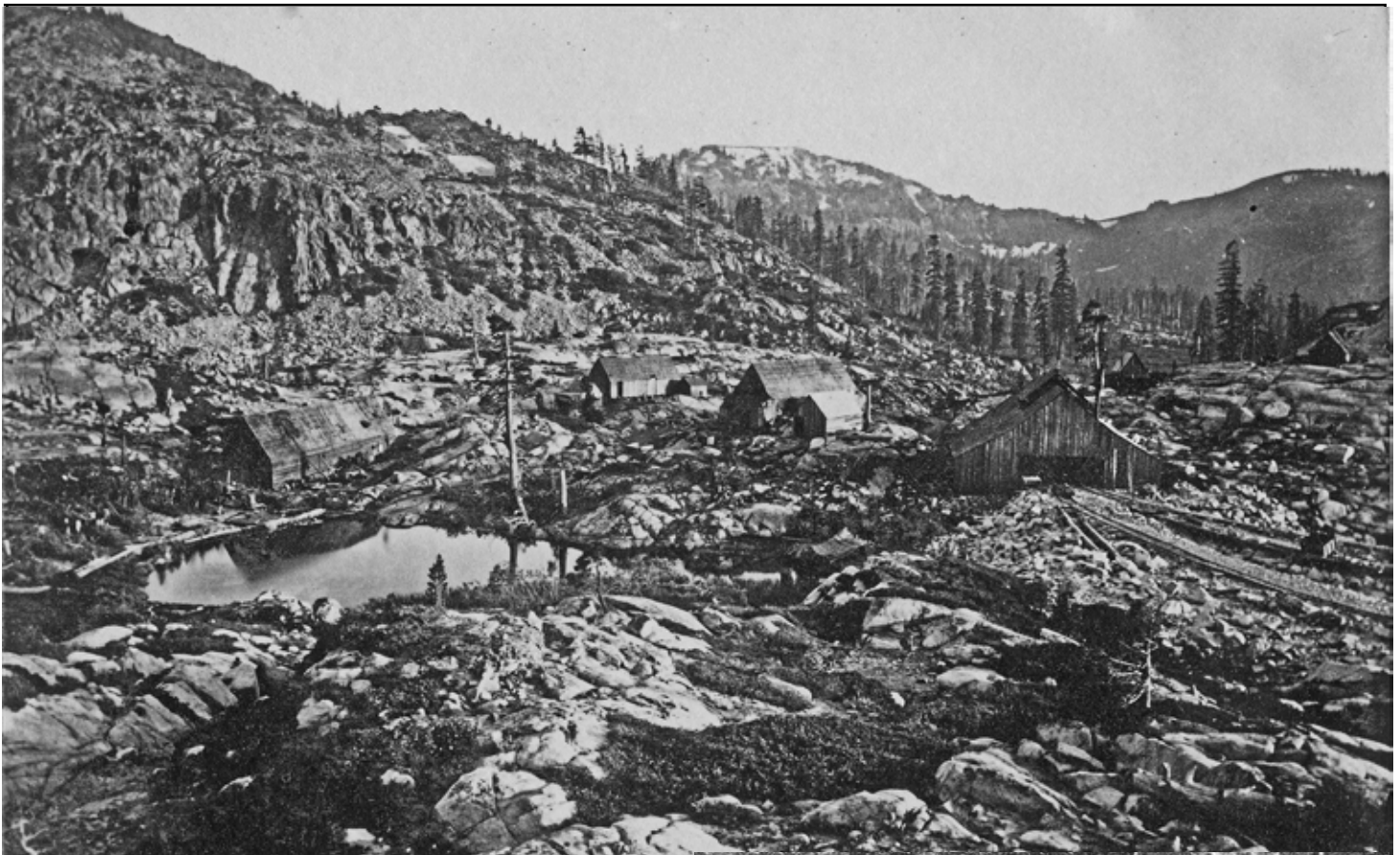


Alfred A. Hart 198 E. Portal Summit Tunnel

China Wall under construction  
An unpublished Alfred A. Hart  
photograph



Alfred A. Hart 202 E. Portal Tunnels 6 and 7 China Wall being constructed just right of center at the bottom. The black line in the background is the Dutch Flat Rd. Note the buildings and in the center the east entrance to Tunnel 7 and behind it the east entrance of Tunnel 6.



To speed progress a central shaft was excavated so workers could work not just from the outside in but the inside out from four faces. Above is Alfred A. Hart 196 Shaft House over Summit Tunnel. Note all the buildings. The inset is an enlargement of the house over the shaft. Note the rail tracks used to moved rock from the shaft to the disposal areas. The picture below right is what the spot looked like in 2020 by Art Clark.



Shaft House over Summit  
Compare to C.P.R.R. #

Shaft House over Summit Tunnel  
Compare to C.P.R.R. #196

Art's Sierra Scenes

# The First Train Over Donner Summit

Before the first train with passengers headed up over the summit, the first train with people went over in early December, 1867 with members of the legislature and officers of the railroad. Here is the story of that interesting trip. The first description of the "Grand Railway Excursion" was in the [Daily Alta California](#) newspaper on December 10, 1867. The headlines, right, give you part of the story. The prose is evocative.

Handsome invitation cards sent out by the "managers of this herculean work"

went to members of the State legislature, the press, and some prominent citizens. Whistles, bells, gongs and rattling carriages woke everyone telling them to get ready. Two locomotives were attached to thirteen railroad cars accommodating the sightseers. Sights along the way to the summit are described but we are interested in the Sierra, "bluer than the blue ocean, towered the majestic Sierras, their summits fringed with a fleecy riband, that glittered like silver in the rays of the rising sun. ..." Everyone was supposed to have one of the special invitations but more than a hundred others snuck above the train.

Apparently the train travel was like a party, "The devotees of Bacchus held high carnival in the one car, the clinking of glasses commingling with the rattling of knives and forks... huge hampers of meat and ham sandwiches, fowls, bread, crackers and delicious butter had been provided." Then there was the punch brewed by Governor Stanford himself. The two barrels provided "baffled" both the legitimate travelers and the party crashers "in their attempts to exhaust the fluids." The [Sacramento Daily Union](#) reported (12/9/67) that there were between seven and eight hundred people on the train.

The trains scaled the "fearful slopes... Up, up, still up these dizzy heights.. the clouds rolled down these giddy steps, dark and ominous.... The air suddenly became colder... rain accompanied the trains beyond Cisco... great fields of snow on the mountain sides were our Summit sentinels."

Then they "discerned the mouth of the Summit tunnel." (The [Sacramento Daily Union](#) said the train arrived at the tunnel at 2:30 which meant it had been a seven hour trip from Sacramento.) It being Don-

ner Summit "the snow began to descend in big flakes, and faster and faster it fell.

## **The Legislature on a Train --- Railway Ride to The Summit --- Novel Sights and Snow-Balling --- Condition of the Work --- Incidents by the Way ---**

Sacramento, December 9th  
"The Grand Railway Excursion".

December 10, 1867  
[Daily Alta California](#)

At the summit "for the first time since the dawn of Creation, this grand chain of mountains was now penetrated by the railway car..." The reporter marveled that California had barely been settled twenty years before but now it was a rich and populous state. "No wonder,

then, that the occasion was one of enthusiastic rejoicing. No wonder that cheers, deafening and prolonged, echoed and re-echoed along that subterranean granite chamber — cheers heard even above the screechings of the iron pilots of the train."

Into the tunnel the train went. "It was so intensely dark as to be absolutely painful. In vain the eye was strained to catch a glimpse of some object to relieve the hideous blackness. On emerging from the eastern terminus the contrast was dazzling, gorgeous. Snow, pure snow, here, there, everywhere. The earth and rocks covered, the air tilled with the flying flakes and even the stunted pines clad in a snowy mantle."

The snowstorm prevented everyone from viewing the "sublime scenery." They could just barely make out Donner Lake. No sooner had the train stopped at the entrance of tunnel 9 than "men and boys plunged into the snow and began pelting each other furiously" ("much to the demoralization of high-crowned hats and immaculate shirt-collars." [Sacramento Daily Union](#)) Windows in the train cars were broken. Ladies did not join the "amusement of the hour". Looking at all the snow it was clear that snowsheds still

had to be built. Another five miles of track had to be laid to connect what had been laid out into Nevada while the Summit tunnels were being excavated. Passenger trains would go as far as Cisco only in the spring. For now, this was the only passenger train to summit the Sierra.

### EXCURSION.

At 4 o'clock the body returned.

[Lieutenant Governor MACHIN in the chair.]

An invitation from the Central Pacific Railroad Company, to go on an excursion through tunnels and across the summit of the Sierra Nevada, on Saturday next, was, on motion of Mr. Mizner, accepted.

[Sacramento Daily Union](#)  
December 5, 1867

Having seen the summit the train whistle blew and it was time to return. Someone pulled the connecting link between two of the cars which left nine cars behind in the tunnel engulfed in "Stifling smoke" that "filled it [the tunnel] to suffocation. "Great consternation prevailed" ([Sacramento Daily Union](#)). Windows were closed but that didn't help. Then one of the excursionists discovered his watch was missing. The train was reconnected and a couple of police officers searched for the watch. Two "suspicious characters" who had gotten on the train at Cisco without tickets were discovered. They

didn't have the watch but were "put ashore at the mouth of the tunnel" and had to walk back to Cisco "thirteen miles through a blinding snowstorm." Then there was some signaling confusion, a train car mix up and a train fireman, oiling machinery, fell off the locomotive. Unhurt, he ran along behind the train trying to catch up. By 10 P.M. the train arrived back in Sacramento about fifteen hours after it had left for the "ride amongst the clouds."

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## ACROSS THE SIERRA NEVADAS THE FIRST RAILWAY PASSENGER TRAIN FROM SACRA- MENTO OVER THE MOUNTAINS

### **Shoveling a Pathway Through Monster Snow. Drifts in Midsummer - Description of Secenery Along the Route – Incidents of Trip-Accomplishment of the Grand- Est Engineering Feat Ever Attempted by Man - Etc., etc.**

Putting detail into the headlines like they did above in the 19<sup>th</sup> Century seems like a good idea. The descriptive headlines make you want to read immediately, the summary of which you're going to do now. The article was eight pages long which seems a little excessive for modern attention spans so we'll focus up the hill with a few interesting tidbits (technical historical term) along the way.

The first passenger train went over the Sierra June 20, 1868 still eleven months from the completion of the railroad. The unnamed reporter left San Francisco on the steamer Yosemite (which we last came across in the June, '23 [Heirloom](#) article about Captain Kidd.) It being June it was chilly on the Bay.

Trains didn't leave Sacramento until "6 ½ o'clock a.m." which allowed the reporter to walk around town. Oleanders were everywhere. "Huge levees" were being built around the city to prevent a return of the recent flooding. The streets had already been raised "high above their natural level by filling in." The State capitol was under construction and beginning to "form a noticeable landmark."

Leaving Sacramento the mighty Sierra Nevada looms up, like a gigantic cloud-bank, against the eastern horizon. The

mountains, for a long way upward from their base, are enveloped in a dim, blue haze, which contrasts beautifully with the snow-fields on their summits, flashing against the blue sky and lighted up by the glory of the summer morning sun.

The Sacramento Valley is a treeless plain and there are herds of horses. ". The country is poor, uncultivated, and for the most part unfenced and uninhabited." Compare that to today. The train comes to the foothills. Auburn is a pretty little village. Then there are mining camps and trading posts along the route. The railroad being a single track, the train was expecting to meet the "down train" but there had been snowslides up high which delayed it.

"Up, up, and onwards, ever climbing, steadily skywards. Through the openings in the mountains we begin to see other mountains beyond, whose peaks are covered with snow... The atmosphere is gloriously exhilarating and our spirits rise as our corporeal substance rises heavenwards."

They expected to meet another descending train at Alta but an accident had delayed it too west of Truckee. That meant passengers coming down had to take the stage up to the summit from Truckee to get to a train. They passed Cisco a "town of shanties." They passed through "continuous snow fields and immense drifts through which the [rail]road has been cut with shovels." This is late June. They reached Summit Valley. Snow banks rose high on either side of the track and shortly the "great tunnel" was reached. "Ne plus ultra [the best example of its kind] might be written on the granite walls of the great tunnel," wrote the reporter.

"A swarm of Chinamen are busy at the other end of the tunnel shoveling away the snow, which has come down in great slides, bringing with it huge granite rocks upon the track, The water pours down in torrents from numberless crevices and sears in the granite walls and roof of the long, dark, cavernous tunnel, but we struggle through on foot, and anxiously inquire after the prospect of getting through."

After a few hours the track was cleared and the train moved

slowly on. Then another slide; another stop, another slide, another stop. The roof eaves of the train cars almost scrape the snow as the train slowly goes by. "It's the closest fit imaginable." Here we see why snowsheds were needed. The ice in the tunnels hung down from the walls like stalagmites and stalactites. The summit is passed, "Words fail us to describe our sensations; we will not attempt it."

Here the train starts downhill, coasting, making no sound, to the romantic valley of the Truckee. Mountain torrents rush and roar out of the mountains. The timber is immense. Sawmills by the dozen, driven by the river, line the banks. Laborers of every nationality are cutting the forests.

"As the first through passenger train sweeps down the eastern slope of the Sierra, John [the 19th Century colloquialism for the Chinese], comprehending fully the importance of the event, loses his natural appearance of stolidity and indifference, and welcomes with the swinging of his broad brimmed hat and loud uncouth shouts, the iron horse and those he brings with him. Well may he shout! Millions of his ancestors toiled for years on years to erect against the barbarian Tartar a barrier over which he should never break: the Tartar wave broke over it, and inundated his land at a single surge. Nature erected between the East and West a barrier such as in other lands 'divides countries and makes enemies of nations, and John with his patient toil, directed

by American energy and backed by American capital, has broken it down at last, and opened over it the grander highway yet created for the march of commerce and civilization around the globe.

The whistle sounds a long shrill scream, and the train arrives at Truckee Station— Coburn's— 119 miles from Sacramento, and 5,860 feet above the sea.

"The portion of the trip between this point and Summit Valley has until this day— June 18th —been made by stages. As we pass we see the jaded stage horse looking wonderingly, and, as it seems to us, joyously at the swift-speeding train; their weary toil through mountain snows and mud is over, and now the stage men will pull down their stables and pack up their traps...."

At Reno, a town of store, hotels, saloons, gambling houses, and stables, the train comes to the end of track. "The whole population men, women, and children, rush out to meet and welcome us. Thus ends the story of the trip of the passenger train over the Sierra Nevada."

Daily Alta California  
June 20, 1868

breakthrough

## PACIFIC SLOPE INTELLIGENCE. CALIFORNIA. DAYLIGHT THROUGH THE TUNNEL.

The following item, from the Sacramento Union, will gratify the reader: The east end of the Summit tunnel is open and daylight shines through its entire length. In a few weeks the bottom will be cleaned out and the track laid. Many predicted it would require three years to accomplish what has been done in one. The first locomotive east of the Sierras is now in running order, and will immediately commence the work of track-laying. Twenty-five miles of road-bed are ready for the superstructure.

Daily Alta California  
September 2, 1867

# TRIUMPHANT COMPLETION OF THE PACIFIC RAILROAD CELEBRATION AT SACRAMENTO

....now that the mass of our people can stop to reflect upon the Grand results which has caused such vast rejoicings over the State within the past week, we shall all begin to see and feel the full value of our State, to Our Country, and to the World, the boundless good which has been achieved for us all by the Grand, Triumphant and Gloriously successful

## COMPLETION OF THE PACIFIC RAILROAD

California Farmer and Journal of Useful Sciences  
May 13, 1869



E. Portal Summit Tunnel

The company have great reason to congratulate themselves upon the monument of American engineering, energy and enterprise which their road undoubtedly is. No other great public work has met with obstacles apparently more insuperable, and none has overcome its difficulties of various kinds, with more determined perseverance ... in the East and in Europe they will fill the public mind with added respect for the practical genius of the American."

Sacramento Daily Union  
December 2, 1867

## One Last Thing

By now we've covered a lot about Tunnel 6 the attention of which Tunnel 6 certainly deserves. There is one detail that's still missing. The answer has been elusive.

As railroad workers were drilling holes more than two feet deep into which to put nitroglycerine or black powder, how did they remove the pulverized granite? As the drill bits, page 5, were pounded they would have turned the granite in the forming holes to sand. It would have had to be continually removed otherwise the "sand" would have filled the cavity and softened the drill impacts.

Workers used no machinery so there were no compressors to blow out the crushed granite. Did they use little long handled scoops?

Train buffs ask this question regularly.



# Book Review

## Crossing:

### A Chinese Family Railroad Novel

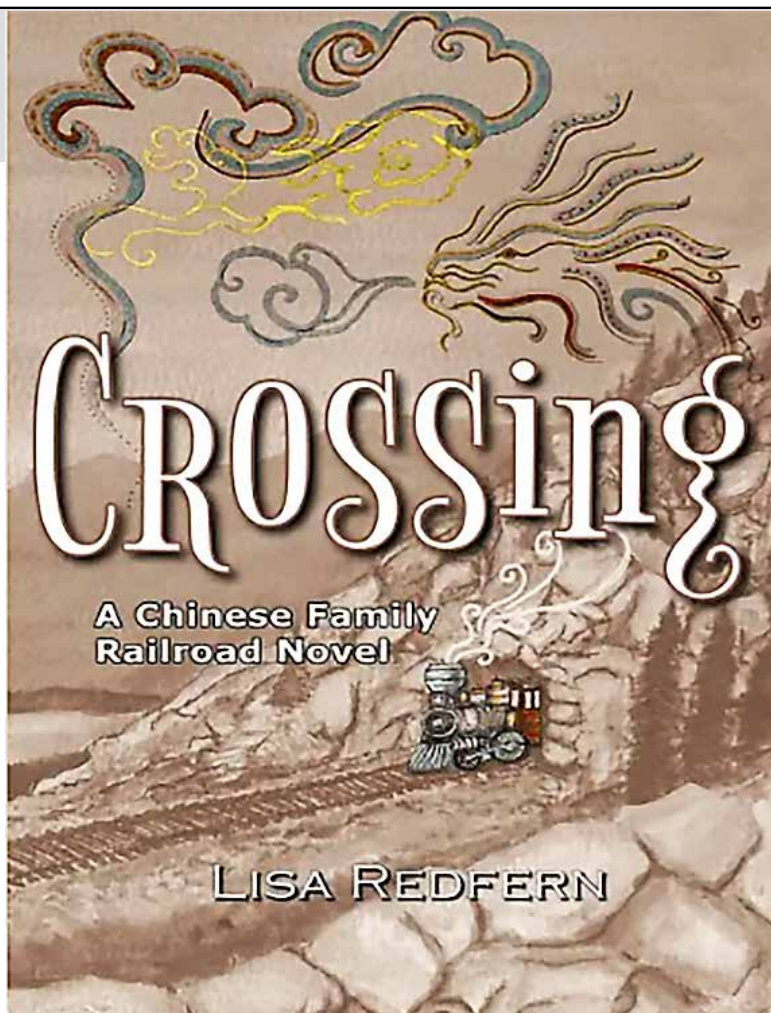
Lisa Redfern 2023 309 pg

Lisa Redfern, the author of Crossing, has clearly done a lot of research about the building of the transcontinental railroad, Chinese railroad workers, and rural Chinese culture. She's also crafted a compelling story for those interested in the culture of Chinese railroad workers, the Chinese in China, and the building of the transcontinental railroad. The book and its story are very rich.

The story starts with a farming family in China and explores rural Chinese culture, family dynamics, Chinese traditions, and family economics as the family lives and farms. Clearly in the Chinese culture family is pre-eminent. Some family members are also sold off to help the family for example. Bride prices are high and land has to be sold but it's necessary in order to get children to help run the farm. In all it's an evocative and rich description of rural peasant life in China as various conflicts arise. Also explored are wider conflicts and economics in China pressuring the family. Taxes were going up. Rebels took the oldest son, marauders stole the harvest, and the government and its representatives are oppressive. One misfortune follows another and we can hope that real families didn't confront this litany of problems. The misfortunes economic travails provide the motivation and back story for sending two sons to America in a quest to support the family still in China. Tracking the story is easy in the first part with each short chapter titled and ages of the children and the year listed.

By page 62, in 1864, Yang and Lee, the two remaining sons, have left China for California where they join up with the construction of the Pacific Railroad. Here various conflicts keep the story going and the reader's interest. Yang and Lee experience just about every story that has come out of the construction of the railroad: the Black Plucked Goose traveling on the Dutch Flat Rd., avalanches, cold, a railroad worker strike, accidents, tunnel collapse, etc. It's kind of like the litany of problems faces in China. Like the China section's highlighting aspects of Chinese culture in China, there is a lot of detail about Chinese culture taken to America. Redfern has a great imagination for what work must have been like along the railroad and in the various other places the story takes place.

All of this is complimented with quotes from newspapers about the railroad's progress and Chinese experiences.



page 196 in the tunnel

In this quote the younger brother, Lee, has joined his brother's team in the tunnel so he could experience what work was like there (and so the reader can get a good view of tunnel work).

“At some point, Charlie asked Lee if he wanted to take a turn sledging. He slid the handle of his hammer into Lee's hand. It dropped to the ground with a heavy thunk. Lee shook his head, “Can't grip it,” he said, using as few words as possible.

“Sledge, sledge, turn. Sledge, sledge, turn. This is torture, Lee thought.

“When Lee could barely remain standing on wobbly legs, Yang put his hammer down and stepped near his brother. He pried the bit out of Lee's claw-like grip, pulling it out from the hole. Smiling, he pushed a finger inside checking the depth. He helped Lee straighten his index finger so he could feel it too.”

page 190 Summit Valley

The valley was about a mile long and a half mile wide. The wagon road skirted the eastern edge. Near its center, a sparkling watercourse meandered a snake path through willow thickets and wild roses. Both of which, Mr. Hang pointed out, Lee could cook with.

Another quote describes Summit Camp, the longest, tallest, and largest of the Chinese railroad workers camps which was on Donner Summit.

page 185 Summit Camp

“Beneath twenty feet of snow, inside a translucent, wet cave, the kitchens remained functional. A fire burned in the center of a large carved-out room with a chimney hole. It provided space for gathering, eating, and warming. Jackets and clothing draped every chair, bench, and table.

“Drying lines crisscrossed, sloping with the weight of pants, jackets, and boots hanging from laces. Only those items closest to the flames had a decent chance of drying all-the-way. It smelled of damp cloth, and cooked food, sweat, wood smoke, opium, and candle wax. A series of tunnels led to the bunkhouses, the latrine, to the blacksmith sheds, and up to

the surface where the brightness of daylight would jolt the system.”

Eventually the longest tunnel of the transcontinental railroad was built and many conflicts resolved. The reader learns a lot about Chinese culture and railroad workers’ lives. There is not one overarching climax to the story, rather, a list of experiences from the fertile mind of the author.

Here's the purchase page link - <https://books2read.com/u/bPDwPz>

Book trailer video: <https://youtu.be/F-tPs2DsF24>



*Crossing: A Chinese Family Railroad Novel*

Nevada County History  
Chinese Culture  
Chinese American Immigrants  
Donner Summit  
Truckee (Cobern's Station)  
Grass Valley  
Nevada City  
Dutch Flat & more!



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Working in the tunnel

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Black Goose

102 They rounded a corner and came out on a hill above a dip in the road. What met their eyes was a spectacle, indeed. It took them all a moment of silence to make sense of what they were seeing. “That, my friends, is the Black Goose.”

Strapped to a flatbed wagon, fortified with wheels that were two feet wide, was a behemoth chunk of rounded metal, studded with rivet points, was strapped atop an extra-wide A shaggy man with a long whip screamed at a team of ten oxen straining to crest the hill.

The audience climbed up on a rock outcropping for a better view. Behind them came another group, led by Hung Wah. “Move it, boys,” Scarred Eye told them as he bent down to lend a hand. Following Hung Wah were the crew boss, their paymaster, multiple cooks, and several Six Company representatives.

As everyone resettled, Hung Wah took up the narrative. “You may not recognize it, but that is a disassembled steam locomotive. It left Sacramento weeks ago and is going up to the summit.”

One cook pointed. “There’s still a long way to go. Will they make it before winter sets in?”



Morford's description of Albert Bierstadt's Donner Lake

In that picture (painted for Mr. C. P. Huntington and for exhibition at Vienna) through a gorge the spectator is looking eastward, lengthwise of the lake, from a point very near the railroad, which is seen at the right, clinging to the side of the Sierra, with the tip of a snow-shed, and a puff of the smoke of a locomotive creeping up the snow-touched ravines and rough crags. In the immediate foreground, at the left, a clump of nobly-painted tamaracks well develop the arboreal features of the Sierra, while even nearer some wild-flower-dotted undergrowth gives tone and color to that portion of the picture. Still farther to the left, from the tamaracks, two little mountain tarns, too small to be called lakes, look up blue to the morning sky, with the only touch of humanity in the occupant of a canoe paddling over the nearer one. Below, in front, the height slopes away, with the old emigrant-road seen creeping down toward the lake. Beyond stretches the lake itself, rather indicated than shown-so hot is the glare from a morning sun full in the face, and so thick are the mists rising from the water. Yet beyond, the hills of the Sierra rise in broken lines, until the picture closes with a range of the higher peaks, far away eastward, a few glints of snow (scarcely enough for the privilege sometimes conferred) touching the tops of the higher and more distant, and carrying up the eye finely to the warm American sky bending over all.

# DOWNTOWN TRUCKEE HISTORY MUSEUMS



## MUSEUM OF TRUCKEE HISTORY

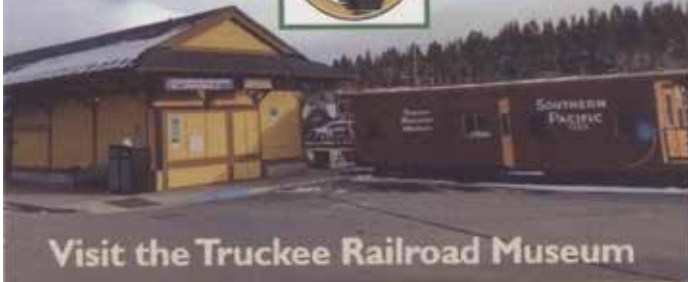
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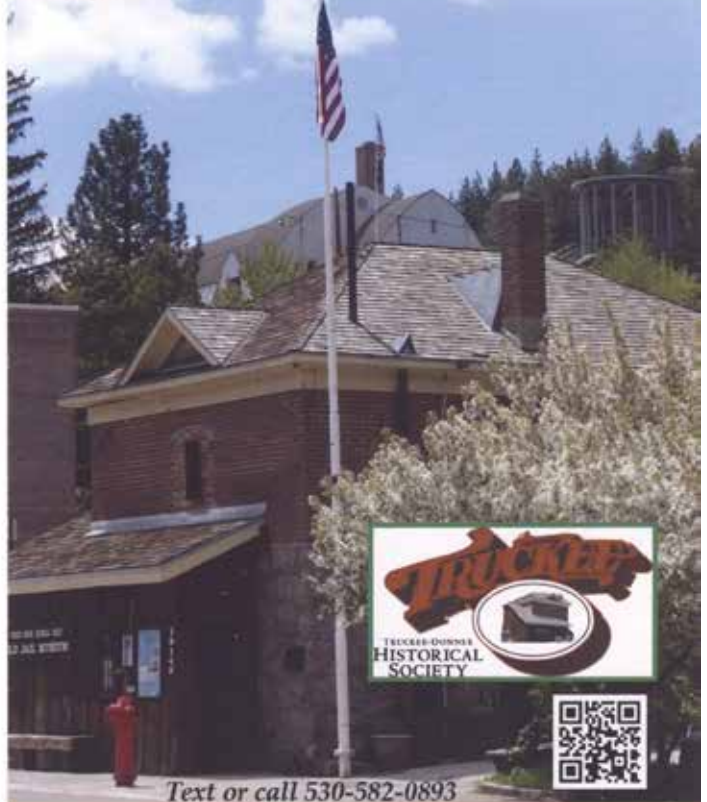
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# DOWNTOWN TRUCKEE HISTORY MUSEUMS

Photo by Greg Zirkel



Text or call 530-582-0893

## Old Truckee Jail Museum

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