Two 19th century *thangkas* from Tibet: examination and conservation.

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1. Introduction

The study, carried out as a diploma-project, is a multidisciplinary approach to the examination and conservation of two *thangkas*. *Thangkas* are complex objects composed of a central painting sewn into a textile frame, wooden rods on top and bottom with metal knots as well as a curtain with ribbons. Traditionally they were transported and stored in a rolled state, and therefore also known as painting scrolls. [1]

The *thangkas* were acquired in the early 1970s in Delhi, India, practically without any knowledge about their origin and dating. Since then both scroll paintings have had a high personal value for the owner and consistently accompanied her while travelling around the world, suffering from the handling and constant risks of varying climates. In 2011 the two painting scrolls reached the Institute of Conservation at the University of Applied Arts Vienna, being in different state of preservation due both changing environment, mechanical stress caused by human action and in partially to various conservation treatments sometimes in the past.

2. Art historical research

Since the origin of the two *thangkas* is unknown and as their iconography differs in the presentation of composition, but they are framed the same way, two major questions occurred: From where did they originate? Are the two paintings just framed the same way or part of a bigger ensemble? [2]

Through research and comparison the *thangkas* could be attributed to an iconographic program: *Buddha Shakyamuni* and the sixteen *Arhats*. It’s based on a theme originally printed with block prints in the former printing house of the Nartang monastery, Tibet. The ensemble consists of seven *thangkas*.

In comparison with block prints from the Tibet House, New Delhi, India infrared light analyses have proven that the two *thangkas* are not completely congruent in execution. No indications of printed underpaint as well as net work colours were detected. So, one can assume that the artists only used this block prints as a model. Slight modifications of the motifs are verifying this assumption.

3. Technical examination

Along with art historical research an analytical study of the materials was carried out with optical microscopy of cross sections and scanning electron microscopy for the pigments compounds, gas chromatography-mass spectrometry (GC-MS) analyses of binding media composition of organic material as well as imaging with X-radiography and infrared light to clarify the existence of underpaint as well as colour notations.

The result of the analytical research confirmed for both *thangkas* the same materials: Kazin and Magnesium White for the ground as well as typical pigments for thangka production (e.g. Malachite, Azurite, Gold, Vermilion, Red Lead, etc.). Since the date of production was unknown the existence of Chrome Yellow (PbCrO₄) as well as Emerald Green (Cu(CH₃COO)₂.3Cu(AsO₂)₂) was an important discovery to narrow the dating of both *thangkas* not earlier than 1815-20. [2]

Animal glue was used as binding media. In the case of the much later applied consolidant animal glue with traces of dammar was identified.

4. Condition

Both *thangkas* mainly suffered from handling and transport, but also from previous conservation treatments. The binding media of the paint layer was probably heavily degraded. Therefore a protein-based consolidant had been extensively applied over the painting in a former conservation treatment. It soaked through all layers as well as the paintings support and formed hard and stiff islands of adhesive material on its backside. Based on these treatments and further oxidation the support got brittle and stiff. The results were multiple tears as well as a hole where the fibers were broken. There are heavy paint losses mostly in combination with the ground layer. Next to the typical damage symptoms of rolling the *thangkas* the main reason for the partially loses of the depictions were attempts of wet surface cleaning (e.g. Indigo colored sky was almost washed out).

The damages are analogous to the water stains marked on the reverse of the *thangkas*.

5. Conservation treatments

The aim of the conservation treatment was to achieve a similarity in the appearance of both *thangkas* through minimal intervention. To secure and stabilize the paintings support without losing its function as a scroll painting was the main focus. Furthermore, a new concept for the hanging should be developed to ensure that the main weight of the lower rods would be carried by supporting construction.

After dry surface cleaning with soft brushes and polyurethane-sponges the treatment included a reduction of the brittle and stiff protein-based consolidant that had been applied on the painting. Several methods were tested and a successfully reduction was carried out with moist compresses on the suction table. The thick crusts got thinned as far as possible without harming the water sensitive ground- and paint layers. Deformations of the paintings-support were reduced with moisture and pressure (Gore-Tex®-Sandwiches). Tear mending of the support was carried out through addition of 20% sturgeon glue + 10% wheat starch paste (ratio 1+2). An ‘intarsia’ was applied with the same method to close the hole. After the successful stabilization of the support, inpainting - dry pigments in 4% Klucel® [E] in Isopropanol - was carried out.

Furthermore, a new concept for the hanging has been developed to avoid damages through tension and elongation. L-shaped brass-plates were covered with padded Tyvek® to carry the weight of the lower rods without harming the delicate textile-frame.

The crusts have been reduced successfully on the suction table.

1. Place model interface layer + Hollytex® underneath the to be treated spot/crust.
2. Place moist interface layer + Hollytex® underneath the to be treated spot/crust.
3) Immediately turn on suction table.
4) Place moist interface layer + Hollytex® + Model interface layer underneath the to be treated spot/crust.
5) Place adhesive strips underneath the to be treated spot/crust.
6) Holes and tears in the paint layers were filled with adhesives.
7) Fixed to the wall it will provide a load-bearing function for the thangka.

A carbon diode, used with paste crackers Holle, was implemented, guaranteeing original support through pressure. The filling (7%) sturgeon glue with Kazin® was applied only on the front side and additionally on the backside. With this method damages in 4% Klucel®-solution (Klucel® E) in Isopropanol...