Non-destructive technical study of a miniature Tuareg *tamzak*

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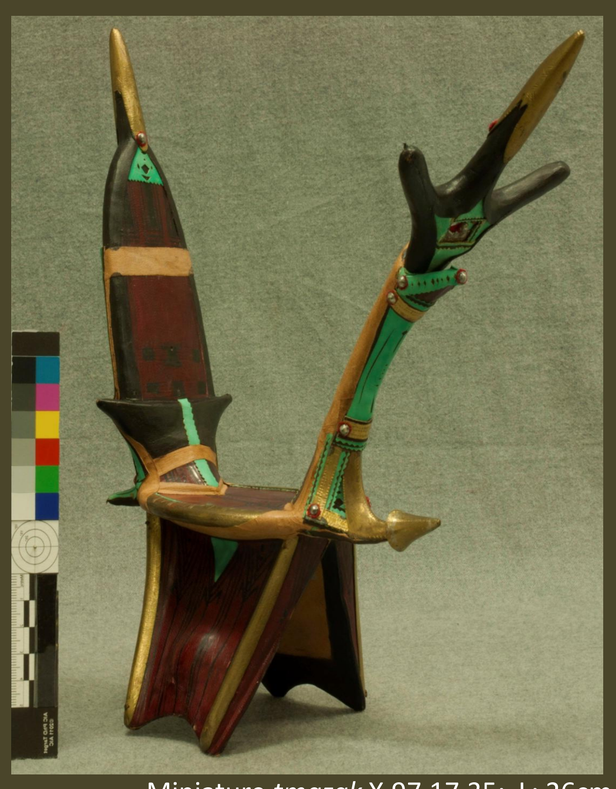
INTRODUCTION

X.97.17.35 is a miniature *tamzak* purchased in 1997 from the maker Hamidan Oumba in Azel, Niger by Thomas Seligman. A *tamzak* is a Tuareg camel saddle traditionally produced by the *inadan* class for the elite.[1] Contemporary *inadan* often supplement their income by making variations of traditional material culture that accommodate tastes of buyers in the tourist/art market. According to Amanda Gilvein[2] scholar on African art, miniatures such as X.97.1735 are likely made of scraps from full-sized projects, and can be interpreted as replicas made to scale using the same methods and materials.

X.97.17.35 was treated at UCLA/Getty labs for fatty exudate and a non-destructive technical study was undertaken using X-radiography and X-ray fluorescent spectroscopy. The goal of this study is to identify materials present to contribute to our understanding of contemporary Tuareg craftsmanship.



Miniature *tmazak* X.97.17.35; L: 26cm H: 29cm W: 15cm

Hamidan Oumba constructing a full-sized *tamzak*. Photographed by Thomas Seligman in 1980; accessed through ArtStor from Cantor Arts Center Thomas K. Seligman Archive

X-RADIOGRAPHY & X-RAY FLUORESCENCE SPECTROSCOPY

Materials & Methods

X-Radiography

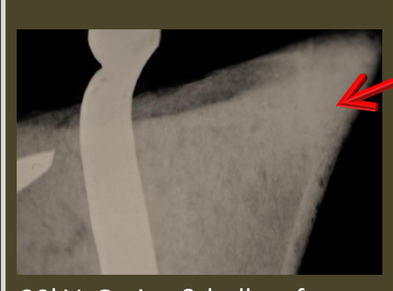
- YXLON tube X-ray
- Kodak Industrex M-100 film
- 60sec 1meter focal distance at: 22kV/8.5mA, 30kV/11.25mA & 35kV/13.10mA

XRF

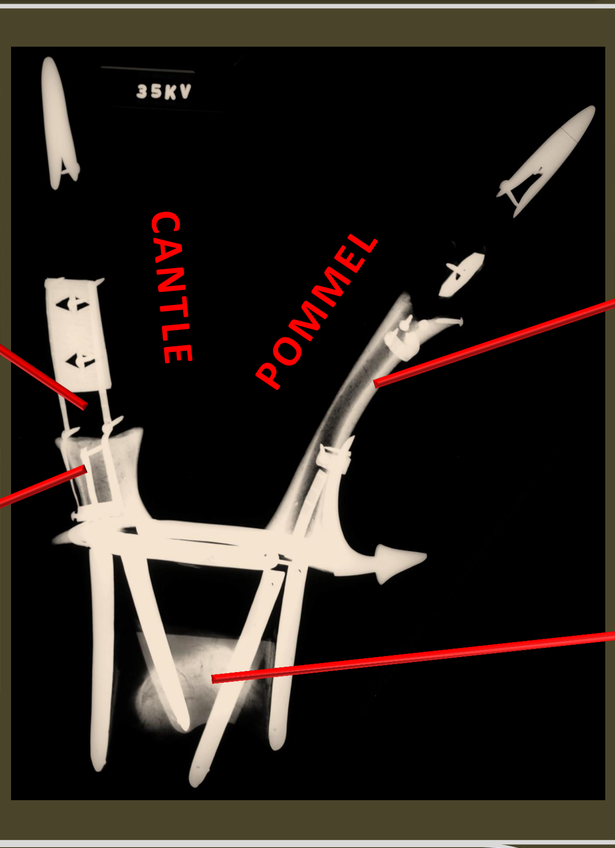
- pXRF Bruker Tracer III-SD
- Rh tube & SP1XRF software
- 120sec with parameters:

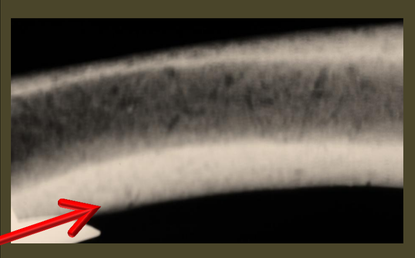
1. 40kV, 38µA, VAC, Cu(150µm)/Ti (25µm)/Al (300µm) GREEN filter
2. 20kV, 26µA, VAC, Ti (25.4µm) BLUE filter
3. 40kV, 18µA, VAC, no filter

22kV: striped below leather

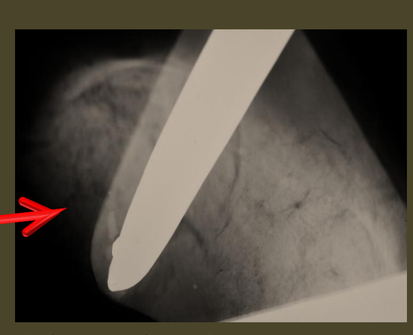


30kV: Grainy & hollow form





35kV: Grainy & hollow tube

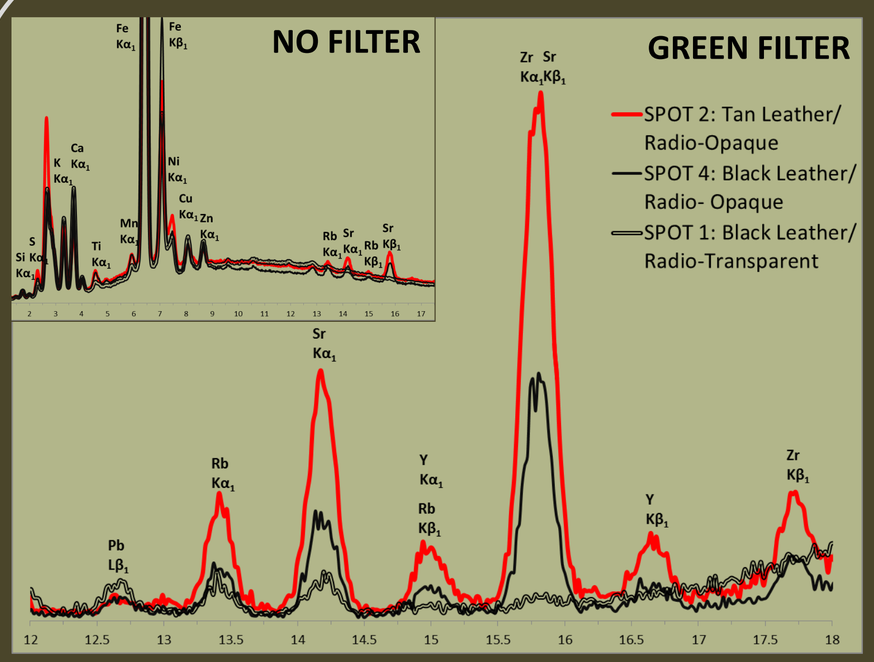


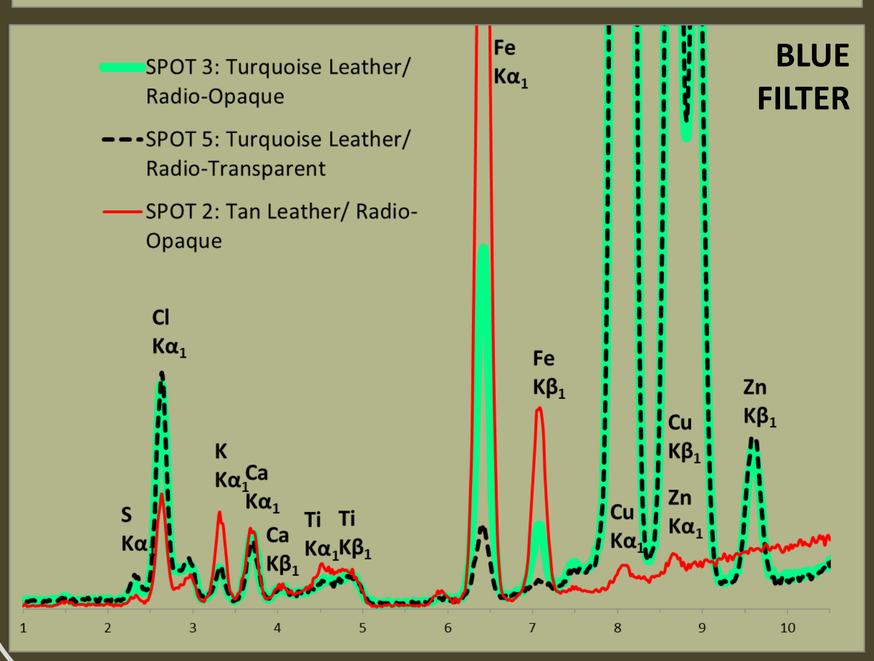
35kV: cracking & grainy texture

X-Radiography Results

X-radiography illustrate a multi-composite frame with varying radio-opacity. At lower kV, the more transparent material present in the back cantle and upper pommel appears to have a tangential wood grain. The three locations of radio-opaque material have a grainy and cracked texture and hollow forms.

At 22kV, the turquoise leather appears more radio opaque than other leathers, suggesting it may contain heavier elements from its tanning or coloring processes.

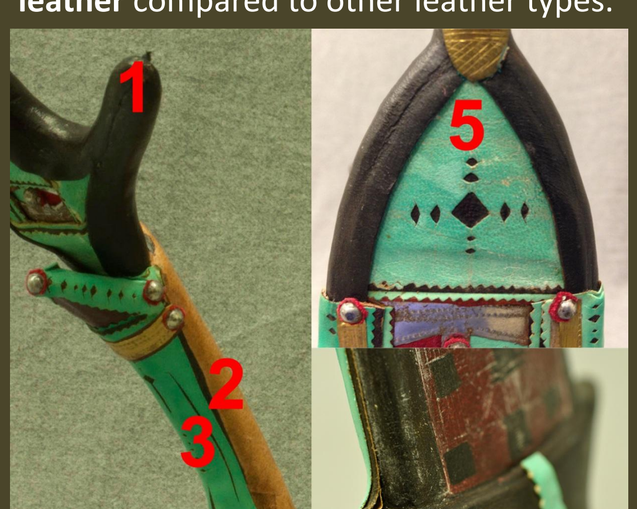




XRF Results

Areas with radio-opaque substrate provide similar spectra, regardless of leather type, compared to spectra acquired over the radio-transparent substrate. The data suggests that in addition to **greater quantity of Fe, the radio-opaque substrate contains Rb, Sr, Zr, and Y**, which are made more visible with the green filter used to analyze silicate materials.

Spectra of **turquoise leather have large quantities of Cu and Zn in addition to Pb** compared to other leathers. Spectra acquired with a blue filter have **elevated quantites of Cl visible in the turquoise leather** compared to other leather types.



Locations of XRF data acquisition

DISCUSSION & CONCLUSIONS

The combination of X-ray imaging with elemental analysis provides information on the materials present in the otherwise inaccessible substrate. The elements Rb, Sr, Zr, and Y are commonly found in silicates and are used to distinguish difference in clays from archaeological contexts.[3] The texture and form seen in X-radiography combined with the presence of elements found in silicates suggests the radio opaque material is potentially clay based. This suggests the manufacture of substrate materials specifically for this object rather than the reuse of scrap materials.

The turquoise leather, which is more radio-opaque than the other leathers (based on X-radiography and XRF) contains large quantities of Cu. This data supports expectations as Cu is a traditional green colorant in Tuareg leatherwork.[2] The combination of Zn, Pb and Cl with Cu suggests that a chloride corrosion product from a leaded brass alloy may be the source of the colorant.

This non-invasive technical study suggests the use of both traditional techniques and innovation in the creation of this miniature *tamzak*. As a next step, further investigation on this subject could including study of other *tamzak* miniatures in the Fowler collection for comparison.

Acknowledgements

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[1] Seligman, Thomas K., and Kristyne Loughran, eds. Art of Being Tuareg: Sahara Nomads in a Modern World. Los Angeles, CA: Fowler Museum of Cultural History, 2006.
[2] Gilvin, Amanda. "Skye Interview with Amanda Gilvin, Mellon Fellow in African Art and Architecture at Mount Holyoke College." Getty Villa Los Angeles, October 28, 2014.
[3] Aimers, Jim J., Dori J. Farthing, and Aaron N. Shugar. "HandheLd XRF Analysis of Maya Ceramics: A Pilot Study Presenting Issues Related to Quantification and Calibration." In Studies in Archaeological Sciences: Handheld XRF for Art and Archaeology, edited by Aaron N. Shugar and Jennifer L. Mass, 423–48. Leuvan, Belgium: Leuven University Press, 2012.