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Lining on the Stretcher:
Glue-paste lining techniques in 19th century Denmark

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Introduction

When examining five 17th-century flower paintings in SMK's collection, all by Elias van den Broeck (1649/50-1708), it was discovered that three of the five had very well preserved glue-paste linings. The five works entered SMK's collection in the late 1700s and spent much of their life on display in Fredensborg and Amalienborg castles. The collection records and materials suggest that the linings were done in the late 19th century. The good and stable condition of the lined paintings, despite many years of fluctuating environment, warranted studying the lining methods.

Alternative lining method

Close examination of the linings suggested a method that strays from more common glue-paste lining techniques. Nearly all the lining tacks are covered by the original tacking edge in one work (fig.1). The other two (figs. 2 & 3) appear more similar to traditional glue-paste linings at first glance except, several nails are covered by lining adhesive (fig. 3a & b) and a few nails by the original tacking edge (fig.2b). Additionally, the lining canvases, two with a salvage edge, show no evidence of being on a loom or temporary support, such as primary cusping, tack/lace holes, or adhesive and paper residues. The original painting has not been attached to the stretcher with tacks and there is glue residue on the side and back of some stretcher bars.

In what was likely the first Danish book on the conservation of paintings in 1855, the painter and conservator F.R. Greve describes two glue-paste lining techniques. The first is a glue-paste lining performed on a temporary loom. In the second method, the painting was bonded to a lining canvas already stretched on the final stretcher. For the purpose of this study we will call this technique "lining on the stretcher". It is a lining process which has been known by conservators in Denmark, and likely other countries, but an accessible description of the method has been lacking.

Approach

Here the method of lining on the stretcher is presented in detail as it could be deduced from examination and technical study of the lining materials of the three works with optical microscopy, FTIR, and XRF. The investigation was combined with a literature review and exploration of the records and writing of 19th century Danish conservators Møller (active as conservator 1813-1854), Petersen (active as conservator 1855-1887), Andersen (active as conservator 1887-1904) and Greve. A combination of diagrams and citations from Greve are presented to make the relevant part of this important Danish text internationally available for discussion and reference.

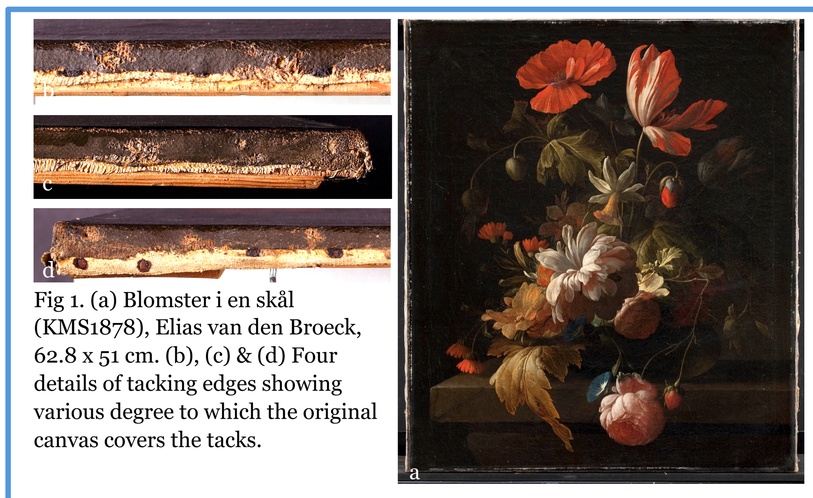


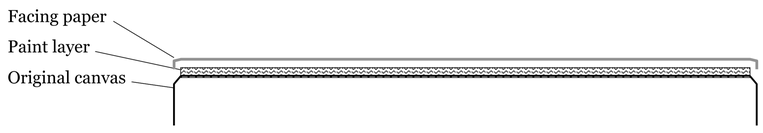
Fig 1. (a) Blomster i en skål (KMS1878), Elias van den Broeck, 62.8 x 51 cm. (b), (c) & (d) Four details of tacking edges showing various degree to which the original canvas covers the tacks.

Fig 2. (a) Blomsterbillede (KMSst60), Elias van den Broeck, 64.5 x 57 cm. (b) & (c) Two details of tacking edges showing two partially covered tacks and adhesive residue on original tacking edges.

Fig 3. (a) Blomsterbillede (KMSst61), Elias van den Broeck, 64.5 x 57 cm. (b) & (c) Two details of tacking edges showing ridges of thick adhesive covering tacks.

Proposed lining method

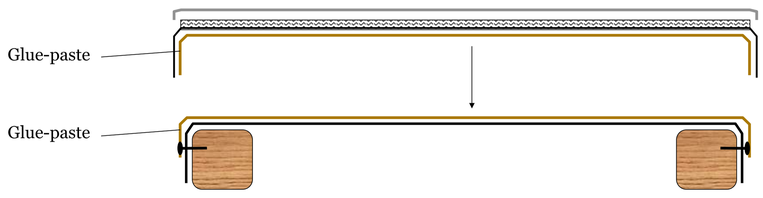
Translated citations from Danish text: GREVE, F. R. 1855. *Om Restauration af Malerier samt en kortfattet Anviisning til at rense og blege kobberstik, Lithographier, Tegninger o.d.l., ved F.R. Greve, Maler og Restaurator, Roskilde*, pg. 11.



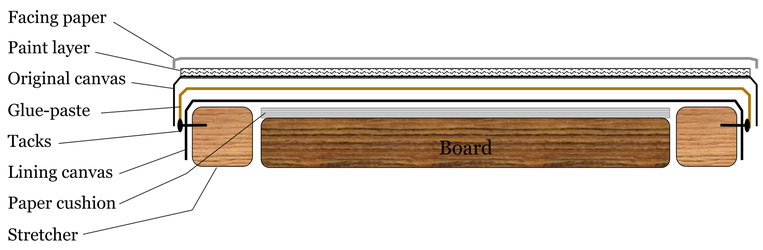
The following was the last step, *"...try with water to dissolve and remove the attached paper"*, indicating that first facing paper was applied to the painting with a water-based adhesive.

"...wash the new canvas in warm water,...tension the new canvas on the stretcher immediately and brush it with a thin glue, let it dry and burnish it smooth with pumice stone."

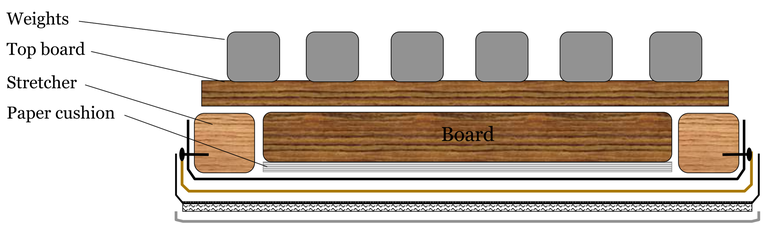
"...acquire a number of very smooth wooden plates of the same thickness as the stretcher to place under the work..."



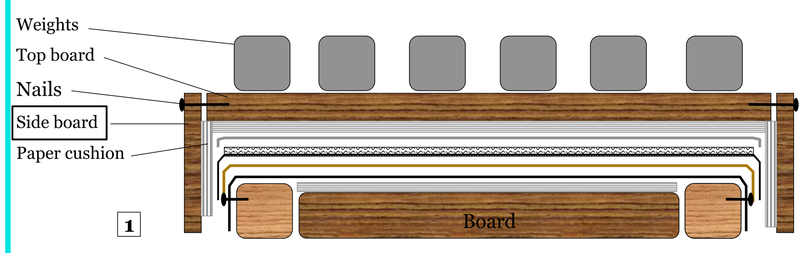
"Then the back of the painting, which has been cleaned for all foreign material, as well as the canvas is brushed with paste and they are both united."



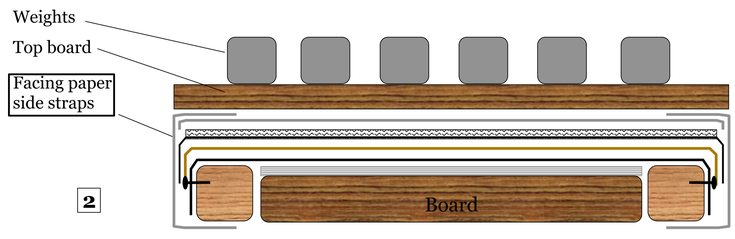
"...unite them by pressing and ironing from the middle to avoid air bubbles."
This process was likely done with the previously mentioned wooden boards behind the painting.



"Once the painting is well attached everywhere the painting is turned around and you press and rub the back thoroughly...once the canvas is smooth all over it is covered with wood or metal plates to avoid detachment or deformations...and leave it till it is half dry."



"It is then treated with a warm iron...which is not spitting (when water is sprinkled on it) anymore... on both sides...until the surface is even and smooth, then let it dry completely... In order to be able to iron the front you must acquire a number of very smooth wooden plates of the same thickness as the stretcher to place underneath during the work."



Greve's description lacks information about how the tacking edges of the original work were held in place during the process. We present two possibilities:

1. Padded side boards held in place by weights or nails.
2. Some form of paper strap which would wrap around the tacking edge from the front facing to the back of the stretcher.

Observations, Results and Conclusions

FTIR results showed that the lining adhesive in all three works consists of protein and starch, confirming a glue-paste method. Though lipids were also identified in some samples they are natural constituents in flour, and not necessarily an added material to the paste. Overall, FTIR and XRF results suggest that the glue-paste adhesive has minimal additives.

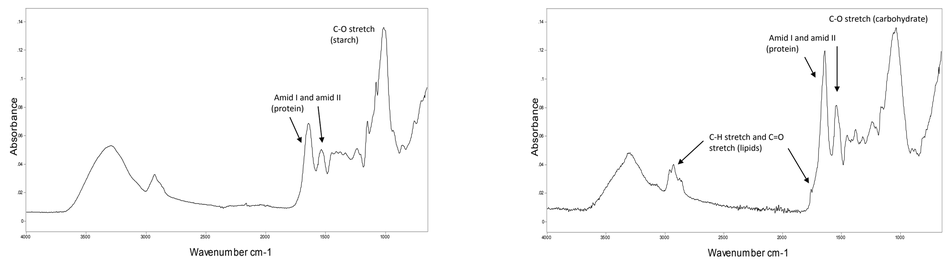


Fig 4. (left) FTIR spectrum of the lining material show the presence of starch and protein. (right) FTIR spectrum of whitish particles on the tacking edge show mainly the presence of a carbohydrate, protein and lipids.

Fibres and white loose particles, likely residue from a facing, were observed on the original tacking edges of two works. The FTIR spectrum of the white particles differed significantly from the spectrum of the lining adhesive (fig. 4), showing a carbohydrate which could not be related to starch as well as strong absorption from protein and bands suggesting the presence of lipids. Since the whitish material was similar on the two paintings, the results may indicate that they have been treated in the same workshop.

Under magnification pieces of wood and long matted fibres, likely paper, were seen on the back of the lining canvases (seen below). This could be remnants from wooden boards and layers of paper used as separation and support layers during the lining

The paste must have been a fluid gel when applied because it was pushed through spaces in the weave of the lining canvases. Since the adhesive would need to be thick and semi-dry to adhere without ironing we can assume that some form of ironing was done during the lining process. The beads of adhesive on the back, seen below, may indicate that minimal or no ironing was done from the back.

The observations and results provide a strong argument that these works were lined on the stretcher using a technique similar to that described by Greve. Although the method is known and evidence of it has been observed regularly by conservators, as of yet, we have been unable to find any other sources referring to the "lining on the stretcher" method. Therefore we hope that this case study and translation of Greve's text provides an accessible record of the method and encourages further study and discussion.

Further work

- Create mock-ups to duplicate the proposed lining method
- Examine works in SMK' s collection that show evidence of being lined on the stretcher
- Continue researching the history of the method
- Further investigation of dark particles and white powdery substance observed on the back of all three works

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