Problems Associated with the Cleaning of 'Unvarnished' Paintings

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1. Introduction

The article is focused on problems related to the removal of surface dirt from painting surfaces that had an unevenly thin matt varnish. This gives a false impression that the paintings are not varnished at all. The three chosen paintings of the Stations of the Cross are attributed to Leopold Layer and his workshop and were presumably made in the Late Baroque (Figure 1). They belong to the Church of Saint Martin in Moravče and will be returned there after the conservation-restoration treatment. The paint layer is thin and, despite craquelure, it is quite stable. The initial cleaning tests indicated that the surface was darkened because of the layers of impurities, which had to be removed. Despite the fact that these paintings were made by the same workshop and exposed to the same environmental conditions, there were still some deviations during the cleaning process. Working on these artworks reminded us that despite our expectations and experiences, every work of art must be treated individually.

The proper aqueous medium for removing the surface dirt was established under the supervision of Paolo Cremonesi and carried out at the workshop of the Academy.
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2. Measurements on the paint surface

All three paintings were documented under ultraviolet light – a fluorescence of the varnish was seen on the edges and also some darkened retouches. Although assuming that the paintings were made in the oil-painting technique, a conservator must never be too confident about the characteristics of the altered materials. The basic test of the sensitivity to water was made with a drop of distilled water. Although the test indicated a hydrophobic surface, some areas were more sensitive to water. On these areas, the drop of water sank into the paint layer. This happened because of the craquelure or because of an untypical surface of uneven hydrophobia that will be discussed later.

2.1. pH value

As for most colour areas, the aqueous medium was chosen for removing the soiling material; therefore, the pH value of the surfaces was measured first. We used a pH meter and tested several areas on each painting twice. The pH was slightly acidic. Additional measurements were made after the surface was cleaned with a Wishab sponge. The pH value of the paint layer was between 5.5 and 6.0 on all three paintings.
2.2. Conductivity

The conductivity was measured with a conductivity meter through agarose rigid gel. This information obtained provides us with the details about the ion concentration in the aqueous solution. By adjusting the ion concentration of the aqueous solution, we enable the osmosis process, which means that water is able to diffuse in both directions (through the material and out of it). A slightly hypertonic solution is also acceptable to help the water come out of a treated artefact. On the other hand, if there are too many ions in the solution, the paint layer is disrupted as the water dries out too quickly. However, if the concentration of ions in the applied solution is lower than in the treated surface, the water will move into the layer and make it swell.¹

3. Tested aqueous cleaning systems

The aqueous medium can be applied in various forms, in a free or a gelled form, as a rigid gel, water-in-oil emulsion or in combination with the preliminary hydrophobization treatment.² A variety of cleaning systems were tested (Table 1).

| Table 1. A list of tested cleaning systems (author: Barbara Dragan, December 2017). |
|---------------------------------|-----------------------------|
| Distilled water in free form    | Citrate gel pH 5,5          |
| Buffers pH 5,5 – 6              | Gelled buffer pH 5,5        |
| Mucin                           | Pemulen gel pH              |
| Mucin + TAC                     | Cyclomethicone D5           |
| *rinsing solution (water : buffer, volume ratio 9 : 1) |

As already mentioned, the surface did not behave consistently. On some parts, particles of pigments were seen on a cotton swab. The red pigment was most problematic on all three artworks, so a great deal of caution was needed. The best results were achieved with buffers. Mucin itself, or in combination with TAC, was not chosen because of the chelates, which could influence the iron ions in the paint layer and therefore remove the pigment, even though the results were

¹ CREMONESI 2017, p. 22 - 23.
² CREMONESI 2017, p. 16.
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comparable to those obtained with the buffer. The buffer with pH 5.5 in a gelled form gave good results, but because of the delicacy of some areas it was difficult to maintain control. Citrate gel also dissolved the varnish layer. As the state of the varnish layer was still unclear, we decided it was best not to use the gel as the painting looked slightly overcleaned. Looking back, we can conclude that even though the use of the citrate gel could have saved us some time, it was more important to maintain control and work selectively. The other gel used with Pemulen was not satisfactory either as it left cloudy spots around the probes.

A porous area on the painting of The IX. Station of the Cross was preliminarily treated with cyclomethicone D5, which created a temporary hydrophobization. While the surface was still wet, a buffer solution was applied to the area with a cotton swab and no pigment was removed.

4. Buffers

Before a conservation-restoration plan is executed, the goals of the treatment must be established. In our case, we wanted to clean the paintings, meaning we had to break the adhesion between the paint and the dirt without jeopardizing the paint layer.

Three properties of the artefact’s surface dictate the choice of the aqueous cleaning medium: porosity, permeability and wettability. The buffers gave the most promising results according to the probes; therefore, they were chosen for the cleaning (Figure 2). Based on the measurements, buffers with different pH values were prepared for each painting. For acidic surfaces, it is better to use buffers of ½ to 1 unit lower (more acid) and for alkaline surfaces, buffers of ½ to 1 unit higher (more alkaline) are better for preventing ionization and swelling. However, we must always work in the safe pH range of 5–9.

A rinsing solution was used after the cleaning with buffers.

The painting of The VII. Station of the Cross was consolidated with a 15 % solution of Beva 371 in Shellsol D-40, applied from the back and reactivated on a vacuum table before the surface cleaning because of a fragile paint layer.

³ CREMONESI 2017, p. 49.
⁴ CREMONESI 2017, p. 17.
It was obvious that in the past all three paintings were exposed to a conservation-restoration procedure. We were aware of the varnish around the edges revealed under the UV light, but the rest of the surface appeared matt and unvarnished. After cleaning the surfaces with buffers, another inspection under ultraviolet light was carried out. It showed that the varnish was merely unevenly thinned, not removed, in the past. The originality of the varnish was questionable. A strong adhesion between the dirt and the varnish was established, so further tests were needed (the Wolbers test). To remove the thin layer of dirt, we had to proceed by removing the varnish layer.

Mixtures of polar and nonpolar solvents were used first: acetone/alcohol and Shellsol D-40. On only one painting (The VI. Station of the Cross), a cloudy veil appeared (Figure 4). The veil was removable only with acetone. A combination of acetone and benzyl alcohol was used for removing the varnish. It appeared to be the most effective solution for all three paintings (Figure 3) because the least mechanical pressure was needed when using a cotton swab compared to the other mixtures.

Figure 2: The painting VI. Station of the Cross partially cleaned with buffer (right).
(Photo: Barbara Dragan, December 2017)

Figure 3: The painting VI. Station of the Cross partially cleaned with buffer (left) and removed varnish with benzyl alcohol and acetone (right).
(Photo: Barbara Dragan, December 2017)

Figure 4: Cloudy veil appeared after testing with some mixtures and was removable with acetone.
(Photo: Barbara Dragan, November 2017)
6. Conclusion

With a conservation-restoration treatment we influence a work of art. Every such interference should be made gradually to maintain control over the activity. A balance between all three paintings had to be achieved so that they could be seen as parts of a unified group, but we also had to treat them individually. Water-based cleaning systems were used for removing the surface dirt, which also caused some problems since the surfaces did not always behave hydrophobically. Even though we wanted to avoid the application of polar solvents, their use was necessary after we discovered that there were still some varnish residues together with the dirt. Although our initial conservation-restoration plan slightly changed, as we did not expect the paintings to have been varnished, we succeeded in achieving our goals. The paintings are now cleaned and prepared for further conservation-restoration procedures.

Bibliography

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