Revisiting the imperial past-

Comprehensive scientific investigation and conservation treatment of historic lacquer coatings of the “Princes’ Dress Carriages” from the collection of the Wagenburg in Vienna

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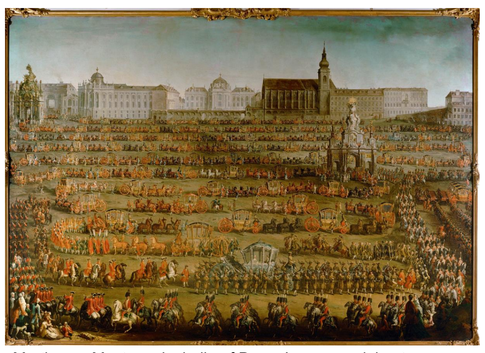


Martin van Meytens, Isabella of Parma's ceremonial entrance into Vienna to become bride of Emperor Joseph II (later Joseph II), after 1760, formerly KHM

Introduction

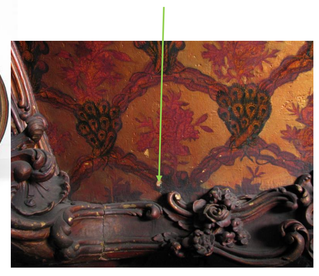
The Imperial Carriage Museum Vienna (Kaiserliche Wagenburg Wien) holds an exceptional and precious collection of various carriages of the former transport pool of the Viennese court. A set of five baroque vehicles, the so called “Princes’ Dress Carriages”, which captivates with its splendid decoration consisting of elaborate panel painting, carving and gilding was studied.The aim of this research project was to provide information on the materials, technology and state of preservation of the objects in order to develop a suitable conservation strategy in further consequence. This included study of exact construction and composition of the lacquered surfaces combining optical microscopy (LM, SEM/EDS) and gas chromatography - mass spectrometry (GC-MS) technique of different carriage components. In this poster we focus on structure of the painted panels of the “carriage body” of three selected carriages.

Martin van Meytens, detail from Entry for Joseph II. for the coronation in Frankfurt,1760/65, KHM

W7

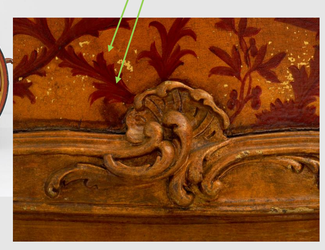
W7 total view of carriage and detail view of the panel

W8



W8 total view of carriage and detail view of the panel

W10

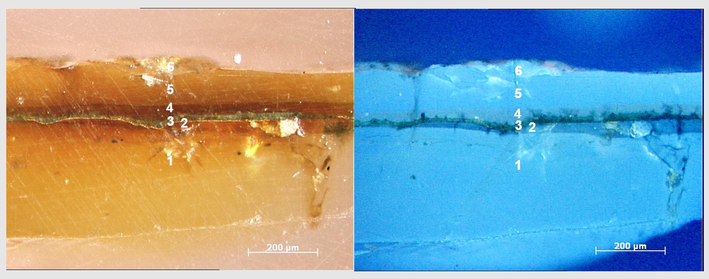


W10 total view of carriage and detail view of the panel

Historical background

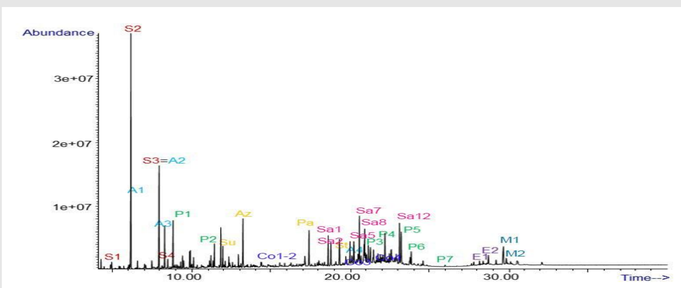
The “Princes’ Dress Carriages” belong to the oldest carriages of the collection and are dated **around 1750**. They belong to the **Berline** carriage type, which became famous at the Brandenburg court at the end of the 17th century. These state carriages were only utilized for festive excursions, therefore they were rarely used. They served representational purposes, for example at court festivities such as weddings or festive processions. Of the original seven princes’ dress carriages mentioned in the 19th century inventory, only five (W7, W8, W9, W10 and W11) are preserved today. Unfortunately, there are hardly any written records of their manufacture and restoration, but from the 19th century onwards, numerous revisions are documented. It is also probable that various carriage components from different vehicles were recombined in the course of their post-processing..

Analysis



Layer	Name	Description
6	remains of upper lacquer layer	organic layer with light orange UV-fluorescence: shellac?
5	second middle lacquer layer	organic layer, partially browned
4	first middle lacquer layer	organic transparent dark brown layer
3	green/blue layer	lead white, chalk, Al and some Fe, Cu, Si, K and Cl
2	gold foil	gold with little of copper and silver
1	lower lacquer layer	several organic layers, partially browned

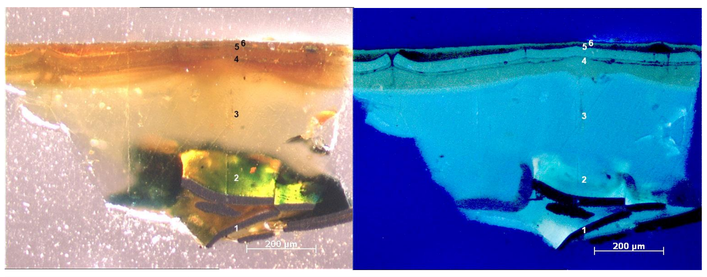
Cross-section of a sample from carriage body, middle panel showing the stratigraphy of the lacquer layers and golden/green decoration (left VIS-, right: UV-illumination)



TIC chromatogram of original varnish after methylation with TMSH showing a complex mixture of binders: linseed and spike oil, amber, pine resin, sandarac, mastic, copal and elemi

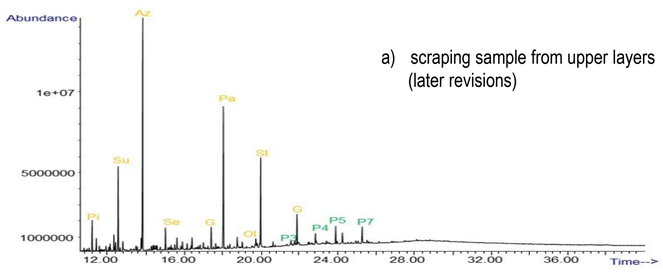
Note: fatty acids from linseed oil (Su=suberic acid, Az=azelaic acid, Pa=palmitic acid, St=stearic acid); S=monoterpenes from essential spike oil (*Lavandula Spica*); A=markers from amber; P=diterpenes of pine resin (*Pinus* species); Sa=diterpenes from Sandarac (*Tetraclinis articulata*); Co=markers from copal (Leguminosae); E=triterpenes from elemi (*Burseraceae*); M=triterpenes from mastic (*Pistacia* species).

Amber	Copal	Mastic	Pine resin	Sandarac	Spike oil
A1= succinic acid	Co1= copal marker1	M1= oleanolic acid	P1= verbenone	Sa1= epimanool	S1= camphene
A2= camphor	Co2= copal marker 2	M2=moronic acid	P2= pinate	Sa2-5= unidentified compounds	S2= eucalyptol
A3= borneol	Co3= communic acid		P3= dehydroabietic acid (DHA)	Sa6= totarol	S3= camphor
A4= succinate	Co4= copalic acid	**Elemi**	P4= ox.pr.-DHA	Sa7= sandaraco-pimarate	S4= α-terpineol
A5= Δ8-isopimarate		E1= α-amyrin	P5= 7-oxo-DHA	Sa8= hydroxy-sandaracopimarate	
		E2= β-amyrin	P6= ox.pr.-7-oxo-DHA	Sa9-11= unidentified compounds	
			P7=15-hydroxy-7-keto-DHA	Sa12= 12-acetoxy-sandaracopimarate	

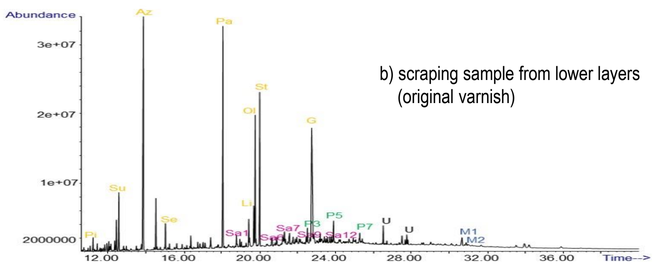


Layer	Name	Description
6	upper lacquer layer	organic transparent layer, partially browned
5	brass colour	mainly organic, some Al , Pb, Sn
4	lower lacquer layer	multilayered, organic but also some chalk and lead (lead white, lead tin yellow?)
3	whitish layer	organic layer
2	green luster	transparent green layer, mainly organic, Al, S, little Fe
1	decoration layer	transparent organic layer with flat silver plates

Cross-section of a sample from carriage body, front panel showing the stratigraphy of the lacquer layers and golden/green decoration (left VIS-, right: UV-illumination)



a) scraping sample from upper layers (later revisions)

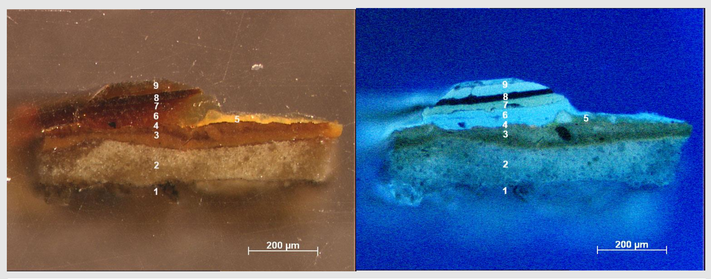


b) scraping sample from lower layers (original varnish)

TIC chromatogram after methylation with TMTFTH (Meth Prep II).
Upper layers were analysed separately from lower layers.

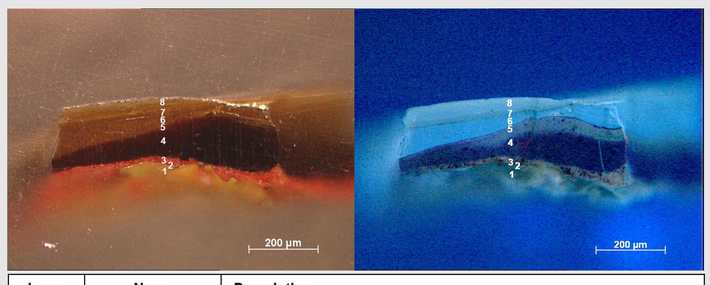
Note: glycerol (G) and fatty acids from linseed oil (Pi=pimelic acid, Su=suberic acid, Az=azelaic acid, Se=sebacic acid, Pa=palmitic acid, Ol=oleic acid, St=stearic acid); P=diterpenes of pine resin (*Pinus* species); Sa=diterpenes from Sandarac (*Tetraclinis articulata*); M=triterpenes from mastic (*Pistacia* species); U=unknown compounds..

a)



Layer	Name	Description
9	upper lacquer layers	several organic transparent layers, partially browned
8	brown layer	high organic content, Fe, Pb
7	middle lacquer layers	organic transparent dark brown layers, multilayered
6	lower lacquer layers	organic transparent layers, partially browned, multilayered
5	yellow luster	transparent yellow layer, high organic content, lead white and ochre
4	gold foil	gold of high purity
3	yellow layers/bole	two layers of ochre and lead white, upper one with higher organic content
2	ground layer	chalk with some ochre
1	dark layer	remains of a preparation layer, mainly organic

b)



Layer	Name	Description
8	upper lacquer layer	organic transparent layers, partially browned
7	second metal foil	
6	lower lacquer layer	organic transparent layers, partially browned
5	dark red glazing	thin mainly organic layer
4	second red layer	highly organic and some Al, multilayered red dye
3	first red layer	cinnabar and lead white
2	first gold foil	gold of high purity
1	yellow layer/bole	remains of a bole

Cross-section of a sample from carriage body, lower panel showing the stratigraphy
a) of the lacquer layers and gilding
b) from the red decoration
(left VIS-, right: UV-illumination)

Results

The comparison of the multi-layered structure of the studied panels on all three carriages shows hardly any similarities. Only due to the ageing a strong browning is clearly visible in the upper layers.

The GC/MS analyses proved the use of complex oil-resinous mixtures for original lacquers containing namely linseed oil with additions of essential oils and various diterpenous and triterpenous resins, while the compositions of later restoration additions is much less elaborate.

Microscopical results revealed a multilayer stratigraphy with several packages of alternating pigmented layers, metal interlayers and organic coatings give an impression of an eventful pre-history of the carriages. However, for their comprehensive inventory further research is required (also on other parts of the vehicles like the under carriage).

The results of the investigation will serve as a basis for the preparation of a restoration/conservation concept. Initial tests on selected areas have already been carried out.

Left side of the panel before and right side after cleaning (W8).

For the removal of the overpaint on the panels a solvent gel with 1,3-dioxolane, methoxypropanol and white spirit was used and for the removal of the later added varnishes Pemuleen gels with triethanolamine (TEA), benzylalcohol and water were applied.