

Chapter 11 The Second Golden Age of the Taisho Era

“The Present and the Future,” a booklet published by the Ichinokawa Mine Co. Ltd in June 1917, conveys the following goals:

“The Ichinokawa Mine is a world-class antimony mine due to the high quantity and quality of its deposits, yet because of immature smelting technology and a lack of knowledge about the world antimony market, the market remains in the grip of Western businesses. Ichinokawa’s potential is untapped. This waste of heaven’s blessings was seen as a loss to the nation of Japan, which led to the establishment of the Ichinokawa Mine Company by concerned parties in 1916. The company will increase capital, expand operations, install equipment, and show the international value of the mine.”

Accompanying this statement, the booklet contains a report on the current state of the mine, a plan to increase capital, and photographs.

With the outbreak of war in Europe, the market price of antimony rebounded, and in 1915 the mine installed a hydroelectric power plant at Gomahara so that the mine could generate its own electricity. Winches, drainage pumps, and an ore separation table were also installed and there was a successful test of ore powder floatation separation methods. The equipment for this separation method was completed, allowing 7.5 million tons (200 million *kan*) of stockpiled discarded ore to be refined further, yielding 4-5% antimony. Furthermore, smelting furnaces were remodeled in the German style allowing for increased yield and the production of the components of sulfur dyes as a byproduct. They designed a plan to dramatically increase the scale of the mine by importing ore from China for refining, to buy promising mines in Japan, and by either buying or launching joint

ventures with mining regions in China. In order to realize this plan, they intended to quadruple their capital to 800,000 yen.

These are undoubtedly signs of the second golden age of the mine.

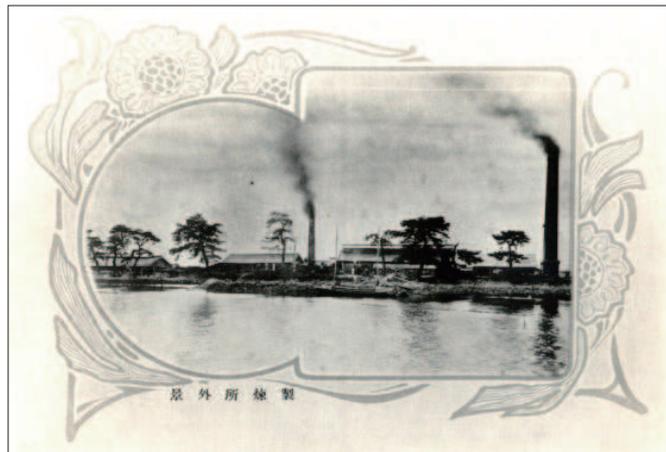
Luckily, images from this period remain for us to study.

First, let's examine the six images published in the 1917 booklet "The Present and the Future."

Exterior and interior views of the refinery (The mouth of the Honjingawa River)

This facility boasted majestic chimneys belching black smoke. The multi-stage repetition smelting process was carried out in the reverberatory furnace.

Yoshihide Matsumoto remembers many things from this period. Slag discarded at the Doba refinery was reprocessed. Galvanized iron sheets used to improve antimony separation were piled up in the storehouse. Villagers gossiped that Mr. Shinohara, the head of the plant, received a large monthly salary of 500 yen.



Refinery at the mouth of the Honjingawa River (year unknown). Ichinokawa Community Center archives.

The mine office

People used to visit the shrine to the mountain god by following a path along the edge of fields that was lit by electric lamps. Along the riverside at the bottom of the photo you can see the Gomahara hydroelectric power plant and a concrete waterway

leading to the ore sorting plant. This water collected in a trough along the road, making it a good rest area. The square roof visible in the distance belongs to the mine office,



The ore sorting plant and mine office (Sept. 13, 1968). Taken from the entrance to the Senga-ko adit, this photo shows the wooden bridge leading to the ore sorting plant. The building on the upper left is the mine office. See page 27 for a photo of the interior of the ore sorting plant. Saijo City Local History Museum archives.

which had a modern design. The office had creaking doors that were fashionable at the



Ore sorting plant and power plant at Gomahara (c. 1914-17). Saijo City Local History Museum archives.

time. It was also apparently sometimes used as a hospital.

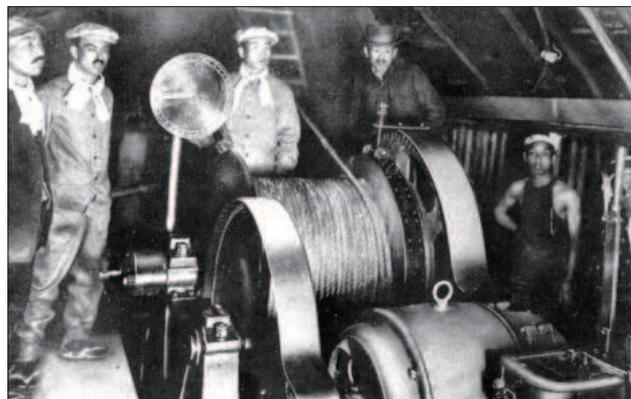
The ore sorting plant and power plant

Newly-mined ore was sorted by hand, and older, processed ore was re-sorted by machine. In order to ensure smooth sorting

operations, the mine was divided into five regions that were assigned designated sorting times: Region 1 (Taisei), 2 (Senga and Nuta), 3 (Noboritate and Keyakidani) 4 (Asahi and Oo-jiki), and 5 (Unagi). Ore received from miners would first be test-sorted and the miners would be paid according to its yield rate.

Winch

This 50 horsepower winch was used inside the Taisei-ko mine to pull mine carts loaded with ore.



Winch (year unknown).
Saijo City Local History Museum archives.

Image of Ichinokawa and afforested area

The Kinsui-ko mine is visible in the distance.

Now let's examine some other photographs.



Ichinokawa Mine and surrounding forestland (c. 1916).
Saijo City Local History Museum archives.

The mine office viewed from a distance at Suisho-jiki

This photograph shows approximately 120 buildings and two bridges. According to Sadayoshi Ito, the number of total number of employees in the mine

at this time, both in the mine and aboveground, was never less than 200.

Asahi-jiki adit viewed from distant Keyakidani-jiki adit

The word “asahi” means “morning sun” in Japanese, and this adit was named because its eastward-facing portal would receive the full light of the rising sun. As at other large deposits in the Ichinokawa complex, you can see an ore sorting plant, ore beating huts (the first stage of separation), and many other buildings. It is said that even today you could see sparkling stibnite inside this adit.

The Oo-jiki adit viewed from a distance at Fukasako

The Oo-jiki entrance is just opposite the Ichinokawa Community Center. Today it is overgrown and difficult to identify.



The mine office viewed from Suisho-jiki adit (c. 1914-1918). Ichinokawa Community Center archives.



The Asahi-jiki adit viewed from Keyakidani-jiki adit (c. 1916). Saijo City Local History Museum archives.



Oo-jiki adit viewed from Fukasako (year unknown). Ichinokawa Community Center archives.

The ore sorting plant (the second stage of separation)

A *yurifu-san* (female ore separator) wore a *karusan*, a work garment resembling a short *hakama* (pleated skirt). She sat on a large cushion and shook the ore in a sifter over a waterproof cover on her knees. The *yurifu-*



Yurifu-san at work in the ore sorting plant (year unknown). Saijo City Local History Museum archives.

-san would raise a basin out of a 1.2 square meter tank of water and separate the ore from the rock in a shallow, round sifter. The stone would be discarded and the stibnite would be placed into a large, deep container. The silt remaining at the bottom of the basin would be sorted further, and the stibnite placed on the rim of the container. Once enough stibnite had been collected, it would be transferred to the large container.

Photographs of adit entrances

The Nuta-jiki (literally “swamp-field deposit”) takes its name from the adit’s riverside entrance, which made the ground muddy. From here an entrance 2.5 square meters in diameter was mined downwards and used to remove ore. The vertical passageways used by miners had sturdy ladders made from pine. In narrow sections rough steps were used.



Senga-ko adit entrance.
Saijo City Local History Museum archives.



Unagi adit entrance.
Saijo City Local History Museum archives.



Asahi adit entrance.
Saijo City Local History Museum archives.



Nuta adit entrance.
Saijo City Local History Museum archives.

Ore transportation

Horse-drawn wagons were used to transport the ore in straw bags (kamasu) to the refinery at Doba. These bags were piled in a huge heap at the refinery. People thought that the empty straw bags would make good fertilizer and tried using them in their fields, but in fact they couldn't be used. The Doba refinery stopped operation around 1918.

As you can tell from these photos taken in around 1915, the mine's managers overspent on facilities during this second golden age. The end of World War I in 1917 meant it became more difficult to raise capital, and the mine ceased operations in 1918.

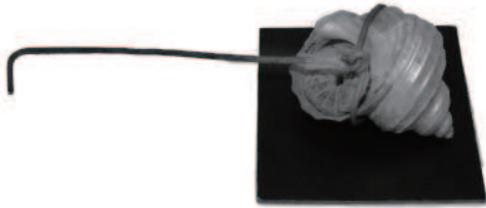
This golden age in the Taisho period was the last time the mine would be staffed by hundreds of workers.



Workers at the entrance to an adit (c. 1916). This adit was large enough for mine carts. Saijo City Local History Museum archives.

Chapter 12 Work in the Mine

Let's examine what work in the mine was like as told by Ichitaro Sogabe and Yazo Yano, who were employed at the mine from 1893, and Tsurumatsu Ito, who worked at Ichinokawa from 1931.



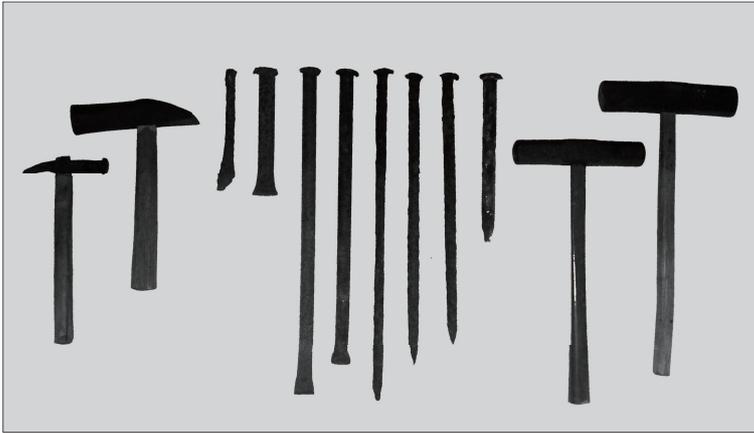
Seashell lamp (*ratou*). A simple lamp made from a turban shell filled with rapeseed oil. The wick was made from cotton. From the collection of the Saijo City Local History

The lamp (*akari*) was indispensable for work in the mine. When Yano began working in the mine in 1893, lamps were made from seashells filled with oil, likely turban shells. They also used iron lamps, but gas lamps appeared much later.

Before the Meiji period, adits were dug primarily with hammers (*setto*) and chisels (*nomi*); hard rock was heated with charcoal. Gunpowder was used from the Meiji period. Miners used the hammer and chisel to bore a roughly 60 cm (2 *shaku*) hole in the rock, into which many grain-sized gunpowder pellets were inserted. A fuse (*hinawa*) was used to light the gunpowder, but this process was still a far cry from dynamite in efficacy. However, if they had used boring machines and dynamite to blast adits, the mine would not have produced large stibnite crystals. Using gunpowder was the very reason miners were able to safely collect the brilliant crystals. Yano believes that the well-known 90 cm (3 *shaku*) stibnite crystal specimen produced in 1880 was mined by hand using a kind of chisel known as a *tagane*.



Gas lamp. An acetylene lamp with adjustable brightness. From the collection of the Saijo City Local History Museum.



(left) Separating hammer (kaname-zuchi). A tool used to separate mineral (stibnite) from excess rock and earth.

(center) Chisel (nomi).

(right) Hammer (setto).

From the collection of Ichinokawa Community Center.

Only miners very skilled in chisel-work (*sukashi*) were able to remove large crystals from cavities without damaging them. The cavities where crystals formed were hollow, so they echoed the footsteps of passing workers. This was how they were located. With great care, the miner would dig approximately 90 cm around the crystal. The crystals were very malleable while inside the cavities, so miners would remark “It’s still growing.” Once exposed to the air, the crystals harden.

Especially large adits such as the Senga-ko were approximately 2.5 x 2.5 meters in diameter. Smaller named adits were 1.5 m x 1.8 m, and unnamed adits were only 90 cm x 1.2 m in diameter, requiring miners to crouch to pass through them. Named adits had tracks for hand-carts, but in smaller unnamed adits rock was removed in boxes pulled by ropes over the shoulders of miners. Once removed, the rock was taken to huts at shaft entrances where women known as *kanametataki* separated ore from rock using hammers.

As the rock is hard, the adits did not need any support braces.

Working by hand in shifts, miners could dig only 10 cm a day into this hard stone, but after the introduction of pneumatic drills this increased to over 1.5 m.

The discovery of a rich stibnite vein was known as “piercing a great vein” (*oobaku wo kiru*) and was celebrated with a banquet: drinking and singing that would last continuously for 2-3 days.

On the other hand, the miners were pale and developed breathing disorders, and it is said that 99 in 100 would die by age 50. As a result, the mine left many widows. Exposure to stibnite is said to be bad for the body, and many miners probably developed the lung disease silicosis.

Chapter 13 Mining Songs

Miners, *kanametataki* beaters and *yurifu-san* sorters each had work songs. When sung by 30-40 voices, these songs echoed throughout the mine and ore separating facilities.

Most of these songs are lost, but we can introduce two that remain.

“Settobushi”

While working as an apprentice, Yano often sang this song. When using only a rock hammer (*setto*) to dig, miners would time their strikes to the rhythm of the song. In 1961, Yano, Ichitaro Bunno, Sadayoshi Itou, Harumi Akiyama performed this song during a symposium at the Saijo City Local History Museum.

San'to kofu nya te-ranpu ga sugiru

Koute ageyozo mensazae

Hand lamps are too nice for third-class miners

Let's buy them some turban shells

“Mensazae” refers to the turban shells that were filled with oil and used as simple lamps by miners. Miners were classified into first, second, and third class and as such shell lamps were probably thought to be appropriate for the third-class miners.

A song popular with ore beaters (*kanametataki*)

This song was performed by Matajiro Ito.

Iyo no Saijo Saijo no meibutsu wa

Bujo no sakura ya Kannon-do

Ikoka yameyoka Tano-ya no nikai

Kado no Kaga-ya no meibutsu wa

Udon ni soba ni gomokumeshi

Agaru okyaku wa Hono ni Maruno ni Ichinokawa

Choito agaryanse

Saijo of Iyo, Saijo is famed for

The cherry blossoms of Bujo and the Kannon-do Temple

Should we go? Should we not? The second floor of Tano-ya

The corner shop Kaga-ya is famed for

Udon and soba and gomoku-meshi (a mix of fish, meat, and vegetables)

Customers come from Hono and Maruno and Ichinokawa

Stop on by for a little while

This song is interesting in that it conveys the mine's most successful years. The miners were prosperous and able to spend their earnings freely in town.

According to Matajiro Ito, people came from Iioka and Ohama to the mine carrying buckets and vegetables. After crossing the Banya area they sold the vegetables to the miners and carried human waste (night soil) home in the buckets for use as fertilizer.

Chapter 14 The Mine in the Showa Era

According to Tsurumatsu Ito, during the period from 1931 to the mine's closure in 1957, 1932-33 were the years when the mine had the most workers. There were some 40 miners, 5-6 *yurifusan*, and 20 apprentices, totaling about 70 workers. In most other years during this period there were about 30-40 workers.

At the time, the average miner was expected to produce 3.75 kg (1 *kan*) of ore in a day, which fetched a price of 0.6 yen. Women workers received about 60% of a male worker's salary. Even unproductive workers could dig up between 75 to 112.5 kg (20-30 *kan*) in a month, and skilled miners produced 187.5 to 225 kg (50-60 *kan*) and earned a lot of money.

Bonuses of rice were given to miners who exceeded quotas: a yield of more than 187.5 kg was worth 30 kg of rice; a yield of more than 375 kg was worth 60 kg. Accordingly, miners who produced 700 kg received large rewards of both money and rice, the latter had to be carried down from the mountains on horseback. Skilled and successful miners gained influence.

In 1926, the mine was jointly managed by Takehei Ito and Fusakichi Takahashi. After Ito's death in 1936, Fukumatsu Yano succeeded him.

At that time, miners would receive raffle tickets for New Year's. Prizes included practical goods like clocks, clothing, and *jikatabi* (split-toed heavy cloth shoes). Tsurumatsu Ito recalls winning an alarm clock. In today's terms, we might call this raffle a year-end bonus for the workers.

During World War II, the Ministry of Commerce and Industry ordered a production increase and the mine expanded operations, but was unable to improve its output. Before the end of the war, the Sumitomo Metal Mining Co., Ltd. conducted a survey of the mine but was unable to find any significant deposits. The survey was ceased with the end of the war. After the war ownership of the mine

passed to Sumitomo, and operations were temporarily suspended in 1947.

In 1951, Ichitaro Miki was dispatched by Sumitomo to conduct a manual survey of the area's deposits. From 1954 machines were installed to bore specimens for surveys, but operations were ceased entirely in 1957.

The mine office, ore sorting plants, machinery houses, storehouses, bathhouses, tenement houses and a guest house were destroyed one after another, leaving only the rock portal described at the beginning of this booklet. According to a connected party, there are still undiscovered deposits of antimony at Ichinokawa. Someday the brilliant light of stibnite crystals might catch our eyes again, as it first did many hundreds of years ago.

Afterword

I hope that you have gained a clear understanding of what sort of mine Ichinokawa was.

The first part of this book, covering the mine's history until the Meiji period, was adapted from *The History of Ichinokawa Mine* by Masataro Sogabe. Mr. Manabu Akehi lent out his copy for this purpose. The second part of this book draws on several sources including an article about Ichinokawa in *The History of Shikoku's Mines* (Shikoku kozan-shi), published by the Shikoku Bureau of Economy, Trade and Industry and borrowed from Mr. Isobe. Sources also include interviews with former miners and a tape recording of the symposium conducted in 1961 at the Saijo City Local History Museum. I am truly grateful to everyone who helped make this project a reality.

On Feb. 6 and 14 (1983), I visited Ichinokawa with Matajiro Ito. The site of the mine is covered in grass and earth and little remains as it originally was. I reconfirmed the importance of creating an accurate and detailed record of the mine as an important cultural property of our hometown. It was impressed upon me that the mine must not disappear both from the earth and from people's memories.

In closing, I would like to welcome reader submissions of any information about the mine no matter how small or seemingly insignificant. Your guidance and support are a valuable part of our endeavors.

Isamu Ito

Director, Ichinokawa Community Center

1983

Appendices

1. From the Translator (1998)

In September '95, we launched upon this translation, being proposed by Miss Patty Kameya, who had been a CIR of Saijo-shi. Monographical contents and insufficiency of our working force have brought a progress at a snail's pace. However, this time, Miss Lynn Lee, who is the incumbent CIR, carefully and energetically looked over our "English," making necessary corrections from page to page, so much so that the Ichinokawa Mine had to be published.

We should be greatly indebted to Miss Lynn Lee for her kind help.

May 1998. Public Relations Section, ELIS

Saijo-shi, Ehime-ken

2. From the Translator (2016)

This booklet was first published in English in the 1990s. It was the result of months of hard work by members of ELIS (English Language Interpreters of Saijo, the name of which has since changed) and the first two Coordinators for International Relations of Saijo City.

In 2014, interest in Ichinokawa Mine was rekindled in large part to the efforts of Saijo High School students, their science teachers, and other members of the community interested in preserving and publicizing this valuable historical site. These activities culminated in a well-attended symposium in August 2014, which featured comments by renowned scientists Sir Colin J. Humphreys of Cambridge University and Hiroshi Harada of the National Institute for Materials Science.

An organization of citizens called the "Ichinokawa no mirai wo kangaeru kai" interested in preserving and promoting Ichinokawa was formed and requested an update of the English translation through the Ichinokawa Community Center.

This translation was completed by John Wheeler, the city's 10th Coordinator for International Relations, with invaluable consultation from Ichinokawa Community Center Director Hiroki Watanabe, Richard Westrop, and Fusako Miura. This booklet was designed and edited by Fusako Miura.

For any inquiries about Ichinokawa Mine, please contact the "Ichinokawa no mirai wo kangaeru kai" at info@ichinokawa.org (English inquiries accepted). To learn more about Ichinokawa, visit ichinokawa.org

The History of Ichinokawa Mine

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