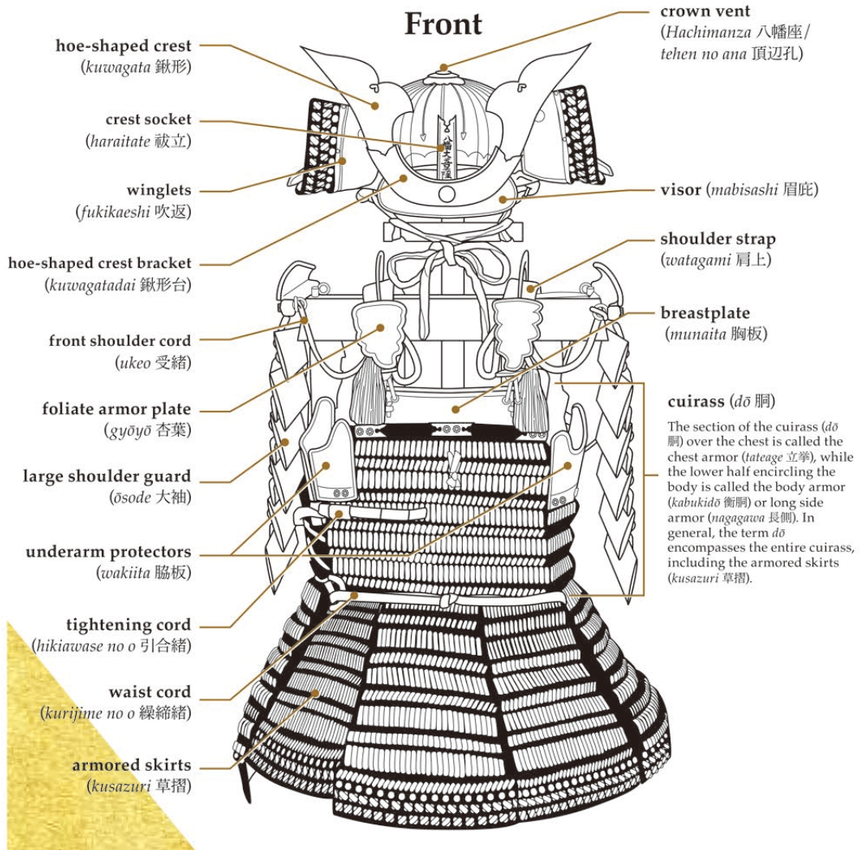
Special Viewing Commemorating the Completion of Conservation

Dōmaru Armor *with* Blue Lacing

June 18–August 4, 2024
Kyoto National Museum
Heisei Chishinkan Wing,
Gallery 1F-5

Important Cultural Property
Dōmaru **Armor with Blue Lacing**
Kyoto National Museum

Armor Parts



The shoulder fastening cord (*kakeo* 掛緒) holds on the large shoulder guards (*ōsode*) using through rings on the back of the shoulder straps.

The standing shoulder plates (*shōjiita*) on this *dōmaru* are reversed front to back from their original positions. Such alterations were common in Edo period (1615–1868) armor restoration.

Armor Materials and Techniques

The distinctive coloration and complexity of Japanese armors comes from carefully conceived combinations of materials and techniques. The basic components of armor are lames (*sane* 札), lacing (*odoshi* 威), and metal fittings (*kanagu* 金具). Producing these components requires meticulous craftsmanship by artisans in a wide range of specialties, including metalwork, lacquer, textiles, and leatherwork.

Lames (*Sane* 札)

Lames are the most fundamental components of Japanese armor. These are small plates measuring 5–8 cm high, 2–4 cm wide, and with a thickness of 1–2 mm, with regularly spaced holes for threading cords. Lames can be further divided into subcategories by their shapes. The basic lame types are introduced here. Lames are usually made of iron or cowhide. Generally, older lames tend to be larger, growing smaller over time, and are sometimes termed "small lames" (*kozane* 小札).

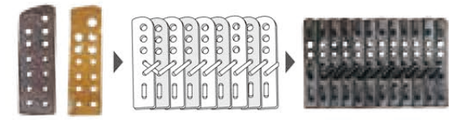
Sizes
lame (*sane* 札) | small lame (*kozane* 小札)

Materials
Iron (*tetsu* 鉄) lames | Leather (*kawa* 革) lames

Finishes
Raised relief (*moriage* 盛上) lames

Moriage lames have multiple layers of lacquer on the parts that show, creating a relief effect.

A lamellar plate (*saneita* 札板) is a horizontal unit formed by stacking several lames, slightly staggering each horizontally, and lacing them together with leather thongs through the holes of the lower four rows. Lamellar plates may be made from either iron or leather lames. They also made be of composite materials, with iron and leather lames alternating in a regular pattern to achieve a balance between lightness and strength. The outer surfaces of lamellar plates are coated with lacquer for reinforcement and for aesthetics color choices. A single suit of armor may incorporate several hundred to several thousand lamellar plates.



To create lamellar plates, lames are stacked horizontally, with each lame offset by half its width, and laced together with leather thongs. Black lacquer is applied to the surface as a reinforcing surface coat.

In the later part of the Muromachi period (1392–1573), solid plates (*itazane* 板札) were introduced as an alternative to labor-intensive lamellar plates *saneita*. *Itazane* include grooved solid plates (*kiritsukezane* 切付札), fashioned to resemble lamellar plates, and straight-edged solid plates (*ichimonji gashira no itazane* 一文字頭の板札).

(Left) grooved solid plate (*kiritsukezane* 切付札)
(Right) straight-edged solid plate (*ichimonji gashira no itazane* 一文字頭の板札)

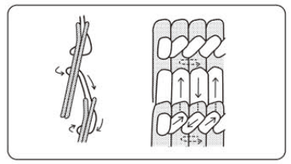
Lacing (*Odoshi* 威)

Odoshi 威, the Japanese character for armor lacing, is derived from the homophonous characters *odōshi* 緒通し, meaning "cord threading." One distinctive feature of Japanese armor is how the lamellar plates (*saneita* 札板) are laced together vertically, with cords threaded through the upper three rows of holes in the lames. The lacing cords (*odoshige* 威毛) are usually braided silk cords (*kumihimo* 組紐) or tanned deer hide (*kawa*革) strips.

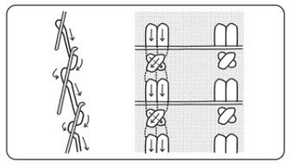
There are two main lacing methods: full lacing (*kebiki odoshi* 毛引威), in which the cords are densely threaded so as to cover the lames, and sparse-point lacing (*sugake odoshi* 素懸威), where the lacing is threaded with spaced intervals.

Additionally, when lames and other components were reused, the entire armor, including the lames and lacing, might be wrapped in leather for visual concealment and reinforcement.

full lacing (*kebiki odoshi* 毛引威)



sparse-point lacing (*sugake odoshi* 素懸威)



Full Lacing
(*Kebiki Odoshi* 毛引威)
Important Cultural Property
Dōmaru Armor with Blue Lacing
Kyoto National Museum

Leather Lacing
(*Kawa Odoshi* 革威)
Important Cultural Property
Dōmaru Armor with Black Leather and Purple, Red, and White Lacing
Kyoto National Museum

Sparse-Point Lacing
(*Sugake Odoshi* 素懸威)
Dōmaru gusoku Armor with Black Lacquered Plates and Dark Blue Sparse-Point Lacing

Leather Wrapping
(*Kawa Tsutsumi* 革包)
Important Cultural Property
Haramaki Armor with Smoked Leather Wrapping
Amanosan Kongō-ji Temple, Osaka

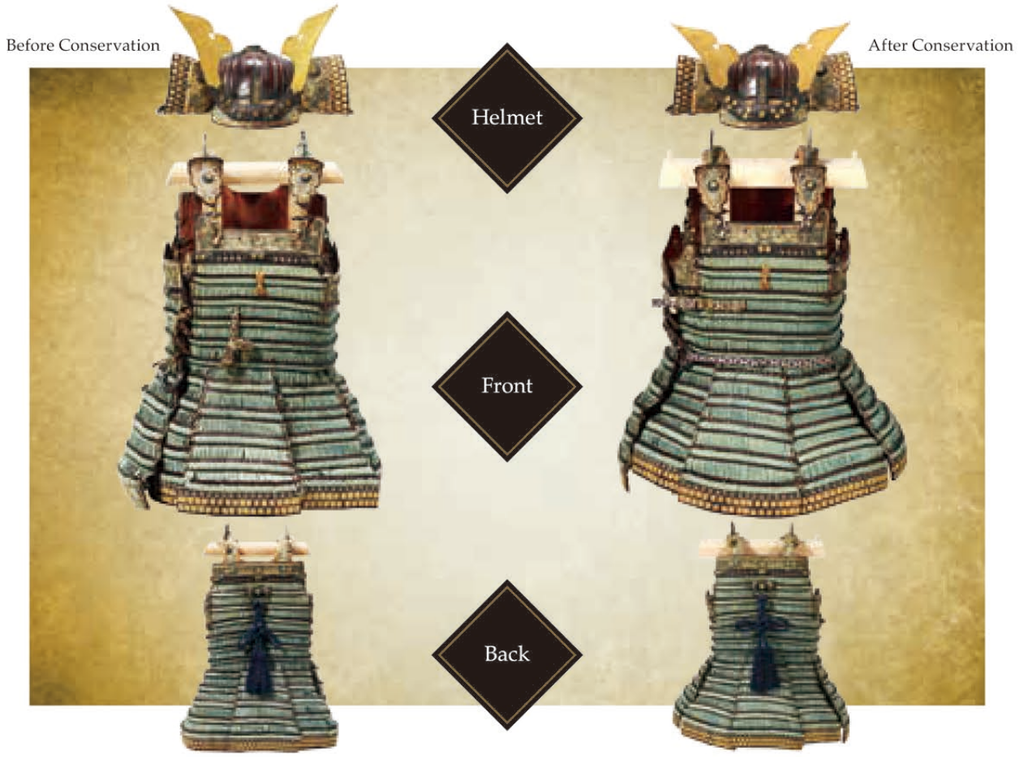
Metal Fittings (*Kanagu* 金具)

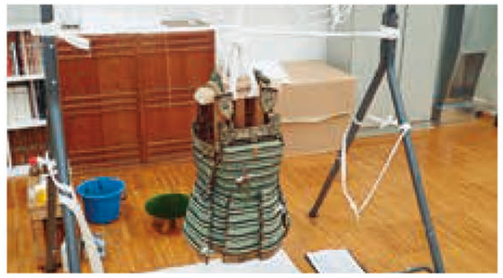
Various metal fittings (*kanagu* or *kanamono*) are used in the production of armor. Many are made of copper that is forged to shape and then colored gold using mercury gilding. The black metal fittings of the *Dōmaru* Armor with Blue Lacing are made mostly of patinated (*nigurome* 煮黒目) copper. Previously, these were thought to made from a copper and gold alloy called *shakudō* 赤銅, which exhibits a similar black color; however, upon analysis during the recent conservation project, the gold content was discovered to be less than 1%, lower than the 3–5% gold of *shakudō*, for which reason the black metal was reclassified.

Examples of replicated metal fittings

Conserving the *Dōmaru* Armor with Blue Lacing

Armor, which utilizes a wide variety of materials, is inherently a composite art form comprising many different mediums. In this conservation project, a groundbreaking approach was adopted: instead of having repairs carried out by a single armorer or workshop, the project was divided among different conservation studios specializing in metalwork, lacquer, and textiles. In each case, conservators aimed to keep repairs to a minimum, doing what was necessary for future preservation and exhibition without compromising the original integrity of the armor and its components.





Dōmaru armor during conservation

Applying flour-lacquer adhesive (*mugi urushi*) to stabilize cracks in lacquer on large sleeve guards (*ōsode*)

Clamps holding adhesive applied to damage on armored skirts (*kusazuri*)

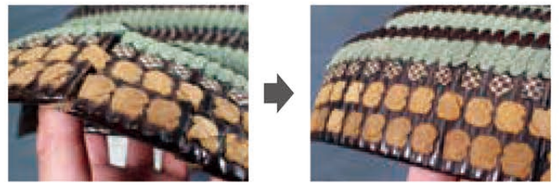
Reinforcing the tightening cord (*hikiawase no o*) with leather

Lacquer Conservation

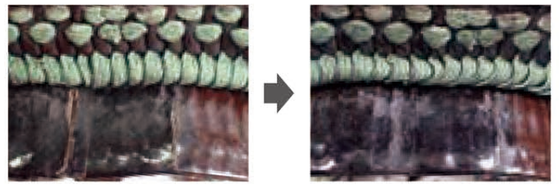
Short-bristled brushes and other tools were used to remove as much dust and impurities as possible from the surface of the lacquer coating.

Armored Skirts (*Kusazuri* 草摺)

Before Conservation — After Conservation



A flour-lacquer adhesive (*mugi urushi* 麦漆) was used to repair breaks in the lamellar plates of the armored skirts. Where cracks had caused warping, the adhesive was used as a filler inside the cracks. Then corrective measures were taken to restore the original shape as much as possible.



Wood dust-lacquer putty (*kokuso urushi* 刻苧漆) was used to reinforce the surface. Then the surface was shaved down to the original shape. Finally, raw lacquer (*ki urushi* 生漆) was applied to the surface of the putty to match the color tone.

Replacement of Metal Fittings

Attaching a replacement metal fitting to a large shoulder guard

Metal fittings are durable components of armor, but they can deteriorate due to rust or deformation, or fall off if damaged. Each of the extant fittings on this armor was meticulously cleaned, and rust was removed. Where parts were missing, new metal fittings were crafted and added. Technically, it's possible to create replacements so precise that they are indistinguishable from the originals; however, to prevent any future confusion between the original fittings and the replacements, a character meaning "repaired" was added to the newly made fittings.

Replacement of a Standing Shoulder Plate (*Shōjiita* 障子板)

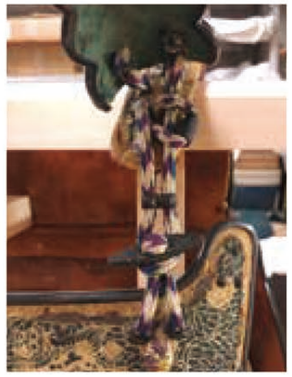
Removing the standing shoulder plate

After restoration with a replaceme with a new standing shoulder plate

Standing shoulder plate and textile fragments removed during restoration

The standing shoulder plate (*shōjiita*) attached to the left shoulder had broken off at its base due to corrosion and had been temporarily secured at some point with synthetic adhesive and cords. The shoulder plate was dismantled, and the remaining fragments from inside the shoulder strap (*watagami*) were collected before incorporating a newly fabricated standing shoulder plate. The damaged *shōjiita* and all other original components were preserved on a wooden mount. Incidentally, the orientation of the standing shoulder plates panels is reversed from that of the Muromachi period. Such reversals are a common feature of Edo period armor restoration, found in many other similar armors. For this *dōmaru* conservation, the orientation was deliberately left in its current reversed state to preserve the appearance illustrated in the text *Shūko jisshu* (Collectied Antiquities in Ten Categories), published in 1800 (see p.8).

Replacement of the Attachment Cords (*Takahimo* 高紐)



Production of braided cords using the *kute* uchi technique

Some of the cords connecting the shoulder straps and the breastplate were replaced. These cords were reproduced using the traditional hand-held loop braiding technique known as *kute uchi*. *Kute uchi* is characterized by a softer finish with more air trapped within the braided cords (*kumihimo*) compared to the commonly used braiding techniques done on braiding stands (*kumidai*). The original color of the silk threads used for the cords was recreated using scientific analysis, but the actual dyeing was modified to match with the existing cords in their current faded state. Like the reversed *shōjiita*, the toggles (*kasakohaze*) that should have been on the back were on the chest side—the result of an Edo period repair. Here too, instead of restoring them to their original locations, these were left attached in their current positions.

The Significance of This Armor Conservation Project

What is *Dōmaru*?

Dōmaru (literally, "body encircled") is a type of samurai armor used primarily during Japan's medieval age. It is typified by a cuirass (body armor) that wraps around the entire torso and fastens on the right side.

During the late Heian and Kamakura periods (approx. twelfth through fourteenth centuries), *dōmaru* armor was worn by retainers and other subordinate infantry accompanying mounted commanders. It was a lower ranking alternative to the large, heavy *yoroi* armor (*ōyoroi*) worn by senior warriors who rode on horseback. While a suit of *ōyoroi* would usually have a heavy cuirass, large square shoulder guards (*ōsode*), and four armored skirts (*kusazuri*) suspended in each direction from the waist, a suit of *dōmaru* would have a lighter-weight cuirass, two foliate armor plates (*gyōyō*) protecting the shoulders, and multi-sectioned armored skirts. All these elements facilitated ease of movement on the battlefield.

Thanks to its lightness and high mobility, *dōmaru* armor gained popularity among senior warriors over time, so that by the Nanbokuchō and Muromachi periods (approx. fourteenth through sixteenth centuries), it was also being worn by generals on horseback. When members of the warrior elite wore *dōmaru*, however, they would enhance it with the same kinds of elaborate helmets (*kabuto*) and large shoulder guards worn with classical *ōyoroi*. In such suits of *dōmaru*, the foliate armor plates, no longer needed to protect the shoulders, were moved to the front of the body, suspended under the clavicle.

Distinctive Characteristics of This Armor

This suit of armor, with its impressive helmet, large shoulder guards, and foliate plates suspended high over the chest, exemplifies the later, elevated type of *dōmaru* favored by senior warriors in medieval Japan.

Helmet The ridged helmet (*suji kabuto*) of this armor is "squash-shaped" (*akodanari*), with an elongated oval bowl made from thirty-four plates. In addition to ridges (*suji*), it features ornamental strips (*shinodare*), decorative perimeter plates (*koshimaki*), and a rim (*fukurin*)—all of blackened copper. From here, the laced lamellar neck guard (*shikoro*) spreads out horizontally like an umbrella.

Cuirass The cuirass (*dō*) itself is crafted from small vertical lames (*sane*) of iron and leather. These have been grouped into horizontal lamellar plates (*saneita*) made from multiple lames arranged alternately by material (iron, leather, iron, leather, etc.), which are laced and then lacquered together. The iron lames provided more protection, while the leather lames were lighter in weight. On the armored skirts of this *dōmaru*, iron lames have been used only in the upper central section; the other areas use only leather. The large shoulder guards also use primarily leather lames; alternating iron and leather lamellar plates appear only in the top row.

Color The lamellar plates are connected using cord lacing (*odoshi*). The aesthetics of a suit of armor can be changed dramatically depending on the type and color of these braided silk cords (*himo*). What makes this armor distinctive is that it is laced almost entirely with cords dyed to a single tone of blue—originally a brilliant medium-toned indigo (*hanada*), now faded to a paler shade. Examples of historical armor laced in only one color are extremely unusual, enhancing the splendor and rarity of this suit.

Distinguished Provenance

Until the 1950s, this magnificent *dōmaru* was handed down over the generations as an heirloom of the Nasu clan in Shimotsuke province, now renamed Tochigi prefecture. The Nasu are known best for their illustrious ancestor, the famed warrior Nasu no Yoichi (c. 1169–c. 1232), whose prowess with bow and arrow is extolled in the mid-thirteenth-century literary epic *The Tales of the Heike*. Though this armor was never worn by Yoichi himself, its association with the family of one of Japan's most legendary military figures has enhanced its profile and significance over history.

Connoisseurial Renown

Apart from its prestigious lineage, this *dōmaru*'s unusual coloration and classical appeal have been famous for centuries among Japanese armor aficionados. Proof of this acclaim is the armor's inclusion in *Shūko jisshu* (Collected Antiquities in Ten Categories), published in the year 1800 by the daimyo Matsudaira Sadanobu (1758–1829). This large, luxurious multi-volume compendium, which records old and rare objects that embodied the tastes of Edo-period antiquarians, illustrates the Nasu clan's *dōmaru* armor and helmet across multipage spreads.

Recognition in Modern Times

The storied reputation of this armor has continued into the modern era. In 1979, the Japanese government's Agency for Cultural Affairs designated this *Dōmaru* Armor with Blue Lacing; Helmet; Large Shoulder Guards; Accompanying Banner an Important Cultural Property of Japan. As a representative example of medieval Japanese armor, it was shown in numerous museum exhibitions in the United States and Japan during the twentieth century.

Conservation Concerns

In more recent decades, however, the poor condition of this armor has led to a discontinuation of such activities, sparking discussions about the need for conservation. Though this *dōmaru* underwent meticulous restoration in the eighteenth century, probably because of its prestigious Nasu pedigree, it has not had full conservation since then—even after it received the Important Cultural Property designation in 1979.

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The conservation of this armor and the production of this pamphlet were made possible thanks to a 2022 Bank of America Art Conservation Project Grant.

Organic Materials The fragile materials comprising this armor—silk braided cords, woven silk textiles, lacquer, and leather—were exhibiting pronounced signs of degradation. The black lacquered lamellar plates were cracking and peeling, and the silk cords lacing them together had numerous areas of discoloration and breakage.

Unstable Stand and Disintegrating Banner The wooden stand used to hold up the armor was no longer stable, hindering safe support in storage and on display. Furthermore, not only the armor itself but also the large silk textile banner (*hata*) accompanying it—one of the objects included in the collective Important Cultural Property designation—required immediate action to preserve structural integrity for the future.

Long-Awaited Conservation

Because of its many component parts, the conservation of armor requires the cooperation of numerous different artisans—specialists in armor, metalwork, lacquer, and various genres of textiles. This makes it a more complex and challenging process than many other art conservation projects. In recent decades, a single conservator has been responsible for the treatment of all important armors in Japan. For this reason it has been difficult in the past for Japanese national museums to carry out the full-scale conservation of their own National Treasure and Important Cultural Property armors.

The long-awaited major conservation of this *dōmaru* was made possible thanks to a generous grant from the Bank of America Art Conservation Project in 2022. The project, which utilized craftspeople with various specialties ranging from metalwork, lacquer, textiles, and armor, was executed under the auspices of the Agency for Cultural Affairs, the National Institutes for Cultural Heritage, and in consultation with the former armor curator of the Tokyo National Museum. This exhibition commemorates the completion of the conservation of this precious armor in March 2023.

Current Status and Challenges in Armor Conservation

Cultural Property Armors Armor is defined as a type of "metalwork" under the Japanese cultural property system; however, unlike other types of metalwork, such as swords—and indeed unlike most other decorative and applied art (*kōgei*) genres including ceramics, lacquer, and textiles—Japanese armor is inherently a composite art form. Because of its heterogeneous materials, the creation of new armor and the conservation of historical examples require the involvement of various craftsmen with suitable technical expertise. Traditionally, specialized armorers (*katchū-shi*), not only produced lames and assembled armor but also supervised and coordinated other artisans specializing in braided silk cords, woven silk textiles, lacquer, leather, gilding, and other areas.

Living National Treasures of Metalwork In the modern age, one method with which Japanese traditional artisanal skills are being upheld and transmitted is through the government system of Living National Treasures (officially, Holders of Important Intangible Cultural Properties); however, while there are twelve Living National Treasures in the category of sword making (six swordsmiths, five polishers, and one maker of sword fittings), there is not a single Living National Treasure in the field of armor.

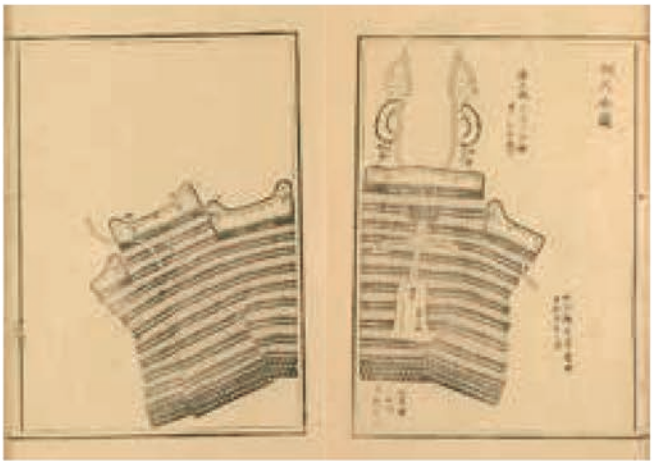
Decline of Armorers In reality, by 1876, when the wearing of swords was banned as part of the Meiji Restoration, armor had already become obsolete in Japan. Large-scale domestic battles hadn't occurred for centuries. Armor specialists, who had lost their livelihoods a century before swordsmiths, had repurposed their skills to make finely crafted articulated metal figures (*jizai okimono*), charcoal tongs, or other kinds of everyday ironware in order to make ends meet.

The Kyoto National Museum owns a collection of documents donated by the Haruta school, a major school of armorers. According to the Haruta family, the family business of producing armor ceased many generations ago, and none of that technical knowledge has survived to the present. Once lost, reproducing such techniques, especially in the absence of demand, is nearly impossible. Even during the Meiji period (1868–1912), when armor was still relevant, there was no movement to protect or nurture such skills.

As a result, in twenty-first-century Japan, there is only one armor specialist in the country capable of properly conserving the over 170 historical suits of Japanese armor that have been designated National Treasures or Important Cultural Properties. Clearly, the conservation of armor in Japan today has reached a state of crisis that promises to grow worse in the future without some kind of intervention.

A New Model for Armor Conservation At such a critical juncture, the current *dōmaru* conservation project provided a unique opportunity for Japanese cultural property stakeholders—including the Agency for Cultural Affairs and the Japanese national museums—to try a new model for the conservation of Japanese armor. For the first time, these stakeholders themselves oversaw a diverse team of experts specializing in armor, metalwork, lacquer, textiles, and other areas, each of whom took charge of one part of the project. The overall conservation plan and the conservation or replication of silk braided cords were handled by armorer Nishioka Fumio. The conservation or reproduction of metal fittings, rivets (*byō*), and the standing shoulder plates (*shōjiitā*) were managed by metalworker Matsuda Kiyoshi. The restoration of lacquer on the lamellar plates and on the lamellar neck guard was overseen by Kitamura Shigeru. The conservation of the white silk banner and the

Illustrations of the *Dōmaru* Armor with Blue Lacing in *Shūko jisshu* (Collected Antiquities in Ten Categories), Compiled by Matsudaira Sadanobu, 1800.



construction of new wooden storage boxes and stands were overseen by Shokakudo Co., Ltd., and Kuroda Kōbō. All of these individuals or workshops have long track records of conserving or restoring National Treasures and Important Cultural Properties in their respective fields.

Although this conservation method provided different challenges when compared to single-workshop conservation—including the mobility of artisans, the difficulty of artwork storage, prolonged time periods for repairs, and increased costs—it showed that the conservation of a composite suit of armor can still be done today effectively and at the highest level of expertise. The conservation of *Dōmaru* Armor with Blue Lacing; Helmet; Large Shoulder Guards; Accompanying Banner, an Important Cultural Property, can be considered a milestone that will serve as a protype for future Japanese armor conservation.

By Suekane Toshihiko, Curator of Japanese Metalwork
Translated and adapted by Melissa M. Rinne, Senior Specialist

Important Cultural Property

Dōmaru Armor with Blue Lacing; Helmet; Large Shoulder Guards; Accompanying Banner

Japan, Muromachi period, 15th century
Iron, leather, lacquer, copper alloy, gilding, braided silk, woven silk, and other materials
Kyoto National Museum