



A White-Type Coffin from the Third-Intermediate Period: Identification of Materials and Conservation Treatment Planning

Kaoru Yui¹, Alison Murray¹, Emy Kim¹

¹Department of Art History and Art Conservation, Queen’s University, Art Centre Extension 15 Bader Lane, Kingston, ON, Canada

Introduction

In 2014-2015, the Master of Art Conservation program at Queen's University obtained three Egyptian coffins dating to the Third-Intermediate Period. Both technical analysis and digital imaging were performed on the white-type anthropoid inner coffin, which is recognized as a rare type of coffin. This project focused on the white coffin to identify materials that remain unstudied, including the species of wood used for dowels and splines with polarized light microscopy (PLM), Hirox digital microscopy and environmental scanning electron microscopy (ESEM); and the binding medium for the pigments with chemical spot tests and Fourier transform infrared spectroscopy (FTIR). The second part of project included the evaluation of possible conservation treatment methods and materials, including cleaning using cosmetic sponges and monitoring using the Hirox digital microscope. Based on the evaluation results, a partial conservation proposal of superficial dirt cleaning with cosmetic sponges was provided. Another important aspect of this research project was to address the ethical considerations surrounding the treatment of the decontextualized mortuary object. Through the study of partial hieroglyphs preserved on the coffin fragments and archival research, the reconsideration of the object’s values was discussed. The entire research project included steps towards the long-term goal to reconstruct the coffin.

Experimental

- The identification of wood species used for the dowels and splines was conducted with the use of a polarized light microscope (Olympus BX51 microscope), Hirox HRX-01 digital microscope and environmental scanning electron microscopy (MLA 650 FEG ESEM).
- The residue of the binding medium was tested by using Fourier transform infrared spectroscopy (FTIR) and a procedure using HCl.
- The solubility testing of the pigments was performed with different aqueous and organic solvents. Various dry-cleaning methods, included using the paintbrush, cosmetic sponge and vulcanized rubber sponge were also evaluated as well.
- Translation of the hieroglyphs written on four of the white coffin fragments (AA2190.A.6, AA2190.A.8, AA2190.A.11, and AA2190.A.16) was carried out.



Fig. 1 AA2190.A White Coffin Before Treatment Image

Results and Discussion

Wood identification

The dowel and spline found in AA2190.A.8 and AA2190.A.9 were confirmed to be hardwood and most likely tamarisk based on the analysis with the use of PLM, Hirox digital microscope, and ESEM. The samples demonstrated semi or diffused porous pore arrangement, multiseriate rays, and vasicentric parenchyma.

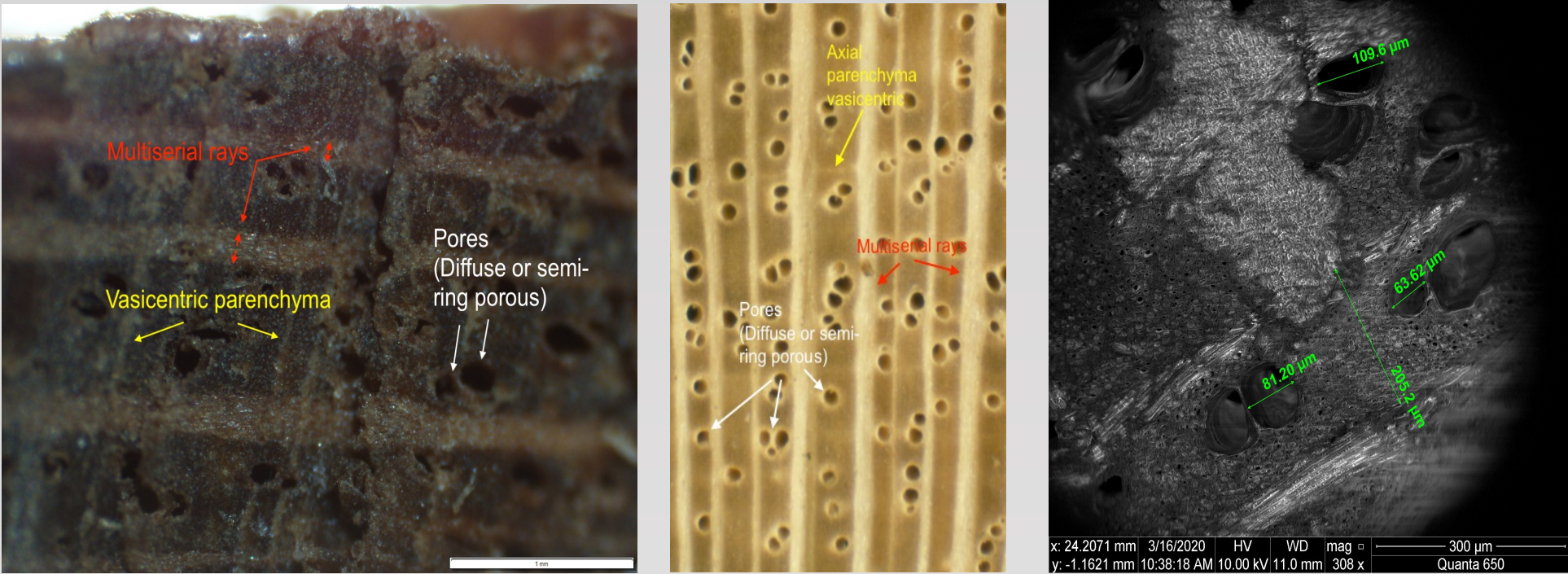
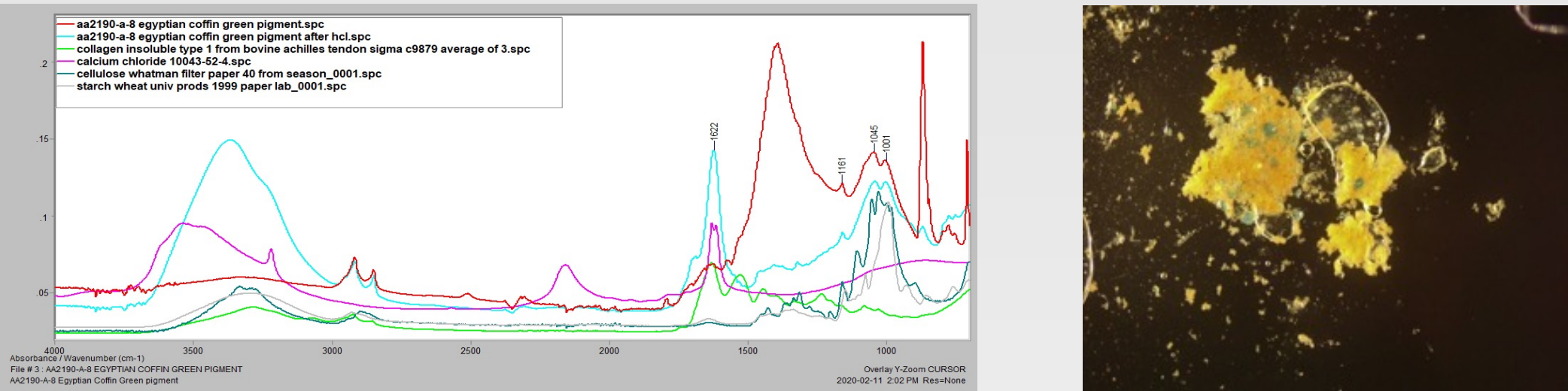


Fig. 2-4: (2) Transverse section of AA2190.A.8 dowel under a stereomicroscope; (3) PLM image of the transverse section of tamarisk. InsideWood. 2004-onwards. Published on the Internet. <http://insidewood.lib.ncsu.edu/search> [May 16, 2020] : (4) ESEM image of the tangential section of AA2190.A.8 dowel

Binding medium identification

The binding medium used for the pigment were starch and/or protein.



Translation of the hieroglyphs

- The two fragments (AA2190.A.6 and 8) contain some of the first portion of the offering formula. The other two (AA2190.A.11 and 16) contain the lists of offerings that were offered to the deity as well as the name of the deceased.
- From the translation that was completed by Mark Trumpour, the name of the deceased, was revealed. The original owner of the coffin was female, and her name was *Ast-ii*. It is still unclear what her status was; however, knowing the name of the deceased made the object transform from a decontextualized “object” to the deceased’s “personal belongings”.

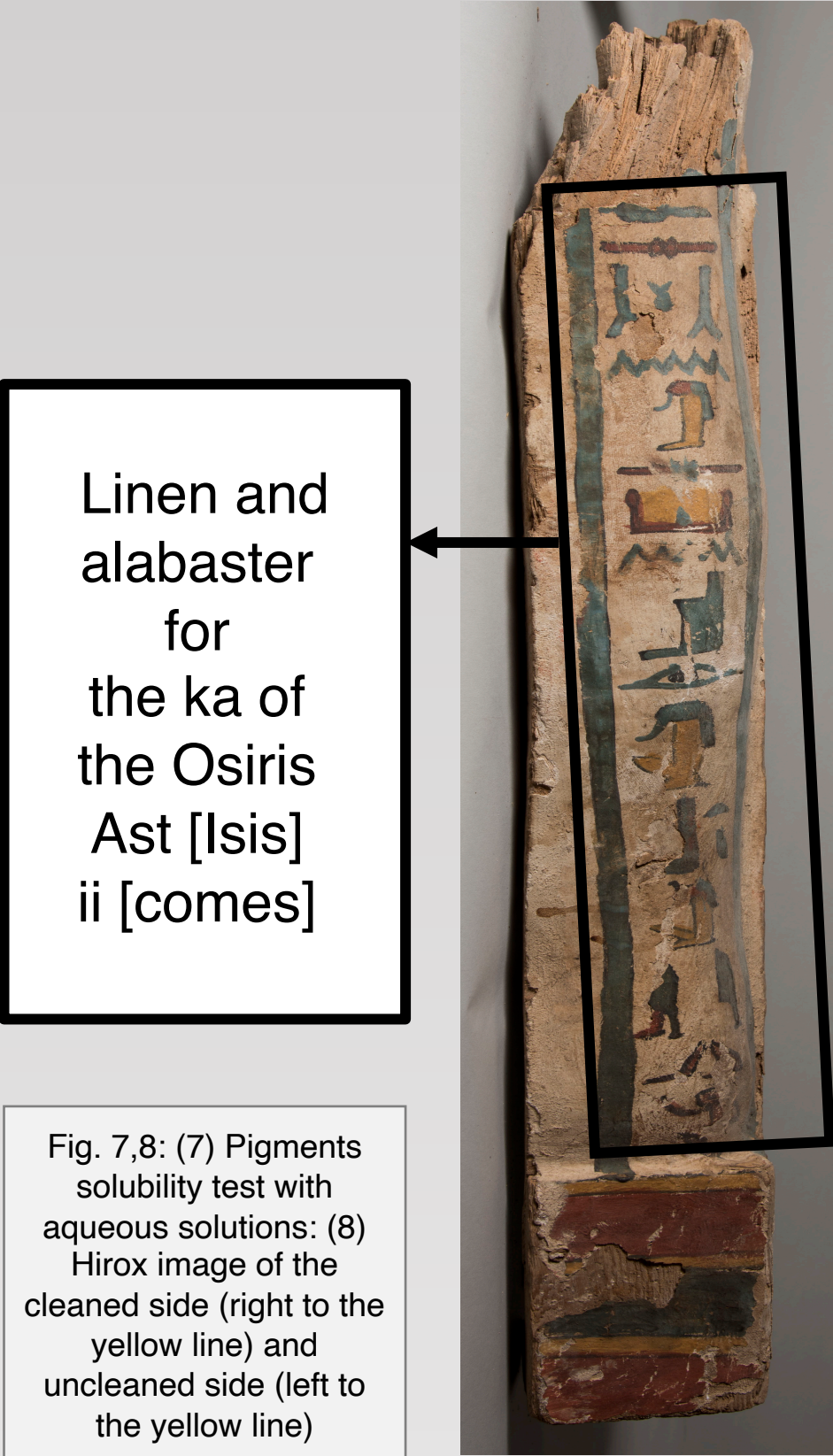


Fig. 7, 8: (7) Pigments solubility test with aqueous solutions; (8) Hirox image of the cleaned side (right to the yellow line) and uncleaned side (left to the yellow line)

Conclusion

Material Identification

- Wood species used for the dowels and splines are determined to be tamarisk.
- Binding medium is identified to be starch and proteinaceous materials.

Evaluation of Treatment Methods

- Cosmetic sponges used with a gentle circling motion is an appropriate method for cleaning the painted surfaces.

Ethical Consideration

- Translation of the hieroglyphs revealed that name of the original owner of the coffin, *Ast-ii*.

Future Plan

- Assess the remaining coffin fragments received from the Phoebe A. Hearst Museum of Anthropology.
- Continue with the evaluation of an appropriate treatment plan.

Acknowledgement

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Evaluation of an appropriate cleaning method

Evaluation proved that cosmetic sponges used with a gentle circling motion were an appropriate method for cleaning the painted surfaces.

	Tap water	Distilled water	Acetone	Ethanol	Mineral spirit	Mineral spirit + Orvus	pH adjusted water (pH 6.5)	pH adjusted water (pH 8.5)	Saliva
Solubility Test of Pigments – Blue	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble
Solubility Test of Pigments – White	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble

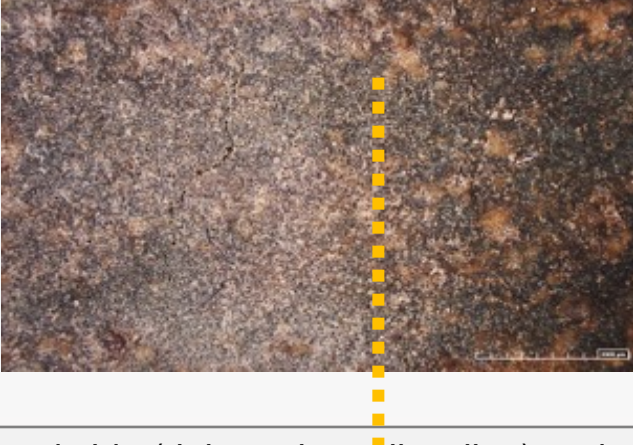


Fig. 7, 8: (7) Pigments solubility test with aqueous solutions; (8) Hirox image of the cleaned side (right to the yellow line) and uncleaned side (left to the yellow line)

Key References

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