



CONDITION AND TREATMENT REPORT

Date: 15 November 2018

Acc./Loan no: 2003-2-5

Object: Bracelet

People; Country: Berber; Morocco

Materials: Silver alloy, niello, enamel, glass, shellac

Reason for conservation report: Block loan (2018-2020)



DESCRIPTION

Arch-shaped silver bracelet with three large colored glass stones set in high relief and attached by means of metal rivets, visible on the underside of the bracelet. A raised curvilinear decorative element, also affixed with rivets visible on the bracelet's underside, defines each edge. Curvilinear green and yellow enamel and red shellac designs ornament the bracelet. Borders of engraved stippled patterns run the length and width of the bracelet and define the areas decorated with engraved rosette patterns. Some of the engraved designs are blackened using the niello technique; in some areas the niello has worn off.

H: 5cm (1 15/16”), W: 7.6cm (3”), D: 6.5cm (2 9/16”)

CONDITION

(Dana Moffett, 16 January 2003)

Overall, the bracelet is in good condition though it has experienced some losses in the niello and enamel. The largest losses in the enamel occur around the central red glass stone where two of the wells have lost nearly all of the enamel. One of the square stones has loss all of the yellow enamel from one well. The ovoid green central design on one of the edge enamels has lost nearly all its enamel, as have the other two green wells in this area. All remaining enamel and niello appears to be secure. The three red glass stones are badly abraded and scratched. Under the microscope, residual oil (body?) can be seen underneath and around the applied decorative elements. The silver is slightly abraded and tarnished. On the reverse, there is a new looking scratch extending from one of the rivets. Near here, there is a series of nicks in the metal. There is adhesive residue from an old label as well as a white paper label.

(Janelle Batkin-Hall, 20 November 2018)

Areas of green corrosion are present on the rivets and in the engraved pattern. The bevel on the center glass stone is missing a few prongs. Fibers are stuck to the oil and are collected in areas where the enamel is missing. One rivet is loose (spins), but is otherwise secure.

PROPOSED TREATMENT

(Dana Moffett, 16 January 2003)

Sample oil residue. Clean silver taking care not to disturb niello.

(Janelle Batkin-Hall, 20 November 2018)

Sample oil residue. Discuss appropriate treatment(s) with a curator (oil removal?).

TREATMENT

(Steve Mellor, 23 July 2003)

1. White adhesive label “\$950” removed mechanically; residual adhesive removed with acetone.

(Janelle Batkin-Hall, 27 November 2018)

1. BT condition documented with photos and photomicrographs.
2. Collected the red material for FTIR; collected oil for FTIR and GC-MS.
3. Using ethanol swabs, removed enough surface oil to consolidate niello, enamel, and shellac.
4. Consolidated niello, enamel, and shellac with 5% B-72 in acetone using a syringe.
5. Reduced tarnish, corrosion, dirt, fibers, and oil with ethanol swabs and bamboo skewers.
6. Dark and iridescent tarnish on the back was reduced using 0.05 micron gamma alumina on ethanol swabs. Cleared with ethanol swabs.
7. Removed object number label with acetone swabs.
8. Attached a new number label to the back using B-72 in acetone.
9. AT photos taken.
10. Stored bracelet in a polyethylene bag to inhibit tarnish.

Photographic Documentation

35mm Black and White BT Filed: 227

Color Slides: BT

Digital: BT and AT

Exhibition Recommendations

Exhibition Record:

"Caravans of Gold, Fragments in Time: Art, Culture, and Medieval Trans-Saharan Exchange",
Block Museum of Art, Northwestern University, Evanston, IL: December 2018 to December 2020.

ANALYSIS

FTIR:

A small sample of the red “waxy” material taken from the center stone area. Additionally, samples of the brown oily material were taken from underneath the metal of the three raised glass stones. FTIR was carried out by Gwenaelle Kavich at MCI on 7 December 2018. The brown oily material was confirmed to be an oil (possibly Tung oil) mixed with quartz (from dirt), and a resin that is not shellac. The red waxy material is most likely shellac with a gypsum/calcium-carbonate filler. No

additional materials were found as a red pigment. Similar results of shellac bulked with calcium sulfate/calcium-carbonate were obtained for 2003-2-2 red samples, except one pigment particle on that object was identified as a beta-Naphthol Barium salt.

UVA:

Red waxy “enamel” fluoresces orange indicating it could be shellac.

Solubility:

Red “waxy” material is soluble in ethanol indicating it could be shellac.

X-ray fluorescence

The surface of the object was analyzed using an XGLab Elio XRF spectrometer, with silicon drift detector and rhodium target. Data was captured at 50kV and 60mA for 60 or 80 seconds, and analyzed using Elio software. The colored enamel and shellac, as well as base metals, rivets, and niello areas, were analyzed at multiple locations.

Analysis area	Major	Minor	Trace	Notes
Yellow enamel [glass]	Pb	Fe	Ag and Cu (from metal)	Colorant likely lead. Iron probably just dirt.
Green enamel [glass]	Pb, Ag (from metal)	Cu (from metal)	Ca, Cr, Fe	Colorant likely lead with some chrome
Red “waxy” [shellac]	Ca, Pb, Ag and Cu (from metal)		Fe	Iron likely dirt. Lead could be a drier
Silver edge metal [bracelet]	Ag	Cu	Pb	Silver-copper alloy
Silver face metal [bracelet]	Ag	Cu, Sn	Pb	Silver-copper alloy
Silver metal [under enamel]	Ag	Cu	Pb	Silver-copper alloy. Lead is from the enamel
Silver rivet	Ag	Cu		Silver-copper alloy
Niello	Cu, Pb	Fe	Ag and Cu (from metal)	More lead and copper in the niello than the silver base metal
Silver bevel [center stone]	Ag	Cu, Sn		Silver-copper alloy
Red glass stone [center stone]	Zn	Ba, Fe, As	Cd, Se	
Red glass stone [side 1]	Ca	Si, Fe	Ag	
Clear glass stone [side 2]	Ca	Si, Fe	Ag	

According to Stromberg (1988), lead in glass acted as a colorant and flux, tin and antimony an opacifier, calcium an alkali (glass former), and iron, copper, and zinc could be colorants, in addition to chrome for green.

Bibliography

Stromberg, Constance. "A Technical Study of Three Cloisonné Enamels from the Botkin Collection." *The Journal of the Walters Art Gallery*, vol. 46, 1988, pp. 25–36. *JSTOR*, JSTOR, www.jstor.org/stable/20169039.