Cleaning the Adolphe Roger murals at the church of Notre Dame de Lorette, Paris

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Introduction

Notre Dame de Lorette, designed by Hippolyte Lebas (1782–1867), was the first church built in Paris after the French Revolution. The entire church, consecrated in 1836, was classified as a historic monument in 1984. Taking his inspiration from antiquity, Lebas combined the austere architecture of the building's exterior with a rich interior decor. While the elevation is reminiscent of paleo-Christian basilicas, the iridescent effect of the stucco and gilding framing the murals echoes the opulence of Italian Renaissance churches. The overall decoration, commissioned from several painters by the city of Paris between 1828 and 1836, offers an outstanding overview of the diversity of religious art under the July Monarchy (1830–1848). The corner chapels are consecrated to the four key events in Christian life: baptism, Holy Communion, marriage and funerals. Each one is the work of a different painter: Adolphe Roger, Alphonse Périn, Victor Orsel, and Merry-Joseph Blondel.

Adolphe Roger (1800–1880) was a student of Baron Gros and spent time in Italy, where he studied the Italian Primitives and admired their work. He was also influenced by the German Nazarene painters, an early 19th-century artistic movement. The composition of the décor he painted for the Baptism chapel between 1832 and 1840, organized in small panels, offers a purely logical narrative, built around associations of ideas and parallels. The very rich iconography presents several famous baptisms: Jesus receiving the sacrament from his cousin, John the Baptist, the Roman emperor Constantine, the Merovingian king Clovis, as well as representatives of populations more recently converted to Catholicism in South America (Peru) and Africa (Ethiopia). The main focus was deliberately placed on the sacramental entry into the Christian life and the baptismal liturgy used at the time. One original aspect is the presence of plants, particularly those used to make the chrism, showing the influence of a theologian on the design.

The unusual technical feature of the murals in the Baptism chapel is that they were painted using a new wax technique, developed in Paris in the 1830s. The condition of these paintings has deteriorated over time (due to leaks resulting from poor maintenance of the roof) but not attributable to this new painting technique, which was fully mastered by the artist. The paintings have also been damaged in the past by poorly managed cleaning methods unsuited to this complex technique. More recently, thanks to new cleaning methods, it was possible to develop an emulsion-based process for removing the old varnish used in earlier restorations, while completely preserving the sensitive paint.[1]

Technical study

The wax painting technique originated during the renaissance of mural art in the 19th century and was developed by a series of experiments with two objectives: resisting humidity and giving a matte appearance similar to that of true fresco. The techniques and materials identified[2] in the Roger murals indicated that several artists of the period had these dual aims.

The coloured layer was analysed to determine the type of binder. The compounds clearly identified were beeswax and oil. The presence of amyrins indicated the use of an elemi-type plant resin. Despite the fact that neither spike lavender nor turpentine were identified in the binder, due to their volatility on application, the combination of wax and elemi resin suggested the use of a binder referred to by Paillot de Montabert as 'gluten'[3] and the addition of a lead-based drying oil was indicative of 'mixed gluten'. This binder was truly a new technology developed by the artists of the period, which made it possible to work with the cold wax/resin mixture, without needing to apply heat to the painted surface, thus giving an absolutely matte appearance. Indeed, the slow evaporation of the solvent used to dissolve the wax-resin enabled the artists to work

FIG. 1 Details of the removal of the two layers of varnish (photo ©Julien Horon).

FIG. 2 *Intelligentia*: before cleaning (photo © Julien Horon).

FIG. 3 *Intelligentia*: after treatment (photo © Julien Horon).

longer with the fresh material. The elemi resin added plasticity to the mixture and the drying oil accelerated the drying of the paint layers, making it easier to paint over them.

A more detailed stratigraphic analysis revealed that the artist had applied two preparation coats under the coloured layer, retaining the mixed gluten as a binder and including clay particles as an extender. In the preparation coat immediately below the paint layer, lead white and Naples yellow pigment were used to give this coat a slightly beige colour. Beneath this preparation coat, a wax/oil sealant layer was applied to the limestone surface. This layer, which was not particularly compact and contained shell fragments, lime, and a few grains of quartz, was intended to seal the wall and prevent moisture from seeping through to the painted surface.[4] Stratigraphic cross-sections revealed the deep penetration of this sealant into the stone, indicating that it was applied when hot. Beeswax and lead-based drying oil were identified in this sealant which indicates that it may have been applied following the process developed by chemists Thénard and d'Arcet. The identification of amyrins in this layer may indicate that the elemi resin had migrated from the upper to the lower layer. Another possibility is that the elemi resin was a component of this lower layer, which would indicate that mixed gluten had also been used as a gluten coating. Once this layer had been applied, the surface of the stone was apparently still too uneven because it was found that a

FIG. 4 *Baptimus aquae*: before cleaning (photo © Julien Horon).

FIG. 5 *Baptimus aquae*: after treatment (photo © Julien Horon).

priming based on white lead and barium sulphate white had also been applied. However, it was not possible to identify the binder used in this layer.

By combining two fundamental principles of this new technique, i.e. a hot base coat and cold wax painting, Roger contributed to the technological research of his period. The end result and the excellent preservation of the paintings show how well this artist had mastered the technique.

Analysis revealed two superimposed coats of varnish. The first coat, in direct contact with the painted layer, was an oil-based varnish containing rosin-type diterpene resin. According to archival documents, two earlier restoration campaigns had taken place – one in 1859, the other in 1933. This oil- and rosin-based varnish was certainly applied during one of these two restorations. The significant thickness of this oil-based varnish was clearly intended to camouflage previous damage to the paint caused by aggressive cleaning methods. This varnish had oxidized and taken on an orange tint over the years. Further analyses then revealed the presence of another, synthetic, acrylic varnish, applied during the most recent restoration in the 1980s. We can assume that the cleaning during this restoration had reduced the matte appearance of the first varnish, so the restorers at that time were obliged to apply more varnish.

The cleaning protocol and its application

Understanding the painting technique used by Roger was the starting point for the entire treatment, including the varnish removal. Once the artist's technique and the various types of varnish had been identified, it was necessary to find a method for removing these two coats of varnish without causing swelling in the mixed gluten compounds. A process was developed using a solvent in a water-based emulsion to remove the two coats of varnish, with the assistance and participation of Richard Wolbers when he visited the site. We chose a 10% benzyl alcohol emulsion in a slightly basic aqueous gel containing 2% xanthan gum, buffered to pH 8. The emulsion was applied with a brush and cleared with water buffered to pH 7. The dwell time was about two minutes.

This emulsion was first tested on several scenes and various colours (Fig. 1). These tests were highly encouraging and it was possible to start removing the varnish. Cleaning started in the dome and progressed to the two lower levels. This particular emulsion made it possible to clean the surface gradually and evenly, without blanching the paint layer (Figs 2–5). The matte finish of the paintings was revealed when the varnish was removed. The low toxicity of the emulsion represented a considerable advantage for the members of the conservation team. The emulsion was easy to prepare and use, making it possible to remove both coats of varnish from a significant total area of 250 square metres.

Conclusion

Those working on the previous campaign in the 1980s showed great caution in deciding not to remove the varnish, as they did not have the appropriate technical solution to do so. Thanks to new, water-based emulsion cleaning techniques, a major obstacle in cleaning varnish from wax paintings has now been overcome. The original colours of Roger's paintings are once again visible. The success of this cleaning process opens up new possibilities for the future treatment of other wax paintings.

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Notes

1. The treatment report is available at the COARC resource centre. It presents a precise, detailed account of all the processes carried out between November 2015 and January 2017.
2. The technical examination comprised observations with the naked eye, under a magnifying glass, and using ultraviolet light. These observations guided the sampling and analyses carried out by the laboratories mentioned in the acknowledgements. The analytical techniques used were: scanning electron microscopy coupled with energy dispersive X-ray analysis, Fourier transform infrared spectroscopy, and gas chromatography coupled with mass spectrometry. All the analysis reports are available at the COARC resource centre.
3. Jacques-Nicolas Paillot de Montabert was a French painter who wrote the nine-volume technical treatise on painting *Traité complet de la peinture* in 1829, with an additional volume of illustrations.
4. The sealant layer was applied directly to the stone on every wall in the chapel, but not the dome, where a coat of plaster was applied between the stone and the sealant.

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