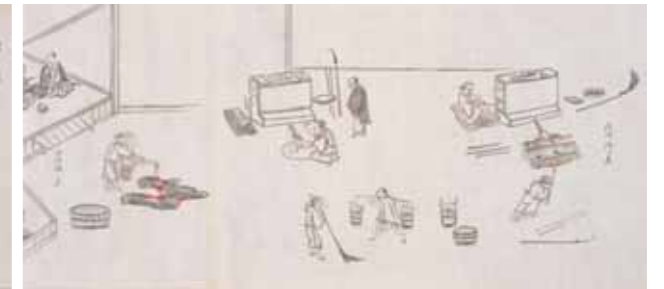


# Mining and Refining Silver Techniques

picture scroll of Iwami-Ginzan Silver Mine (Property of Toshiro Nakamura)



Over 600 Mabu, or old mines in which silver was mined, can be found in the Mountain. One of the representing Mabus is the Ryugenji Mabu, which lies at Yasumidani Valley, in the depths of the Iwami-Ginzan Silver Mine site. While this is the only Mabu which can be visited, only a portion of it is open to the public, as the shafts dug like ant holes are inaccessible. The privately owned "picture scroll of Iwami-Ginzan Silver Mine" describes how the miners were at work. Let's follow the picture scroll to find out how silver was mined in those days.



Ryugenji Mabu



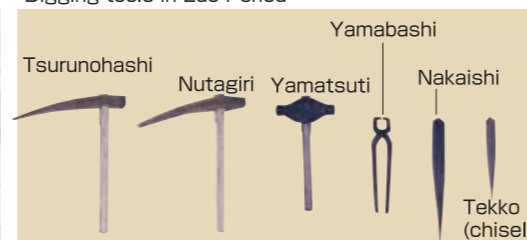
Scene Where Kanahori enters Mabu

## Digging

Mine Shafts called "Mabu" is a world of darkness. To light this darkness, miners used a lantern made out of turban shells. According to a record from 1858, 39 workers were digging for silver ore in two shifts in the Ryugenji Mabu. 24 miners called "kanehori" dug with a chisel, and 10 ten-year-old boys called "tego" helped digging while five workers carried out useless ore.



Digging tools in Edo Period



## Pumping out water

Water gushes out from the ground as the shaft reaches deep into the earth. The miners used their physical strength to pump out water with the type of wooden pump.



## Sending in air

In the depths of the mine ventilation was extremely poor, and many miners fell ill. It is said that they celebrated longevity when they lived to be 30 years old.



## Carrying out silver ore

The work of carrying out ore was called "karayamaoi". The workers picked up the ore from the ground and carried them out on their backs through the narrow tunnel.

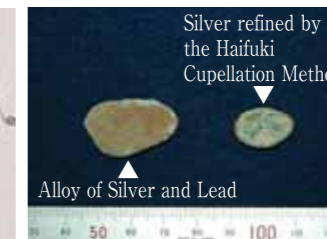


## Refining Silver - Haifuki Cupellation Method

The Haifuki method, which passes air over a mixture of lead and silver to sort the silver from the raw ore, was first introduced to Japan at Iwami-Ginzan in the early 16th century, and later spread to other mines throughout the country. This revolutionary technique made it possible for the country to substantially increase its production of quality silver, triggering economic reform in East Asia and cultural exchanges between the East and West.

### The refining process can be divided into:

1. Crushing the silver ore;
2. Adding a solvent (lead, manganese, etc.) to melt it and remove any impurities (iron, etc.) that come to the surface, creating an alloy of silver and lead; and
3. Melting the alloy over an ash bed and blowing air across it to separate the silver from the lead.



Property of Ohda City



Product (Gokuyogin currency) Property of Currency Museum, Bank of Japan

## Clues to the elucidation of the Haifuki method

Excavations have found an iron pan that was used when this technique was first introduced to Iwami-Ginzan. The pan was unearthed near the peak of Mt. Sen'noyama (470m above sea level), in remains from the days when the mine was in its infancy. Approximately 20cm in diameter, the lipped pan was used for cooking. Paving stones and iron tongs were also unearthed. Iron, Manganese, Lead and Calcium were detected in the ashes that were found stuck to the inside of the pan.



Iron Pan Property of Ohda City