

Sons in Retirement, Branch 5, Presents: The Mercury Mines of New Almaden, 1845 to 1975

Presentation by Michael Cox,
New Almaden Quicksilver County Park Association

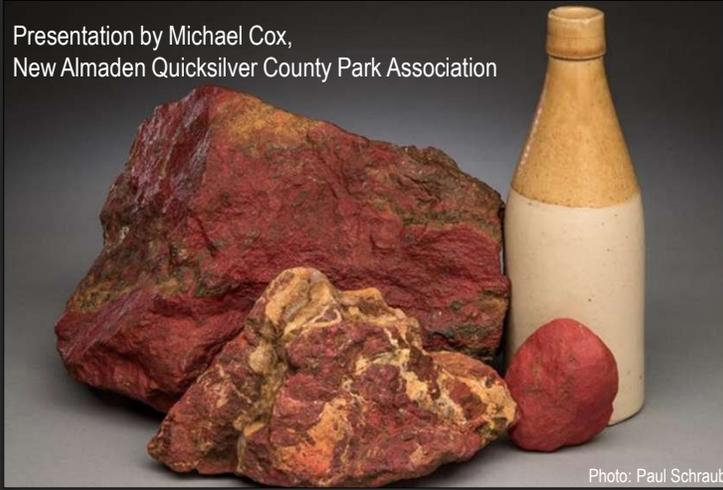


Photo: Paul Schraub



Title Slide

OUTLINE

- About Speaker and NAQCPA
- Location
- Background
- New Almaden Facts
- Retorting and Furnacing
- Geology and Workings
- Mining Settlements
- History of Production and Last Days
- Mine Closure
- Environmental Consequences
- Cleanup and Restoration

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

2

These are the primary topics I'll be briefly touching on today.

NEW ALMADEN QUICKSILVER COUNTY PARK ASSOCIATION

About Speaker

- Founding Board member of NAQCPA, lifelong interest in mining.
- Contributor to park projects including mine closure, environmental investigations, and development of interpretive resources.
- BSc geology and MSc international supply management.

About NAQCPA

- Established in 1982, incorporated in 1984 as 501c3.
- Partners with County Parks to preserve and promote Almaden Quicksilver County Park, 325 members and 40 years of work.
- Web site: <http://www.newalmaden.org/>

Self-explanatory.

Location

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

4

Section divider.



This is the location of Quicksilver Park and New Almaden. On July 4, 1961, New Almaden and the mining lands were added to the National Register of Historic Places as a Landmark District. The mine is about 12 miles south of downtown San Jose, CA.

Background

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

6

Section divider.

The Story of Cinnabar and Vermilion (HgS) at The Met, Ellen Spindler, 2018,

<https://www.metmuseum.org/perspectives/cinnabar-vermilion>

- Natural cinnabar as a pigment dates back to prehistory.
- 300 CE, synthetic manufacture of vermilion from mercury and sulfur.
 - Possibly invented first in China as early as the fourth century B.C.—consisted of heating mercury and sulfur in a sealed container.
 - In the East, cinnabar was added as a colorant to the sap known as urushiol to form lacquer work.

2/14/2026

Michael F. Cox

7

Humankind has used natural pigments for decoration and ceremony for tens of thousands to hundreds of thousands of years. Cinnabar, mercuric sulfide, bright-red natural mineral, occurs in shallow deposits and is easily exposed by erosion. Where significant deposits occur around the world, so does archeological evidence of use.

Ancient use of cinnabar in ceremony

Schotsmans, E.M.J., Busacca, G., Lin, S.C. et al. (2022). "New insights on commemoration of the dead through mortuary and architectural use of pigments at Neolithic Çatalhöyük, Turkey," *Sci Rep* 12, 4055. <https://doi.org/10.1038/s41598-022-07284-3>



*Skeleton of a male individual aged between 35 and 50 years old with cinnabar painting on the cranium, 7000–8000 BC.
Credit : © Marco Milella, CROPPED*

2/14/2026

Michael F. Cox, Non-Commercial Use Only

8

Here is an example of ceremonial use dating to 7,000-8,000 yrs. Before the common era. Because the known origins of the word cinnabar trace to allusions to blood, I like to suppose that when the ancients painted the bones of their ancestors, it had something to do with returning the blood of life, perhaps so they were assured continuance in the afterlife.

Use of Cinnabar and Vermillion



Left: The bright red murals in the Villa of Mysteries in Pompeii (before 79 AD) were painted with ground and powdered cinnabar. 2012Sept06, Matthias Kabel, CROPPED



Right: Tiziano Vecellio (Titian), Assumption of the Virgin (1516-1518). Oil (incl. vermilion) on panel, 690 x 360 cm (22'7¼" x 11'9¼"). Church of Santa Maria Gloriosa dei Frari, Venice. Photo in public domain.

2/14/2026

Michael F. Cox

9

Artisans have used ground up cinnabar (natural mineral) and mercuric sulfide (manufactured, called vermilion) as a colorant called for a long time. A problem with finely ground vermilion is that it can darken with age due to sunlight, oxidation, and exposure to chlorine-based cleaners.

Use of Cinnabar and Vermillion in Chinese Lacquerware

- Color varies depending upon how pigment was made and applied.
- May darken with age.
- Originally powdered natural cinnabar until more common manufacture using mercury and sulfur after 8th Century.
- Taoist culture regards vermilion as the color of life and eternity.

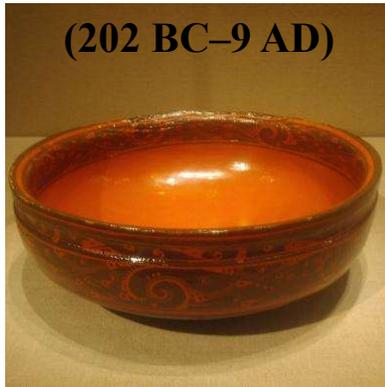


Photo by Periselo of Athens, 2008
2/14/2026

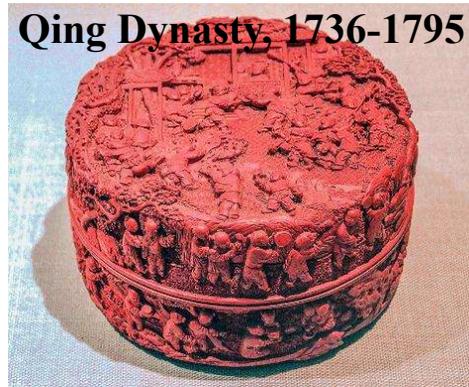
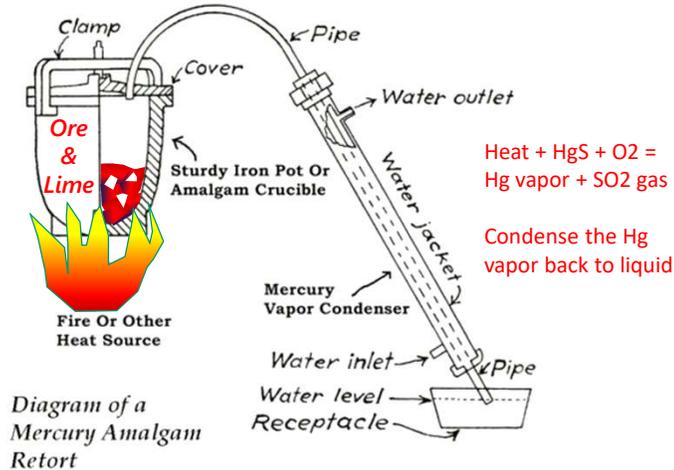


Photo by Andrew Lih, 2004
Michael F. Cox 10

Here is an example of cinnabar darkening with age after use. The vermilion (manufactured mercuric sulfide) box is bright, the lacquerware made with natural cinnabar (HgS) to the left has darkened.

Recovery of Hg from Ore: Retort



From Nevada Outback Gems, URL: http://nevada-outback-gems.com/Reference_pages/Amalgamation.htm

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

11

When mercury ore is heated the mercury comes off as a vapor that can be condensed back to mercury that is 99.9% pure (DO NOT DO THIS at home, Hg vapor is TOXIC!) Ore is heated in retorts and furnaces. A retort is typically an iron pipe or vessel that holds a limited quantity of ore that is sealed inside. The container is fired from the outside to heat the ore within. A furnace is heated from within. Condenser tubes connected to the retorts and furnaces allows the mercury vapor to be contained and to cool and return to a liquid form. Oxygen is necessary to combine with the sulfur, so it can escape as SO₂ gas rather than recombine with the mercury. With a retort, it is always necessary to add calcium oxide to the ore charge, so that enough oxygen is liberated to combine with the sulfur in the ore.

Iron Mercury Flasks and Henry Tregoning



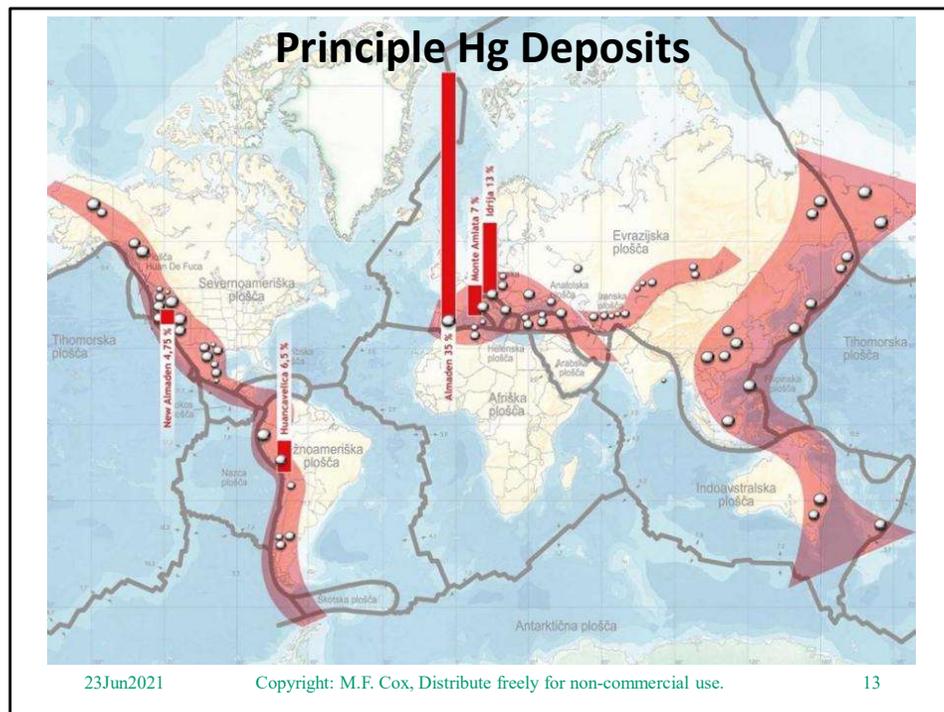
1997-034-0 81

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

12

Mercury historically was put into iron flasks, because mercury does not react adversely with iron. In this photo, Henry Tregoning putting mercury into cast iron flasks at the Hacienda circa-1880? Fun fact, Henry's ladle and scale were saved because of the 1894 International Exposition (World's Fair) in San Francisco, CA, and today are on display at the New Almaden museum. A stream of mercury about a pencil-width in thickness flowed from the brick condenser chambers day and night and into a large iron pot, to Henry's right. The pot could hold about four tons of the metal. Each cast-iron flask at this time held 76-1/2 pounds of metal. The half-pound increment was eventually dropped to make accounting easier.



This graphic shows the largest former mercury mines by their share of the nearly 2-billion pounds of Hg produced over recorded history. It also illustrates that mercury mines congregate along the edges of continental plates, where volcanic and crustal processes assist the deposition of mercury ore in shallow crustal rocks. It is theorized that mercury cannot form below a depth of about 2500 feet (760 meters) in the crust.

The largest mines historically are the Almadén mine in Spain (33%), Idrija mine in Slovenia (13%). Monte Amiata mine in Italy (7%), Huancavelica mine in Peru (6.5%), and the New Almaden mines in California, USA (4.8%). A few hundred other mercury mines around the world account for the remaining ~36%.

Principal mines and production through 1977^[1]

Mines in bold font used forced labor

Mine or District	Product, Kg	Percent of Total	76-lb. Flasks
Almadén, Spain	271,000,000	32%	7,861,220
Monte Amiata, Italy	104,000,000	12%	3,016,852
Idrija, Slovenia	102,000,000	12%	2,958,836
Huancavelica, Peru	52,000,000	6%	1,508,426
New Almaden, U.S.	38,000,000	5%	1,102,311
New Idria, U.S.	20,000,000	2%	580,164
Rest of U.S.	64,000,000	8%	1,856,524
Rest of World	188,000,000	22%	5,453,540
Total	839,000,000	100%	24,337,873

^[1] Cargill, et. al., 1980, "Resource Estimation from Historical Data: Mercury, a Test Case" in: *Mathematical Geology*, Vol. 12, No. 5, pp. 489-521

23Jun2021

Copyright: M.F. Cox, Distribute freely for non-commercial use.

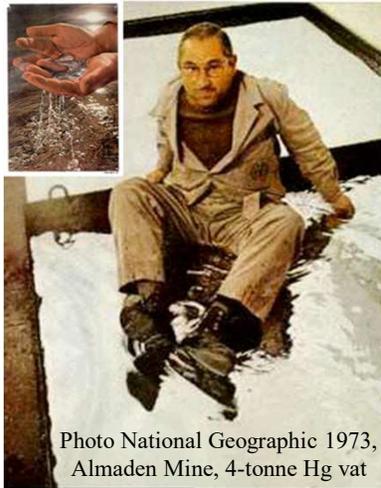
14

The Almadén mine in Spain remains the world's largest and most significant mercury mine. New Almaden is 5th in production, but it eclipsed the other mines historically in some ways. New Almaden broke the Spanish monopoly on global sales of mercury and contributed significant management and technology improvements to the global industry, especially in the areas of ore roasting and mercury condensation, and in programs for social welfare and well being at the mines.

Mercury, Gold, and Silver

- Mercury has a density of 13.5 grams per ml (cm^3).
- Gold has a density of 19.3 grams per cm^3
- Iron is 7.5 grams per cm^3
- Silver is 10.5 grams per cm^3
- Lead is 11.3 grams per cm^3
- Mercury can separate gold from other metals.
- Mercury can amalgamate metals except iron.

The photo to the right is a miner sitting in a vat of mercury at Almadén, Spain.



Sept. 2022

Michael F. Cox, New Almaden Quicksilver County Park
Association

15

Miner Pablo, sitting on 4 tonnes of mercury. I am sorry to say I have forgotten the last name of the miner. The late Dr. Edgar H. Bailey, mercury commodity geologist for the United States Geological Survey was witness to the act and reported that pounds of mercury poured out of his clothing when he exited the vat. Mercury can be absorbed dermally, but luckily his exposure was brief and only very occasionally for visiting dignitaries. For a poignant examination of the life of a former miner in Almadén, displaced by the closure of the mines in 2000, see “Pablo’s Winter,” a film by Chico Pereira.



The Empire of Mercury

- Before the New World discovery, there was nothing beyond the Straits of Gibraltar, represented in Spanish currency by two pillars. The ribbons on the pillars proclaimed *Non Plus Ultra* (*Nothing Further Beyond*)
- After the New World discovery, the proclamation was changed: *Plus Ultra* (*Further Beyond*).
- The Pillars together scrolled with a single ribbon, a united Spanish Empire built on mercury, gold, and silver

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

16

Self-explanatory. When one makes a dollar sign, one is tipping their hat to the Spanish Empire.

Why Was New Almaden a Big Deal?

- Europe had a virtual monopoly
 - Almaden, Idrija, Monte Amiata, Huancavelica (controlled by Spain/Austrian empire interests)
- 1835-1850, N.M. Rothschild & Sons control Almadén mines, virtual monopoly
- 1845, New Almaden discovered
- 1849, California Gold Rush
- 1859, Comstock Silver Rush

2/14/2026

Michael F. Cox

17

New Almaden broke a virtual mercury monopoly that was hampering the supply of mercury to Mexico and its territories. If not for New Almaden, the House of Rothschild would have not only dictated the supply of mercury for the California gold rush and Nevada silver rush, they also would have had significant leverage to dictate political actions. Mercury was also essential as a primer for ordinance (bullets, bombs, etc.). The primer is mercury(II) fulminate ($\text{Hg}(\text{CNO})_2$) and was used from the 1820s until the mid-20th century.

The Gold Rush Was Mining on an Industrial Scale



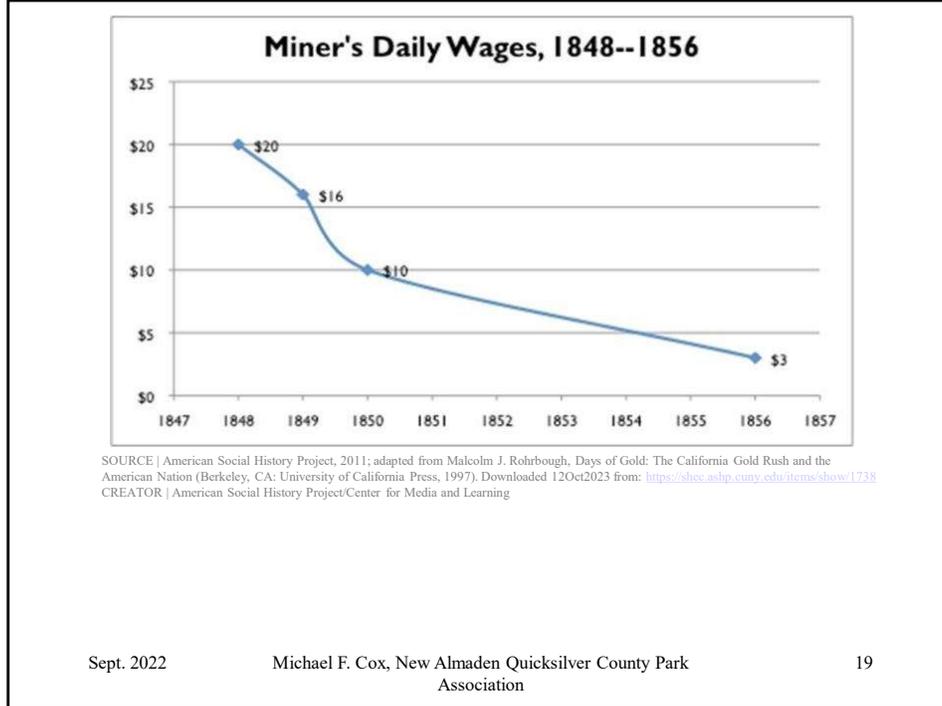
2/14/2026



Michael F. Cox

18

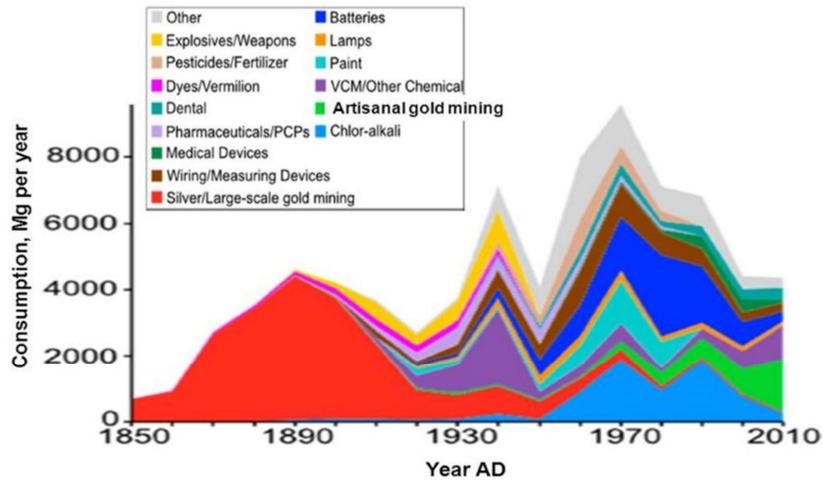
The fabled rugged individual miner of the Gold Rush was a short-lived phenomena and is largely a myth. The claims quickly consolidated into mining on an industrial scale. As hundreds of thousands of workers flocked in to make their fortune, wages dropped and the price of supplies rose. The law of supply and demand is not ideology that is easily overthrown. These photos, taken in the 1870s, are by the famous photographer of the early west, Carleton Watkins.



In the early days of the Gold Rush, experienced labor was rare, population was scant, and the grades of the ores were fabulous. Given the miners were independent contractors, paid for product (ore) rather than activity, they made more money in the brief cornucopia of rich ore and fewer workers. As the industrial works came to the fore, and the population of California exploded, mining work became segregated. Miners remained contractors paid for ore and for footage (feet driven in ditches and underground). I prefer not to use the term wage, because it implies employment. I prefer the term income when integrating both contractors and actual hourly and salaried employees, as this chart does.

In any case, population explosion and the rise of mechanization conspire to depress income for relatively unskilled work while generating riches for the folks in higher positions of skill and authority. The overall flow of capital in volume and speed is as asymptotic as the population explosion, but, paradoxically, in the hands of a smaller and smaller percentage of the total population. This is the sea in which the history of mining is floating.

Global historical use of mercury in commercial products



Horowitz et al. [2014]

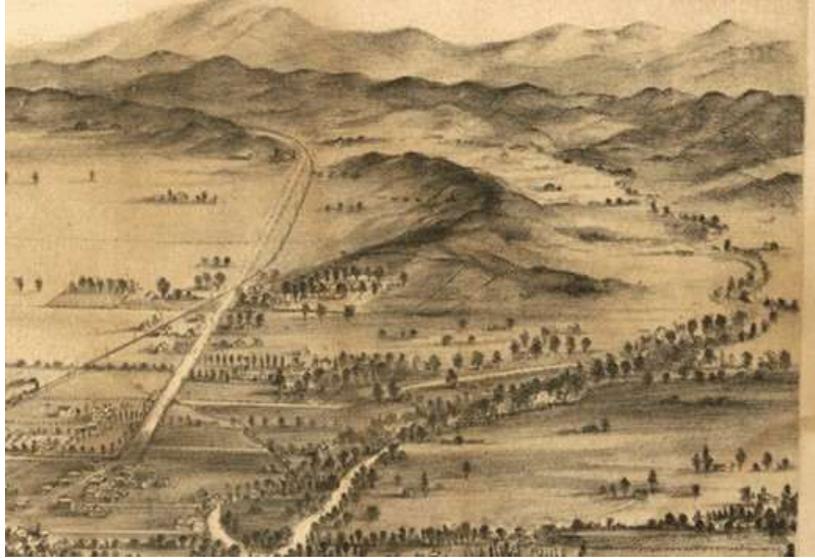
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

20

By 1975 all significant mercury mining had ceased in the U.S. except for the last mercury mine operating in North America, the McDermitt open-pit mine. Even this mine had to cease production as price and demand continued to fall and did so in 1990. In 2000, virtually every major mercury mine in the world had shut down. Some of the largest users of mercury, chlorine production and batteries, were able to curtail use significantly. At the same time, mercury consumption was substantially increased by small gold miners, mainly in the Amazon, and by vinyl chloride monomer production for plastics, mainly in China.

Almaden Valley in 1869

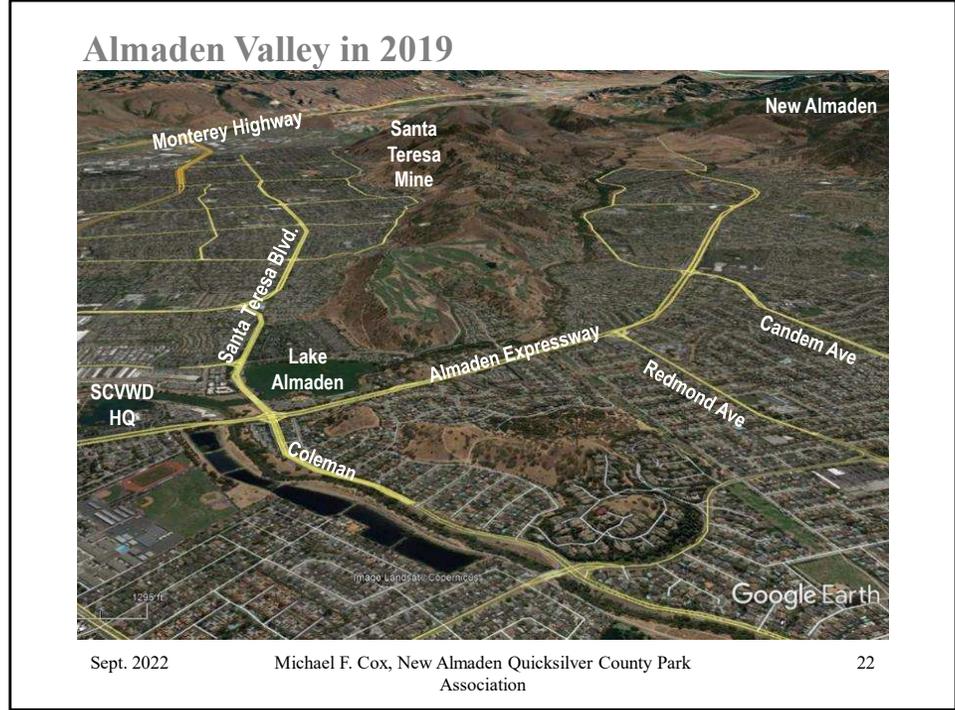


21Sept2022

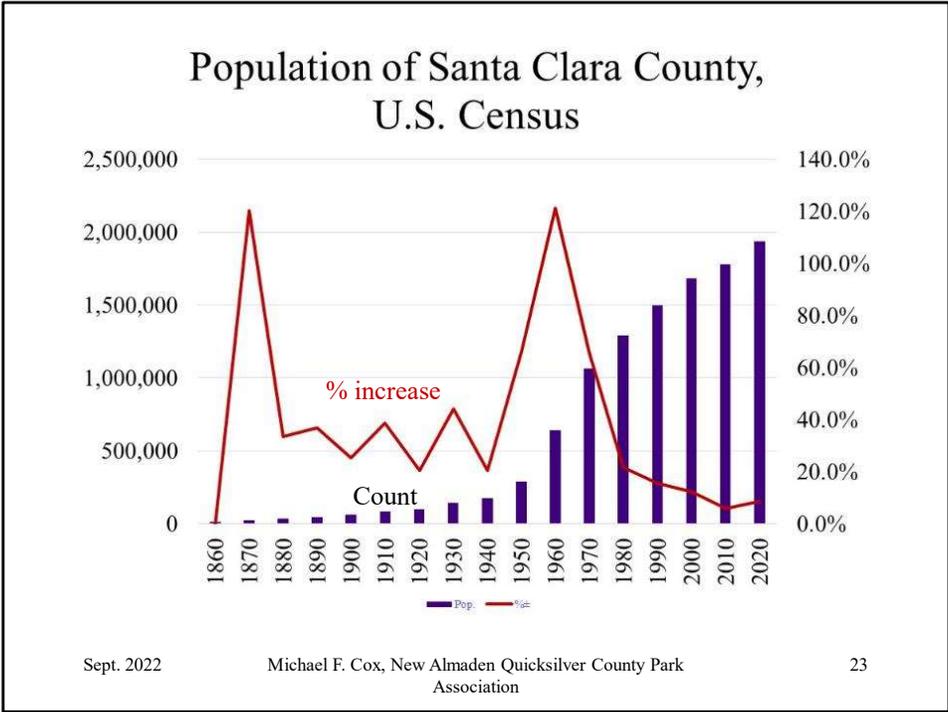
Copyright: M.F. Cox, Distribute freely for non-commercial use.

21

This is a drawing of Almaden Valley in 1869. These lands were once part of huge land grants and common pueblo lands. The New Almaden mercury mine was a big deal, the 800-pound gorilla of Bay Area industry and employment from about 1854 until the end of the 19th Century. After the mines closed, the valley remained largely agricultural until just after WW-II, when the valley suddenly exploded with radio and electronics industry and housing for millions of recent arrivals who had discovered its charms.



A lot happened in 150 years. It is both amazing and frightening to witness the development of the valley in such a short space of time. This is the same view as the prior slide, absent the artistic license of the drawing. Lake Almaden and Colman Road are just left of center. Almaden Valley and Almaden Expressway is to the right and upper right. The low hills at the center are the Santa Teresa hills (Lomas Bajas) and host minor mercury deposits. The village of New Almaden is in the valley barely discernible in the upper right corner of the photo. The artist that made drawing of the prior slide mashed some of the features together to save space. Loma Prieta mountain and the tall peaks of the Sierra Azul mountains are outside the view above, to the right. Only the falda (skirt) of the mine hills (Terreno de la Mina) is visible at the upper right.



Keep in mind population explosion and its impact on the percentage of people involved in primary resource extraction. At one time, ten percent of the population of Santa Clara County lived and worked at New Almaden. As time goes on, these individual miners are a smaller and smaller percentage of people. Today their individual stories have largely faded into unknown depths of stars (to quote Mary Hallock Foote). Hg and Au mining in California has been replaced by the roar of anonymity that comes with 8 billion plus people.

New Almaden Facts

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

24

Section divider.

Discovery: Prehistoric, mined by first peoples

**Activity: claimed 1845, main production 1854-1885,
closed Nov. 1975**

**Size: 7 mines with 54 miles of tunnels, 45 miles in
main mine**

**Product: about 1,100,000 76-lb. flasks, 4.5 flasks per foot
of mine workings**

**Gross Revenue: in excess of \$60,000,000 (about
\$1.4 billion in today's dollars)**

First official mining claim in California

Largest Hg mine in North America

Deepest world Hg mine, 5th in product

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

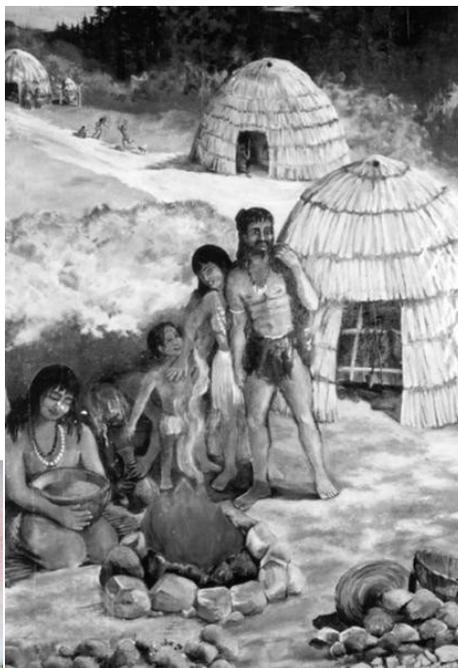
25

Self-explanatory.

Fun fact, the largest mercury mine by production is the Almadén and the second largest is the Idrija (Idria) mine. In North America, the largest former mine is New Almaden and the second largest is New Idria, both named before their size could be known.

PREHISTORIC MINING

- ~10,000 ybp to ~1800
- At New Almaden, indigenous people mined and traded cinnabar (HgS)
 - Body paint
 - Ceremonial use
 - Called the ore “mohetka”
 - Called the mine “pooyi,” a place of evil spirits.



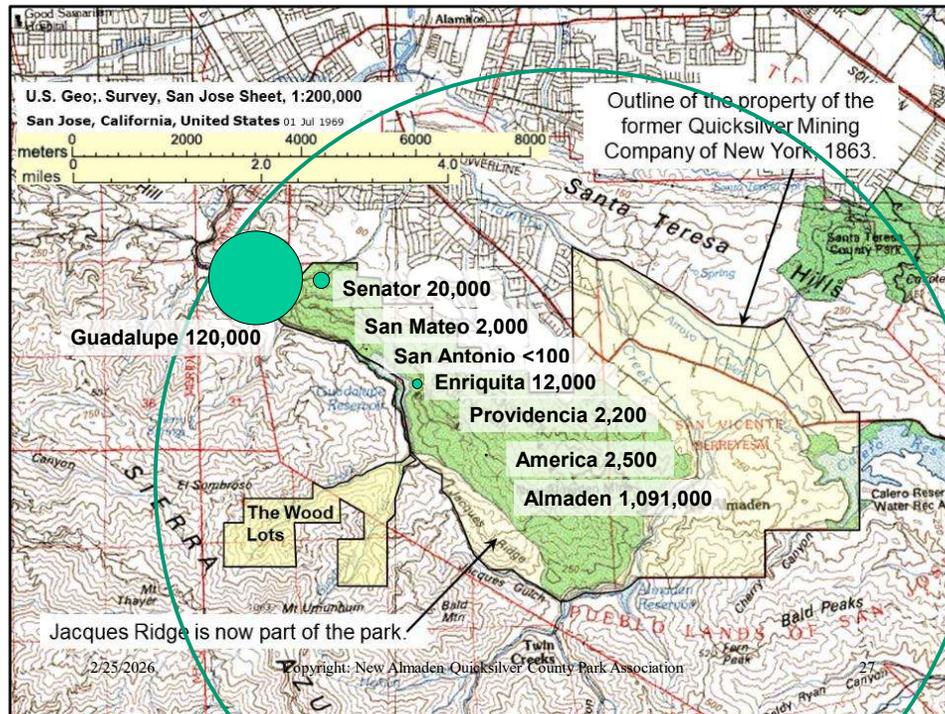
23Jun2021

Copyright: M.F. Cox, Distribute freely for non-commercial use.

26

Indigenous people mined the ore for body adornment and ceremonial use for a long time, in fact before recorded history, but in the 1700s early-1800s, Spanish colonialists and settlers from Mexico noted the heavy red rock and its use by the first peoples. The bright red color of cinnabar makes a great body paint but has a more profound significance. It is the color of blood. Indigenous people in many places left their dead perched on elevated platforms, perhaps reflecting the bird-like spirit of humans. After the bones were exposed and sun-bleached, they were collected and painted with bright-red cinnabar powder and then buried.

Bones painted with cinnabar are found around the world wherever cinnabar ore is plentiful. Perhaps painting the bones is an act akin to returning the blood of life to the ancestors before burial, so the dead could continue in the after life. Vermillion painted bones are reported from graves throughout the country west of the Mississippi river. The first peoples must have traded the cinnabar extensively, but it was also a curse. The peoples had quarried into exposed Mine Hill rock with cinnabar, after the creek nuggets were collected. They probably used fire and water to fracture harder rock. Fire will liberate toxic mercury vapor. This may be the source of a local legend the people held about evil spirits in the ore. The ancient mine also caved in, trapping several indigenous miners. After that, the native peoples reported conducted only ceremonies at the mine site, leaving small offerings of feathers and shells.



This map of Almaden Quicksilver County Park shows the principles mines in the park and one, the Guadalupe, outside of the park. The New Almaden main mine production dwarfs the total product of the other mines by a factor of about eight times (8x).

NAQCPA



*Don Weden 2022, Pioneer Day,
Photo by Ron Horii*



*Kitty Monahan at the Wood
Road Trail Dedication, 2004,
Photo by Ron Horii*

2/14/2026

Michael F. Cox

28

The park association was the brainchild of Don Weden, who worked with Kitty Monahan, the unofficial mayor of New Almaden and an open space parks booster. The association quickly grew to over 600 paying members, both individuals and dozens of organizations. Don's top priority was to bring together the diverse groups that loved the park but were not working together cohesively.

New Almaden Museum



Original New Almaden Mercury Mining Museum, 1970s Postcard



Casa Grande Interpretive Center, Prior to Restoration, circa 1999

2/14/2026

Michael F. Cox

29

Working with county parks the association was able to save a 1949 privately-owned but continually-operated mercury mining museum open to the public without invitation. In the 1990s, the county and association working together were able to purchase a decaying resort property that was the former home to the mine superintendents in the 1800s, called the Casa Grande.

Casa Grande Interpretive Center



*Casa Grande After Restoration, Nov. 11,
2010, Ron Horii Photo*

2/14/2026

Michael F. Cox

30

In the 2000s, county parks restored the structure to its condition at the height of the period of significance, and the association was able to solicit monetary and physical asset donations to create a wonderful interpretive center. It is well worth a visit.

Retorting and Furnacing

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

31

Section divider.

Andres Castellero Nov. 1845, crude retort



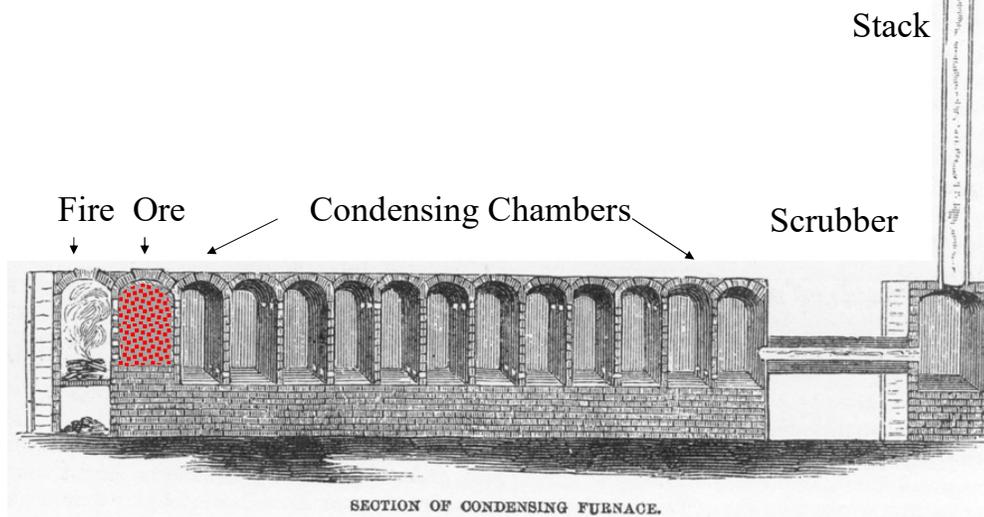
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

32

The New Almaden museum has a whaler's trying pot used by Castellero and company to process ore in the early days. The process was simple, dig a hole, put one of the iron pots into it, fill the pot about $\frac{1}{4}$ full with water, put iron bars over it, pile up ore, put another pot on top, lute the seal with clay and soil, build a fire and keep the pot red hot for a few days, let it cool down, open it up, ladle up the mercury in the bottom pot. Quite a system. It is estimated that around half of the mercury escaped from the pot furnaces as vapor. Early furnace workers were poisoned and many probably died or lived miserable lives after their encounter with the toxic mercury fumes.

Recovery of Hg from Ore: Batch Furnace - 1855



From: William A. Wells, *The Quicksilver Mines of New Almaden*, 1863, *Harpers New Monthly Magazine*, V 27, pp 25-41

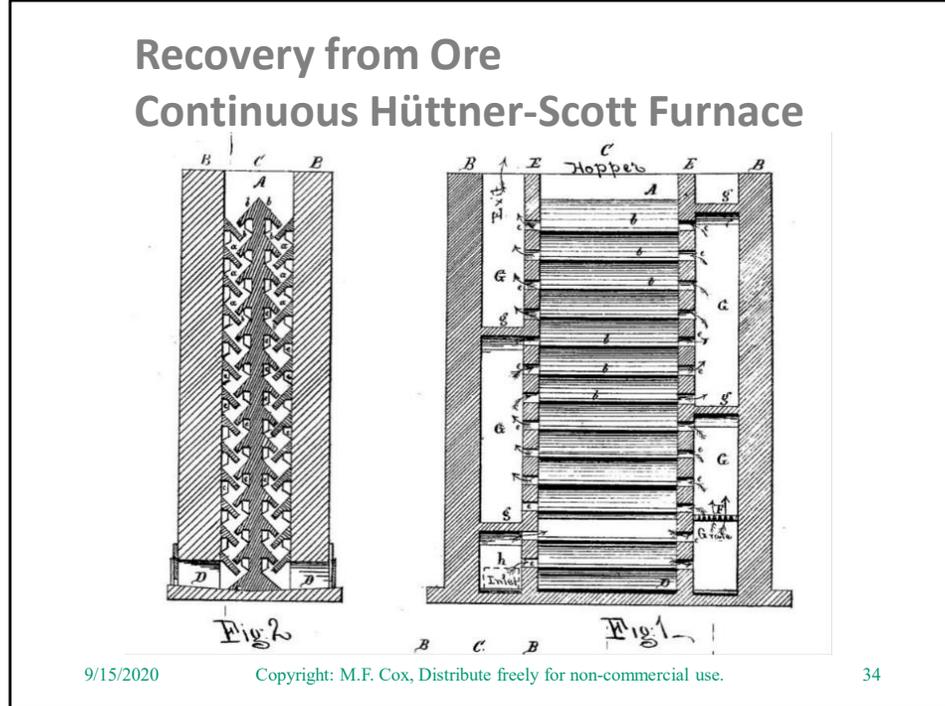
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

33

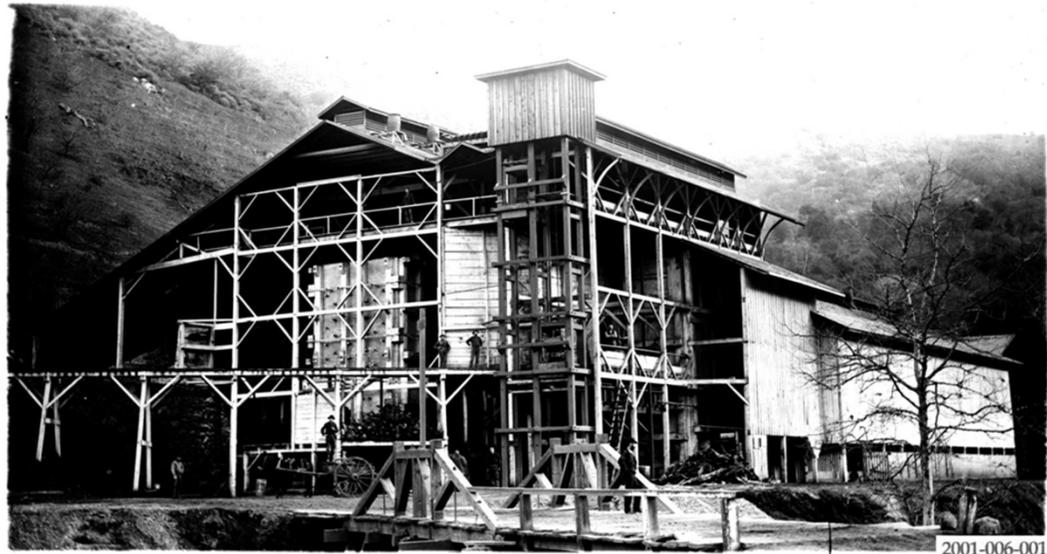
Baron and Forbes brought capital, men, and proper mining technology to New Almaden. They constructed large furnaces made of fire brick and attached condensers made of carefully plastered red brick. Mercury condensed in the brick chambers, fell to the floor, and ran out a small hole to a collection trough. The carefully-constructed brick furnaces were a vast improvement over the pot furnaces, and considerably reduced the mercury losses, but brick is porous, and these furnaces leaked a great deal of mercury into the surrounding air and soil. As time went on, the furnaces were further improved, so much so that working in the mine rather than the furnace yard became a greater health risk due to mercury vapor in air.

Recovery from Ore Continuous Hüttner-Scott Furnace



James Hüttner, a mechanical engineer, with Robert Scott, a brick mason, adapted a cereal mill roaster design to mercury processing. Scott had worked on the cereal mills in London, Canada, and similar furnaces were in use in Kellogg, Michigan. Brick work remained the essential part of the structure, so Hüttner became a footnote to his invention and Scott prospered. Perfected in 1875, the Scott furnace rapidly expanded across the world. Scott spent the rest of his life building these furnaces.

Scott Continuous Furnace – 1880



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

35

In the early-1870s, one of the greatest improvements in mercury ore furnacing was a new type of furnace. The Scott fine-ore furnaces were mechanical marvels, and even included an elevator for ore cars. The elevator operated by using a water-tank counterbalance mechanism. The large brick furnace is visible in the center of the enclosing shed. Note the two workers standing on the ore-car trestle by the ore-car elevator shaft to the left. The ore cars were carried up to the top of the furnace where the ore was dumped in. Unlike earlier retorts, these furnaces could operate continuously. Rock with much less mercury in it could be processed at a profit.

La Hacienda de Beneficio – 1880



1997-032-0 79

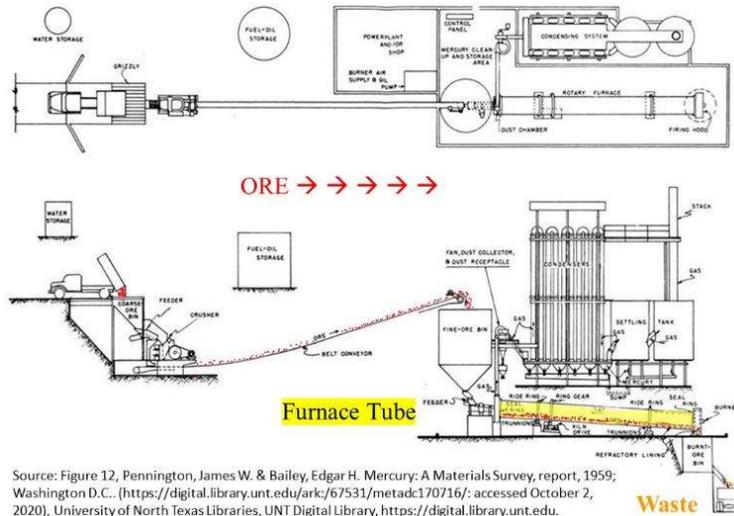
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

36

Here is a photograph of the furnace yard in the 1880s.

Recovery from Ore – Mechanical Furnace Rotary Furnace Plant



Source: Figure 12, Pennington, James W. & Bailey, Edgar H. Mercury: A Materials Survey, report, 1959; Washington D.C.. (<https://digital.library.unt.edu/ark:/67531/metadc170716/>; accessed October 2, 2020), University of North Texas Libraries, UNT Digital Library, <https://digital.library.unt.edu>.

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

37

The rotary furnace, built on a design similar to a 19th-Century iron-mine ore dryer or today's cement-kilns for roasting limestone, was revolutionary. It allowed the third-wave of mercury mine activity. The first wave was underground hand-mining and inefficient batch furnaces prior to about the 1880s. The second-wave was still underground, but included brick furnaces that could operate continuously, machine drills, locomotives, mine pumps, ventilators and other mechanization, high-explosives (dynamite), and better lighting (carbide and electric lamps). This second-wave gouged out formerly subeconomic ore and also raided the older mining waste rock dumps for ore that could be processed economically with new continuous furnaces. This interval ran out of steam in the early 1920s.

With renewed demand for mercury caused by World-War II, a third wave started- largely open pit mining to process vast amounts of low-grade ore in efficient mechanical furnace plants using both the Herreshoff and rotary furnace kilns. The third-wave left open pit scars up and down California. Rotary furnaces allowed very low-grade material, as little as 2.5-lbs of mercury in a ton of ore, to be processed economically, but most plants needed a grade of at least 5-lbs per ton.

The process is simple, crush the ore to a fine feed of 2.5-inch and smaller size, run it through the fire-brick-lined kiln to heat it up to about 1,200 F, use a fan to pull of the gases from the ore and send the gases through water-cooled metal condenser pipes. In this case, a little bit of ore was added to the rotating rotary kiln, filling it not more than 25% vertically. An oil flame was shot up the center of the tube by a turbine oil burner, heating the ore. The tube was rotated about 8 revolutions a minute, turning the ore over to heat it uniformly. Because the tube is inclined, the ore worked its way down the tube in a spiral pattern, falling out the lower end after 20 to 40 minutes, depending on the rotational speed. These furnaces could run day and night, and typically processed around 30 to 200 tons of ore per day. Waste from the operation was simply dumped on the adjacent hillside.

WW-II 100-TPD Rotary Furnace Operated 1940 through 1945



C.N. Schuette photograph 1942

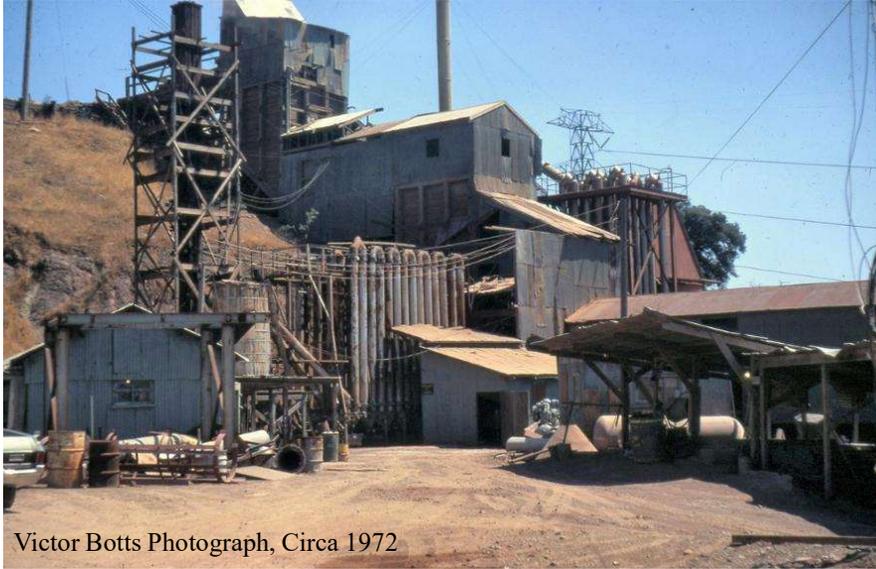
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

38

The war increased the demand for mercury for explosives, munitions, and electrical apparatus. On May 1, 1940, Curt Nicholas Schuette, the foremost mercury mining engineer in the United States, took over the operation of the New Almaden mines. Schuette was the General Manager appointed by W.H. Newbold and Sons of Philadelphia, Massachusetts, the mine owners. Newbold desired to reopen the mines based on an appraisal C.N. Schuette completed in 1936. The mining company reopened the mines, undertaking both strip-mining and underground mining through the Santa Rita shaft and Day Tunnel, with some ore also mined through the Harry Tunnel. The New Almaden Corporation built a large 100-ton-per-day rotary furnace plant on Mine Hill, the first large-scale furnacing to take place at on the Hill. When the War Labor Board lowered the relative wages of mercury miners, in favor of munition and ship makers, the mines struggled to stay open. They managed to hang on until the end of the war, November 1945.

1956-1975 30-Ton per Day Rotary Plant



Victor Botts Photograph, Circa 1972

9/15/2020

Copyright: M.F. Cox, Distribute freely for non-commercial use.

39

The New Idria Mining and Chemical Company purchased the New Almaden mines in 1968 and attempted to reopen the mines. They spent a lot of money on exploration and development. They drove a new tunnel under the Hill by extending a short prospect called the April adit, and they found ore under the area of the San Cristobal and San Pedro workings. The future looked bright in 1970, so New Idria built a new 100-tpd rotary plant next to an older 30-tpd furnace. New Idria refurbished the older kiln to handle 35-tpd. The older kiln was in the building that remained from the Newbold WW-II operation. Newbold's plant was removed in 1946, but the building shell was left behind. In 1956, Andy Camilleri, owner of Andy's Pet Shop on the Alameda in San Jose, CA, financed putting in a 30-ton – per-day rotary in the building and leased it to teams of independent miners in return for a percentage of the gross mercury sales. When New Idria took over in 1968, they purchased everything on the property.

Geology and Workings

21Sept2022

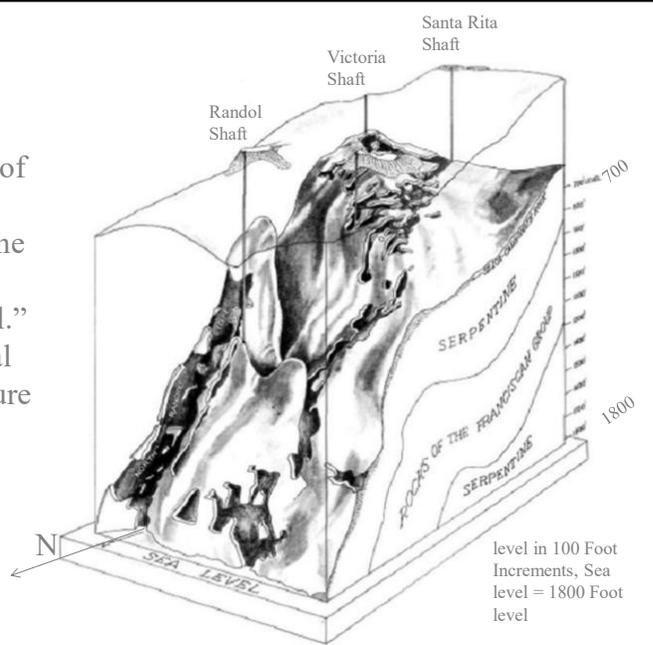
Copyright: M.F. Cox, Distribute freely for non-commercial use.

40

Section divider.

.

Perspective drawing of the mine workings showing relation to the upper surface of the upper serpentine "sill." U.S.G.S. Professional Paper 360, 1964, figure 93, p. 140.

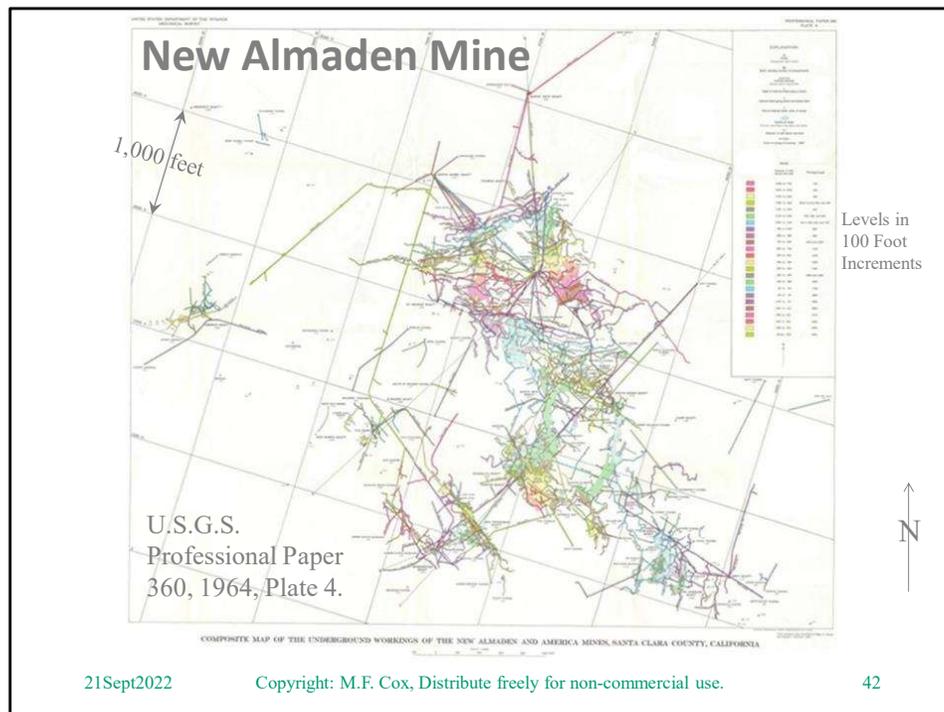


21Sept2022

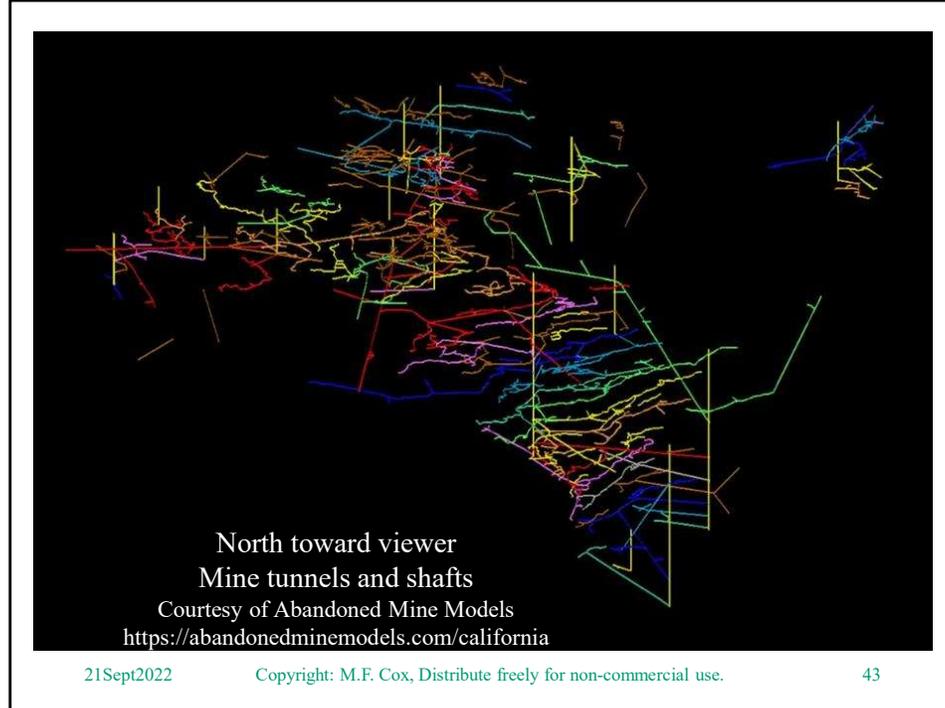
Copyright: M.F. Cox, Distribute freely for non-commercial use.

41

The mercury ore bodies of the main New Almaden mine are on the surface of a type of rock called serpentinite, the state rock of California. Serpentine is ancient oceanic crust. It started out as basaltic magma, like what is erupted at the Hawaiian Islands. The ocean crust reacts with seawater, and this converts the rock to serpentine group minerals.

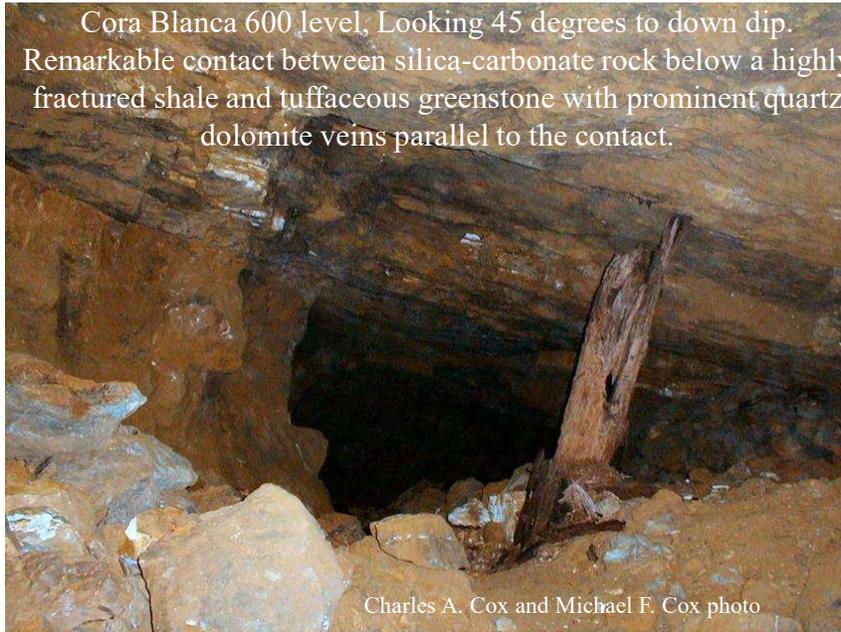


The New Almaden mine comprises a main mine and six separate and smaller mines. The main mine includes about 50 miles of underground workings. Each square on the map is 1,000 feet. The main mine is not as extensive as the world's primary producer, the Almaden in Spain which has over 100 miles of workings. The New Almaden mine only had about a tenth of the ore found in Spain, but some of the richest ore in terms of the amount of mercury in each ton of ore processed.



This is a simplified 3D image of the mine created by Dr. Keith Russ. It is missing the stopes, in other words it shows only the shafts and tunnels. As well, it only shows the workings as flat-lying and separated by 100-foot and sometimes 50-foot intervals. Inclines are shafts are shown where they connect different levels.

Cora Blanca 600 level, Looking 45 degrees to down dip.
Remarkable contact between silica-carbonate rock below a highly fractured shale and tuffaceous greenstone with prominent quartz dolomite veins parallel to the contact.



Charles A. Cox and Michael F. Cox photo

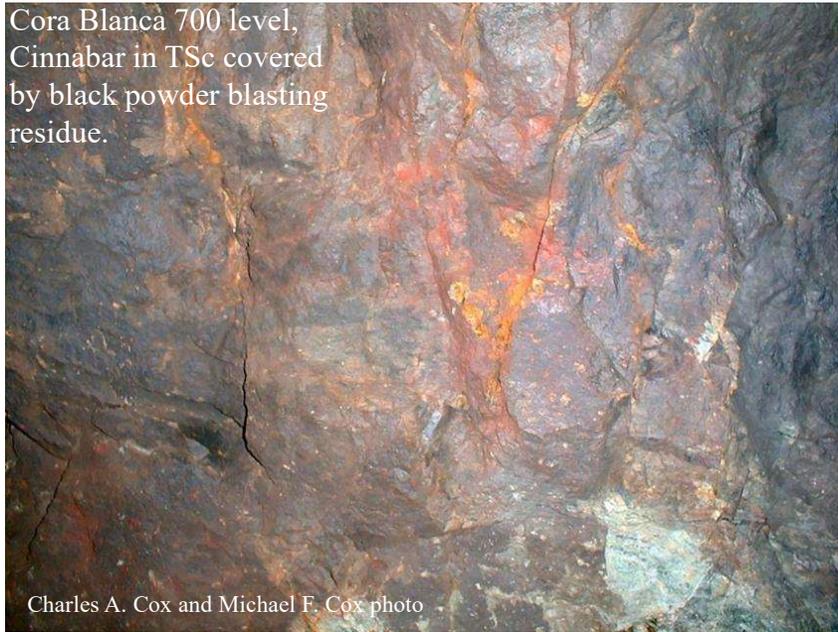
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

44

Self-explanatory

Cora Blanca 700 level,
Cinnabar in TSc covered
by black powder blasting
residue.



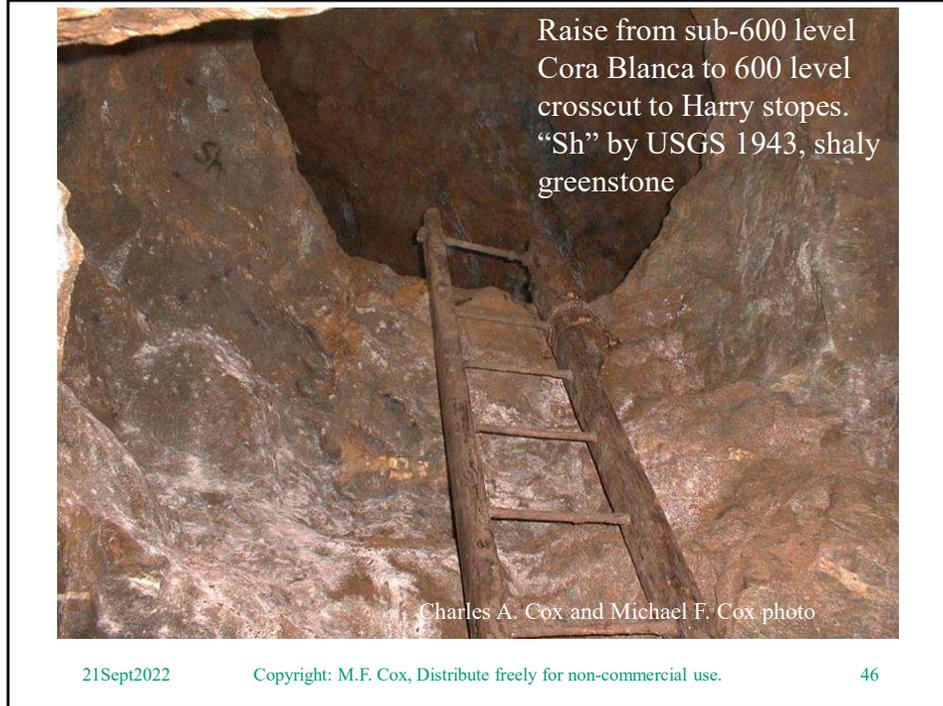
Charles A. Cox and Michael F. Cox photo

21Sept2022

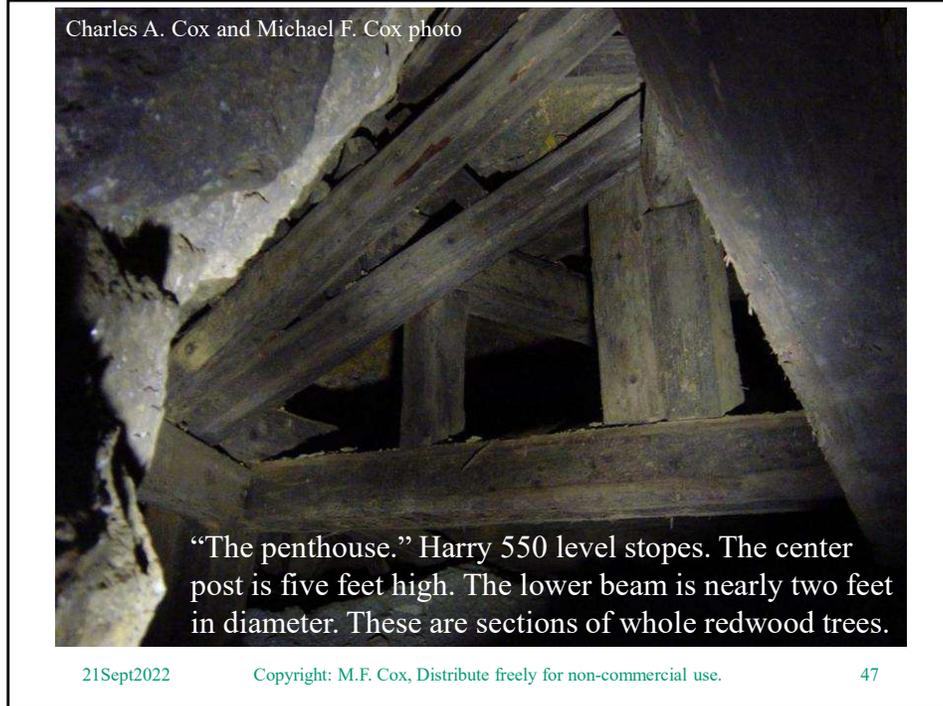
Copyright: M.F. Cox, Distribute freely for non-commercial use.

45

Self-explanatory, TSc = silica-carbonate rock, a silicified serpentinite that is mainly quartz (SiO_2), dolomite ($\text{CaMg}(\text{CO}_3)_2$), magnesite (MgCO_3), and residual iron-silicate minerals left over from the silicification of the serpentinite.



A raise is a working driven up to connect two levels. It can also be called a shaft, but that term is more generally applied to vertical workings connecting many levels. The main difference is a raise is typically for exploration whereas as shaft is typically for providing access, ventilation, dewatering, and ore hauling. The ladder in the raise is original, made of redwood with hand-wrought iron rungs dating to 1892.

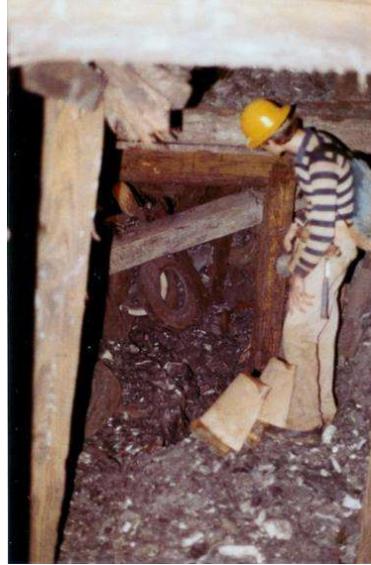


Massive timbers were used to support the back (ceiling) of mining chambers where the ground was made of softer rocks prone to cave-ins, in this case a grey clayey rock called alta by the miners.

Harry Tunnel in 1984



Fred Beall, photos

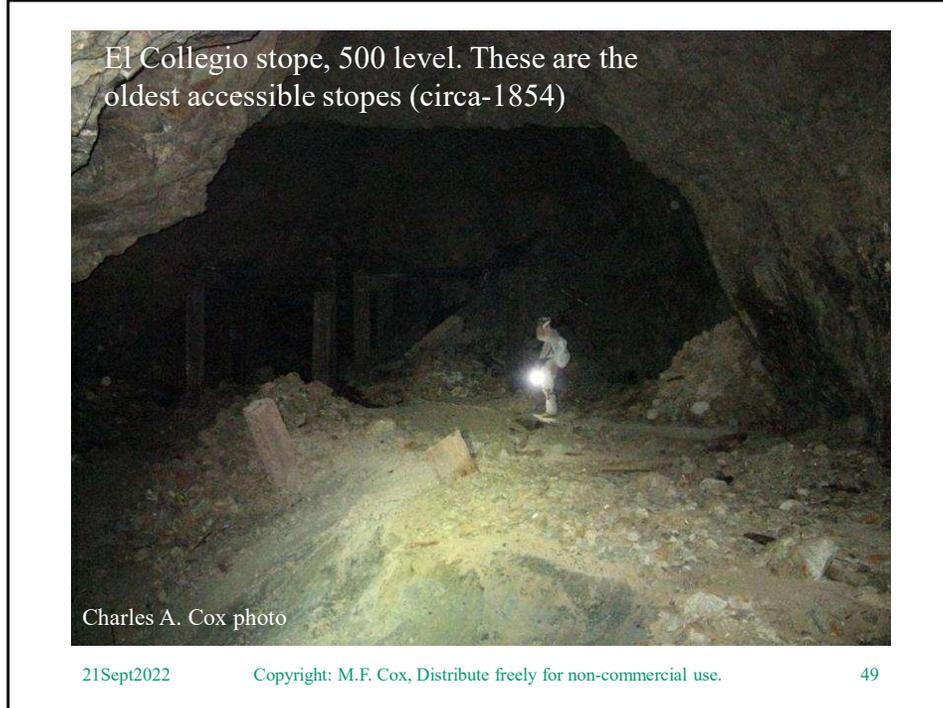


21Sept2022

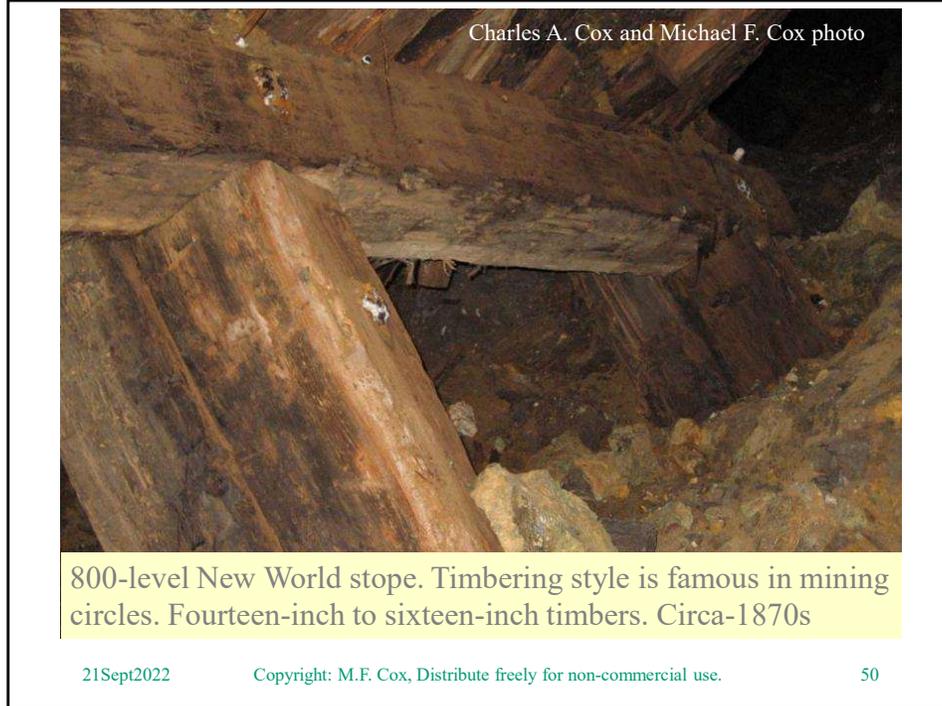
Copyright: M.F. Cox, Distribute freely for non-commercial use.

48

This is the Harry 500-level tunnel that provides access to the oldest accessible workings in the mine. The Harry passes through a thick wedge of shale and the rock called alta, a clay gouge made up of ground up shale and sandstone. The grinding was caused by active faulting and other geological forces acting over tens of millions of years. The type of support above the cap board on the left is called “close cribbed spiling” driven in heavy ground but was still passable. Today, this type of work would not be allowed under modern industrial and mining safety orders. At this link is the general orders applicable to shafts at construction sites: <https://www.dir.ca.gov/title8/1542.html>. The Loma Prieta earthquake in 1989 collapsed this section of the tunnel.

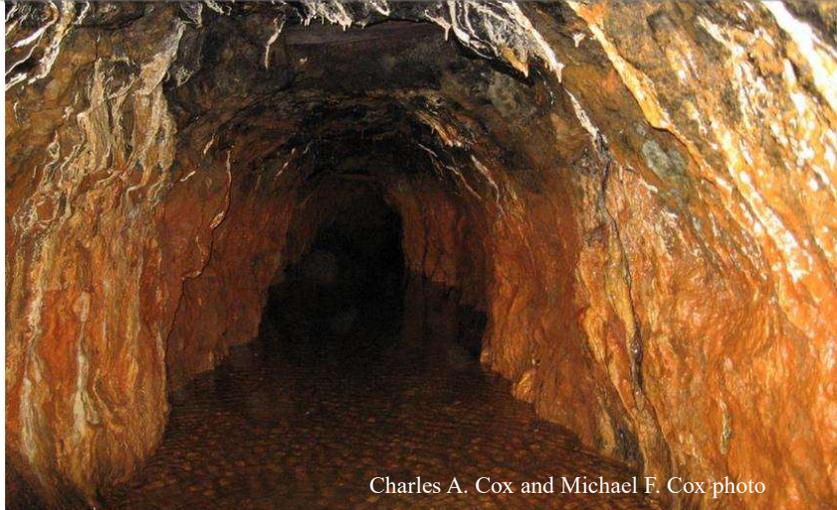


The El Collegio stope was not the earliest, but it is the earliest accessible working. It sits 500-feet below the summit of Mine Hill. Above it is a mass of collapsed and caved workings dating back to the earliest days. El Collegio is accessed through the Harry tunnel. The NAQCPA had hoped to open this tunnel to mine tours, but concerns about mercury and safety blocked any serious consideration on the part of the County.



New Almaden used a peculiar timbering method that was different than the Deidesheimer square-set system (https://en.wikipedia.org/wiki/Philip_Deidesheimer) popular at the Comstock Lode mines in the 1860s. At New Almaden, miners raised two vertical wood pillars that ran from the footwall to the hanging wall. The posts, properly called stulls when on an incline as shown here, could then support shorter vertical posts leaned up against and bolted to the stulls. When these posts were in place, the miners could raise a heavy cap timber to rest on the posts. The miners would then insert heavy lagging that spanned from one set of posts and caps to another set. The lagging is plainly visible here. In order to “catch up” the rock prior to allowing any slack or fall, the miners would erect the sets at each increment of working face, in a step-wise fashion, often driving spiling and wedges between sets to “keep the ground tight.” Even a half inch of slack can result in a huge and heavy mass of rock detaching from the hanging wall (aka back). In this stope, the timbers eventually settled under pressure and enormous rock falls occurred. So much so little of the original stope (room left behind after removing ore) is open.

Day tunnel 800 level is flooded due to lack of surface-runoff maintenance. Rainwater is getting into the mine. This is as deep as one can go, nearly 800 vertical feet below the surface.



Charles A. Cox and Michael F. Cox photo

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

51

Sadly, a lack of maintenance of surface draining improvements made in 1983-1984 when the miner openings were closed is leading to water accumulating in the mine. Several years after the mine closure project, this water had dropped several feet and previously inaccessible workings could be reached. Prior to the mine closure, streams were freely flowing into open workings and the mine was more flooded, as evidenced by the iron stain elevation on the tunnel wall.

Mining Settlements

Hacienda Village

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

52

Section divider.

Watkins – Hacienda 1863 cropped detail

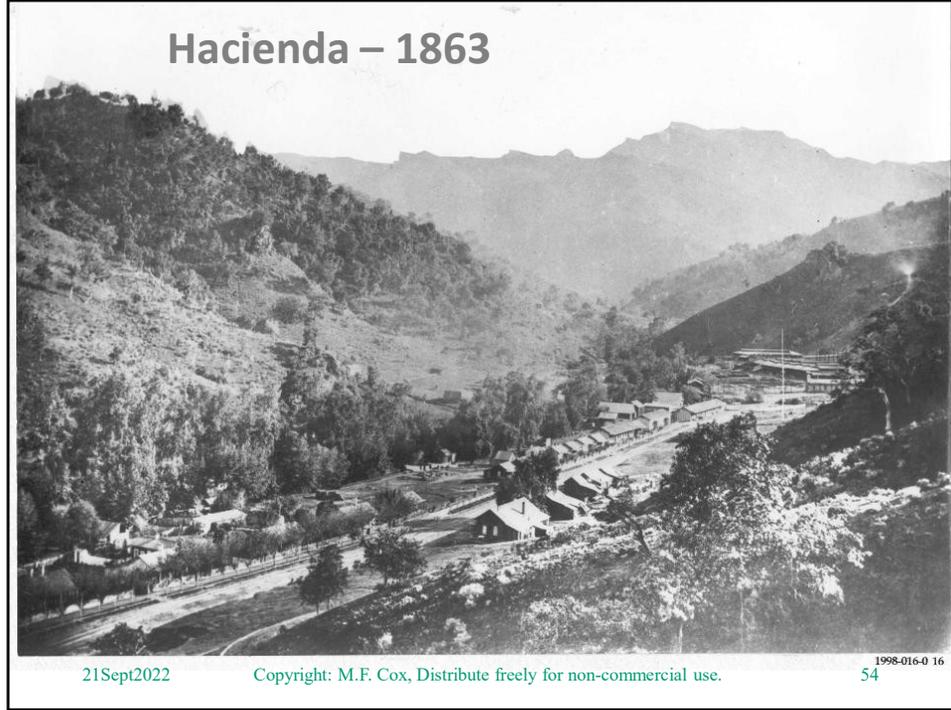


21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

53

Carleton Watkins photographed the mines in 1858 and again in 1863. There was a village north of the furnace yard, called La Hacienda. Furnace workers and the management of the mines lived in the Hacienda. The Hacienda school is in the foreground. A brick sidewalk allowed teachers and students to walk to school without getting muddy in the winter. The mine superintendent's mansion and lush garden, including viniculture, is in the foreground. Cottages line the road to the furnace yard in the distance. The cottages increased in size toward the mansion and decreased in size toward the furnace yard., reflecting the relative position of the occupants within the mining company hierarchy. The Chief Engineer lived closest to the superintendent.



This is a better view of the cottages on the road to the furnace yard. Nearest to the yard was apartments for single furnace yard workers. A larger two-room residence sat between the apartments and another long single-story building that was the company store in the Hacienda. There was also a store on Mine Hill.

La Casa Grande circa 1885



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

55

Halleck built the Casa Grande in 1854. Francis Meyers was the architect. Typical militaristic style that Halleck was used to. Originally planned as a hotel, Halleck decided it was better suited to be his residence, and thus it remained the home of mine superintendents until the mine went bankrupt in 1916 and its vast land holdings were sold off in pieces, with only the 3600-acre mining property intact until it was fully converted to a County park in 1976.

Chinese Ting (tea house) – circa-1885



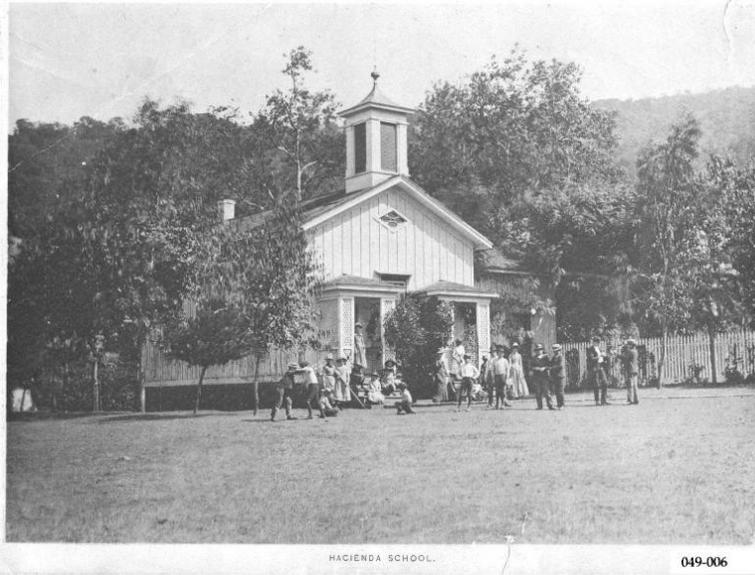
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

56

This pagoda or Ting, a garden temple, was a gift to the mine sometime in the 1850s, but the exact date has yet to be found, possibly 1856. It was said to be a gift from emissaries from the Emperor of China. As mentioned in the prior slide, the Chinese government wanted to purchase New Almaden ore and mercury to make color-fast vermilion ink for official state seals and for Imperial red lacquerware. The pagoda structure, albeit decayed, was pulled apart by souvenir hunters in the 1930s. All that remains today are eight carved pillars and a few carved panels, one or two with a brass pagoda bell.

Original Hacienda School – 1886



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

57

There were three schools in New Almaden, one in each camp. This is the Hacienda school.

Mining Settlements

Mexican Camp (Spanishtown)

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

58

Section divider.

Mexican Camp – 1863, Carleton Watkins



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

59

Watkins made exceptional photographs of New Almaden. There is no positive proof, but he may have been hired to do so by Frederick Billings, the principle attorney defending the New Almaden Company (Barron, Forbes and Company) from the claims of the Fossat group (the Quicksilver Mining Company of New York.) The QSMC for 13 years had hatched plans to steal the mine by using politicians and the courts to wrest it away from BF&C. By the end of 1863, the mine had been “sold” to the QSMC of New York, New York. BF&C did this to at least get some sort of monetary recovery in the face of Supreme Court litigation that was not going 100% in their favor. QSMC had managed to acquire a ranch that incorporated the northern half of the mining claim. This group, fronted by Fossat, who held the rancho title, alleged that Andres Castillero’s mining claim was not legal and valid and therefore the landowner owned the cinnabar mine. The Courts agreed. Corrupt politicians in government even used President Lincoln as a cat’s paw to try to get an injunction enforced by armed military and be appointed agent for the government. Lincoln, distracted with the Civil war, gave the order to seize the mines, but quickly figured out he had been duped and he cancelled the order. None the less, the experience chilled BF&C’s enthusiasm to continue the legal fight. They now knew an English firm operating principally in Mexico and on the west coast stood little chance against well-founded New York and Washington chicanery.

Entrance to Main Tunnel
Sherman Day, Superintendent, on right



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

1999-007-0 12

60

The mine entrances were about a mile from the Hacienda and about 1500 feet higher in elevation. The miners lived first in tents and shacks and then cottages built around the mine openings. This Carlton Watkins photo shows a two-ton load of rich ore being pushed out of the mine. Surveyor and Superintendent Sherman Day is standing to the right, and mine owners to the left, among the wealthiest men in the State.

Mexican Camp – 1863, Carleton Watkins



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

61

This view shows the Main tunnel Planilla on the 300-foot level of the mine, in other words, 300 feet below the peak of Mine Hill. The waste rock from ore cleaning and sorting is dumped down the hillside.

Carleton Watkins – Main Tunnel Planilla, 1863

1863 P15H New Almaden Mine, Watkins CSL



Composite of two separate Watkins photos meant to go together as a single photo. Compositing performed by Nick Wright, Sunnyvale, CA photography historian.

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

62

This is a detail of the sorting shed.

Carleton Watkins – Main Tunnel Planilla, 1863



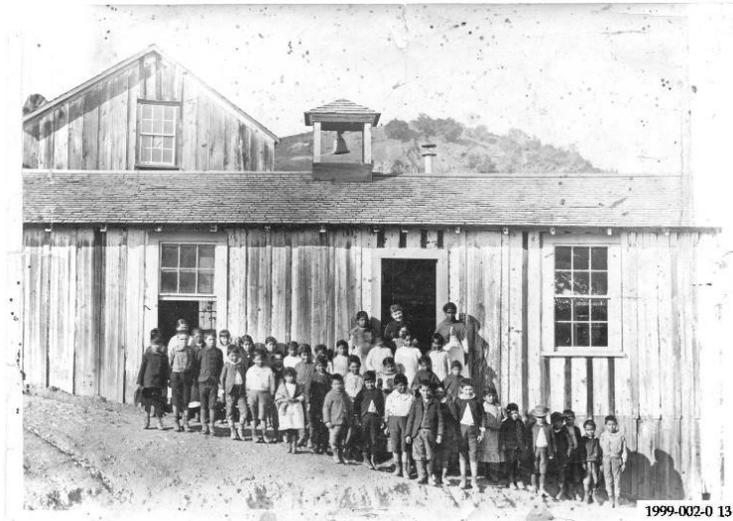
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

63

Inside the sorting shed, showing the individual piles of ore that will be credited to the pay account for the different mining gangs. At New Almaden, mining gangs were independent contractors. The bid on the work by offering a set price for each 300 pounds of ore delivered to the Hacienda furnace yard.

Grade School – Spanishtown - 1863



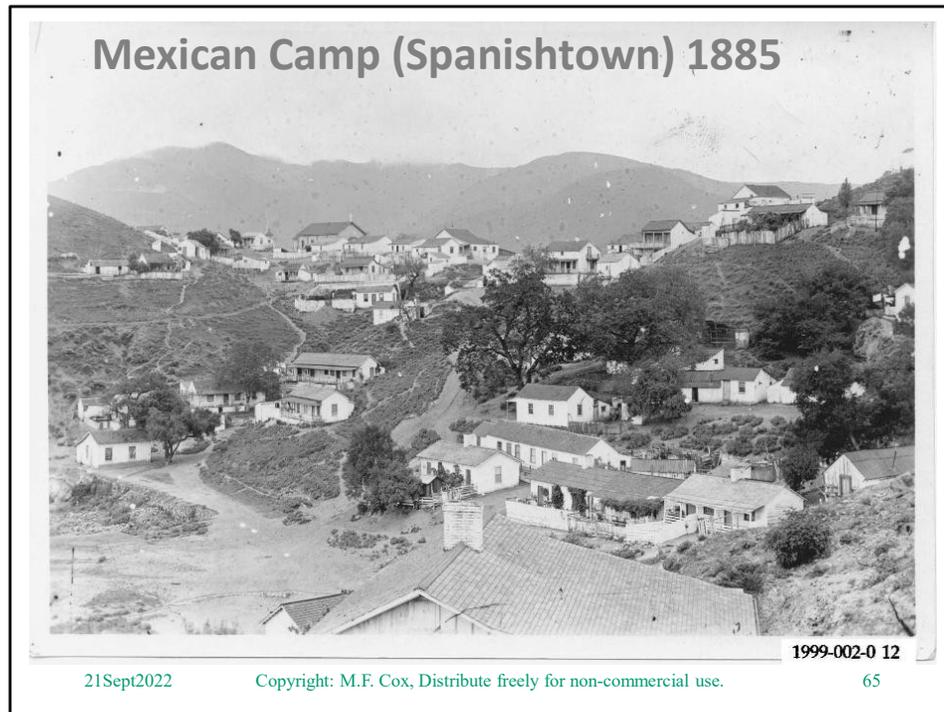
1999-002-0 13

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

64

This is the Mexican Camp school for the lower grades. When graduating to the upper grades, the students will transfer to the English Camp school.



The camps were initially very rough and dangerous. By 1872, a paternalistic and closed management approach had resulted in two orderly and somewhat model communities existing on the Hill: Spanishtown (the old Mexican Camp renovated) and Englishtown.

Catholic Church – Spanishtown – 1886



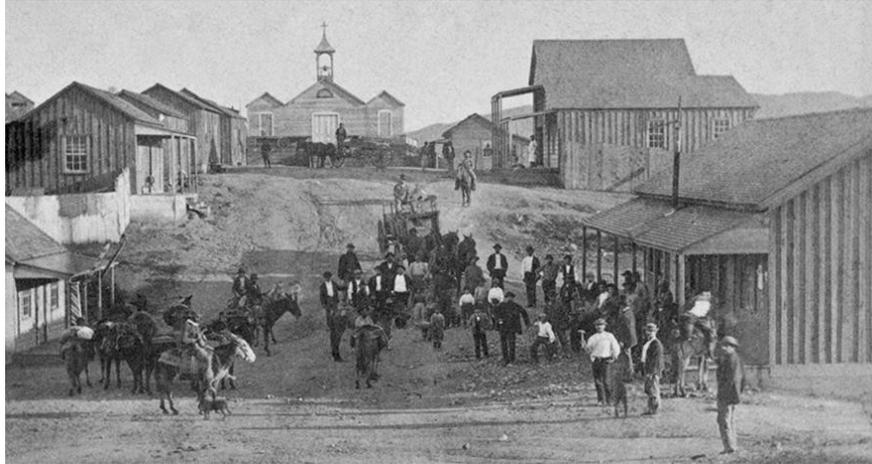
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

66

There were three churches, one in each camp or town.

Mexican Camp, date uncertain, possibly 1890



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

67

This appears to be a photograph of some sort of gathering or celebration. The Catholic church is quite different than that which appears in other photographs. The church was destroyed and rebuilt three times. This may provide a clue as to the date if one could find period descriptions of the church.

Mining Settlements

English Camp (Englishtown)

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

68

Section divider.

Englishtown – 1885



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

69

Englishtown included the Hill office of the mining company, a boardinghouse, infirmary, reading library, and Methodist church. The residents of Spanishtown resented having to walk to Englishtown to shop. Everyone complained about being paid in script and being forced to shop at the company store, which charged higher prices because of middlemen and management fees.

Methodist–Episcopal Church – 1885



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

70

This is the church in Englishtown

Company Store – 1880



1998-009-0 18

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

71

The camp or town residents were obligated to purchase their goods at the company store. They were paid in script good only at the store and had to take a 10% discount if they wanted cash instead. There were two stores, one on the Hill and one in the Hacienda.

Helping Hand Hall – 1887



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

72

The mining company provided Helping Hand halls for reading and recreation – one on the Hill and one in the Hacienda.

History of Mining Production

Last Days of the Mine

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

73

Section divider.

Independent Miners 1946 to 1968



San Francisco Opencut, Jean Camilleri, circa 1964

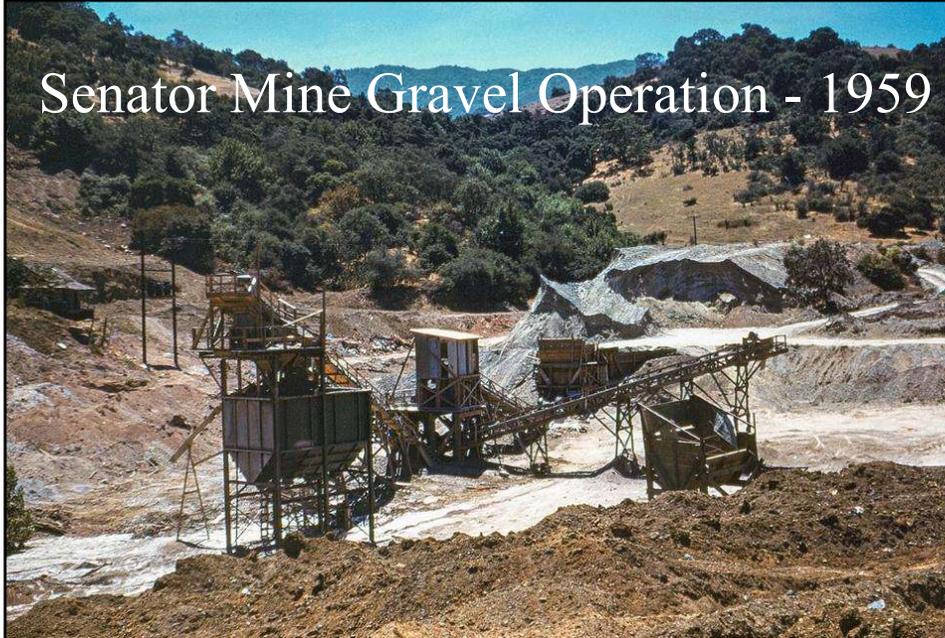
9/15/2020

Copyright: M.F. Cox, Distribute freely for non-commercial use.

74

Beginning in 1940, heavy equipment came to the hill and opencut mining became predominant over underground mining. Here, independent miners are digging a very unsafe (vertical and overhung) opencut to look for cinnabar ore under the grey clayey sediments. The bulldozer is scraping “quicksilver rock” toward the bottom of the pit, where it will be picked up by pan scrapers and taken to the adjacent Mine Hill rotary furnace plant.

Senator Mine Gravel Operation - 1959



2/14/2026

Michael F. Cox, Non-Commercial Use Only

75

Independent miners and small companies of miners wanted to take advantage of the Silicon Valley boom and the higher prices for mercury that came with increased technological demand after WW-II price controls were lifted. Here a company is digging up old mine dump material and processing it into gravel and fill to be sold for the construction of roads and buildings.

Reopening the San Mateo Mine



2/14/2026

Michael F. Cox, Non-Commercial Use Only

76

Woody Goodman bulldozing and Art Morell drilling at the San Mateo mine. They realized the mine contained ore that was overlooked by earlier operators due to its black color. The ore was mainly black mercuric sulfide, the mineral called metacinnabar. This and other small scale mining during periods of high prices for mercury made many of these miners well off financially. Others that never “hit it big,” spent their lives living hand-to-mouth while searching for a strike.

Reprocessing Dump Material



Many miners reprocessed old dump material during periods of high mercury prices. This is a washing plant at the Day tunnel, reprocessing waste rock that contained a small amount of high grade ore. The old times had already picked over the dumps, so the operation was not very productive.

New Idria Mining and Chemical Co. 1968-1973



New 100-tpd rotary furnace, Vic Botts photo, circa

2/14/2026

Michael F. Cox, Non-Commercial Use Only

78

When the WW-II operation shut down at the end of 1945, the New Almaden Corporation removed the 100-TPD rotary furnace from its building. Around 1956, a local businessman, Reno Andy Camilleri, owner of Andy's Pet Shop on N. 1st St. in San Jose, bankrolled the installation of a used 30-TPD furnace they acquired from a mercury mine in the wine country up north. Independent miners could roast their ore in the plant, and Andy would take a percentage of the mercury to pay for the plant and its operation.

Camilleri called his operation "Andy's Mercury Retort," a misnomer. When New Idria Mining and Chemical Company purchased the property in 1968, they paid Andy for the furnace and used it to generate some revenue until they could develop the property into a large-scale operation. NIMCC planned and then installed a new 100-TPD rotary next to the old plant. Sadly, the market price for mercury collapsed just as the new plant was coming on line. It was only test run and then sold to a mercury mine in the Philippines in 1972. NIMCC sold the property to Santa Clara County for open space, keeping a mining option on Mine Hill open until that parcel was also transferred to the County. New Idria leased the parcel to a small group of miners that called themselves the Santa Clara Quicksilver Company, a nod to the original name for the New Almaden mine – La Mina de Santa Clara. The mine closed late in 1975. The mining run spanned 130 years.

Mine Closure

Section title

Mine Opening M-66



Michael F. Cox, photographer

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

80

The mine requires ventilation to reduce the potential for cave-ins and carbon dioxide gas accumulation. Unfortunately a trade off is the release of picogram to milligram concentrations of mercury vapor per cubic meter of ventilated mine air. The underground workings have elevated trace concentrations of mercury in air, both due to natural outgassing, but also because the miners used black powder for blasting and the heat of the powder cooked some of the ore and released elemental mercury.

Paul Stope Closure – Drain, Vent, & Grading



Michael F. Cox, photographer

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

81

A track loader is spreading out coarse rock on a special geotextile that will be folded over the rock and will make a French drain to carry water away from a buried concrete slab constructed over a collapse into very large stope. The slab is under fill at the uphill end of the drain trench. A ventilation tube drilled into the stable ceiling of the room is just visible to the right of center in the background at the top of the photo. A D-9 Caterpillar dozer sits on the bench above the track loader. This dozer belonged to the New Idria Mining and Chemical company, and they used it to excavate open-cuts from 1968 through 1973. The equipment was auctioned off in 1973, and the dozer was purchased by Stevens Creek Quarry in Cupertino, CA. The closure project, under San Jose general contractor George Bianchi, Jr., rented the dozer with operator (Chuck Miller) from the Quarry. The old NIMCC dozer came home to the Hill where it had once been a decade earlier.

San Francisco Opencut Final Grades- 1985



Michael F. Cox, photographer

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

82

When finished, the old ratty open pit looked pretty good. Subsequently, the County decided to use the open pit for the encapsulation of mining wastes excavated from different locations in the park where encapsulation in place was not practical.

The Mine Hill Rotary Furnace 2015



9/15/2020

Copyright: M.F. Cox, Distribute freely for non-commercial use.

83

The ruins of the 30-TPD plant are fenced off. The building was in good shape in 1975 when Parks took over, but neglect, a lack of maintenance or arrested decay, lead to steady and persistent collapse. There is still o active program to maintain the structure.

Environmental Consequences

21Sept2022

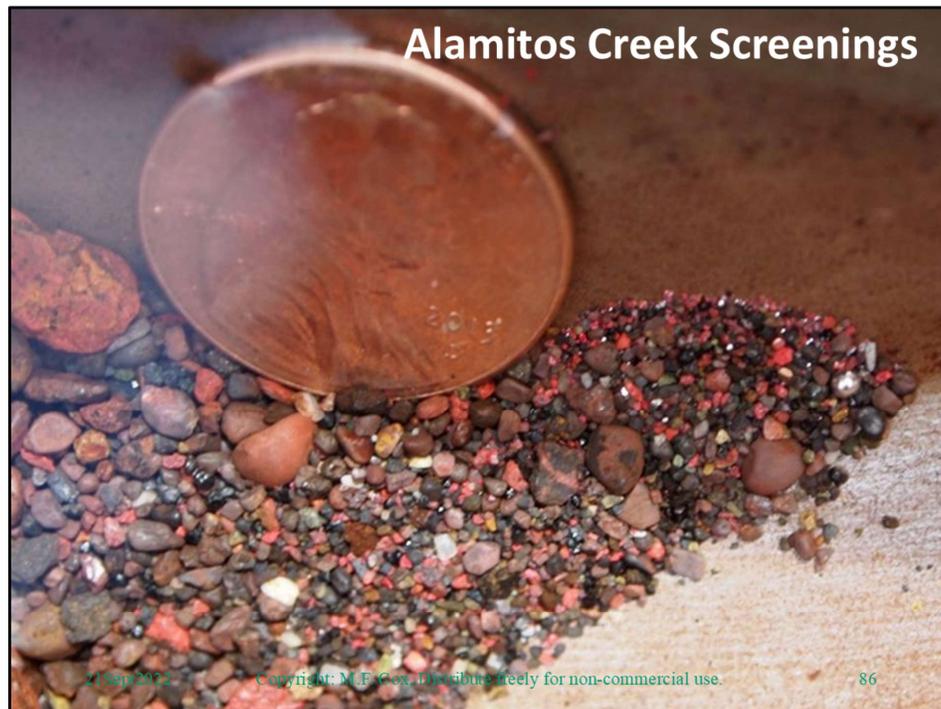
Copyright: M.F. Cox, Distribute freely for non-commercial use.

84

Section divider.



The legacy of the dead mercury industry at New Almaden is easily found in Alamitos Creek downstream of the mine. This is old material, released long ago but still rolling along. It is heavy. It does not dissolve. So it does not move very far or disappear. Nonetheless, the trace amounts of mercury that do escape through water, air, and biota, are great enough to potential harm wildlife. This is why it is best to remove these legacy materials. The impact is not shockingly noticeable, but the impact will continue until this material is removed from the system.



It is not just cinnabar. It is many species of mercury, as demonstrated by analysis work by Adam Jew and others at the Stanford Linear Accelerator Center. There is also a great deal of finely-divided elemental mercury, as can be seen here- the bright silver spots. Notice the larger ball at the right edge of the panned material.

Methyl Mercury

- An organic compound when anaerobic bacteria interact with mercury. Organic mercury is absorbed by plants.
- Plants are eaten by little fish, BIG fish eat little fish.



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

87

Mercury can be concentrated up the food chain, especially by fish, which typically contain more than 1 million times the concentration of mercury in the waters they swim in. Luckily, the fish concentrations are still mostly within the range of concentrations that do not seem to produce any acute and significant impacts. Health consumption guidelines are extremely conservative, so today at least half of the waterbodies in the USA have fish that exceed “safe” guidelines. Opting to be “safe rather than sorry” is good, but also creates a level of concern in the general public that in some cases is not proportional to the risk.

Realizing that mercury methylation is a problem in water reservoirs, the State and local agencies have embarked on research and maintenance programs to try to reduce mercury methylation in water bodies. Results are mixed. The biogeochemical processes leading to methylmercury formation are very complex and not entirely understood.

Cleanup and Restoration

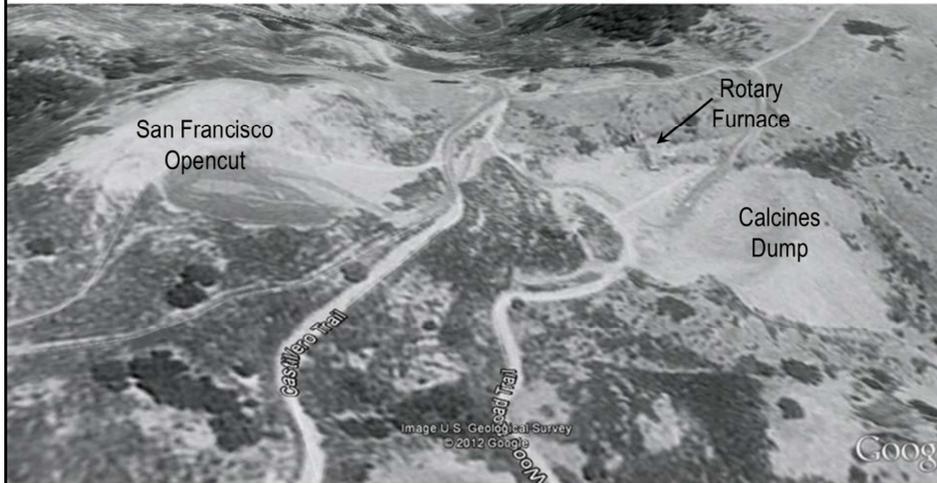
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

88

Section divider.

Mine Hill before Restoration



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

89

USGS aerial photograph of Mine Hill looking northeast, circa 1980s. This plant, placed into operation in November 1941, was the first significant ore roasting on Mine Hill. The New Almaden Corporation, a venture of Newbold and Sons of Philadelphia, PA, took a lease on the mine in 1940 and reopened the old workings. They blocked out marginal ore from the 19th-Century that could be processed in the 20th-Century at a small profit. After enough ore was found, a 100-tpd furnace plant was built on the “big rock” of the site of the former Spanishtown settlement. This plant operated until November 30, 1945. Burnt mercury ore, called calcines, was dumped down the adjacent hillside.

Much of the ore came from opencut work on Mine Hill, including the San Francisco area opencut. After the NAC left the property, small miners sniped out ore here and there, paying a small rent and royalty to the property owner, the Sexton family of Burlingame, CA. In 1956, a local businessman, Andy Camilleri, leased a portion of the property and refurbished the Mine Hill rotary furnace plant, installing a 30-tpd plant. In return for a percentage of the production, Andy processed the ore furnished by groups of independent miners. In 1968, New Idria Mining and Chemical Company purchased the property and continued to operate the furnace until they left in November of 1972 but continued to lease the Hill and the furnace to small miners until June 27, 1975, when the County of Santa Clara acquired the mining lands for open space.

Mine Hill after Restoration



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

90

The County had to abate the calcines by grading and capping them with clean clay soil and concrete drainage ditches. Calcines at the Hacienda furnace yard were graded, and a substantial amount of material was backfilled into the San Francisco open-cut and capped. The nicely-graded cut shown in an earlier slide is now filled with capped burnt ore.

Hacienda Furnace Yard 1926



1997-034-0 42

21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

91

The Hacienda furnace yard is where most of New Almaden's mercury was produced, so it received the most cleanup attention. Originally not part of the park, the ten-acre site was the subject of a development permit submitted by the owner to the County in the very early 1980s. Public outrage demanded that the County acquire the land and add it to the adjacent park. The County was not able to make a deal with the owner, so they used reverse condemnation to try to get the land. The owner sued and the Courts ruled in favor of the owner, telling the County to pay the owner the \$480,000 asking price and all of the owner's legal fees in exchange for the ten-acre site. Weeks after the transaction closed, the State of California Department of Toxic Substances Control asked the County to begin an investigation and cleanup project of the site.

The County could not respond quickly and DTSC grew impatient, so DTSC rented a helicopter, flew into the park, jumped out and took samples for total mercury analyses, and then added the park to the cleanup demand based on the sample results. Investigations started in 1986, and cleanup started in 1990. DTSC signed off on the work around 2005, and at that point the California Regional Water Quality Control Board told the County that the work done for DTSC to protect health and environment was not good enough to eliminate mercury from fish in the watershed and San Francisco Bay. Investigations and cleanup pursuant to Board orders continue to this day and will likely never end. So far two different RWQCB managers have retired on New Almaden, and a

third is now at work to do the same. Meanwhile. . .

Hacienda Furnace Yard 1979



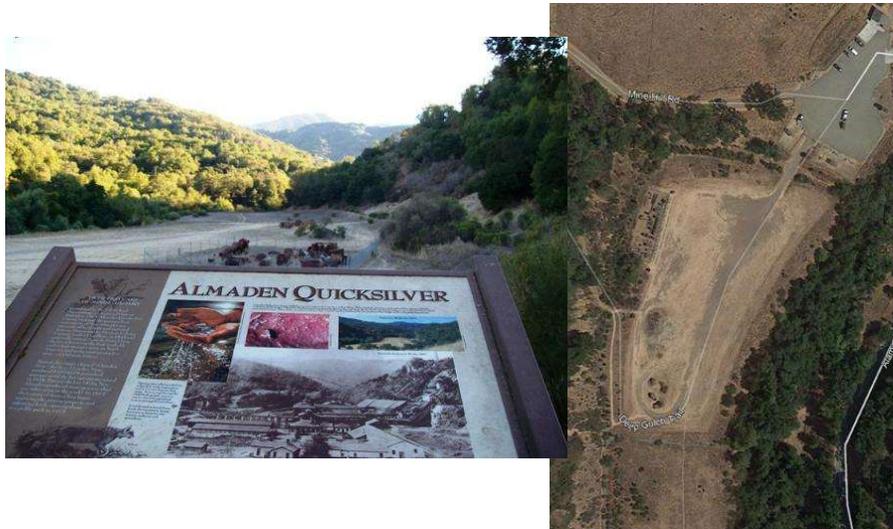
21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

92

This is the Hacienda shortly before it was acquired by the County. Charles and Michael Cox took this photo around 1977. Michael was a freshman at San Jose State University, majoring in geology.

Furnace Yard Remedial Cap - 2005



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

93

So far in the history of modern environmental mercury cleanup, the result of all the environmental testing is pretty-much always the same. Waste materials with elevated mercury content are graded and capped with several feet of clean clay soil or hauled away to a special landfill. To the left is a recent picture of the Hacienda and to the right is what the site looks like today, a satellite image from 2018 courtesy of Google Earth™. The piles of pinkish burnt ore in the previous photograph were graded and encapsulated under a clay cap and concrete wall along Alamos creek (to the right in the right photograph.)

Mercury Mining Interpretive Center



21Sept2022

Copyright: M.F. Cox, Distribute freely for non-commercial use.

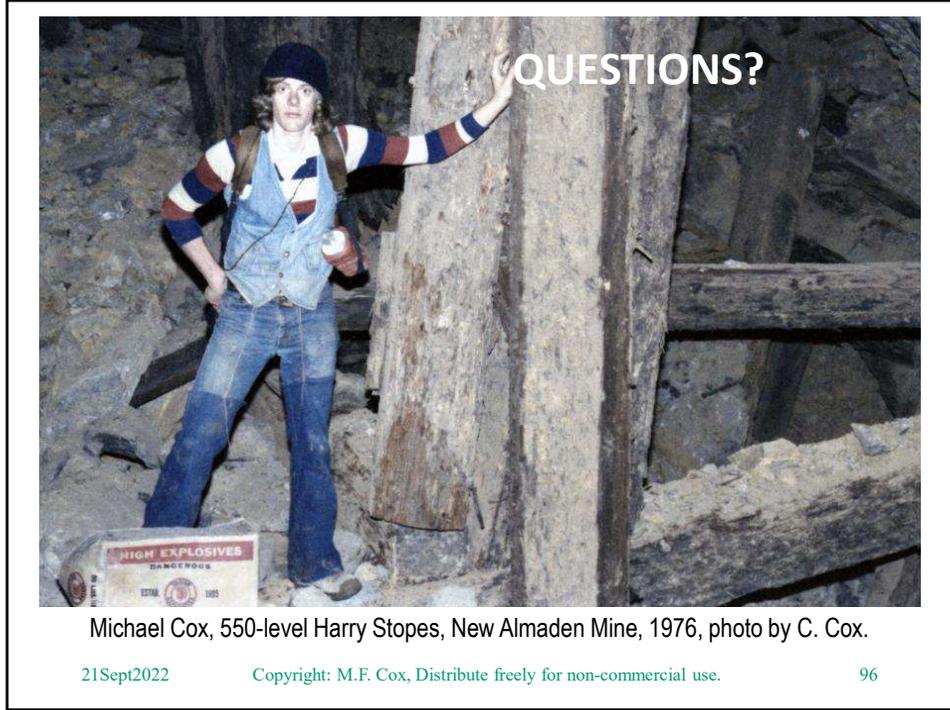
94

This award-winning photograph by Ronal Horii, a board member of NAQCPA, is of the fully-restored Casa Grande, the former home of the mine superintendents from 1854 until 1926. After the mines closed, the residence became “Club Almaden,” a weekend retreat with restaurant, bar, swimming pools, and a playhouse for stage performances. The playhouse was built on the left side of the structure and was taken off during renovations as it would have cost too much money to restore, and historic grant monies would not apply to the modern addition. The restored Casa Grande is home to the New Almaden Mercury Mining Museum, a collection of mining-related items largely from the older New Almaden Mercury Mining museum established by Constance Perham in 1949 and operated by her, open to the public, from 1950 until she retired in 1983. NAQCPA was instrumental in raising money and support for purchasing the museum and modernizing the operation with the County. Today, the building houses what is one of only five significant mercury mining museums and interpretive centers in the world, the others being Almaden Spain, Idrija, Slovenia, Monte Amiata, Italy, and Huancavelica, Peru.

Online Links to More Information

- SCCP&R
 - <https://parks.sccgov.org/santa-clara-county-parks/almaden-quicksilver-county-park>
 - <https://parks.sccgov.org/plan-your-visit/activities/cultural-venues/almaden-quicksilver-mining-museum>
 - <http://sccparks.pastperfectonline.com/>
- NAQCPA
 - <http://www.newalmaden.org/>

Self-explanatory.



This 18-year-old did not understand that the mercury industry had no future, but he had a good run anyway. This concludes the talk. I hope you enjoyed it.