Introduction

A pair of stylistically related Japanese wooden polychrome masks from UCLA Fowler Museum's collection demonstrates severe paint loss, and the pristine fluting of the extant paint layer on both masks calls for immediate stabilization treatment. The stages of the masks, one with an open-mouthed expression (a gui), and the other closed-mouthed (a gui) originated from the representations of the Vo (Benoitino Kings), guardian figures in Japanese Budhism.

Objectives

The museum's object records currently date the masks as 18th-19th century, “made in the style found in the Kyushu region,” and attribute the pair of masks to the same maker, without supporting textual or technical evidence. Therefore, a comparative technical study is being carried out on the pair of masks in order to:

- Investigate the construction and material composition of the masks in relation to their current states of preservation;
- Add technical and condition information that may support or refine the masks' suspected manufacture by the same hand.

Method of Manufacture

As confirmed by X-ray radiography, each mask (including the horn sprung from the forehead) was carved from a single piece of wood, with highly refined details. The placed eyes, nose, and mouth suggest that the masks might have actually been worn by performers. The carved masks were first coated with a layer of white ground, after which the paint layer was applied.

The paint with an open-mouth expression (X2063.7.29) was painted dull red. Areas where the paint is preserved are highly radiopaque, suggesting the presence of heavy metal elements in the red paint layer. The mask with the closed-mouth expression (X2063.7.13) was painted dull greyish green that is not radiopaque when compared to the red accent used on the mouth.

Black accents are painted on both masks representing facial hair. The horns on both masks appear gray, and have a slight surface sheen in comparison to the rest of the mask.

Characterization of Wood

Since the Japanese wood tradition commonly utilizes certain types of light-weight softwoods and hardwoods (Nishikawa 1978: 143-144), identifying the exact wood species of the masks' substrate does not necessarily confirm suspected manufacture by the same hand. Since in this case it is more important to confirm the use of the same type of wood and similarities in working methods, a comparison is being made without invasive sampling.

The extant paint condition on both masks allows investigation of the gross morphological features of the wood support without risky sampling:

- When the masks are oriented vertically, the long axes of the masks reveal a roughly parallel tangential section of the tree.
- A central core of the transverse section of the wood is located on each mask, and radial cracking is evident near the center of the tree.
- Preparatory ground painted in the pores enhances the transverse section, indicating that both masks are made of a diffuse porous hardwood.

Binding medium

Paint samples from both masks were submitted to the Getty Conservation Institute for binding medium analysis. Perylene-3-giacmarthioquinone-mass spectrometry (PG-GCMS) shows a negative result for the presence of Asia lacquer, which was attributed as the painting medium in Fowler Museum’s object records. Giacmarthioquinone-mass spectrometry (GCM) identified collagen as the best mask for amino acids detected in the samples, supporting the animal glue binder. Trace amounts of fatty acids were also detected, which were likely contaminants that accumulated from handling and use.

Materials Analysis

For the analysis of the painting materials, very low energy XRF (XRF) was used to obtain elemental composition of the polychromy and the ground layer prior to invasive sampling of paints for instrumental analysis. Pigments were then identified by x-ray diffraction (XRD) and polarized light microscopy (PLM), the latter technique lead to the identification of isotropic materials used as pigments in one of the masks. The results of particle identification are tabulated below:

Future work

- Consult Mustafah Metz, College of Wood Science and Technology, Nanjing Forestry University, for further comparison of the wood used for each mask.
- Analyze the paint cross-sections by scanning electron microscopy-energy dispersive spectrometry (SEM-EDS) for further investigation of the elemental composition within each stratum.
- Research the manufacture or use of traditional pigments in Japan, as the current analytical results did not provide a conclusive identification of the green pigments present in the green paint.
- Devise and carry out a consolidation treatment to stabilize the fragile paint layer.
- Examine the reverse side of the masks for tool marks and any evidence of surface staining and accumulations of materials after the stabilization of paint layer.

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