Mist Consolidation: future treatment potential for deteriorated iron-dyed yarns

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INTRODUCTION
A needlework sampler was slated for exhibition at The Art Museums of Colonial Williamsburg (fig. 1). Based on Samuel Lewis’ 1796 A Map of the United States, the sampler was embroidered and painted on a plain weave silk ground to imitate hand colored printed paper maps. This poster focuses on the various fine, dark-colored silk yarns used to denote latitude and longitude lines and the border scale.

OBJECT CONDITION
The sampler was discolored overall with aged brown tidelines along the bottom edge from water events. The silk was weak around the edges and in the tidelines with tears and losses. The fine, dark-colored silk yarns used across the map were friable and brittle, some to the point of disintegration (fig. 2). In this state, handling, exhibition, and any treatment would result in further damage and loss to the yarns.

ANALYSIS
SEM-EDS analysis indicated iron in the dark-colored silk embroidery yarns. Fracturing of the silk filaments was visible, particularly within the blue-black yarns (fig. 3). The presence of metal ions in silk, whether from weighting processes of the late 19th and early 20th centuries, or in this case, from the dye itself, strongly absorbs radiation in the ultra-violet range and can cause oxidative degradation. The consolidated samples had a more robust handle and were visually unaltered. Consolidant particulate was found on all samples compared to the unconsolidated control when examined using SEM (fig. 4). At and above 30 passes of consolidant, the filaments had a “stack together” appearance and brittleness and breakage was observed. Number of passes had a greater impact on consolidation than the type of consolidant used. As such, treatment proceeded with 10 passes of 0.5% Methocel A4C, due to its excellent long-term stability and frequent previous successes in similar published treatments.

TREATMENT
A mount to hold the map at a 30-degree angle was fabricated to aid in consolidant application, as the sampler could not be placed vertically (fig. 5). Consolidant was applied to the yarns most susceptible to damage from movement and handling. On the front, this consisted of the long floats of the latitude and longitude lines and the scale bar border (fig. 6, left). On the back this consisted of the loose tied-off thread ends (fig. 6, right).

RESULTS and CONCLUSIONS
Mist consolidation did not prove as effective on the most degraded yarns on the sampler and minor loss to some of these yarns occurred during treatment. Recent studies (Zheng 2021) using fibrin for consolidation could prove useful for the treatment of these yarns. Nevertheless, using Methocel A4C provided structural integrity to the yarns overall, which allowed for more ease of handing, display, and further treatment of this object.

REFERENCES

ACKNOWLEDGEMENTS
The author is grateful to the staff and students of the SUNY Buffalo State Garman Art Conservation Department and Gretchen Gaedens, Jackie Peterson-Grace, Kirsten Moffitt, Kim Ivey, and the staff of the Colonial Williamsburg Foundation conservation department for their assistance with this project, and the Foundation for Advancement in Conservation for their funding.