

**Japanese Gateway**  
Kew Gardens  
Copper Repoussé Trails  
October 2023



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## 1.0 INTRODUCTION & SCOPE

Dorothea Restoration was commissioned by Acanthis Clews Architects, on behalf of Royal Botanic Gardens Kew, to inspect the replica gate of Nishi Hongan-ji (Western Temple of Original Vow) the original located in Kyoto, Japan. The structure was created for the Japan-British Exhibition held at White City in London in 1910. The structure is grade II listed and was first listed in 1950 by Historic England.

The highly decorative wood structure has been decorated with copper repoussé cladding which will be what the investigation and trial work will focus on. Dorothea has limited records for restoration works carried out in 1995 or specification for the work completed to the copperwork however Historic England's listing identifies that the roof has been replaced as part of the restoration works carried out.

Dorothea was presented with an historic black and white photo taken in circa 1910 according to the records. The photos identify a highly reflective copper surface which indicates that the surface finish might have changed during the life span of the structure. We understand that the Nishi Hongan-ji structure in Japan has a gilded finish, but it is unclear whether all the copper repoussé is gilded.

The survey includes a visual inspection of the external copper surfaces, components, fixings and connection where safe access was available. The trial works were carried out on the rear face of one of the square posts facing the river and are fully reversible in the future.

The aim of the survey is to establish and provide the following information.

- Is there a coating already on the copper?
- What would be required to get paint or gilding to attach to the copper surface?
- If the copper was highly polished, what coating would be suitable to apply over the top to protect it.
- Provide a specification for protective coatings once treated.
- Consider the feasibility of carrying out the works using rope access.

## 2.0 EVALUATE EXISTING

The copper components consist of around 0.7 - 0.8mm copper sheet which has been dressed by hand to create unique patterns and workmanship on display. The surface has been dressed from both sides to create the contrast appearance. Generally, the copper has been protected with a nutty brown patina which has started to breakdown in places. The surface is left exposed to the elements and oxidation has create a "turquoise" verdigris finish in places and the copper salts has stained surrounding stone slabs in places.



Photo above identifies one of the areas where the patination has chipped off the surface of the copper leaving the edge exposed. The photos also highlight the variation in colour across the copper, based on exposure to the elements.

Dorothea identified an area at the base of the right-hand post facing the river to carry out samples and the area what taped off to create four equally sized areas as shown below. The area was taped off using a low tack masking tape.



Each of the areas numbered 1 – 4 has been treated separately ensuring that there is no cross contamination between the surfaces. The investigation and trials were carried out on the 5<sup>th</sup> of October 2023 with modest winds and temperatures between 12 and 18 degrees Celsius.



### 3.0 CLEANING

A sample area was chosen, and a small sharp blade was used to scrape the surface to identify any buildup on the surface and reveal the nutty brown patina underneath. The dirt and debris on the surface of the components have formed a hard coating over the top of the patina.



#### Area 1

Area 1 was cleaned by hand using a cotton lint free cloth and white spirits to remove loose debris and dirt from the surface. Medium level of force was applied to release any guano from the surface and the cloth rotated to ensure residue was not spread across the surface. After drying the surface with an absorbent white paper roll the surface was left to dry naturally.



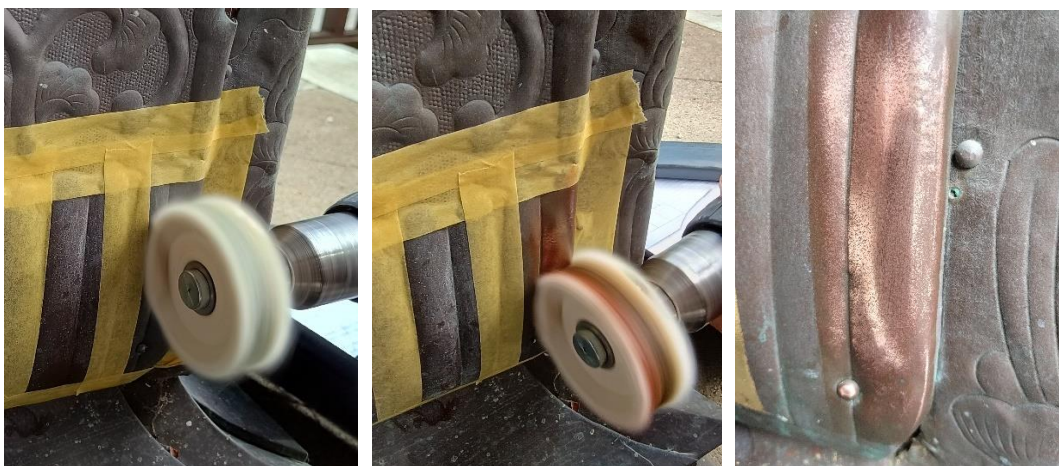
### Area 2 & 3

Were cleaned using methylated spirits and the same principle was used as in area 1. The lint free cloth was changed between area 2 & 3 to avoid contamination and the surface dried very quickly as the alcohol evaporated from the surface.



### Area 4

The final area was cleaned using a polish mop and 1000gm mirror finish polishing bar designed for use on non-ferrous metals. The dirt, debris and existing patina was removed to reach the copper surface. The copper was polished to remove the dirt from the surface however the pressure was light and not aggressive enough to remove any dirt from indentations within the surface. The area selected was chosen to avoid any damage to highly decorative areas where polishing would be difficult without losing some of the detailing.





## 4.0 COATINGS



### Area 1

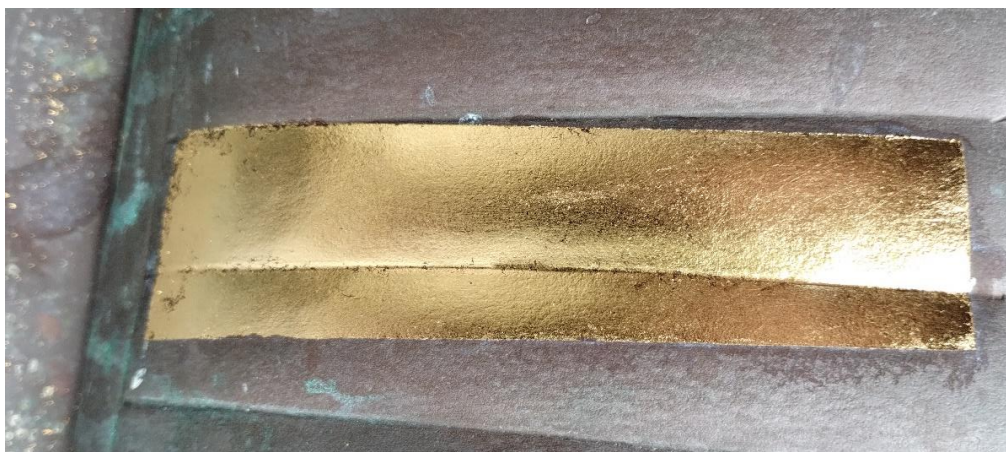
Once cleaned the surface was treated with cold renaissance wax, applied with a lint free cotton cloth. The wax was left to dry naturally.

### Area 2

No further protection or treatment was applied over the surface once the surface had dried.

### Area 3

Once dry the surface was treated with mordent solution to provide a key on the surface. The area was coat with a thin layer of 3 hour Le Franc oil-based size and left to dry ready for 23.5ct gold to be applied. Once the surface had adequately dried the loose-leaf gold was applied and brushed into indents and pin holes within the surface of the copper.



#### Area 4

Once cleaned the surface was treated with cold renaissance wax, applied with a lint free cotton cloth. The wax was left to dry naturally.

### **5.0 CONSIDERATIONS**

The following items should be considered before establishing the best cleaning method and subsequent protective coating.

- Does the build-up and patina need to be removed before applying a protective coating?
- Is there a requirement to change the existing appearance of the copper to match the gilded finish at Nishi Hongan-ji, Japan?
- Is the works proposed preventative conservation or restoration to match original design.
- Would the copper be removed for conservation off-site or is onsite conservation preferred?

### **6.0 CONCLUSIONS**

The conclusions will provide an option for each of the consideration listed above, however at this stage we do not know what the full extend of the work proposed are.

#### Removal of build-up and patina

If the build-up and patina does not need to be removed, then cleaning the surface from loose debris and applying a wax protective coating on site would be sufficient. The wax would need to be monitored and reapplied if required in completely exposed areas but would provide a solution which can be maintained easily.

If there is a need to get back to bare copper the surface would need to be abraded or chemically treated. We do not believe that a poultice would be as effective as chemically dipping the copper components. There is also the risk that some of the chemical is absorbed by the surrounding timber structure if carried out on site. Dry ice blasting would provide an onsite solution however this can only be carried out of fixed scaffold. Any abrasive cleaning could damage the copper in areas where the copper might have worn during the last century. A full condition survey was not carried out by Dorothea.

#### Is a Gilded finish required?

The gilded sample was carried out over the top of the existing patination and build-up reducing the need to abrade the surface. Dorothea was able to create a key onto the external surface of the copper without removing the existing protective layers. This will result in an uneven finish where the patination has been damaged but reduces the risk to the existing copper during removal. The existing copper repoussé is very delicate and would be extremely difficult and unlikely to be reproduced in large quantities within the UK.

### Preventative conservation or restoration?

Preventative conservation should consider the structure as a whole ensuring that any work carried out to the copper repoussé works does not hold any risk to the structure. Minimal intervention ensuring that the copper repoussé works remains protected and does not deteriorate should be viewed as a minimum. Full restoration is generally required where maintenance has not full protected the structure or where materials have reached the end of their serviceable life.

### Should the copper be removed from site for conservation?

Dorothea do not believe that rope access would be suitable method for accessing the copper repoussé work. Lightweight mobile access platforms or fixed scaffolding should be considered for any onsite high-level works. Fixed scaffold can be used to provide a sheeted controlled environment during the application of finished without the risk of contamination form rain, trees, soil, or leaves surrounding the structure.

If the copper is not removed it would be difficult to establish whether there is any hidden timber rot behind the copper repoussé cladding. In the same breath the removal of fixing will result in some failing and the need for replica components to be produced. The copper repoussé is thin and delicate and we would expect it to be brittle in some area. At this point we believe the copper repoussé does not need to be removed to accommodate works to the copper in isolation.

End of report