

# HIGHLIGHTING *Japan*

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THE JAPANESE AND GOLD (PART I)

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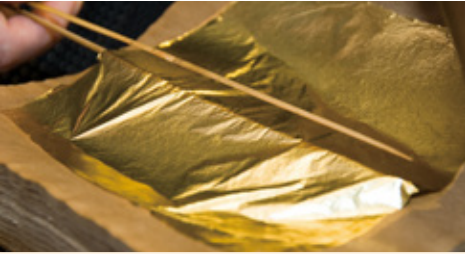
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THEME FOR **OCTOBER:**

**THE JAPANESE AND GOLD  
(PART I)**

**G**old has been a cherished aspect of Japanese culture since ancient times. Many historical examples of gold-covered structures and artifacts survive, such as the Konjikido (Golden Hall) (pp. 10-11) at Chuson-ji Temple, Iwate Prefecture, and the Yomeimon Gate at the Nikko Toshogu Shrine (pp. 12-13), Tochigi Prefecture. For centuries, Japan was one of the world's largest producers of gold (pp. 7-9), with mines such as that preserved on Sado Island in Niigata Prefecture (pp. 16-17), and this is reflected in gold's lavish use in huge gold-leaf-backed screen paintings (pp. 20-21), luxurious fabrics (pp. 22-23), as well as in everyday objects. In Part I of a two-part Feature, we introduce some of the ways in which Japanese people have cherished gold.



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**ON THE COVER**

The Yomeimon Gate at the Nikko Toshogu Shrine; two sides of a *koban* gold coin produced on Sado Island; a pen holder, sake cups and mirror decorated with Kanazawa gold leaf

Photos: hojoj0123/PIXTA; Courtesy of Kanazawa City; Courtesy of Golden Sado Inc.

**EDITORS' NOTE**

Japanese names in this publication are written in Japanese order: family name first, personal name last.

## PRIME MINISTER KISHIDA'S ATTENDANCE AT THE GLOBAL FUND'S SEVENTH REPLENISHMENT CONFERENCE

On September 21, 2022, Mr. Kishida Fumio, Prime Minister of Japan, attended the Global Fund's Seventh Replenishment Conference hosted by the Honorable Joseph R. Biden Jr., President of the United States of America, during his visit to New York to attend the United Nations General Assembly. The overview is as follows.

The conference was attended by more than 300 people from various governments, private companies, private foundations and the civil society, including Prime Minister Kishida, President Biden, H.E. Mr. Emmanuel Macron, President of the French Republic, Rt. Hon. Justin Trudeau, Prime Minister of Canada, H.E. Mr. Olaf Scholz, Chancellor of the Federal Republic of Germany, H.E. Dr. Ursula von der Leyen, President of the European Commission, as well as Mr. Bill Gates, Co-Chair of the Bill & Melinda Gates Foundation.

At the conference, Prime Minister Kishida noted the need for all stakeholders of the international community, including donors, implementing countries, private companies and the civil society, to mobilize all efforts to achieve the goal of ending the three major infectious diseases (HIV, tuberculosis and malaria) by 2030.

Prime Minister Kishida also stated that strengthening health systems under the initiative of the Global Fund will lead to better preparedness for future pandemics and contribute to achieving Universal Health Coverage (UHC). He also stressed the need for all parties to work together to accelerate such efforts.

In light of these ideas, Prime Minister Kishida announced that Japan will contribute up to 1.08 billion dollars over the next three years to the Global Fund, which was established following the G8 Kyushu-Okinawa Summit.

Prime Minister Kishida went on to refer to the G7 Hiroshima Summit to be held next year and stated that Japan will continue to exercise leadership in the field of global health, working closely with relevant parties. He said that such initiatives are intended to help strengthen international frameworks that contribute to enhancing prevention, preparedness and response to future pandemics learning from COVID-19 experiences, as well as to achieve UHC for strengthening the response to a wide range of global health challenges, including



Prime Minister Kishida delivers his speech at the Conference

countermeasures against infectious diseases, which have been undermined by the COVID-19.

### SPEECH BY PRIME MINISTER KISHIDA

<https://www.mofa.go.jp/mofaj/files/100395953.pdf>

### [Reference 1] Global Fund

Established in 2002 in Geneva, the Global Fund has served as a major public-private partnership dedicated to providing support for countermeasures against infectious diseases, which were first addressed as a major summit agenda item at the G8 Kyushu-Okinawa Summit in 2000. Since its establishment in 2002, the fund has helped to save more than 50 million lives from the three major infectious diseases (HIV, tuberculosis and malaria), as well as to reduce deaths from the three diseases by 46% in more than 100 supported countries. The fund has also contributed to the achievement of Universal Health Coverage (UHC) and the prevention of the spread of infectious diseases through providing test laboratories, surveillance, community networks and trained healthcare workers for countermeasures against the three major infectious diseases that have also contributed to the fight against the COVID-19.

### [Reference 2] Universal Health Coverage (UHC)

To ensure that all people can receive the quality health services they need at an affordable cost without financial hardship.



Prime Minister Kishida (second from left) at the photo session

Photos: Courtesy of Cabinet Public Affairs Office

Note: This article was created with the consent of the Ministry of Foreign Affairs of Japan and on the basis of materials published by the Ministry.

“Maple” by Hasegawa Tohaku (National Treasure, Chishakuin Temple. Height 180.0 cm, Width 563.0 cm)  
Photo: Courtesy of Chishakuin Temple



# The Japanese and Gold (Part I)



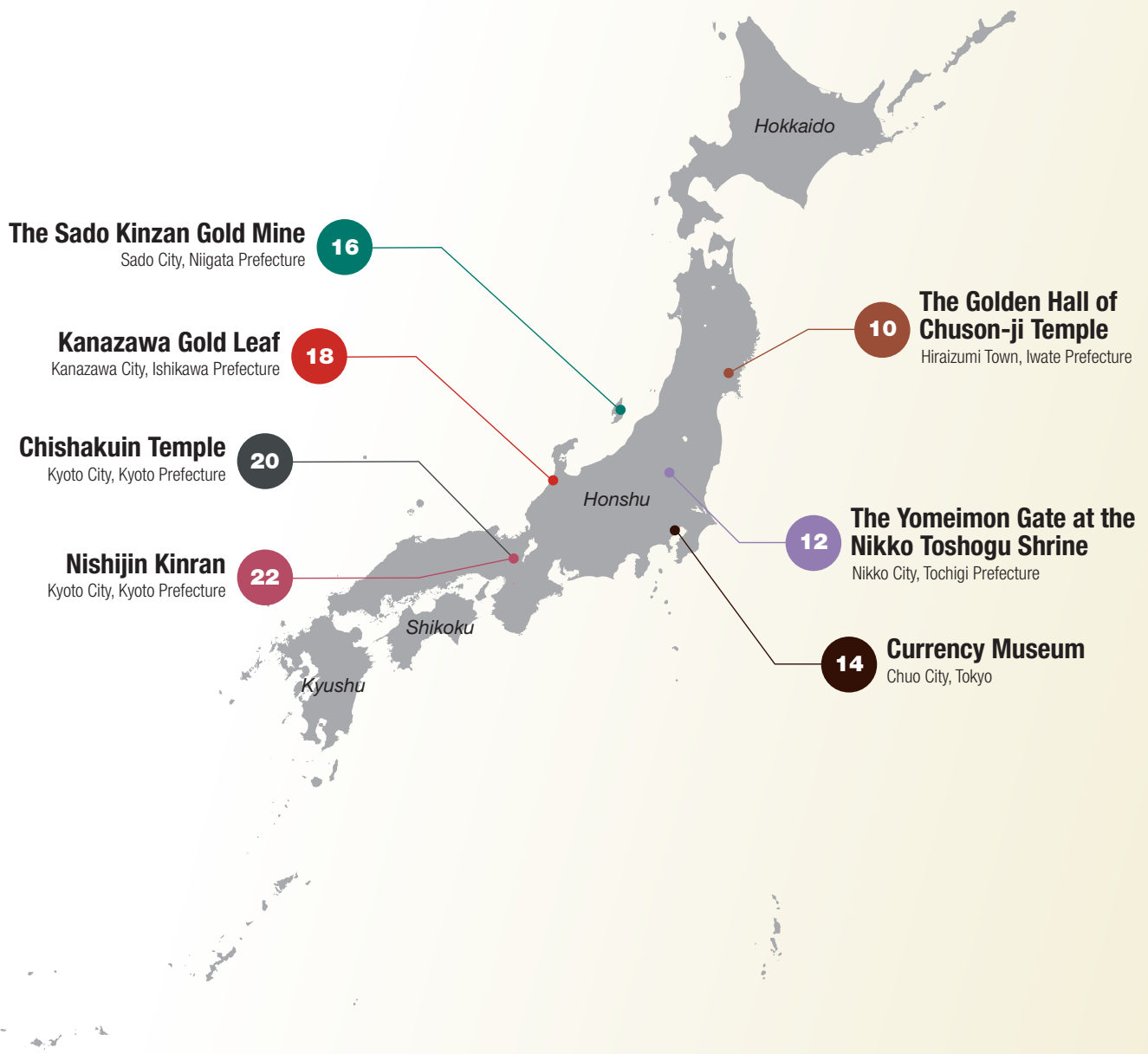
A display of Nishijin Kinran obi (kimono belt) fabrics  
Photo: Courtesy of Nishijin Textile Industry Association



Tensho Naga Oban (approximately 17.5 cm x 10 cm)  
Photo: Courtesy of Bank of Japan

# G

old has been a cherished aspect of Japanese culture since ancient times. Many historical examples of gold-covered structures and artifacts survive, such as the Konjikido (Golden Hall) (pp. 10-11) at Chuson-ji temple, Iwate Prefecture, and the Yomeimon Gate at the Nikko Toshogu Shrine (pp. 12-13), Tochigi Prefecture. For centuries, Japan was one of the world's largest producers of gold (pp. 7-9), with mines such as that preserved on Sado Island in Niigata Prefecture (pp. 16-17), and this is reflected in gold's lavish use in huge gold-leaf-backed screen paintings (pp. 20-21), luxurious fabrics (pp. 22-23), as well as in everyday objects. In Part I of a two-part Feature, we introduce some of the ways in which Japanese people have cherished gold.



# The Production and Use of Gold in Japan



Dr. Murakami Ryu, Director of the Takaoka Art Museum  
Photo: Sawaji Osamu

**D**R. Murakami Ryu is an expert in the history of materials science, Director of the Takaoka Art Museum and Specially-Appointed Professor at Kyoto Arts and Crafts University. We asked Dr. Murakami about the history of the production and use of gold in Japan.

**Gold has fascinated people throughout the ages, not only in Japan but around the world. What properties does it possess, and what makes it so attractive?**

One of the properties of gold is that it doesn't oxidize, and therefore does not rust. While gold is in the ground, and even after it has been mined or placed in water, its brilliance remains basically unchanged. Mankind has revered and admired this unchanging nature of gold, and has been fascinated by gold as something that represents "eternity" and "immortality."

Gold also has excellent properties as a material; for example, it is workable. It spreads out well when hammered, and can be melted to cast items. Then there is its durability. When combined with other metals, it can be made harder, or more resistant to wearing away.

Gold is also a rare substance. If you calculated the amount of gold that humanity has mined to date, it would only fill around four Olympic-size swimming pools.

Humanity has long had the constant desire to mine gold in vast quantities, possess it, and process it into various items. Technologies for mining and processing gold have developed as a result. The strong desire for metals, namely gold, as well as silver and copper, has had a profound

impact on world history. As I will explain later, there was a time when Japan was one of the leading producers of gold, silver and copper, and these metals have been deeply involved with the development of the Japanese economy and culture.

**Around when did gold start to be used in Japan?**

It is estimated that by at least the fifth to sixth centuries gold products and gold processing methods had been introduced from mainland China and the Korean peninsula. Gold earrings and other ornaments have been unearthed from the *kofun* (tumuli, or burial mounds) of powerful people at the time. It is thought that gold was a symbol of the power of the buried person. It is rare to find gold products from around that time in places other than *kofun*. Gold was special and was likely not something the general public would ever see.

But when Buddhism was introduced to Japan in the first half of the sixth century, temples and altars began to be decorated with gold, and gold gradually became more visible to the public. In 749, the first production of gold in Japan took place in the Tohoku region in the Oda District of Mutsu Province (present-day Wakuya Town, Toda District in Miyagi Prefecture). This gold was used as the material for the gold plating of the Great Buddha at the Todai-ji Temple in present-day Nara City, which was at that time under construction and subsequently completed in 752. Then in 760, although it is not known whether the coins actually circulated as currency, the first gold coins in Japan, known as *kaiki shoho*, were minted. Following the production of gold in Mutsu Province, gold was discovered all over Japan, and Japan became one of the largest producers of gold in the world.



Gilt earrings excavated from the Omishinkanji Kofun (burial mound) located in Gyoda City, Saitama Prefecture (Collection of Tokyo National Museum; 6th-7th century)

Photo: ColBase (<https://colbase.nich.go.jp/>)

### How was gold mined back then?

At the time, most gold was produced in the form of gold particles, including the gold from Mutsu Province. Veins of gold near the surface were worn away from weathering, and grains of gold that flowed down into rivers accumulated on river beds as gold particles. Compared with gold obtained by mining gold ore from underground, this gold was easier to obtain.

At the end of the Heian period (late 8th to late 12th century), samurai families took over power from the aristocracy. This led to the emergence of warlords who obtained large quantities of gold and used that wealth to seize power. One such example is the Oshu-Fujiwara clan, who flourished in Hiraizumi (present-day Hiraizumi Town, Iwate Prefecture), an area in the Tohoku region, in the 12th century. The Oshu-Fujiwara clan were supported by the gold particles produced in the Tohoku region. The Konjikido (Golden Hall) of the Chuson-ji Temple (see pp.10-11) constructed at the time in Hiraizumi Town remains from this time. Gold is used in abundance in the design of the hall, showing how prosperous the Oshu-Fujiwara clan was at the time. There is a theory that the “land of gold” referred to as “Zipangu” in the *Travels of Marco Polo* recorded by the Italian adventurer Marco Polo in the 13th century might have been Hiraizumi. While there is no firm evidence underpinning this theory, we can understand why some would believe it to be the case.

It is estimated that approximately 100 tons of gold was produced during the roughly 800 years from when gold particles were discovered in Mutsu Province until the mid-16th century when gold started to be extracted from gold ore. Japan is a rare country for producing this amount of gold from gold particles over such a long period.

### How did the production and use of gold change in Japan after the mid-16th century when it became possible to obtain gold from gold ore?

From the mid-16th to early 17th century, there was a period of frequent conflict among *daimyo* (feudal lords) across Japan. During that period, powerful daimyos started to develop gold, silver and copper mines within their territories to finance the maintenance of their territories and their expansion. For example, the daimyo of Kai Province (present-day Yamanashi Prefecture), Takeda Shingen

(1521-1573) developed a gold mine. Then he used that gold to mint and circulate a currency known as *Koshu kin* (Koshu gold).

To show off their authority, some powerful warlords constructed buildings richly adorned with gold, and commissioned works of art from gold. The renowned warlord Oda Nobunaga (1534-1582) even built Azuchi Castle using tiles covered with gold leaf, and Toyotomi Hideyoshi (1537-1598), who rose to power after Nobunaga's death, built a tea room whose entire interior was covered with gold leaf.

The structure of the currency system based on the *Koshu kin* minted by Takeda Shingen was later inherited by the Tokugawa Shogunate that was established in 1603 by Tokugawa Ieyasu (1543-1616). A three-currency system based on gold, silver and copper was established by the Tokugawa Shogunate and these three types of coins came into circulation throughout the country.

### How did mining develop during the 260 years from 1603 when the Tokugawa Shogunate ruled Japan, a time known as the Edo period?

During the Edo period, the Tokugawa Shogunate actively pursued mining development. The shogunate directly controlled the Sado Kinzan Gold Mine (see pp.16-17) and the Toi Gold Mine (located in present-day Shizuoka Prefecture). During the first half of the Edo period, Japan's gold production volume was one of the highest in the world. In addition to gold mines, silver and copper mines were also developed. Take for example the Iwami Ginzan Silver Mine in present-day Shimane Prefecture, which is registered as a World Heritage site. Following the discovery of silver at the site in 1527, the Iwami Ginzan Silver Mine, which eventually came under the direct control of the shogunate, is believed to have produced one-third of the world's silver at its peak in the late 16th and early 17th century. Similarly the Besshi Copper Mine in Besshi in present-day Ehime Prefecture, development of which began in 1690, was one of the world's largest copper producers at one point.

In this way, abundant gold, silver and copper supported the money-based economy of the Edo period. And while the Tokugawa shogunate limited exchanges with outside countries, it did engage in trade, limited to that with China and the Netherlands. Gold, silver and copper were primary exports in these trading activities.

However, in the latter half of the Edo period, production of gold, silver and copper gradually declined due to limitations in mining technologies, deteriorating profitability and resource depletion. Several mines that operated during the Edo period, including the Sado Kinzan Gold Mine, Iwami Ginzan Silver Mine and Besshi Copper Mine, continued to be run into the Meiji period (1868-1912), but almost



Ashi kame maki-e inro (box with reed and turtle design in make-e lacquer) (Collection of Tokyo National Museum; 19th century) (7.6 cm tall, 5.2 cm wide)  
Photo: ColBase (<https://colbase.nich.go.jp/>)





*Mo ni namazu mitokoromono*<sup>i</sup> (algae and catfish sword fittings) created by Goto Joshin. (Collection of Tokyo National Museum; 16th century) Top: *kogai* (length 22.9 cm), bottom left: *kozuka* (length 9.7 cm), bottom right (two items): *menuki* (length 4.4 cm)

Photo: ColBase (<https://colbase.nich.go.jp/>)

all had closed by the latter half of 20th century.

### During the Edo period, how was gold used other than for money?

One example is its use in crafts. During the Edo period, I believe that Japanese metalwork using metals such as gold, silver, copper and iron had reached a level unrivaled elsewhere in the world. The Goto family founded by Goto Yujo (1440-1512) was particularly renowned for metalworking. The Goto family manufactured large and small-sized metal coins, but also made decorative metal sword fittings known as *mitokoromono*<sup>i</sup> for shoguns, daimyos and other powerful samurai families. A feature of the *mitokoromono* made by the Goto family was the use of *shakudo* which was created by Yujo. *Shakudo*, which is said to be unique to Japan, is an alloy of copper that contains around 3% gold. A special coloring method adds a lustrous black color to the surface of the product. The glossy black of the *shakudo* with a slight purplish tint allowed gold and silver decorations to stand out beautifully.

*Maki-e*<sup>ii</sup> craftworks were also produced in great number. *Maki-e* is a decorative technique that developed independently in Japan from the Heian period onward, in which gold or silver powder is sprinkled on top of a pattern drawn in lacquer. During the Edo period, *maki-e* was used to decorate various craft items, such as *inro* (small wearable cases used for carrying small items) and inkstone cases used to hold writing utensils. *Maki-e* craftworks were also popular overseas. From the 16th century onward, furniture, dishes and other products made with *maki-e* techniques were exported to Europe.

Many of these crafts were exhibited at world fairs held in Europe and the United States from the late Edo period to Meiji period, and were very popular. One of these crafts was a golden *shachi*<sup>iii</sup> from Nagoya Castle, displayed at the 1873 Vienna Expo. The golden *shachi* was the guardian deity of the castle and symbolized the power of the Tokugawa family. Two of the *shachi* were displayed atop the keep of Nagoya Castle, which was constructed in 1612. Standing at a height of around 2.5 meters, their surfaces were covered with gold plate. Unfortunately, these golden




One of two golden *shachi* on the roof of Nagoya Castle (height about 2.6 meters)  
Photo: Nagoya Convention & Visitors Bureau

*shachi* were burned down along with Nagoya Castle during the war in 1945. The guardian deities adorning Nagoya Castle today are reconstructions made in 1959.

### What role will Japan play in the world going forward to ensure effective utilization of limited mineral resources such as gold?

You may not think that metals such as gold, silver and copper are directly related to our daily lives, but these kinds of metals are actually used in all kinds of electronic devices and home appliances that are familiar to us, such as PCs, mobile phones and digital cameras. What's more, these products are produced and also thrown away in large quantities around the world. In other words, useful metals such as gold, silver and copper are thrown away along with the products that contain them. Nothing could be more wasteful.

The presence of useful and recyclable metals in various industrial products such as home appliances is referred to as an "urban mine." Japan possesses superior technologies for recovering useful metals from urban mines (see pp.26-27). As testament to this, the roughly 5,000 gold, silver and bronze medals awarded during the Tokyo 2020 Olympic and Paralympic Games were all made from gold, silver and copper recovered from products such as PCs and mobile phones. Among the various initiatives being pursued by the international community to achieve the Sustainable Development Goals (SDGs), I believe these Japanese technologies can make significant contributions. 

Interview by SAWAJI OSAMU

i *Mitokoromono* are the three ornamental fittings for a sword, comprising the *kogai*, a tool for pinning one's hair, the *menuki*, an ornament attached to the *tsuka* (hilt), and the *kozuka*, the hilt of a small sword.

ii See *Highlighting Japan* May 2022, "The History and Culture of Lacquer in Japan" [https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202205/202205\\_01\\_en.html](https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202205/202205_01_en.html)

iii *Shachi* or *Shachihoko*. An imaginary creature with the head of a dragon or tiger and the body of a fish.

The *shumidan* altar of the Konjikido (Golden Hall) surrounded by four *makibashira* pillars (Chuson-ji Collection)



# THE GOLDEN HALL OF CHUSON-JI TEMPLE

**Chuson-ji Temple is a World Heritage Site located in Hiraizumi Town, Iwate Prefecture, in the Tohoku region of northeast Japan. On the temple grounds there is the Konjikido (Golden Hall), an example of *kai-konjiki* (all-gold) Buddhist architecture that is preserved in the same beautiful condition as when it was built almost 1,000 years ago.**

**YANAGISAWA MIHO**

**C**HUSON-JI Temple is one of five components that make up the World Heritage Site of Hiraizumi Town, Iwate Prefecture, which was registered by UNESCO in 2011 under the inscription “Hiraizumi – Temples, Gardens and Archaeological Sites Representing the Buddhist Pure Land.” Principal among the treasures and cultural assets of Chuson-ji is the Konjikido Golden Hall, the only structure remaining in its original form from the 12th century when Hiraizumi was the political center of northeastern Japan

(known as Oshu at the time, a large part of the present-day Tohoku region).

The Konjikido was built in 1124 by Fujiwara no Kiyohira, the founder of the Oshu-Fujiwara clan, and enshrines Amida Nyorai (the Buddha of Infinite Light). The Oshu-Fujiwara clan had earlier founded Chuson-ji as a large Buddhist temple complex. Kiyohira was deeply devoted to Buddhism and is said to have built the Konjikido, which measures around five-and-a-half meters on each side and around eight meters tall, to comfort

All photos: Courtesy of Chuson-ji



The Konjikido (Golden Hall) at Chuson-ji Temple (Chuson-ji Collection)


relief-like three-dimensional forms are exquisite. Surrounding the altar are four *makibashira* pillars that are lavishly decorated with *maki-e*\* lacquer, raden and gold. A copper altar fitting called the “*kondo kewan*” featuring depictions of the mythical half-human, half-bird “*karyobinga*” said to inhabit the Pure Land softly shimmers with gold.

In the *Travels of Marco Polo* (c. 1300) the Venetian merchant and explorer describes a place called “Zipangu” (Japan) that he heard about while in China. There, the place was said to have “tremendous quantities of gold” and a “King’s palace roofed with pure gold.” One theory holds that the palace that Marco Polo heard about was the

Konjikido.

Haseki comments, “It is true that a lot of gold was produced in this area allowing for its extensive use in the construction of the Konjikido, but there really is no historic basis for the ‘King’s palace’ theory at present.”

Nevertheless, looking at the dazzling Konjikido today, Haseki acknowledges that it is tempting to imagine that the “land of gold” reported by Marco Polo in the thirteenth century and dreamed about by explorers such as Christopher Columbus after him “might have been Hiraizumi.”

And the Konjikido Golden Hall, radiating the charm of the Pure Land, still attracts people today. 

\* See *Highlighting Japan* May 2022, “The History and Culture of Lacquer in Japan” [https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202205/202205\\_01\\_en.html](https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202205/202205_01_en.html)

the spirits of all those who died during the region’s long-lasting power struggle in the latter half of the eleventh century. In particular, he sought to create in Hiraizumi a peaceful realm, or Buddhist Pure Land, building temples, gardens and ponds. As a symbolic manifestation of the Pure Land at Chuson-ji, almost everything on the interior and exterior of the Konjikido, including the Buddhist ritual utensils, was entirely covered with gold, a style known as “*kai-konjiki*” (all gold).

Starting with Kiyohira, three generations of the Oshu-Fujiwara clan ruled the present-day Tohoku region, but then war broke out again, and in 1189 the young city of Hiraizumi was almost entirely destroyed. Remarkably, however, the Konjikido escaped that calamity. It risked devastation many times, but thanks to the joint efforts of the monks, various forms of aid, protection and restoration by rulers and the powerful over the years, almost 90% of the structure and materials used when the Konjikido was first built still survive. Even after nearly 1,000 years, the building retains its original appearance, although it is now housed inside a larger building and protected behind glass.

Haseki Shinsho, a monk at Chuson-ji Temple, says, “You can see the sophisticated sensibility of Buddhist art from that time in the Konjikido, even in the smallest details. The founders likely brought in the best craftsmen from Kyoto to complete the work. Some of the decorations such as the *raden* (mother-of-pearl inlay)\* are symbolic of the Buddhist art in the culture of the Oshu-Fujiwara.”

The *shumidan* altar, where the bodies of the three generations of Fujiwara leaders are enshrined, features peacock motifs shaped with a hammer and gilded with gold leaf. The



Close-up of one of the gilded peacock motifs on the altar (Chuson-ji Collection)



The Yomeimon Gate at the Nikko Toshogu Shrine  
Photo: hojojo123/PIXTA

# The Glittering Beauty of the Yomeimon Gate at the Nikko Toshogu Shrine



**The Yomeimon Gate at the Nikko Toshogu Shrine is a glittering structure decorated with more than 240,000 pieces of gold leaf.**

**KATO KYOKO**

**N**IKKO City in Tochigi Prefecture is about two hours from Tokyo by the fastest train route. The city is famous for its shrines and temples, specifically a group of 103 shrines and temples of great artistic and historical value which, together with their natural surroundings, in 1999 were registered as a UNESCO World Cultural Heritage Site.

Particularly well-known among the components of the site is the Nikko Toshogu Shrine complex, which was built

Some of the hundreds of carvings on the Yomeimon Gate  
Photo: Yuta1127/PIXTA

in 1617 and reconstructed by Tokugawa Iemitsu in 1636, the third shogun, to worship Tokugawa Ieyasu (1543-1616), the first shogun of the Edo shogunate.<sup>1</sup> Many of the structures in the complex are decorated with gold leaf. Particularly eye-catching is the Yomeimon Gate, a National Treasure which is covered with about 240,000 sheets of gold leaf. The gate is about 7 meters wide between the pillars, 4 meters deep, and 11 meters high, and is decorated with 508 elaborate carvings of dragons, phoenixes, and other imaginary animals as well as events and sages including those from ancient



The Sima Guang carving on the Yomeimon Gate  
 Photo: Courtesy of Association for the Preservation of the Nikko World Heritage Site Shrines and Temples



Decorative metal fittings (top right) on the Yomeimon Gate  
 Photo: Yuta1127/PIXTA

China. It is known as “the most beautiful gate in Japan” and is also called “the all-day gate” because it’s impossible to get tired of looking at it.

Since their construction, the shrines at the Nikko Toshogu Shrine complex, including the Yomeimon Gate, have undergone 21 major and minor repairs, thus maintaining their beauty.

Yamasaku Yoshiyuki of the Nikko Toshogu General Affairs Office explains, “In 2017, after completing a four-year period of repairs using traditional techniques, the Yomeimon Gate was once again restored to its former beauty. For example, the gilding on the decorative metal fittings attached to various parts (see photo) faithfully reproduced the appearance of the original building using the traditional technique of applying mercury to copper plates, applying gold leaf to that, then firing them to vaporize the mercury and fix the gold, a different technique from modern electroplating.”

About 240,000 pieces of 10.9 cm square gold leaf are used in total for the gilding of the metal fittings and lacquered wooden parts of the Yomeimon Gate. Each leaf is extremely thin, at just 1/10,000th of a millimeter, and the leaves are carefully and uniformly attached one by one using lacquer and glue as an adhesive and making sure they are completely flat. Kanazawa gold leaf (see pp. 18-19) processed in Kanazawa City, Ishikawa Prefecture was used for all the repairs that were completed in 2017. It is said that the same amount of gold leaf was used at

the time of construction. In this repair, the damaged coating was scraped off, new lacquer was applied, and the gold leaves were reapplied.

Moreover, a technique in which color is added by applying *iwaenogu*, a traditional Japanese paint made from natural minerals, on top of the gold leaf is used in selected spots to make the carvings of animals, plants and patterns appear more vivid. Even if the *iwaenogu* on the surface peels off due to exposure to wind and rain, the gold leaf will appear from below, thus revealing a different kind of beauty.

The enormous carvings on the Yomeimon Gate are not just designs; they also contain ideas and messages. Yamasaku says he attaches special importance to the sculpture on the second-level railing, “Sima Guang Breaks the Vat.”

“It depicts a scene where Sima Guang (1019-1086), a scholar of the Northern Song Dynasty (960-1127) in China, as a child wanted to help a friend who had fallen into a precious water vat, so he breaks it with a rock. The story teaches us that there is nothing more precious than human life. I think it is a symbolic sculpture that captures the heart to realize a peaceful world that Lord Ieyasu aimed for.”

The Yomeimon Gate has many other carvings with interesting ideas and messages. These stories add yet more depth to the glittering golden glow of the abundant gold leaf. 7

i It continued for 15 generations over 260 years from 1603 when Tokugawa Ieyasu became shogun.



Craftsmen attach repaired metal fittings to the Yomeimon Gate  
 Photo: Courtesy of Association for the Preservation of the Nikko World Heritage Site Shrines and Temples



Craftsmen renovate colorful carvings on the Yomeimon Gate  
 Photo: Courtesy of Association for the Preservation of the Nikko World Heritage Site Shrines and Temples

Tensho Naga Oban  
(approximately 17.5 cm x 10 cm)

# Oban, Japan's Giant Gold Coins

In this article we introduce *oban*, the large gold coins once made by Toyotomi Hideyoshi, who unified Japan, and by the Edo shogunate.

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SATO KUMIKO

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LARGE oval-shaped gold coins known as *oban* were made from the second half of the 16th century until the 19th century. They measured from between 14 to 17 cm in length. These coins were not for general circulation, but were instead made on a limited basis by Toyotomi Hideyoshi (1537-1598)<sup>i</sup> and the Edo Shogunate as awards, gifts, or other ceremonial items. The coins fascinate the viewer today with their beauty; with line patterns, seal imprints, black-ink lettering and other unique features on the surface of each coin that accentuate the shining gold.

There are six varieties of *oban*, broadly divided by era.<sup>ii</sup> Genuine examples of these coins are on display at the Currency Museum in Tokyo, located in the Institute for Monetary and Economic Studies at the Bank of Japan. Sekiguchi Kaori, the Chief Curator of the museum, says, "Our museum exhibits all six varieties of *oban*, including the Tensho Naga Oban<sup>iii</sup>, one of



the world's largest gold coins with a consistent length of about 17.5 cm. It is rare to see such a collection on display together. Ordinary people at the time would not have been able to see them, because all of these were highly expensive coins mainly used as a gift."

Gold coins were first minted in Japan around the middle of the 8th century, but they would not become a form of currency until much later. Until the 16th century, mainly gold dust was used for large transactions between merchants or as awards to samurai for their military achievements. Full-scale manufacturing of gold and silver coins began in the early 16th century, once silver mines mainly in west Japan and gold mines in east Japan were successively discovered and developed. While the feudal lords were fighting over the mines, mining and refining techniques improved and spread, and feudal lords from around Japan all began to manufacture coins in their territories.



From left, Keicho Oban, Genroku Oban, Kyoho Oban, Man'en Oban and Tenpo Oban

During this time, Toyotomi Hideyoshi had Goto Tokujo, the fifth-generation head of the Goto family which had been making sword fittings as a family business for generations, create the Tensho Oban in 1588. This coin determined the format for later oban coins. These coins were made by pounding gold and silver together to form an alloy, and were larger than a typical smartphone today, with a length of around 17 cm and a width of around 10 cm. They weighed around 165 grams, with a gold content of between 70% and 76%.

Later, in 1603, Tokugawa Ieyasu (1543-1616) established the shogunate and took direct control of the Sado Gold Mine (in present-day Niigata Prefecture) and the Izu Gold Mine (in present-day Shizuoka Prefecture), the major gold mines at the time, and established direct control over the manufacturing of gold coins. The format of the Tensho Oban coins was followed and manufacturing was continued by the same Goto family.

There are characters written on the face of the oban in black ink, denoting the weight, the Goto family name, and *kao* (written seal mark), which acted as the signature of the head of the Goto family at the time. There is also a paulownia tree crest

stamped on the coins. Sekiguchi says, “The Goto family manufactured coins at the *oban-za*, or oban mint, specially set up when the Edo Shogunate ordered the manufacturing of oban. The weight and gold content of the coins changed over time, but manufacturing was always entrusted to the Goto family. Having the coins manufactured by the Goto family was a guarantee of quality.”

The Edo Shogunate established a three currency system of gold, silver, and copper coins as currency. Oban were mainly offered as gifts and not used for ordinary purchases. The *koban*, a miniaturized version of the oban that could be mass-produced without ink writing, was then introduced. One koban coin had the value of one *ryo* (see pp.16-17). However, when the Meiji government was established in 1868, Japan began its journey on the road to modernization and the oban and its role ended. ▣

- i A feudal lord who unified the country. According to some accounts he was born in 1536.
- ii Tensho Oban (1588), Keicho Oban (1601), Genroku Oban (1695), Kyoho Oban (1725), Tenpo Oban (1838), and Man'en Oban (1860)
- iii A type of Tensho Oban, with the very long and large coins being called Tensho Naga Oban



A Tensho Oban, front side at left, reverse side at right



Seal stamps used to ensure the quality of the currency

# The Tokugawa Shogunate's Gold Mines

The Sado Kinzan Gold Mine on Sado Island (also known as Sadogashima Island) in the Sea of Japan was placed under the direct control of the Tokugawa Shogunate from the early seventeenth century, and the gold mined there supported the shogunate's finances.

SASAKI TAKASHI

SADO Island is located in the Sea of Japan off the coast of Niigata Prefecture in northwestern Honshu. The island extends over an area of some 850 kilometers and its population numbers some 50,000 inhabitants (2020 statistics). Sado Island was once a major gold-mining area in Japan. During the first half of the seventeenth century,



All photos: Courtesy of Golden Sado Inc.

Front (right) and back (left) of a *Shotoku-koban*, a type of *koban* made on Sado Island (7.0 cm x 3.8 cm, early eighteenth century)



Japan accounted for around 20 percent of the world's gold production, with almost half that volume produced on Sado Island.\*

It was the discovery of a large vein of gold and silver at Aikawa in 1601 that led to Sado Island becoming a major gold producing area. Shortly after, in 1603, Tokugawa Ieyasu (1543–1616) established the Tokugawa Shogunate, placing Sado Island under its direct administration that same year and initiating the full-scale development of the Aikawa mine. What is now known as the Sado Kinzan Gold Mine would develop as an important mine that supported the finances of the Tokugawa Shogunate, which continued to rule Japan for the duration of the Edo period lasting some 260 years.

From the earliest days of the mine's development, the Tokugawa Shogunate brought technicians with expertise in mining from other parts of Japan to Sado Island. Using the most advanced, albeit traditional, techniques available at the time, in all the processes from excavation until refinement of the metals, the purity of the refined gold produced at the Sado Kinzan Gold Mine was raised to 99.54 percent. This level of purity is reported to have been higher than in the West, where gold production was mechanized and involved the use of chemicals.\*

Golden Sado Inc. manages the Historic Site Sado Kinzan Gold Mine, a sightseeing facility on Sado Island where visitors can see exhibits including a diorama of the Sado Kinzan Gold Mine in the Edo period and the remains of the actual

A diorama of the process of hammering gold into sheets as depicted on a Sado Kinzan Gold Mine picture scroll (a Historic Site Sado Kinzan Gold Mine exhibit)




mine shafts that were used. Official Nabata Sho says, “What sets the Sado Kinzan Gold Mine apart from other mines is that gold was produced here for an extended period of time using traditional non-mechanized methods. Whereas mines in other countries became increasingly mechanized from the seventeenth century, gold production at the Sado Kinzan Gold Mine was not mechanized during the Edo period, partly due to the shogunate’s strict regulations on contact with foreign countries. Despite this, constant technical improvements enabled the Sado Kinzan Gold Mine to continue producing high-quality gold, reaching such a high level of production that it was deemed the pinnacle of the manual gold production system.”

The gold mined on Sado Island was mainly formed into gold coins called *koban*. During the Edo period, the shogunate established a monetary system based on gold, silver, and copper coins. While a limited quantity of large-denomination oval gold coins known as *oban* was also produced, their primary function was ceremonial (see pp.14-15), so the smaller sized *koban* played the more important role in the functioning of Japan’s monetary economy. In 1621, the shogunate established a facility on Sado Island for the making of gold coins, and *koban* were made there for the next two centuries.

The *koban* coins made on Sado Island also came to be used in trade overseas. Although the Tokugawa Shogunate had placed restrictions on contact with foreign countries, it continued to trade with China and the Netherlands, monopolizing the revenue from that trade. Initially, payments for the purchase of imported commodities such as raw silk and ceramics

were made in silver. By the mid-seventeenth century, however, the large exodus of silver led to a prohibition on payments in silver. Instead, payments began to be made in *koban*, and it would be no exaggeration to say that *koban* became the mainstay of the shogunate’s trading currency thereafter. Visitors to the Historic Site Sado Kinzan Gold Mine museum can see *koban* on display as well as view exhibits explaining the production process.

From the Meiji period (1868-1912) onward following the fall of the Tokugawa Shogunate, the Sado Kinzan Gold Mine pushed ahead with mechanization, continuing to produce large quantities of gold and silver. However, from the second half of the twentieth century production volume gradually declined, with the mine finally closing in 1989.

Many remnants of the mine shafts and facilities remain in the Sado Kinzan Gold Mine, revealing the way the mine was in the Edo period. The Japanese government is recommending that the “Sado Island Gold Mines” be registered as a UNESCO World Heritage Site in recognition of the mine’s unique status in the world as an historical site of a production process encompassing all stages from the mining of metals to their refinement using traditional non-mechanized methods. The Sado Kinzan Gold Mine that once supported the Tokugawa Shogunate’s finances now forms an invaluable part of the world’s mining history. 

\* See the following Agency for Cultural Affairs materials:  
[https://www.bunka.go.jp/seisaku/bunkazai/shokai/sekai\\_isan/suisenchu/pdf/93733301\\_01.pdf](https://www.bunka.go.jp/seisaku/bunkazai/shokai/sekai_isan/suisenchu/pdf/93733301_01.pdf)



Section of a picture scroll depicting the manufacturing process from mining and smelting to *koban* production at the Sado Gold and Silver Mine



# Kanazawa Gold Leaf

Traditional techniques of gold leaf production have been passed down for over 400 years in Kanazawa, Ishikawa Prefecture. Today, Kanazawa-made gold leaf accounts for more than 98% of all the gold leaf produced in Japan.

**SUGIYAMA MAMORU**



**G**OLD leaf is an alloy of gold and very small amounts of silver or copper that is stretched thin. Since ancient times in Japan, buildings and Buddhist sculptures, as well as household furnishings and accessories have been decorated by covering them with gold leaf. Gold leaf has been used on many historical buildings, such as the Konjikido (Golden Hall) at Chuson-ji Temple in Iwate Prefecture (see pp. 10-11), Kinkaku-ji Temple in Kyoto, and the Yomeimon Gate in Nikko, Tochigi Prefecture (see pp. 12-13). The main production area for this gold leaf is Kanazawa, Ishikawa Prefecture. Today, more than 98% of the gold leaf in Japan is made in Kanazawa.

During the Edo period (early 17th to mid-late 19th century), what is now Kanazawa City was a castle town for the Kaga Clan, the largest clan in Japan at the time. The successive generations of feudal lords in the Kaga Clan encouraged the development of traditional crafts, and they put effort into the production of gold leaf among other major crafts, including

*Entsuke* gold leaf, pounded and stretched more than 70,000 times (one-ten-thousandth of a millimeter thick)  
Photo: Courtesy of Society for the Preservation of Traditional Kanazawa Gold Leaf

fabric dyeing and ceramics<sup>i</sup>. Gold leaf production developed centered on the town of Kanazawa and these traditional techniques have been passed down over 400 years.

Yamaga Naohisa, the director of the Ishikawa Prefectural Gold Leaf Commerce and Industrial Cooperative, says, “The connection between Kanazawa and gold runs deep, with the name ‘Kanazawa,’ or ‘marsh of gold,’ given to the area because gold particles were collected upstream from the Saigawa River that flows through the city. Even during the Edo period when gold leaf production was limited to Edo (present-day Tokyo) and Kyoto by the Tokugawa shogunate, gold leaf production continued in secret without pause in Kanazawa, continuing today.<sup>ii</sup>”

Gold leaf is an alloy containing small amounts of silver or copper that has been thinly stretched out by a rolling mill and cut by a gold leaf artisan who has inherited the traditional techniques. The leaf is then placed between paper and pounded to make the leaf as thin as possible. Gold leaf will not stretch out uniformly if pounded directly, so it must be stretched out while placed between something.

Kanazawa gold leaf is made by beating and stretching one gram of gold down to one square meter (100 cm x 100 cm) with a thickness of just one-ten-thousandth of a millimeter. From that one gram of gold, about 50 sheets of gold leaf can be produced.

Special Japanese *washi* paper is used in *entsuke*, a traditional technique that has been carried out for over 400 years. First, the gold that has been stretched out into sheets with a rolling mill is cut into 5-cm squares. Next, after placing single squares in layers between Japanese washi paper (roughly 21-cm squares), the gold is pounded with a machine until it is one-thousandth of a millimeter in thickness and has spread out over the whole of the paper squares. The surface of the gold becomes smooth and easy to handle after beating it multiple times, and the leaf is then made into uniform 20-cm



Gold leaf, which has been stretched to one-thousandth of a millimeter, is placed in special paper to be further stretched

Photo: Courtesy of Ishikawa Prefectural Tourism League



Soft-serve ice cream covered with gold leaf

Photo: goro/PIXTA

squares. The leaf is then further cut up into small and large squares and rectangles, and work continues until the leaf is one-ten-thousandth of a millimeter in thickness. The gold leaf made in this way is carefully trimmed with a special bamboo tool, one sheet at a time.

To be a gold leaf artisan, one must be highly proficient, skillfully placing the sheets of gold leaf between sheets of paper, carefully beating the gold leaf numerous times, then cooling the hot leaf by dividing it into small portions. This uniquely Kanazawan method of gold leaf production was registered on the Representative List of the Intangible Cultural Heritage of Humanity in 2020 as “Traditional skills, techniques and knowledge for the conservation and transmission of wooden architecture in Japan.”

Yamaga says, “Gold leaf production has continued in Kanazawa because it has all the conditions needed, including a highly humid climate that reduces static electricity resources. Since the 1960s, new more efficient techniques have been adopted, but gold leaf made through the traditional *entsuke* technique still has a special sparkle.”

Today, the gold leaf used in the restoration of cultural properties in Japan is almost always from Kanazawa. In recent years, use of gold leaf has found a wide range of uses, including interior and exterior decor, everyday goods, accessories, and food and drink, and demand from abroad is also increasing. In Kanazawa, there are many shops that sell gold leaf in a variety of ways. For example, the soft-serve ice cream wrapped in gold leaf<sup>iii</sup> that was sold when the section of the Hokuriku Shinkansen line connecting Tokyo with Kanazawa opened in 2015 was a big hit. In response to the increase in demand, efforts are being taken to train future gold leaf artisans in Ishikawa Prefecture. For instance, an artisan training program has begun funded by Tiffany & Co., a global jewelry brand. These days, Kanazawa gold leaf is drawing attention from all over world. 

<sup>i</sup> Today, this is Kaga Yuzen dyeing and Kutani ware ceramics

<sup>ii</sup> Some say that gold leaf making was suspended for a time during the Edo period but was revived in the Meiji period (1868–1912).

<sup>iii</sup> See *Highlighting Japan* June 2016, “Striking Gold” [https://www.gov-online.go.jp/eng/publicity/book/hlj/html/201606/201606\\_11\\_en.html](https://www.gov-online.go.jp/eng/publicity/book/hlj/html/201606/201606_11_en.html)

# Masterpieces of *Kinpeki Shouhekiga* at Chishakuin Temple

Visitors to Chishakuin Temple in Kyoto City can view late-sixteenth-century masterpieces in a painting style known as *kinpeki shouhekiga*, large works painted on walls and sliding screens that are entirely covered with gold leaf.

SAKURAI SHIN

**S**HOUHEKIGA (wall and sliding screen paintings) first appeared around the ninth century on *fusuma*<sup>i</sup> sliding screens, walls, ceilings, and other elements of residential architecture in the homes of aristocrats and the wealthy. Unlike murals, which are painted directly on the surface of a wall, the paintings on shouhekiga are pasted onto the surface. Another distinguishing feature of shouhekiga is the large scale of the fusuma “canvas,” which enabled artists to give full play to their ideas and create a distinctive atmosphere in the interior space.

*Kinpeki shouhekiga* is one style of such

wall and sliding screen paintings. This style is characterized by magnificently striking paintings featuring motifs of beautiful scenes from nature rendered with pigments such as *gunjo*, *rokusho* and *taisha*<sup>ii</sup> on wall and floor-to-high-ceiling screens entirely covered with gold leaf foil.<sup>iii</sup> Kinpeki shouhekiga became especially popular in the late sixteenth to early seventeenth centuries when the world was transitioning from a time of conflict to a time of peace, as a way for powerful people of the time to decorate their castles and mansions, with many fine examples of the painting style produced during this time.

Some Kinpeki shouhekiga that are acclaimed as masterpieces are housed in Chishakuin Temple in Higashiyama Ward, Kyoto City. These shouhekiga were painted by the Hasegawa school, including Hasegawa Tohaku (below “Tohaku”; 1539–1610) and his son Kyuzo (1568–1593). Tohaku is one of the most eminent artists in the history of Japanese painting, renowned for his kinpeki shouhekiga and *suibokuga* (ink wash paintings). Chishakuin Temple houses a collection of kinpeki shouhekiga painted by Tohaku and the Hasegawa school, five of which have been designated National Treasures by the Japanese government.



“Maple” by Hasegawa Tohaku (National Treasure, Chishakuin Temple. Height 180.0 cm, Width 563.0 cm)

All photos: Courtesy of Chishakuin Temple



Of these, “Maple” (National Treasure) by Tohaku and “Cherry Blossom” (National Treasure) by his son Kyuzo are particularly stunning. “Cherry Blossom,” painted by the 25-year-old Kyuzo, is a large painting 179.5 cm high and 649.5 cm wide, depicting cherry blossoms in full bloom on a background of *kinpaku* gold leaf. However, a certain fragility and impermanence can be sensed behind its external magnificence.

“If you look closely at the white, double-flowered cherry blossoms in ‘Cherry Blossom’ delicately depicted on the slender branches, you can see that some of the petals are raised from the surface. This is



accomplished by using an advanced technique called *moriage gofun* involving the application of layers of calcium carbonate (*gofun*) made from crushed oyster shells to create a raised textured effect. It wouldn’t be surprising if all the petals had peeled off by now, 400 years after the work was painted, and the fact that some are still intact is testament to the high level of technical skill,” explains Chishakuin Temple curator Inoue Mami.

However, the year after this splendid piece was completed, Kyuzo passed away at the young age of 26. His talent as a painter showed great promise, and was said even to surpass that of his father, yet in the end that talent was as ephemeral as the petals of a cherry blossom.

Meanwhile, the loss of his son left Tohaku crushed with grief, but it is said that he painted “Maple” when he was 55 years old as a way to encourage himself. In the painting, which is 180 cm high and 563 cm wide, a mighty maple trunk is depicted in the center with delicate branches and leaves spreading out on either side over a resplendent background of *kinpaku* gold leaf covering the entire surface of the painting. Red autumn leaves and the sprinkling of multicolored autumn flowers reflected in the *kinpaku* gold leaf create an impression of majestic beauty. The work may be interpreted as a simultaneous depiction of life and death, this world and the next world.

It is interesting to note that, although both works are covered entirely in *kinpaku* gold leaf, the effect in “Maple” is the solemn glow of a religious painting, while “Cherry Blossom” seems to radiate a delicate light, evoking moonlight illuminating the nighttime cherry blossoms just before they fall.

Says Hattori Yuryo, Director of the Teaching and Education Department of Chishakuin Temple, “The paintings passed down at Chishakuin Temple have been subject to fire damage and theft, yet these particular works have always been saved thanks to the monks’ strong conviction of their particular worth. The reason these paintings have survived in the same condition as when they were created is because of our predecessors’ desire to protect them.”

Until now, *kinpeki shouhekiga* have been on open display. However, from April 2023<sup>iv</sup> it is planned to keep them in a new repository, a special glass case controlled for temperature, humidity, and lighting, in order to ensure that these shining gold National Treasures are preserved for the next generation. **7**

i Sliding screens (or doors) constructed of wooden frames and covered with paper or fabric on both sides.  
ii *Gunjo* is a bright blue mineral pigment. *Rokusho* is a green pigment made from malachite. *Taisha* is a yellowish brown or reddish brown ochre pigment whose main component is ferrous oxide (hematite).  
iii Gold ground with traces of silver and copper then pounded to form thin sheets.  
iv From November 17, 2022 to April 3, 2023, all *kinpeki shouhekiga* by Hasegawa Tohaku and the Hasegawa school will be unavailable for public viewing.



Nishijin Kinran *obi* (kimono belt) fabrics  
Photo: Courtesy of Nishijin Textile Industry Association



Nishijin Kinran cushion covers  
Photo: Courtesy of YAMAZAKI ORIMONO Co., Ltd.

# NISHIJIN KINRAN

## Kyoto's Magnificent Gold Brocade

***Kinran*, a type of gold brocade, is a luxurious fabric distinguished by its use of gold thread. “Nishijin Kinran,” gold brocade made in the Nishijin district of Kyoto, is especially famous among such fabrics for its high quality and rich expressiveness. This magnificent gold brocade combines the traditions of Kyoto Nishijin weaving with modern technology.**

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SATO KUMIKO

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**S**ILK weaving conducted in the northwest of urban Kyoto is called “Nishijin weaving” and boasts a history of more than 1,000 years. Fabrics produced in Nishijin using thread wrapped with gold leaf, so-called Nishijin Kinran fabrics, have an especially luxurious appearance and have been admired since ancient times. Their exquisite beauty comes from weaving gold-covered threads into the weft to create patterns.

Yamazaki Seiichiro, vice president of the Nishijin Textile Industry Association, explains, “In Kyoto, kinran has long been used for Buddhist monks’ robes and ritual implements. The patterns used differ depending on the sect. In addition to its religious uses, kinran is used to make bags for tea utensils, decorative cloth for hanging scrolls, and the costumes worn by Japanese dolls. These are the four main uses of kinran, with specialist weavers for each.”

Kinran was first imported to Japan from China in around the 13th century, and production in Nishijin began in earnest when the techniques for making the cloth also arrived in the late 16th century. The manufacturing technique of the gold thread itself and the technique of weaving “leaf yarn” (*hakuito*), in which gold leaf is stretched thinly and pasted with lacquer on hand-made washi paper and cut into thin threads, were improved by many craftsmen throughout the Edo period (early 17th to mid- to late 19th century). Through the hand-weaving process, leaf yarn blends well with the silk thread, creating a splendor and texture unique to kinran. Eventually, during the Meiji period (1868-1912), as Japan modernized, kinran production increased sharply due to the spread of Jacquard looms.<sup>1</sup> Since

Close-up of Nishijin Kinran place mats  
Photo: Courtesy of YAMAZAKI ORIMONO Co., Ltd.



A display of Nishijin Kinran *obi*  
(kimono belt) fabrics  
Photo: Courtesy of Nishijin Textile  
Industry Association




the finish of textiles from Jacquard looms differs depending on the combination of warp and weft threads, gold threads that are easy for machines to handle were developed, with gold leaf strips wrapped directly around the thread. However, the traditional technique of using leaf yarn has been steadfastly preserved in the production of Nishijin Kinran.

There are various types of gold leaf depending on the purity of the gold used (gold content), but gold thread using expensive pure gold leaf has been strictly distinguished as “*hon-kinshi*” since ancient times and has been the material used for producing Nishijin Kinran.

The patterns expressed in Nishijin kinran are said to have developed based on the textiles used for the bags to contain tea utensils loved by samurai lords and famous tea masters from the second half of the 16th century onward as well as the kinran held in the Shosoin Repository via the Silk Road, but nowadays they are created freely using computer programs, ranging from complex patterns to reproductions of photographs. The motifs have also developed in a variety of ways

according to the times, from traditional ones centering on auspicious natural objects, such as birds and clouds, to geometric and modern patterns.

Nishimura Tetsuya, executive director of the Nishijin Textile Industry Association, says, “There are twelve types of weaving techniques in Nishijin designated as national traditional crafts, such as *tsuzure-ori*<sup>ii</sup> and *kasuri-ori*.<sup>iii</sup> By combining these techniques with kinran that uses gold thread, we have acquired a rich expressiveness that is exquisite. Kinran is currently produced in several places in Japan, but in 2007 we registered it as a regional collective trademark under the name ‘Nishijin Kinran’ to guarantee the quality of Nishijin weaving.”

Long-practiced traditions and modern technologies coexist in Nishijin Kinran, fabrics whose magnificent beauty remains undimmed. 

i Automatic loom invented in France in 1801.

ii In *tsuzure-ori*, weavers weave precise designs using their fingertips, as if spelling out letters.

iii *Kasuri-ori* means weaving with threads dyed according to a pattern in advance before folding.



# Ensuring the Safety of Discharging ALPS Treated Water into the Sea

**The Government of Japan, under review by the International Atomic Energy Agency (IAEA), is pushing forward with preparations to discharge the ALPS treated water from the Fukushima Daiichi Nuclear Power Station into the sea in a safe and highly transparent manner in accordance with international safety standards.**

**SAWAJI OSAMU**

**T**HE Great East Japan Earthquake of March 11, 2011 caused extensive damage from the tsunami, especially along the Pacific coast of the Tohoku region. At Tokyo Electric Power Company Holdings (TEPCO) Fukushima Daiichi Nuclear Power Station (hereinafter, “Fukushima Daiichi NPS”) in Fukushima Prefecture, the cooling system for the reactors was shut down, causing the three reactors that were in operation to reach high tem-

peratures and melt fuel. Hydrogen gas was generated, and it caused a hydrogen explosion, releasing radioactive materials into the environment. After the explosion, countermeasures taken including the cooling of reactors resulted in a sharp decline in the amount of radioactive materials released, and the reactors were placed in “cold shutdown” status in December of that year. To date, the amount of radioactive materials released has remained at a level that has had virtually no environmental impact.

Nevertheless, water continues to be injected into the reactors to cool the “fuel debris,” which is melted fuel mixed with structural materials that have solidified. Water that comes in contact with

fuel debris becomes contaminated water containing high concentrations of radioactive materials, which then mix with groundwater and rainwater that flows into the reactor buildings, generating new contaminated water. In response, TEPCO has been taking measures such as installing impermeable walls and pumping up groundwater. However, it is difficult to immediately stop the generation of new contaminated water, and more than 1,000 tanks are expected to be full by fall 2023. Although TEPCO is currently conducting decommissioning work with various tasks at the Fukushima Daiichi NPS, there are concerns about the lack of space to build the facilities needed for future decommissioning work due to the storage tanks occupying the site, as well as concerns about the risk of the tanks leaking in the event of a disaster. There-



The ALPS (Advanced Liquid Processing System) at Fukushima Daiichi NPS



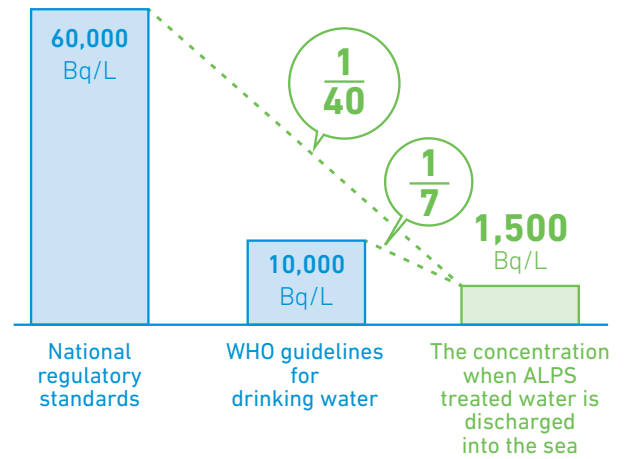
fore, eliminating the tanks by disposing of the ALPS treated water, in which radioactive materials other than tritium are purified from the contaminated water by ALPS (Advanced Liquid Processing System) until it meets regulatory standards, has become a crucial task for the decommissioning of Fukushima Daiichi NPS and reconstruction of Fukushima. In April 2021, after more than six years of deliberation, the Government of Japan announced its policy of discharging ALPS treated water into the sea, taking into consideration the precedents both in Japan and overseas as well as ease of monitoring.

## SAFETY OF DISCHARGE INTO THE SEA

In the case of discharging into the sea, concerns have been raised about the presence of tritium in ALPS treated water. Tritium is a radioactive material present in all water on earth, including rainwater, seawater, and tap water, as well as in the human body. Since tritium bonds with oxygen to form a liquid with virtually identical properties as water, it is extremely difficult to separate tritium alone from water. No technology that can be applied to the removal of tritium from water currently exists. However, the radiation energy emitted by tritium is very weak and if tritium were to enter the human body, it is not expected to accumulate. Actually, water containing tritium is generated at nuclear facilities around the world, and each facility discharges it in compliance with safety standards. No effects caused by tritium have been observed in the vicinity of these facilities.

The ALPS treated water from the Fukushima Daiichi NPS will be diluted with seawater before being discharged into the sea, up to the pre-accident discharge control target of 22 trillion Bq (becquerels) per year. The designated concentration of tritium will be 1,500 Bq per liter. This is 1/40th of the Japanese safety standard and 1/7th of the World Health Organization (WHO) guidelines for drinking-water quality. The Government of Japan evaluated that the impact on the human body and the environment from the discharge of the ALPS treated water into the sea is significantly small even compared to the impact from natural sources.

In addition, the Government of Japan has requested assistance from the International Atomic Energy Agency (IAEA) to ensure that the ALPS treated water is discharged into the sea in a safe and highly transparent manner in accordance with international safety standards. The IAEA has accepted the request and is conducting a rigorous review of the safety-related aspects of the entire process from before to after the discharge of ALPS treated water. The first review was conducted in February 2022, and 15 Task Force members, consisting of the IAEA secretariat and experts from eight countries, including the United States, the United Kingdom, China, South Korea, and Russia, visited Japan. They held discussions with the government and TEPCO, and visited the Fukushima Daiichi NPS. The report on the mission was released in April of that year, and the Task Force noted that TEPCO had successfully incorporated



Comparison of tritium concentrations

prevention measures in the design of the ALPS treated water facility as well as in the associated operating procedures. The Task Force further noted that the effect on humans from the ALPS treated water being discharged into the sea is expected to be significantly below the dose constraint designated by Japan in accordance with international safety standards and so on.

In May 2022, Rafael Grossi, Director General of the IAEA, visited the Fukushima Daiichi NPS. Following the visit, Director General Grossi made the following comment, “We, as the IAEA, will be able to ascertain that once the discharge of processed water goes into the Pacific Ocean, it will be done in full conformity with the international standards, and therefore it will not cause any harm to the environment.”

In order to ensure rigorous transparency, IAEA laboratories and third-country research institutes take part in marine monitoring from before to the completion of discharge, and local government officials and fisheries workers also have the opportunity to see the monitoring.

(For more information on the ALPS treated water, see <https://www.meti.go.jp/english/earthquake/nuclear/decommissioning/atw.html>). 📄

**Note:** This article was written with the consent of the Ministry of Economy, Trade and Industry and on the basis of publicly available data from the Ministry.



IAEA Director General Rafael Grossi (center) holding a bottle containing a sample of the ALPS treated water at TEPCO's Fukushima Daiichi NPS in May 2022



Sagami City Minami Waste to Energy & Recovery Plant in Sagami City, Kanagawa Prefecture

Photo: Courtesy of Sagami City, Kanagawa Prefecture

# Waste to Energy Plant that Recovers Gold and Silver from Waste

A Japanese company has succeeded in developing a waste to energy plant that can recover gold and silver from waste. Technological development is ongoing to recover other types of precious metals such as platinum, palladium<sup>1</sup> and copper by applying this technology.

## SASAKI TAKASHI

IN June of this year (2022), it was reported that a total of about 30 kilograms of gold and silver had been recovered from a waste to energy plant at the Sagami City Minami Waste to Energy & Recovery Plant in Sagami City, Kanagawa Prefecture. The city was reported to have sold the recovered precious metals at a profit of about 37 million yen.

Fujita Jun, Professional Engineer (P.E.Jp) and Deputy General Manager of the Technical Improvement Section at the Environmental Engineering Business Unit of Kobelco Eco-Solutions, Co., Ltd., explains, “We succeeded in recovering gold and silver from the fluidized bed gasification and melt-

ing furnace which we designed and built. Owing to inadequate separation, some waste electric and electronic equipment is thrown away with household waste, so we knew that the precious metals used in electronic circuit boards were contained in the residue discharged from the incinerator, but until now there was no way to recover it as a resource.”

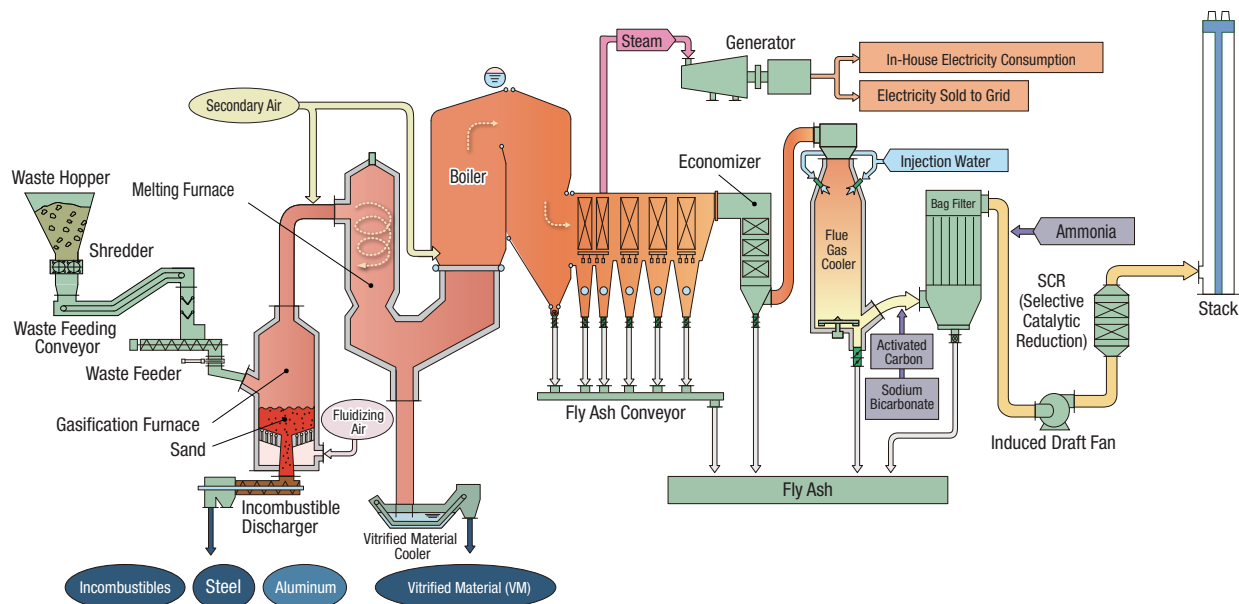
The fluidized bed gasification and melting furnace was initially developed to prevent the generation of harmful substances such as dioxins during waste thermal treatment and to reduce the environmental load of the final disposal. It consists of a fluidized bed furnace that gasifies waste by circulating sand at high temperatures of 500-550 degrees and a melting furnace that melts the ash discharged from the fluidized bed furnace at high temperatures for re-use as vitrified material (see Diagram 2). Iron and aluminum contained in waste could be recovered from the sand inside the furnace. The combustion temperature inside the melting furnace reaches as high as 1,250 degrees, so not only is the furnace less likely to produce dioxins but also the ash melts at these temperatures to form vitrified material, which is a material used in road construction. All of the heat needed to melt the ash is generated by the gasification of the waste, so no fossil fuels are required.

Fujita says, “In 2018, when we started developing the precious metal recovery technology, we had no idea where in the waste to energy plant the gold and silver could be found. The ash and non-combustibles eventually discharged from the furnace contained little gold or silver, so we were certain that it remained somewhere in the gasifier. After two years of survey



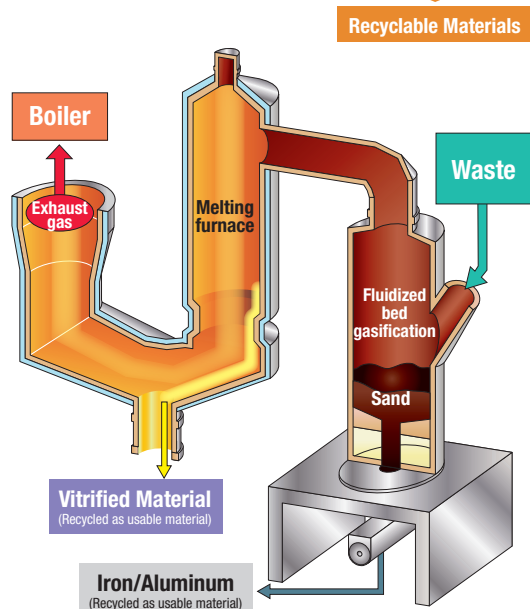
Gold bars (replicas) equivalent to the amount of gold recovered from the fluidized bed gasification and melting furnace

Photo: Courtesy of Sagami City, by Kobelco Eco-Solutions, Co., Ltd.



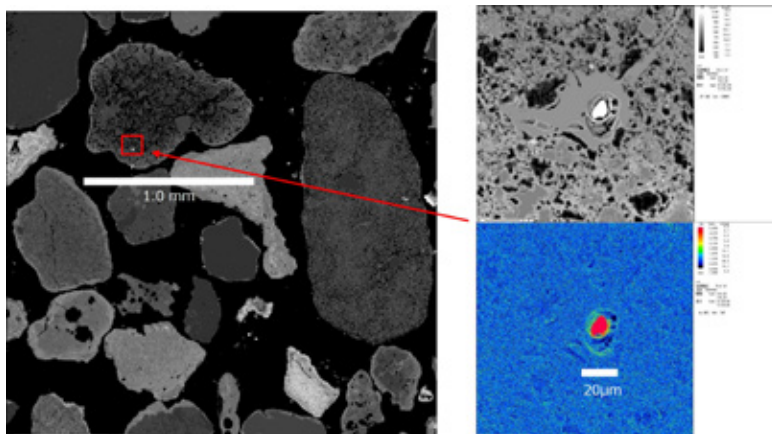
**Diagram 1: Process flow diagram of the fluidized bed gasification and melting furnace**

Courtesy of Kobelco Eco-Solutions, Co., Ltd.



**Diagram 2: Mechanism of the fluidized bed gasification and melting furnace**

Courtesy of Kobelco Eco-Solutions, Co., Ltd.



A particle of gold (highlighted in red) with a diameter of about 20 μm (micrometers) inside a sand particle of about 1 mm

Photo: Courtesy of Kobelco Eco-Solutions, Co., Ltd.

we have finally discovered that the gold and silver remained concentrated in the sand accumulated at the bottom of the fluidized bed furnace.”

Typically, the gold content of gold ore mined from a gold mine is about 3-5 grams per ton of ore. By contrast, the sand at the bottom of the incinerator contained more than 6 kilograms (6,000 grams) of gold per ton.

At the Minami Waste to Energy & Recovery Plant, operations are suspended once every three to four months and maintenance work is carried out. By extracting the sand accumulated at the bottom of the furnace at that time and taking it to a refining plant, the Minami Waste to Energy & Recovery Plant was able to recover about 15 kilograms of gold and about 15 kilograms of silver in total in the 2021 fiscal year.

There was quite a big response to this news, and inquiries from local municipalities and recyclers nationwide followed one after another.

At present, gold and silver recovery has already commenced

at five out of seventeen locations around Japan where the company’s fluidized bed gasification and melting furnaces have been installed.

This precious metal recovery technology reduces CO2 emissions to less than one-tenth of that of refining gold from gold ore, so it is environmentally friendly as well. If the technology advances as hoped, waste to energy plants may soon be able to recover not only gold and silver but also platinum, palladium, copper, and other metals. As Japan relies on imports for these resources, this technology to recover precious metals from waste to energy plants is not only useful, it will also contribute to the realization of the “recycling-oriented society”<sup>ii</sup> which Japan is striving to build. **7**

- i Silvery-white rare metal which resembles platinum.
- ii A society in which resource consumption is suppressed and the environmental burden is reduced by promoting the efficient use and recycling of things.



## An American Artist in Japan Exploring the Samurai Spirit through Art

American artist David Stanley Hewett creates Japanese history- and culture-themed works of art that utilize large amounts of gold leaf, and his works have received high praise from within Japan and abroad.

SATO KUMIKO

**A**MERICAN David Stanley Hewett is an artist based in Karuizawa, Nagano Prefecture whose art is inspired by Japanese culture and history. Hewett has become internationally famous for his *Bushido Series* of paintings (“bushido” refers to the code of conduct of the samurai) and more recently for his newly released series, *LIFE*. The *Bushido Series* is inspired by Japanese historical events and the spirit of the samurai.

In 2017, Hewett’s painting “Majime” from the *Bushido Series* was chosen as a gift for the First Lady of the United States by the then Prime Minister of Japan’s wife, and is now housed in the National Archives of the United States. Hewett’s works have been highly praised, with yet another work being added to the collection of the US Embassy in Japan in 2021.

Hewett explains, “The red used in the *Bushido Series* portrays passion, the black portrays discipline, and the gold portrays the elegance of the samurai. Japanese samurai were not just trained to fight, but were unusual in that they also had great cultural knowledge of the tea ceremony, calligraphy, and more, especially in the Edo period (early 17th to mid- to late 19th century).”

The gold leaf portraying the elegance of the samurai is made

in Kanazawa, Ishikawa Prefecture. Hewett applies each sheet of gold by hand and creates small cracks representing the passage of time. The painting process culminates in the throwing



“Bushido 205,” part of the *Bushido Series*

David Stanley Hewett in front of “Immortal,” a painting in his new series, *LIFE*



of the black “swoosh.” This “swoosh” represents the instant that a warrior’s character is revealed in battle.

Hewett says, “Before I start painting, I sit in meditation and focus my mind.” Each painting is the result of Hewett’s interpretation of a historical event or the emotional experience of Japanese samurai during these events.

Hewett, whose mother was also an artist, was exposed to various artistic traditions from a young age and spent much time with his mother in her art studio as a child.

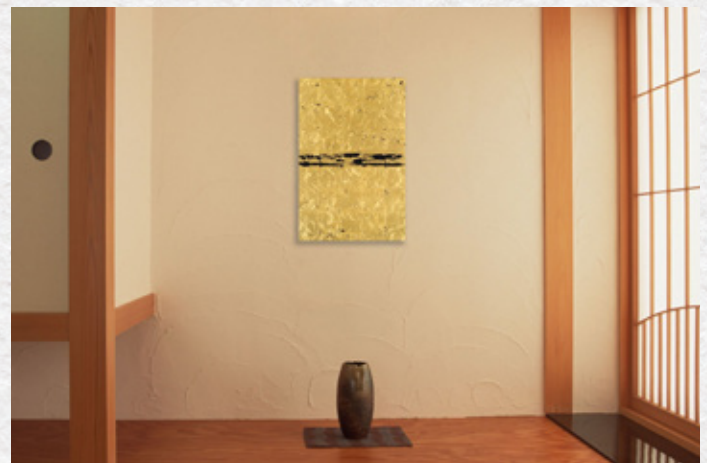
Hewett majored in Japanese history at the University of Massachusetts where he also taught ceramic arts, and spent time as exchange student at Hokkaido University. He came back to Japan in 1990 after graduating from the University of Massachusetts and studied under a



A “Hewett Luster Glaze” vessel

Japanese ceramic artist. He later joined the US Marine Corps and, after four years of service, came back to Japan and began work as an artist in earnest.

After moving back to Japan, Hewett attended many galleries to view ancient Japanese folding screens. Inspired by the resilience and strength of some of the 12th-century screens Hewett saw, he began his study of the techniques of gold leaf crafts and traditional folding screen-making. This eventually led to the *Bushido Series* of paintings. Hewett says, “While the color of the paint had faded, the gold leaf and some of the paint pigment remained on the folding screens creating a beautiful abstract piece of art.”



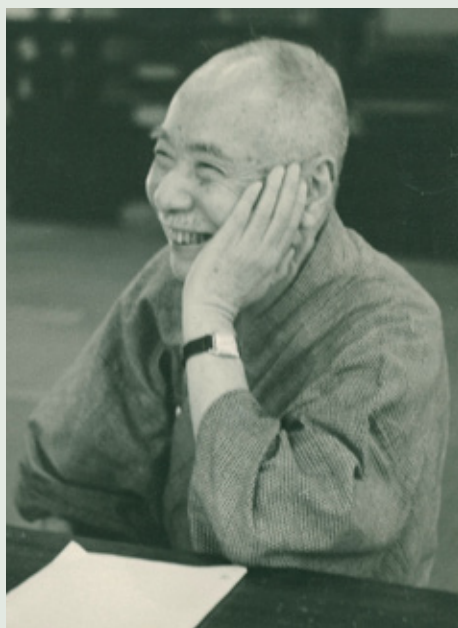
“Majime,” part of the *Bushido Series*, chosen as a gift for the First Lady of the United States in 2017

Hewett also makes pottery with a distinctive golden glaze. The glaze is called “Hewett Luster Glaze” and the pottery produced using it has been widely exhibited.

In 2021, Hewett was commissioned to paint the ceiling of the Kumano Kotai Shrine in Karuizawa, Nagano Prefecture. For Hewett, this commission was one of the most important works he has been asked to paint. This enormous painting, utilizing 2,400 sheets of gold leaf, covering over 24 square meters, is viewed by thousands of visitors to the shrine every year.

In 2022, Hewett unveiled *LIFE*, a new series of paintings. These new paintings are composed of interpretations of Japanese traditional themes combined with modern influences. Bright colors and circles of gold are prevalent across the series. Hewett says, “The global pandemic that began in 2020 has been challenging and I wanted to create an optimistic worldview that focuses on the energy and resilience of life on earth.”

Fans of Hewett’s work will surely look forward to future works by this unique artist. 7



Takahama Kyoshi

## SAKURAI SHIN

**T**AKAHAMA Kyoshi (hereinafter, “Kyoshi”) was born in 1874 in what is now Matsuyama City, Ehime Prefecture. Kyoshi began studying haiku as a junior high school student under haiku poet Masaoka Shiki (1868-1902, hereinafter, “Shiki”), who was from the same province. That was with an introduction from classmate Kawahigashi Hekigoto (1873-1937) (hereinafter, “Hekigoto”), one of Shiki’s two greatest pupils along with Kyoshi.

It was Shiki who gave him his pen name, “Kyoshi.” At age 20, Kyoshi and Hekigoto moved to Tokyo with the help of Shiki, who was living there. Shiki seemed to know that he was approaching the end of his life due to a serious illness, and he asked Kyoshi to become his successor, having acknowledged Kyoshi’s talent as a haiku poet. But the still-young Kyoshi did not accept. However, their teacher-student relationship continued until Shiki’s death.

In 1898, Kyoshi took over all of the editing and publishing for *Hototogisu*, a haiku magazine established in the preceding year in cooperation with Shiki. As a result of Kyoshi working on *Hototogisu*,

Cover of *Kyoshi Kushu* (a collection of haiku poems by Kyoshi), published in 1928, Shunjusha Publishing Company

# Takahama Kyoshi

## A Haiku Poet Who Composed Clear-Eyed Poems about Nature and the Changing of the Seasons

**Takahama Kyoshi (1874-1959) looked at natural phenomena and the changing of the seasons with clear eyes, and he composed many haiku with objective descriptions while also training other haiku poets.**

it became a general literary magazine, featuring serial novels and more along with haiku.

As editor of *Hototogisu*, Kyoshi began to select haiku sent in by readers, so-called *senku*. Kyoshi later said, “Selecting poems is itself creative work.” He said that choosing what to select, what to focus on, and how to evaluate a poem from among many haiku is related to the eye for beauty of the person selecting and is a true and fine act of creativity. To Kyoshi, selecting haiku was a creative activity just the same as composing haiku.

So, what were the characteristics of the haiku Kyoshi composed? Kobayashi Sachiyo, curator of the Kyoshi Memorial Museum, explains as follows.

“Kyoshi noted that the main viewpoints (or concepts) of his own haiku were *kacho fuei* (to compose poems



The cover of the October 1898 edition of *Hototogisu*, the first edition published with Kyoshi as editor and publisher

about flowers, birds, and nature in general) and objective portrayals. “Kacho fuei” is a phrase that Kyoshi himself coined. It is an idea of haiku creation that looks honestly at and respects the various phenomena of the natural world and the changing of the four seasons, and places value on *kigo*, or seasonal words. Objective portrayals highlight the author’s emotions through a collection of objective expressions rather than by expressing things subjectively.”

In addition to demonstrating his abilities with haiku creation and as a poetry instructor, Kyoshi also wrote a primer on haiku and worked to train many pupils.






The Kyoshi Memorial Museum, located in Ashiya City, Hyogo Prefecture

He also worked to train female haiku poets starting in the 1910s, when there were few women composing haiku. He did so by hosting gatherings of haiku poets for women, creating a column in *Hototogisu* for women, and more.

In 1954, Kyoshi was the first haiku poet to be awarded the Order of Culture by the Japanese government. He died five years later in 1959 at the age of 85. Kyoshi is said to have composed more

than 30,000 haiku in his lifetime. Active as a haiku poet for many years, he spent his life as a driving force in the world of haiku, connecting the late 19th century with the present day. 

i See *Highlighting Japan* September 2022, "Masaoka Shiki: A Poet Who Brought Innovation to Haiku" [https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202209/202209\\_12\\_en.html](https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202209/202209_12_en.html)

*Hakubotan to  
iu to iedomo  
kou honoka*

A white peony  
We say, yet I sense  
Faint pink

Translation by Aya Nagayama and James W. Henry, III, Inabata Teiko, *100 Works of Kyoshi*: Trafford Publishing, 2009

Composed in 1925 at the age of 51. *Hakubotan* (a white peony) is the *kigo* (seasonal word) for early summer. One of Kyoshi's famous haiku. It speaks of the fact that while it is called a white peony, you can see a slight pink color if you look closely. You can feel Kyoshi's sense of praise for nature along with an objective observation of nature in his eyes as he noticed that there were parts that were slightly pink when observing the white flower.

*Tohyama ni  
hi no ataritaru  
kareno kana*

The sun shines  
On the distant mountains;  
Withered field

Translation by Aya Nagayama and James W. Henry, III, Inabata Teiko, *100 Works of Kyoshi*: Trafford Publishing, 2009

Composed in 1900 at the age of 26. *Kareno* (withered field) is the *kigo* for winter. This poem speaks of a scene where the winter sun shines on a distant mountain making it bright, but cold, a withered field spread out before the viewer. Kyoshi noted that a life with strong sunshine was not bad but was bothersome, and that the life he desired was that of a quiet view with the sun shining on the tip of a distant mountain. He said, "This haiku has established the state of mind for composing my haiku." Although this haiku was written when he was young, it is a haiku that Kyoshi wrote repeatedly in calligraphy until his last days.

*Toki mono o  
kaiketsu suru ya  
haru o matsu*

May time solve  
Worries and difficulties—  
Awaiting the spring

Translation by Aya Nagayama and James W. Henry, III, Inabata Teiko, *100 Works of Kyoshi*: Trafford Publishing, 2009

Composed in 1914 at the outbreak of World War I at the age of 40. *Haru o matsu* (awaiting spring) is the *kigo* for winter. Kyoshi explains this haiku, saying, "If we halfheartedly try to solve our troubles, they quickly become even more entangled. If we instead let nature take its course, things will become untangled in time. Let us quietly bear the cold winter days and wait for the warm spring days to come." You can see Kyoshi's view on life in this haiku.



Japanese gentian with  
bluish purple flowers  
cozy/PIXTA



Cut white Japanese gentian flowers  
Anemone/PIXTA

Example of a family crest featuring Japanese gentian

Jun PIXTA/PIXTA

**J**apanese gentian (*Gentiana scabra*) is a perennial herb that blooms from September to November, making it a flower associated with the autumn in Japan. Native to Japan, where it is known as *rindo*, the plant is distributed on the main islands of Honshu, Shikoku and Kyushu. In nature, Japanese gentian typically grows alone rather than in clusters. It can be found on the forest floor of mountains, in grasslands, and on embankments in sunny, well-drained areas.

Japanese gentian differs in height depending on the variety, but the smallest grow to about 10 cm and the largest up to about 1 m. The flowers are bell-shaped, measure 3 to 5 cm in diameter, and are usually blue, light blue, or purple. The petals are divided into 5 or 6 lobes, the tips of which are pointed and triangular. The flowers bloom on sunny days, and close on cloudy days and at night.

In Japan, the root of the plant has been used as a medicinal herb since long ago and is said to counter fever and have anti-inflammatory effects. It has also been used as a family crest since ancient times. In the Japanese language of flowers, the gentian expresses “justice” and “sincerity.”

Selective breeding of the plant has flourished, and many varieties with pink or white flowers can now be found. Japanese gentian are popular in Japanese homes both as potted plants and cut flowers.



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