Silver
History and Conservation

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Bowl and ewer, Joh. Lutma, 1646
Content

• Delamination of silversulphide
• Everything on the conservation of silver is known..
• Conservation of historic silver
• Case study
Legacy F.G.S. Baron van Brakell tot den Brakell, 1878
Historic comparison

Hans Jakob Mair, 1674, KMKG Brussels

Thusfar unknown, Rijksmuseum Amsterdam
Cross section Showplate Ag/Cu
Vulcans workshop
Jan Breughel I (1568-1625), Ambrosiana, Milan, 1608
Cross section Showplate Ag/Cu
Use of the rolling mill in the 16th century

- Rollingmills
- Drawbenches
- Punch
- Mintagepunch
- Fasteners for stampholders
Delamination of Ag$_2$S
Experiments
Variable thickness with an average of 14 µm
BSI of silver, copper and sulphur
Combination of Ag, Cu, oxides and S on the original sample
Reproduction silver (15x annealing, not worked, 925/1000)

- Enrichment of silver layer
- Thickness pure Ag of 6-8µm
- Enriched Ag/Cu oxide 16-20 µm
EDS-Mapping
925/1000 Ag
15x Annealing, not worked
First conclusions

• Tarnished silver delaminates with an average thickness of 14 µm
• Copper sulphur based corrosion products remain present
• Copper corrosion must slow future tarnishing down
• A relation between manufacturing technique and conservation issues seems obvious
Further research

• Comparison of microstructures of the two plates
• Longterm tarnishing of silver alloy according manufacturing technique to reproduce the effect
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Everything on the conservation of silver is known.

Everybody can polish silver.
Silver saltcellars
Claes Claesz Schoon
Rijksmuseum, BK 1957-A/B
Macroscopic with camera
Microcracks in the silver
Influences on treatment

• Chemical cleaning will cause problems
• Microscopic research with every object before treatment
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Conservation of historic silver

- The object is in a showcase
- The object will be exhibited outside a showcase
- The object is in storage

Rijksmuseum, 1927
Silver on display

• The showcase should be closed and contain no materials which can give off S (given tests are the Azide test and the accelerated aging test)

• Preventive conservation The showcase should be made of safety glass (which can have its disadvantages as well)
Disadvantages of safetyglass

(no outside reflection was allowed to take place)
Silver objects outside a showcase

The possibilities for conservation are:

Doing nothing

- Advantage: beautiful lustre if the $\text{H}_2\text{S}$ concentration is low
- Disadvantage: $\text{H}_2\text{S}$ concentrations are never that low, meaning cleaning many times and therefore loss of material
- Conclusion: it is better to lacquer the object

Lacquering the object with three possible methods, *dipping*, *brushing*, and *spraying*. The lacquer which is most suitable is a nitrocellulose lacquer, ercalene or frigilene

How do we remove the lacquer?
Dipping a lacquer

Until 1995 all silver objects in the Rijksmuseum were dipped in frigilene.

• Advantage: the whole object is covered with lacquer
• Disadvantage: crevices are filled with lacquer which become hard to remove. An iridescent curtain effect is in many cases the result. Because of slow evaporation of the solvent; dripping is visible.
• Conclusion: the layer of lacquer is too thick, therefore the iridescence is disturbing
Iridescent curtain effect
Lacquer with dirt, after dipping
Brushing the lacquer

Almost all silver from the V&A museum in London is brush lacquered

• Advantage: a fume hood is enough for safety
• Disadvantage: if one spot is missed, accelerated corrosion will take place, turning part of the object specifically black
• Conclusion: extra check if the lacquer has covered the object
Accelerated tarnishing
Spray lacquering the object

All silver objects in the National Maritime Museum, London are spray lacquered with frigilene.

- Advantage: the chances for obtaining a better covering are much larger, no brushstrokes are visible
- Disadvantages: practice is needed to do it properly and a special fume exhaust is needed.
- Conclusion: the best way to lacquer your silver, there are always companies who can do this for you
Conservation of silver at the Rijksmuseum

- 1240 objects on display
- 2117 objects in storage
Keep it from tarnishing

H₂S emission

[C]

Foil

Distance
Budget

• ArchiPress Pouches 100 pieces (27 x 41cm) 90,53 euro
• ArchiPress Pouches 100 pieces (28 x 50 cm) 155,83 euro
• Sealdevice 1.430,- euro
Result
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Case study

The ewer has fallen and has a sharp crack in the middle of the body. The object is an important piece in the collection of the museum.

• What would the microstructure at the sharp dent in comparison with the rest of the object look like?
• What are the possible treatments and the influences of those treatments?
• What should your proposal of treatment look like?
Ethics is conservation

Ethics:
• Part of philosophy that focusses on human morality

Conservation:
• Maintaining archaeological historical (art) objects for future generations

Deontology:
• English philosopher Jeremy Bentham (1748-1832) formed out of Greek *deon* (het nodige) + *-logica* (verhandeling).
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