Tamar Davidowitz

Capturing Nature's Colors

The Technical Examination and Conservation of Painted Finishes on Silver Life-Casts

In recent years, conservators at the Rijksmuseum and at the University of Amsterdam, in collaboration with Columbia University, have been investigating the early-modern process of life-casting in silver. This research has focused on all aspects of the technique, from the preparation of the moulds to the surface finishes. The intention of life-casting was to produce direct copies of actual plants and animals in extraordinary detail, including their nuanced color and texture. The paints and varnishes used to enhance the surfaces of life-casts not only served a decorative function, but also acted as a protective coating. Intact original finish layers are rare as they have often since degraded, been damaged, retouched, replaced, or removed entirely. An extensive study of contemporary sources and technical analyses were carried out in an effort to understand the methods and materials used to produce life-casts and how to best preserve them.

Research into the finish layers focused largely on two objects from the Rijksmuseum collection containing life-casts: the Merkel Centerpiece (inv. no. BK-17040) completed by Wenzel Jamnitzer in Nuremburg in 1549 (fig. 1), and the Diana Automaton (inv. no. BK-17010) produced by Jacob Miller in Augsburg in 1613 (fig. 2). The Merkel Centerpiece life-casts are still clearly decorated by partially intact paint and varnish layers, and analysis centered on determining their composition and authenticity.[1] In the case of the Diana Automaton, the life-casts no longer seemed to feature any visible decorative surface layers. However, as similar examples of this object in other collections do feature them, the aim was to identify and analyze possible remnant paint layers not visible to the naked eye before performing any conservation treatment, ensuring no original material would be lost. Indeed, in this case, and potentially in many others, remnants of surface decoration were found (fig. 3).

Contemporary sources were initially used to determine the possible composition of paints and varnishes originally used to decorate life-casts. One rare and remarkably detailed manuscript at the Bibliothèque nationale de France (inv. no. BnF. Ms. Fr. 640) provided significant insight, and was therefore the primary historical source used. While other sources describing this technique do exist, this manuscript contains the most extensive descriptions known of life-cast production, including the materials and methods used to prepare the animals and plants, the investment and casting processes, and the final finishing techniques.

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Fig. 1
Merkel Centerpiece, Wenzel Jamnitzer, Nuremberg, 1549, silver, gilt silver, enamel, paint, h. 99.8 cm, Amsterdam, Rijksmuseum, inv. no. K-17040 (details of the areas containing life-casts, some of which are painted and some of which are bare silver)

Fig. 2
The Diana Automaton, Jacob Miller, Augsburg, 1613,
silver, partly gilded and painted, copper, iron, h. 62.3 cm,
Amsterdam, Rijksmuseum, inv. no. BK-17010

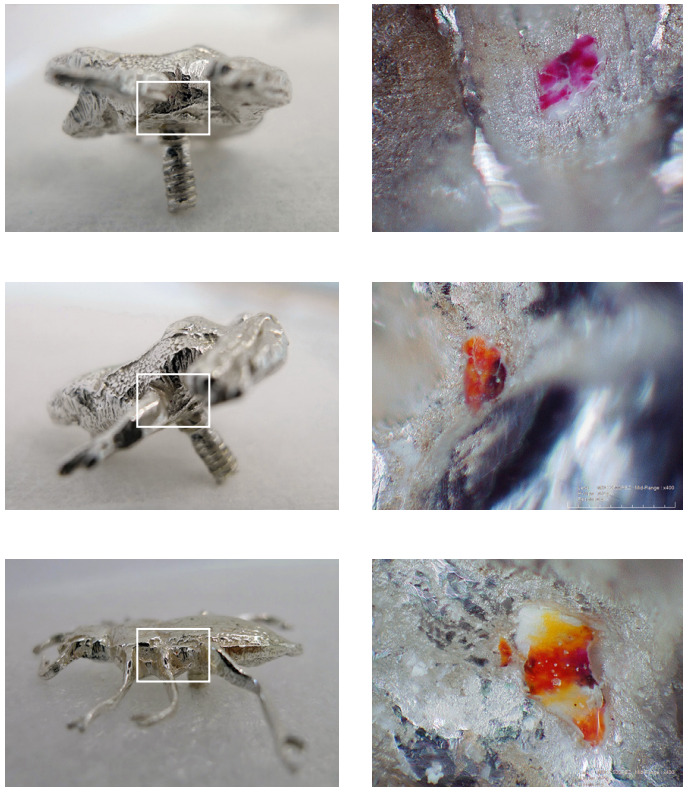
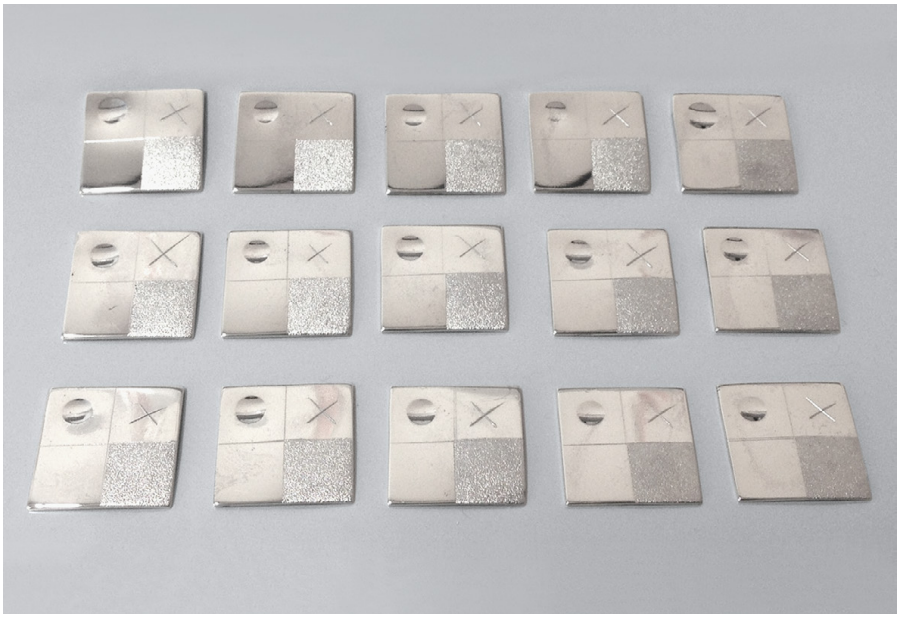
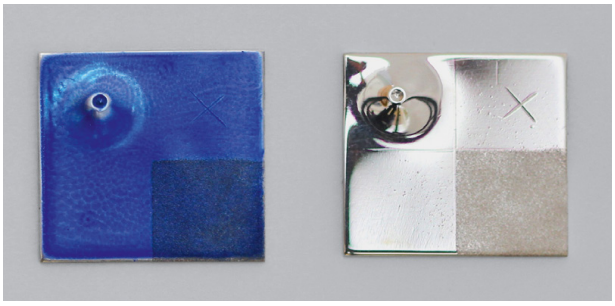


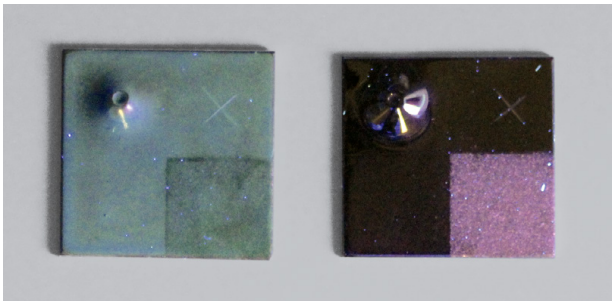
Fig. 3
Details of decorative coating remnants found on silver life-casts from the Diana Automaton

Material investigations were carried out with a variety of microscopic and spectroscopic techniques to help characterize the pigments and binders contained in the paints and varnishes. These included polarized light microscopy, ultraviolet light photography, x-ray fluorescence, x-ray diffraction, and gas chromatography mass spectrometry.

Other avenues of material research were also explored, as the conductive nature of the silver substrate potentially allows for the implementation of electrochemical techniques rarely applied to the study of cultural heritage objects. A joint project was established between the University of Amsterdam, the Rijksmuseum, and Delft University of Technology. This focused on determining which electrochemical methods developed for industry are potentially able to help characterize historical coatings on silver, what type of data could be expected to be gained, and how these analyses could be optimized in the future, particularly with regard to degraded remnant coatings.







Figs. 4–6
20 mm² 'universal' silver coupons before coating
and experimentation (top), coated and uncoated coupon
in visible (middle) and ultra-violet light (bottom)

To do this in a systematic and standardized way, a 'universal' silver coupon was designed for experimentation, also allowing for future comparison of datasets. It was important to examine a historically representative surface, with a composition and surface morphology similar to the objects being studied. A generic "pre-1800" historical alloy was chosen, cast into coupons, and subsequently worked according to a set protocol to achieve representative metallographic structures and surface finishes (figs. 4 – 6).[2] A flexible quadrant design featuring a polished, engraved, matted, and embossed surface was chosen in order to determine in how far these electrochemical techniques could analyse surfaces with irregularities in height, texture, and chemical composition.

While these experiments are still underway, this has already proven to be a complex area of research.[3] The study of these surfaces will undoubtedly help scholars and conservators to gain insight into the production of life-casts, what their intended appearance was, and develop appropriate approaches towards their preservation.

1 Tamar Davidowitz, Tonny Beentjes, Joosje van Bennekom, Identifying 16th-century Paints on Silver using a Contemporary Manuscript, in: Sigrid Eyb-Green (Ed.), The Artist's Process. Technology and Interpretation, London 2012, pp. 72 – 78. **2** Composition: 92.4 % Ag, 7 % Cu, 0.4 % Pb, 0.1 % Au, 0.05 % Bi, 0.05 % Zn. **3** Preliminary results have been presented as a lecture and poster within the Netherlands Institute for Conservation, Art and Science (NICAS), and can be shared upon request.