The Selection of the Gap-filling Material for the Conservation of a Chinese Shang Dynasty Bronze Vase

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This project is a BSc dissertation finished in January 2012 and concerns the selection of a gap-filling material for the restoration of a Chinese Shang Dynasty bronze vase which belonged to a private collection and was assigned to the Metal Conservation Laboratory of the Benaki Museum.

Initially, the historical data of the object, the manufacturing technology and construction material were studied, as well as the condition of the object. The vase was photographed in visible and ultraviolet light. The construction metal-alloy was examined in light microscope (Benaki Museum lab) and scanning electron microscope (SEM-EDAX, Institute of Materials Science, N.C.S.R. Demokritos), whereas the analysis of the gap-filling material applied in previous restoration was undertaken by the method of X-ray Fluorescence (XRF, Benaki Museum lab). Further, mechanical cleaning of the object was implemented and the old fillers removed.

The desire of the owner was complete gap-filling and color restoration of all missing parts. He wished the best possible aesthetic result of the object as well as its overall resilience. The key factor for the acceptance of this desire and implementation of gap-filling was the good condition of the object according to the analysis results and microscopic observations.

The main concern on gap-filling the object was the extreme small thickness of the metal, in combination with the large extent of the missing parts at the base and rim. The thickness of the metal at the area of loss on the base was 2.5-3 mm, at the area of the edge 1-1.5 mm, whilst at the area of the body 0.25-0.5 mm.

According, to the bibliographic sources on the materials usually used for gap-filling metal objects and the debate on criteria that need to be met by a gap-filling material in order to be classified as suitable, various materials were selected for experimental testing.

The selection of the materials was made in cooperation with Despoina Kotzamani, supervisor of the project, conservator (MSc) of the Metal Conservation Laboratory of the Benaki Museum. The materials chosen for testing were, Paraloid Acrylic Resin with glass microballoons or/and fiberglass as fillers, Cosmoloid Synthetic Wax and Milliput Epoxy Putty. The main criterion for the selection of Paraloid and Cosmoloid was their empirical use in the Benaki Museum lab - during the last ten years - for the gap-filling of metal objects, whereas for Milliput, a harder material that has been used in other conservation labs.

These materials were subjected to tensile and hardness testing (Universal Testing Machine and Shore Durometers, Polymers & Composites Testing Lab, NTUA) and some of those were selected for experimental application on the object. According to the above procedures and the desired result, Epoxy Putty was chosen as the ideal material for the application to the vase object with special characteristics.

The choice of the gap-filling material and the color was based on the general properties of the materials used in the field of conservation, as well as the minimal intervention in terms of the decorative details of the object. The subject of the final aesthetic result was the restoration of the visual entity without the reproduction of details, while the fillings could be visible to the naked eye of any observer at close inspection.

After conservation and restoration was completed, the best form of exhibition was decided in collaboration with the owner. A special plexiglass mount was constructed. Finally, the conclusions of this study were recorded. The object was returned to its owner and is kept in his personal collection.

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