Object: Salt cellar

Cultural attribution/provenance: American, U.S.S. Olympia

Date: likely late 19th - early 20th Century

Identification number: 1999.575

Dimensions (cm): 4.3 (height) x 9.4 (diameter)

Medium: Nickel plated lead alloy

Current/past owners: Independence Seaport Museum, 211 S Christopher Columbus Blvd, Philadelphia, PA 19106

Markings: Small paper label with accession # (1999.575) adhered to base

Date of examination: April 9, 2019

Conservation fellow: Kasey Hamilton

Supervising conservator: Julie Baker

Object Description:

The object is a small, nickel plated lead alloy bowl. The object has been identified by the Independence Seaport Museum as a salt cellar.

Condition Summary:

The salt cellar is in good structural condition, however approximately 85% of the nickel plating has been lost from the interior. White corrosion products (lead carbonates) are present on the surface of nickel plating and the exposed base metal on the interior. A black, grimy material is visible on the surface of the nickel plating on the exterior walls and foot ring.

Cultural Background:

This object is understood to be associated with the USS Olympia (C-6), a protected cruiser used by the US Navy between 1895 and 1922. The USS Olympia served during the Spanish American War (most famously recognized as the flagship for Commodore George Dewey during the battle of Manila Bay in 1899) as well as during World War I and the Russian Civil War. The USS Olympia now functions as a museum ship in Philadelphia, part of the Independence Seaport Museum (ISM). It is the oldest American warship constructed from steel that is still afloat.

The small bowl has been identified in two separate instances by employees of the Independence Seaport Museum as a salt cellar or shaving cup. The object arrived to the UCLA/Getty Conservation Program with a paper label reading “99.575; Shaving Cup”. However, following email correspondence with Craig Bruns, Chief Curator at the ISM, it was discovered that this was likely a misidentification made by an employee inventorying the item. The object is more likely a salt cellar, which would have been used on board the USS Olympia as tableware to hold salt. Salt cellars may be open or closed forms with a lid, and may range in size from large vessels meant for sharing, or small dishes for individual use. This salt cellar does not have an associated lid at this time, and its small size may suggest that it was intended for individual use.

Materials and techniques:

The object is constructed of a nickel plated lead alloy (as identified via X-ray fluorescence, see *Testing & Analysis)*. It is formed from two metal pieces soldered together: a bowl-shaped upper portion, and a foot ring. Evidence of solder is present between the foot ring and bottom of the bowl on the underside of the object. The upper portion of the bowl was likely formed by spinning on a lathe; a concentric circular pattern is visible on the underside of the object. The foot ring may have been spun or cast, however no distinct tool marks are visible to help distinguish. The design is simple; no decorative elements are present on the surface, nor is there any evidence of a makers mark or hallmark. Two concentric lines are present just below the lip of the bowl on the exterior.

Lead is a soft and malleable heavy metal element. Freshly cut lead is silvery in color but oxidizes to a dull gray when exposed to air. Lead is a known toxin, and is understood to accumulate within soft tissue and bones and have detrimental effects on the human nervous system. When cast, lead is often alloyed with other metals in order to improve durability, as lead alone is very soft and ductile. This object appears to be made from a lead alloy containing tin and antimony, similar to “type metal” (also referred to as “hot metal”) typically used to produce “sorts” (lettered stamps) used in typesetting.

Type metal may be comprised of anywhere between 61-87% lead, 10-25% antimony, and 3-14% tin (Selwyn 2004). On its own, lead is soft, easy to cast, and melts at 327 °C (Scott, 2013). However, it has little tensile strength, and quickly deforms during use. Thus the addition of tin and antimony was required in order to produce sharp cast letters that could be repeatedly used for printing. The use of this alloy for an object related to foodstuff is odd, but perhaps the dangers of lead were not fully understood at the time the bowl was created. The composition of the base metal may suggest the reuse of type metal, and the nickel plating would have been applied in order to protect the surface from corrosion as well as abrasion, and incidentally protect the user from the lead.

Nickel plating is achieved via an electroplating technique utilizing electrical current to deposit a thin layer of metal (in this case nickel) on the cathodic end of a circuit in solution. Nickel plating may be added to the surface of an object for decorative or aesthetic reasons, or to provide corrosion or wear resistance. There are two different types of nickel plating which can be deposited on the surface of the metal, referred to as “bright” or “semi-bright” nickel. Bright nickel is typically used for decorative purposes due to its high luster.

The piece to be plated is first cleaned in order to ensure the object is free of dirt, corrosion products, or other surface impurities. This can be achieved through pickling or etching, which employs the use of an acid to clean the surface of the metal, or heat treatment. Common nickel plating processes utilize a Watts bath, which contains nickel sulfate, nickel chloride, and boric acid in solution (Di Bari, 1994). Due to its low cost, nickel sulfate is used as the main source for nickel ions (usually in the range of 150-300 g/L for bright nickel). Nickel chloride improves conductivity of the solution; a minimum of 30 g/L NiCl is required for good anode corrosion. Boric acid serves as a buffer to keep the pH around the cathodic end of the circuit below 6.0, essential to avoid the precipitation of nickel hydroxides throughout the process (Snyder, 2011). Optical brighteners may also be added to the bath to increase the luster of the plating.

Condition:

Structure

The bowl is in sound structural condition, with no major losses. Minor nicks or small losses can be seen around the rim and bottom of the foot ring (Fig. 1.).

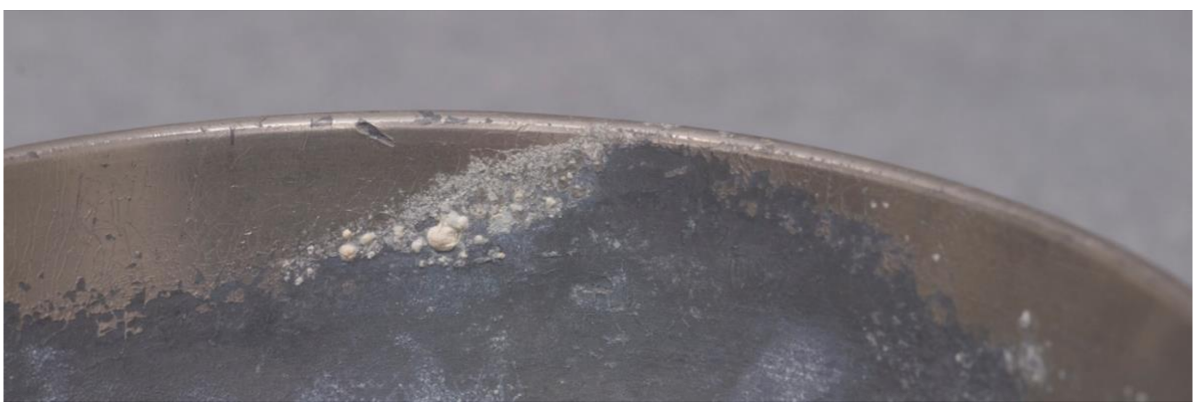


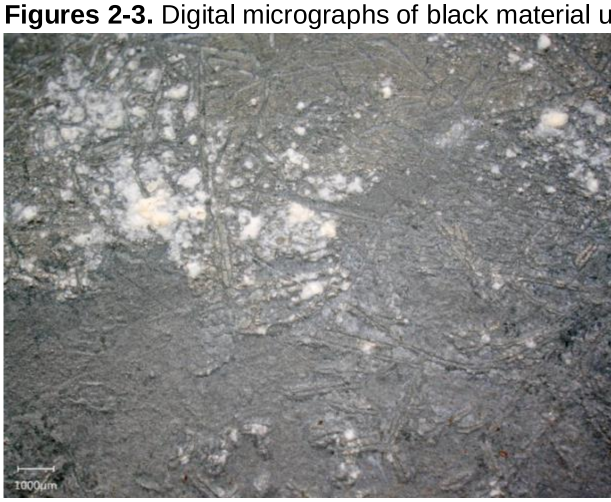
Figure 1. Minor nicks/small losses around the rim.

Surface

Approximately 80% of nickel plating has been lost from the interior of the vessel, exposing the dull grey base metal; the nickel plating is largely intact on the exterior. Fine scratches can be seen on the nickel plating throughout, larger scratches are visible on the base metal in the interior of the vessel. The wear to the nickel plating on the interior as well as the scratches in the base metal may be attributed to use, due to combined mechanical and chemical action from contact with salt grains. Black material (possibly tarnish/corrosion, or some other dark-colored, exogenous material) is present on the surface of the nickel plating, particularly on the exterior of the bowl (Fig. 2-3.). Micrographs reveal that the material, particularly on the exterior of the bowl (Fig. 3.), has a craquelure pattern and appears more similar to grime as opposed to corrosion. The remaining nickel plating has a warm-yellowish tone.

A white-yellow crystalline material is present on the surface in discrete locations on both the interior and exterior of the bowl (Fig. 4-5.), primarily on forming on nickel plated surfaces. A fine craquelure pattern can be observed on the surface of the nickel plating around the rim, on both interior and exterior of the bowl (Fig. 6.). During photo-documentation, the paper label adhered to the base of the object detached.

Figures 2-3. Digital micrographs of black material underneath (left) and on exterior (right) of foot ring.



Figures 4-5. Digital micrographs of crystalline accretions on the interior *(left)* and exterior *(right)* of the bowl.

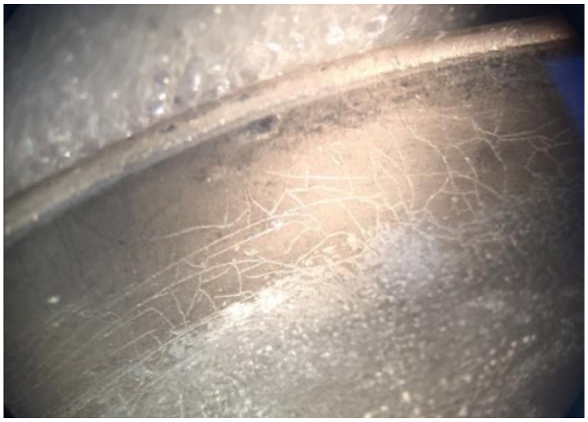


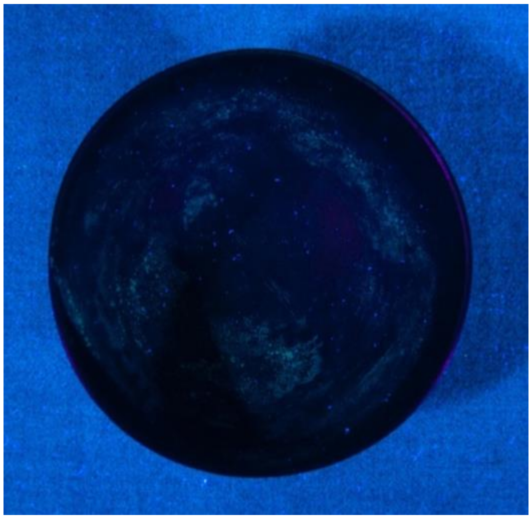
Figure 6. Detail of craquelure pattern visible in areas of remaining nickel plating, near the rim at the interior of the bowl.

Testing and Analysis:

Ultraviolet induced visible luminescence

UV-induced visible fluorescence (UVIVF) imaging is a photographic technique used in conservation for investigation and non-invasive characterization of materials. An ultraviolet light source is directed at the object, which interacts with the materials present leading to either fluorescence (in which the material appears bright) or quenching (in which the material appears darkened, as it absorbs the incident UV wavelengths). Images were captured using a Nikon D90 DSLR camera and illuminated with Wildfire UV lamps (365nm).

UV examination revealed the presence of a material within the bowl fluorescing yellowish-green in color. These areas appear to correspond to areas on the surface of the base metal that appear hazy-white in visible light (Fig. 8.). Crystalline material accreted on the interior and exterior of the bowl appear to fluoresce green-blue in color (Fig. 8-9.).



Figures 7-8. Interior of the bowl photographed in visible (left) and UV (right) illumination.

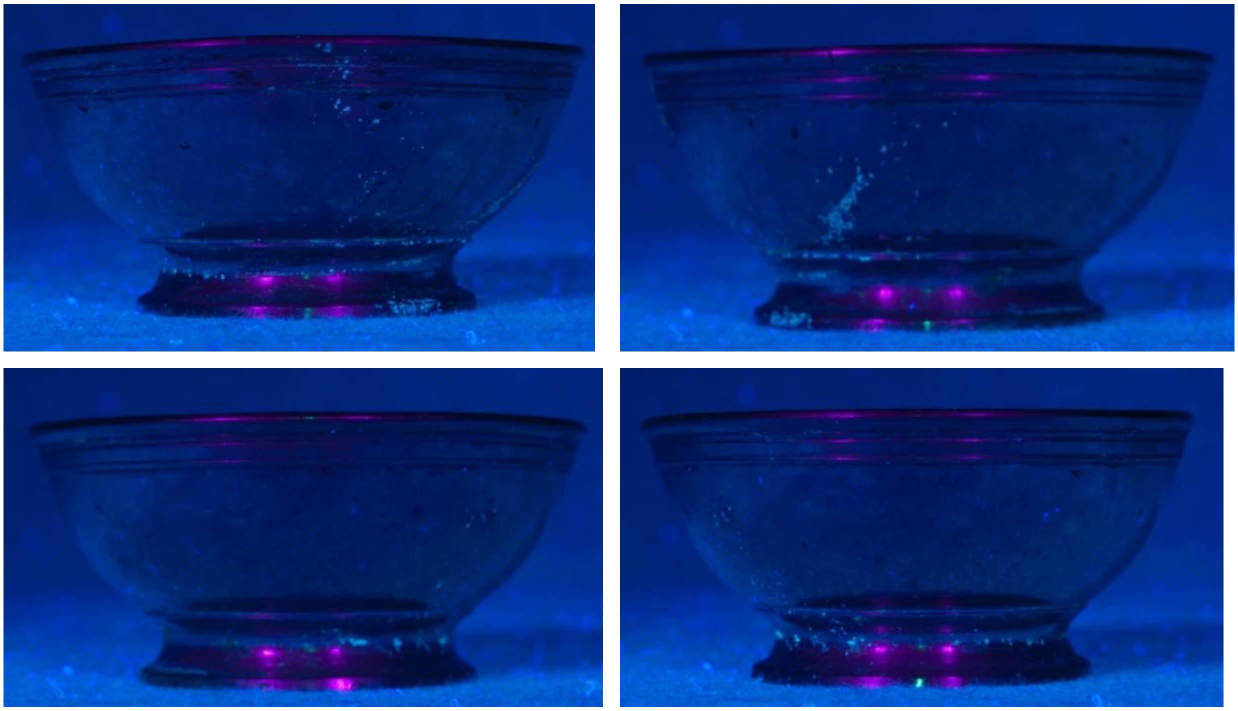


Figure 9. Sides of the bowl, UV illumination.

Portable x-ray fluorescence (pXRF)

X-Ray Fluorescence (XRF), a nondestructive elemental analytical technique, was carried out to examine various locations on the interior and exterior of the bowl. Readings were taken with a Bruker-Tracer III-SD instrument with a rhodium x-ray source and silicon drift detector. Readings were collected at 40 kV, 11 µA, 90 sec, using the Ti-Al (yellow) filter for analysis of heavy metal elements. Spectral data was acquired from the three spots indicated in Figure x, and interpreted using S1pXRF software. Due to the small size of the bowl, no readings could be taken on the interior.

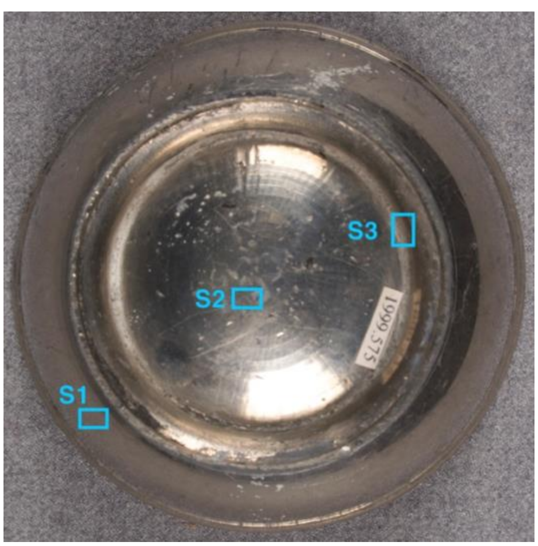


Figure 10. Areas where pXRF readings were taken. S1 = exterior side, S2 = underside, S3 = solder line

For all spots analyzed, pXRF revealed large peaks for nickel (Ni) and lead (Pb). The nickel is believed to relate to the plating material, whereas lead is believed to derive from the base metal. Small peaks for tin (Sn) and antimony (Sb) were also detected in all spectra (Fig. 11.). The presence of lead, tin and antimony is consistent with the composition of "type metal" alloys.

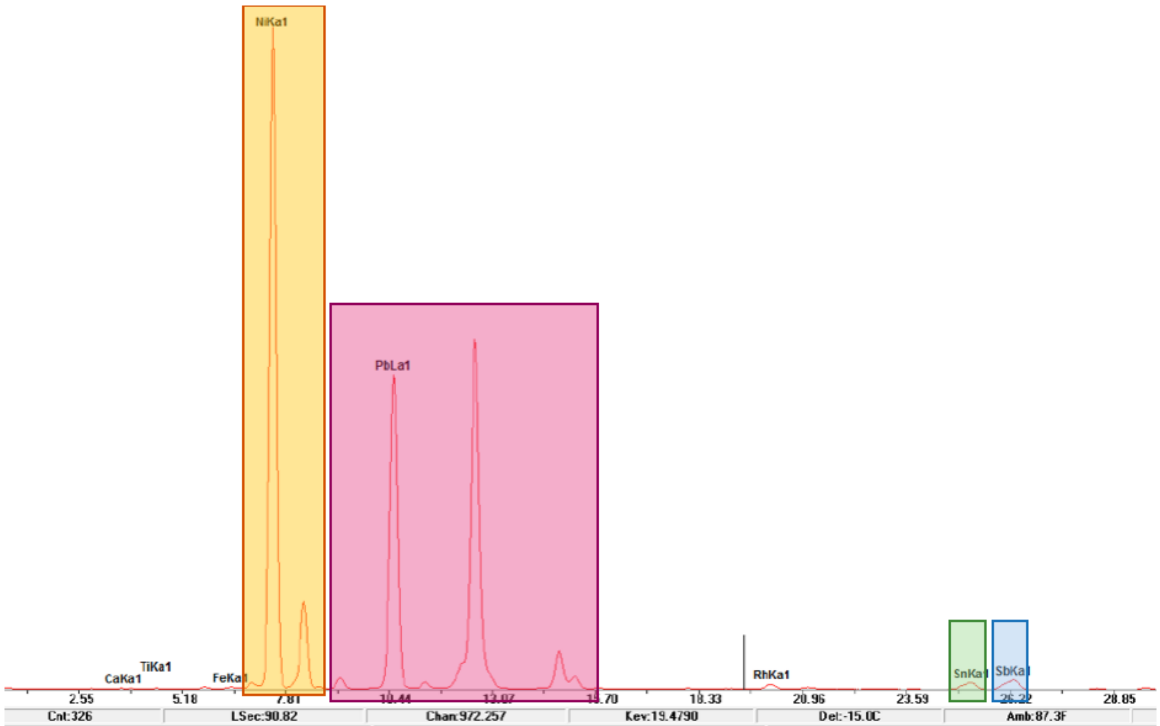


Figure 11. pXRF spectra from [S1] indicating large peaks for nickel (highlighted in orange), lead (pink), and small peaks for tin (green) and antimony (blue).

Solubility testing

Solubility tests were carried out on the black, exogenous material on the foot ring, white haze on the interior of the bowl, as well as white crystalline deposits on the exterior, nickel plated surface. Results of solubility testing can be found in Table 1.

Table 1. Solubility test results

Material description	Solvent tested	Result	Notes
White crystalline	Deionized water	Insoluble	
	Hot deionized water (~90C)	Insoluble	May be slightly softening?
	Acetone	Insoluble	
	Isopropyl alcohol	Insoluble	
	Ethanol	Insoluble	
	Odorless mineral spirits	Insoluble	

Material description	Solvent tested	Result	Notes
White haze	Ethanol	Insoluble	
	Isopropyl alcohol	Insoluble	
	Deionized water	Insoluble	
	Acetone	Insoluble	
	Odorless mineral spirits	Insoluble	Leaves some tidelines on lead-alloy (removed with isopropyl alcohol followed by acetone)
Black material	Deionized water	Insoluble	
	Acetone	Slightly soluble	
	Isopropyl alcohol	Slightly soluble	Leaves some haze/tidelines
	Ethanol	Soluble	
	Odorless mineral spirits	Slightly soluble	

Microchemical test for chlorides

Two areas of white corrosion were sampled and tested for chlorides, using a silver nitrate microchemical spot test (Odegaard, Carroll, Zimmt, 2015). Small samples were removed from the areas indicated in the figures below, and placed in small test tubes. Approximately 5 drops of deionized water was added to each test tube, followed by 2 drops of nitric acid and 1 drop of silver chloride. A known positive (NaCl) was also tested. In the presence of chloride ions, a white precipitate will form.

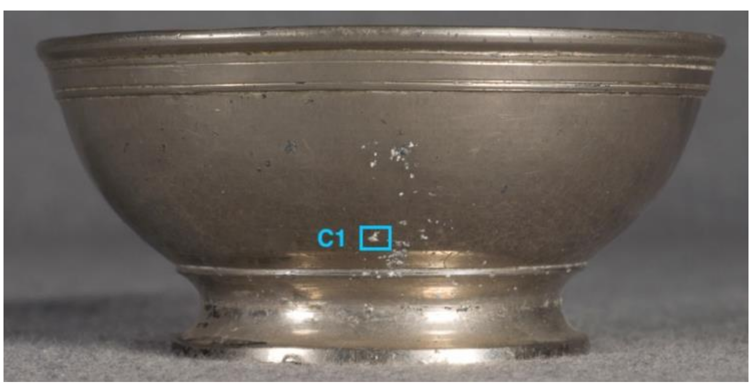


Figure 12. Sampling locations for microchemical spot test for chlorides.

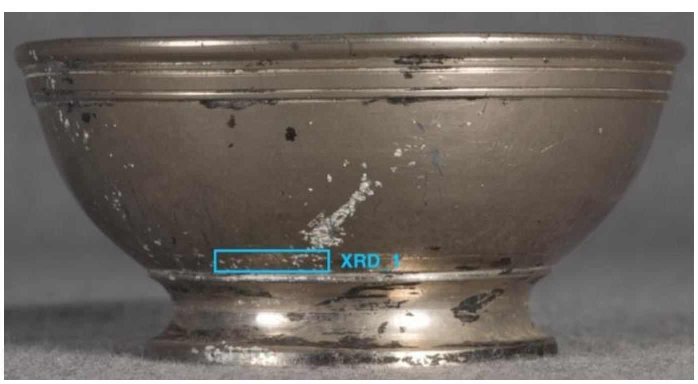
Table 2. Chloride test results

Sample	Description	Result	Observations
C1	White crystalline corrosion, exterior	-	Sample non-reactive, did not dissolve
C2	White crystalline corrosion, interior	-	Sample non-reactive, did not dissolve

No white precipitate was observed for either samples. However, the samples must first dissolved in the solution in order for the reaction to occur which produces a precipitate (a solid must come out of solution). Because the samples did not dissolve in water or upon addition of nitric acid, the test cannot effectively evaluate the presence of chlorides. This may be a limitation of this test when investigating lead chloride salts, which have very low solubility in water. Increasing the concentration of acid in this microchemical test may permit lead chloride salts to dissolve, however this was not explored in this instance.

X-Ray Diffraction

Small samples of the white crystalline material were obtained from both the interior and exterior surfaces of the object for analysis via X-ray Diffraction (XRD). XRD is an analytical method for the identification of crystalline materials. Samples locations are indicated in Figure x and y. A small sample is required, which is mounted on a glass spindle using Apiezon N grease. Analysis was completed using a Rigaku R-Axis Spider powder diffractometer, at setting of 50kv, 40 mA using a Cu-α target. Data was processed using Rigaku's 2D software. Diffraction patterns were identified using Jade 8.3, which contains a reference database from the International Center for Diffraction Data (ICDD). The material tested was identified as containing the lead carbonates cerussite ($PbCO_3$) and hydrocerussite ($Pb(CO_3)_2(OH)_2$).



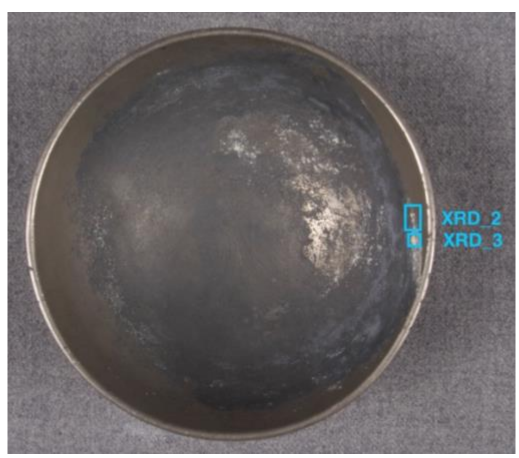


Figure 3. Sampling locations for x-ray diffraction analysis of white crystalline material.

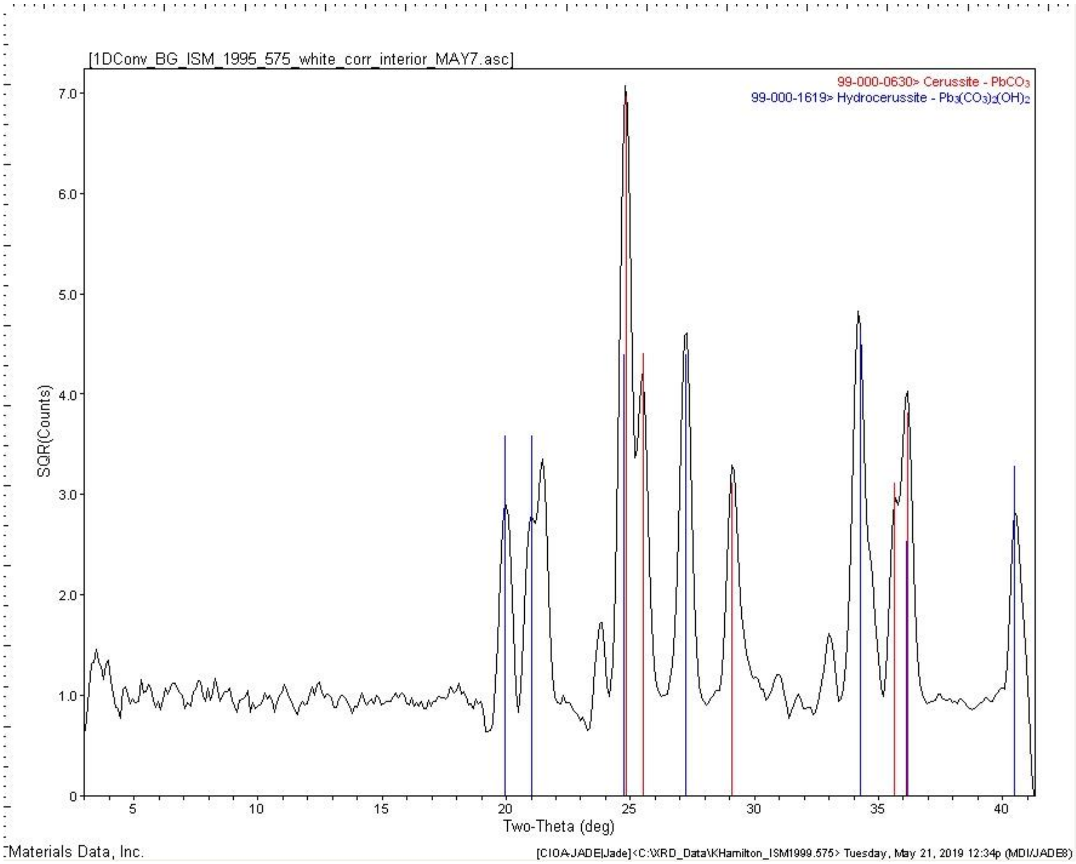


Figure 14. X-ray diffraction pattern of white crystalline material, identified as containing cerussite ($PbCO_3$) and hydrocerussite ($Pb(CO_3)_2(OH)_2$).

X-radiography

X-radiography was attempted, however very little information could be gleaned from the resulting image due to the object's high lead content.

Figure 15. X-ray image of 1999.575 taken at 185 kv, 4.85 mA, with an exposure time of 35 seconds.

Fourier Transform Infrared Spectroscopy

FTIR analysis of a sample of the black material (shown in Fig. 3-4) was attempted using an Agilent 4300 handheld FTIR in diffuse reflectance and attenuated total reflectance (ATR) modes. Due to the small sample size removed from the object, analysis in both of these modes failed to produce legible spectra.

Treatment rationale:

Through discussion with ISM curator Craig Bruns it was decided that the treatment for this object would focus on cleaning, removing exogenous material and corrosion products, preserving the worn appearance of the interior of the bowl. No attempts will be made to imitate nickel plating to cover up exposed base metal, as this provides evidence of the materials present and technology used to make the object. Corrosion products must be identified in order to determine whether they are chloride-containing (a possibility if the object was once used to hold salt). This identification will determine whether or not the object requires a desalination treatment. Corrosion products will be cleaned from the surface of interior and exterior of the bowl. Craig Bruns has requested that the black, exogenous material on the exterior of the object be removed in order to improve the overall appearance of the object. It is unclear whether this material is related to use and perhaps intentionally applied, or is simply grime. Samples of the black material will be retained following removal, and analysis via portable-FTIR will be attempted. However, a more refined benchtop FTIR may be required to produce results. In either case, samples of the black material will be retained and stored along with the object in order to remain available for future research or reference.

Proposed treatment:

1) Sample crystalline material on interior and exterior of bowl for analysis via x-ray diffraction.
2) Dry clean surface of object using a soft brush and vacuum on low suction.
3) Surface clean using appropriate solvents (test with acetone, ethanol, water).
4) Remove black material on the exterior via solvent cleaning with ethanol.
5) Remove crystalline accretions.
6) Consider polishing remaining nickel plating, pending testing and approval.
7) Reattach paper label to bottom of vessel.
8) Construct custom housing for shipping and storage.

Approval:

Treatment approval was obtained via email on May 20th, 2019, from ISM Curator Craig Bruns. See email record attached.

Treatment steps:

1) Small samples of white crystalline material were taken from interior and exterior surfaces, analyzed via x-ray diffraction and identified as lead carbonate corrosion (see *Testing and Analysis*).

2) The surface of the object was minimally dry cleaned using a soft brush, as little to no loose surface dust or debris was detected.

3) The surface of the object was cleaned overall using deionized water followed by ethanol.

4) Black material was removed using a combination of mechanical and solvent cleaning. The material was softened with ethanol delivered on a cotton swab, and then mechanically removed using the pointed end of a bamboo skewer, taking care not to scratch the surface of the nickel plating. Mechanical action was successful in removing the majority of the black material, but in cases where small amounts of black material was left behind, these areas were swabbed with 1:1 acetone:ethanol.

5) White crystalline accretions (identified as lead carbonate) were difficult to remove using the solvent cleaning methods described above. Lead carbonates are known to be soluble in acids or alkalis. Several dilute acid and alkali solutions were tested, including: 5% and 10% sodium hydroxide, 5% acetic acid, 5% and 10% sodium carbonate, and 5% ammonium chloride. These solutions were evaluated for their ability to dissolve the lead carbonates and minimally effect the appearance of exposed base metal. 10% sodium hydroxide was identified at the most effective cleaning agent. This alkali solution was applied to areas with corrosion using a dampened cotton swab and moderate rubbing action. This method proved effective in reducing the amount of lead carbonate corrosion. Following application of sodium hydroxide, the area was cleared with several (3-5) applications of DI water applied with a swab. In areas where corrosion was more voluminous, a small #15 scalpel was used to reduce the crystalline deposits mechanically as much as possible. The scalpel was held close to parallel with the surface of the object in order to avoid scratching the surface of the object. In addition to solubilizing carbonates, the sodium hydroxide solution cleaned the surface of the lead alloy base metal, leading to a slightly brighter appearance. In order to even the surface following removal of carbonates, the entire interior of the cup was cleaned with fine pumice mixed as a dilute slurry in DI water, applied using a cotton swab and cleared with several applications of DI water applied on a swab.

6) The nickel plating on the exterior of the object was polished using an abrasive. Two different abrasives were tested: calcium carbonate ($CaCO_3$/precipitated chalk) and 1.0 micron α-particle Al_2O_3 alumina (particle size comparable to $CaCO_3$). For both abrasives, powder was mixed with deionized water to form a slurry and applied to the surface with a cotton swab and slight rubbing action, taking care not to apply too much pressure in areas where plating was weakly bound to the substrate. Nickel is harder than silver, with a Moh's hardness of 4.0 compared to 2.0 for silver (3.0 for sterling silver). Calcium carbonate has a Moh's hardness of 3.0. Because the nickel plating is harder than the $CaCO_3$ abrasive, little to no polishing was achieved. Polishing with aluminum oxide (Mohs hardness of 8.0-9.0) produced good results; a slight brightening of appearance was noted without scratching the surface of the plating when observed under a steromicroscope. Because these particles are significantly harder than the plating, only gentle pressure was applied during polishing. Following polishing, the surface of the object was swabbed several times with deionized water in order to remove any remaining abrasive.

7) A new paper label was printed and attached to the bottom of the object using 15% B72 in 3:1 ethanol:acetone.

8) A small box was constructed for packing and storage. An outer box was made from archival blue board, lined with ¼" Ethafoam, and two custom fit Ethafoam bumpers were affixed within the interior of the box on opposite corners. The bumpers were padded with Volara at points coming in contact with the object. An additional square piece of ¼" Ethafoam was laid over the object to minimize movement during shipping, this square can be removed upon unpacking at ISM. A custom fit lid was made to cover the object, and the box was tied with twill tape to ensure the lid stays on during transit.

Handling Recommendations:

- Object contains lead – always handle with gloves. Support object with two hands from the bottom.

Storage Recommendations:

- Store in well ventilated area.
- Minimize exposure to volatile organic compounds (VOCs). Lead objects are sensitive to volatile organics, particularly acidic vapors. Wooden storage cabinets and display cases should be avoided as these may off-gas VOCs.

- Inspect regularly for lead corrosion. Lead corrosion products are typically white and can appear either powdery to compact. These corrosion products are toxic and can more easily become airborne; a conservator should be contacted to ensure safe removal.

Environmental Recommendations:

- Recommended temperature range: 60-75° F
- Recommended relative humidity range: Below 50% RH

Suggested Future Research:

Depending on future exhibition goals, it may be desired to pursue loss compensation on the interior plating of the salt cellar. Ideally, this treatment would be reversible or retreatable and leave the original surface unaltered. A thin nickel foil may be worth investigating as a material to use for loss compensation. Other metal foils may be suitable as well – silver foil craft sheets may be more cost effective than nickel plating. The foil could be cut to size in order to cover the exposed lead alloy base metal. It is likely that the foil would also need to be treated in some way in order to match the tone and texture of the exterior metal plating.

Mock-ups could be prepared to evaluate different methods for surface treatment of the metal foils. Some examples of surface treatments to try can be found below:

- Toned with metallic paints to mimic color of nickel plating
- Toned with metallic watercolors?
- Brushed with fine sand paper to attempt to reduce luster
- Paints mixed with fumed silica to reduce luster and color match

Additional testing would be required to determine appropriate methods of attaching these metal foil fills to the interior of the object. Issues with matching the contours of the interior may arise when using metal foil. A potential alternative to this could be to make a mold of the interior surface, capturing the general contour of the bowl, and utilizing electrodeposition to create a custom-shaped nickel film or foil that could rest within the interior. If this is possible, the custom-fit nickel film could potentially sit within the bowl, without requiring the use of an adhesive. This might be preferable as a more reversible option, and could allow for a seam-free interior.

Materials used:

Materials used for cleaning

Material	Manufacturer	Description
Deionized water	Hach	Deionized (demineralized) water
Ethanol	VWR	Reagent alcohol 95%, CH_3CH_2OH
Bamboo skewers	Table craft	6” bamboo skewers with one pointed end.
Cotton wool	Talas	100% pure, long fibered cotton.
Acetone	VWR	Organic solvent, $(CH_3)_2CO$.
10% sodium hydroxide (in deionized water)		Diluted from a 20% stock solution.
#3 Scalpel handle	Sklar Surgical Instuments	4-3/4" Stainless steel scalpel handle.
#15 Scalpel blade	KAI Group	Small rounded stainless steel scalpel blade.
Fine pumice		A pale gray porous variety of the volcanic stone rhyolite composed of potassium aluminum silicate with small amounts of iron and alkalis. Used as an abrasive for polishing jewelry and cleaning metals.
Calcium carbonate ($CaCO_3$)	J.T. Baker	Calcium carbonate, light powder (also referred to as precipitated chalk). Commonly used as a polishing abrasive for silver cleaning. Moh’s hardness of 3.0.
Alumina polishing powder - 1.0 micron α-particle A_2O_3	Baikalox	A hard, white, insoluble powder, often used as an abrasive. Moh’s hardness of 8.0-9.0.
Paraloid B72	Talas	Acrylic resin; 70% ethyl methacrylate and 30% methyl acrylate copolymer.

Materials used for housing

Material	Manufacturer/supplier	Description
Ethafoam	Talas, Uline	
Corrugated blue board		An acid- and lignin-free buffered cardboard.
1/4“ Volara		A cross-linked flexible polyethylene foam, with a continuous, smooth surface that is resistant to water absorption, vapor transmission, thermal transmission and chemical reactions.
3M 3792 LM-Scotch-Weld Hot Melt Adhesive	McMaster-Carr	Low melt hot glue adhesive (ethylene-vinyl acetate polymer with hydrocarbon resin).
5 mm. Mylar		An optically clear, colorless, thermoplastic polyester film (5mm thickness).
Polyester Double-Sided Tape (415)	3M	A thin polyester film coated with a transparent acrylic-based adhesive on both sides.

Appendix I. Before Treatment Photography






Appendix II. After Treatment Photography










References:

Di Bari, G. (1994). Nickel Electroplating. *ASM Handbook*, *5*, 201.

Fry's Metal Foundries, L. (1966). *Printing metals.* London: Fry's Metal Foundaries.

Odegaard, Nancy.; Carroll, Scott.; Zimmt, W. S. (2015). Material Characterization Tests For Objects of Art and Archaeology. Archetype Pubns.

Scott, D. A. (2013). Metallography and microstructure of ancient and historic metals. Retrieved from http://www.getty.edu/publications/virtuallibrary/0892361956.html

Selwyn, L. (2004). Metals and corrosion: a handbook for the conservation professional. [Ottawa]: Canadian Conservation Institute.

Snyder, D. (2011). Nickel Electroplating. Retrieved from Products Finishing website: https://www.pfonline.com/articles/nickel-electroplating

Gmail **Kasey Hamilton <klh927@gmail.com>**

1999.575 Salt Cellar update

8 messages

Kasey Hamilton <klh927@gmail.com> Mon, May 13, 2019 at 4:26 PM
To: Craig Bruns <cbruns@phillyseaport.org>, J M BAKER <jbakeroca@msn.com>

Hi Craig,

I have analyzed some of the white corrosion products on the interior and exterior of the salt cellar and found that they are lead carbonates (hydrocerussite and cerussite). These compounds are largely insoluble in most of our typical cleaning solvents, but it should be possible to remove them mechanically, followed by careful and targeted cleaning with an alkaline solution (Julie has suggested a few options, including 5-10% solutions of sodium hydroxide or sodium carbonate. I would of course test these cleaning solutions first in discrete locations to make sure there is no change in appearance to the nickel plating.)

Would you like me to try and remove these white, crystalline accretions on the interior and exterior of the object?

There is also some black material present around the foot ring of the object (and other parts of the exterior), you can see some detailed images of this material in my condition report (Figures 3 and 4). I am not sure what the origin of this material is, although I have done some solubility testing in small areas and it looks like it could be removed with ethanol. What are your thoughts on this black material? Would you like to have it removed, or would you rather it be left on the surface? We have access to some analytical techniques that may be able to identify the material if this is something you're interested in, although it will involve removing samples of the black material from the surface of the object, so perhaps this would only be suitable if you do want the black material cleaned.

Please let me know your thoughts, and how you would like me to proceed.

Thanks!
Kasey

--
Kasey Hamilton
Kahn Graduate Fellow

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Los Angeles, CA 90095-1510
http://conservation.ucla.edu
https://www.facebook.com/UCLAGettyProgram

J M BAKER <jbakeroca@msn.com> Mon, May 13, 2019 at 6:00 PM
To: Kasey Hamilton <klh927@gmail.com>
Cc: Craig Bruns <cbruns@phillyseaport.org>

Thanks Kasey!
If soluble in acetone, ethanol, and odorless mineral spirits we are probably into the drying oil or asphalt/pitch/tar realm (Does it smell like anything as it is removed?).
Plenty of blackish paints and tars aboard ship...
I'll have to reread your report- given how finished the footrim looks I imagine we can rule out that it was weighted (like traditional cheapish wedding silver with closed, pitch-filled bases) and that the material resides from it's incomplete removal.
It's good to have a bottom-heavy salt seller on a shipboard table, eh?

Sent from my mobile phone
[Quoted text hidden]

Kasey Hamilton <klh927@gmail.com> Mon, May 20, 2019 at 7:47 AM
To: J M BAKER <jbakeroca@msn.com>
Cc: Craig Bruns <cbruns@phillyseaport.org>

Hi All,

Julie - yes, I have actually found that the black material is slightly soluble in all solvents you mentioned (acetone, ethanol, and mineral spirits)! I haven't noticed too much of a smell during removal.

Craig - What are your thoughts about my proposed treatment? As it stands now, these are the questions I am hoping to hear your opinion on:

1) Do you approve of the removal of white corrosion products via the method I described in my May 13th email? " remove them mechanically, followed by careful and targeted cleaning with an alkaline solution (Julie has suggested a few options, including 5-10% solutions of sodium hydroxide or sodium carbonate. I would of course test these cleaning solutions first in discrete locations to make sure there is no change in appearance to the nickel plating."

2) Would you like the black material to be removed, or left as is?

3) Would you like me to attempt to identify the black material? As I mentioned in my previous email, analysis would involve removing samples of the black material from the surface of the object, so perhaps this would only be suitable if you do want the black material cleaned.

Craig (and Julie), please let me know if I should send a separate, revised report with my treatment proposal for approval, or if approval via email will suffice.

Many thanks,
Kasey

[Quoted text hidden]

Craig Bruns <cbruns@phillyseaport.org> Mon, May 20, 2019 at 7:53 AM
To: Kasey Hamilton <klh927@gmail.com>, J M BAKER <jbakeroca@msn.com>

Kasey,

I had written a response - but my dog must have eaten it….

Yes, I approve of the removal of the white corrosion products as proposed.

I also think that the black material should be removed.

Thanks for all of your work on this artifact.

Craig

[Quoted text hidden]

Kasey Hamilton <klh927@gmail.com> Mon, May 20, 2019 at 10:43 AM
To: Craig Bruns <cbruns@phillyseaport.org>
Cc: J M BAKER <jbakeroca@msn.com>

Hi Craig,

No worries, and thanks for your quick response to the follow-up email. I will keep you posted as things progress!

All the best,
Kasey
[Quoted text hidden]
