Early Medieval Wall Paintings from the Collegiate Church of Amay (BE). Material Studies and Comparisons with Window Glass and Mosaics from North-Western Europe.

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1. Introduction

The site of the Saint-Georges-et-Sainte-Ode church of Amay was excavated in the late seventies and early eighties by the Cercle Archéologique Hesbaye-Condroz. The Cercle Archéologique Hesbaye-Condroz has now initiated a new study of the stratigraphy of the site and of the material found during the excavations. This material includes numerous wall painting fragments and some portions of painted walls conserved *in situ*. A fraction of these wall paintings was studied by Magali Souris during her master thesis in history of art and archaeology, orientation archaeometry, at the University of Liège, under the supervision of Prof. Patrick Hoffsummer. This article reports the methodology used for the study and the results obtained regarding the wall paintings dated from the early Middle Ages. The article also provides a comparison with other contemporaneous arts in North-Western Europe, such as window glass and mosaics.

2. Context

Amay is situated in the south part of Belgium, along the river Meuse between the cities of Namur and Liège. Amay has a rich history, partly due to its situation within the communication routes network at different periods. The region of Amay is already inhabited at prehistoric times (Willems 1980: 11). During the Roman period, a *vicus* develops at the intersection of the river Meuse and the Roman road that connected Metz to Tongeren, the capital of the *Civitas Tungrorum* (Willems 1968: 5). After the fall of the western Roman Empire, the Merovingian kings take control of the region. From the end of the 7th century, a significant number of Christian monasteries are founded in the region, e.g. Stavelot abbey. At this time, at Amay, the *vicus* doesn’t exist anymore, but graves and remains of the Merovingian and the Carolingian periods were found at some distance to the north, at the emplacement of the present collegiate church (Thirion 1980: 26). The agglomeration develops around it during the Middle Ages and later on.

The excavations on the eastern part of the site of the church brought to light four buildings which followed each other according to the stratigraphy (fig. 1). A Roman construction stands from the second to the third century. Its function was at first interpreted as a *villa* (Willems 1969: 57). However new interpretations are now discussed and its function as a place of cult is considered.

Probably at the end of the 6th century or at the start of the 7th century, a first Christian church with an apse is established on the destruction layer of the Roman building. The testament of Adalgisel Grimo, a member of the aristocracy, confirms its existence in 634 AD. The text mentions a Christian oratory where his aunt, Chrodoara, was buried (Thirion 2006a: 23).

This edifice is modified at the Carolingian period, between the second part of the 8th century and the second part of the 9th century (Thirion 2006a: 23). Some structures, as the apse, are conserved, others are reconstructed, and the ground is built up (Thirion 2006b: 66). At that time, three successive layers of painted plaster cover the apse of the church (Thirion 1978: 70) (fig.2).

The next remains from a chronological point of view are the ones of a third medieval church, allegedly built between the end of the 10th century and the beginning of the 11th century (Thirion 2006b: 68). It is qualified as pre-Romanesque to distinguish it from the other churches. Its remaining walls are covered by a plaster layer which seems to have been painted.

In the choir, a part of the stratigraphy was disturbed by the burying of the sarcophagus of Chrodoara. This operation took place before or after the settling of the pre-Romanesque floor and resulted in the breaking up of all the ground levels and layers down to the Roman destruction layer (Thirion 2006b: 66; Lethé 2006: 74).
Above the pre-Romanesque floor, no floor can be seen in the stratigraphy up to the ground level of the current church. However, this current church has a Romanesque structure. The foundations built at the end of the 11th century are visible in the stratigraphy. The Romanesque elevated structures were transformed over the centuries, especially between the 16th and 18th centuries. (Colin 1989)

3. Material and Objectives

The wall painting fragments studied come from the medieval layers of the eastern part of the church. They were found in different levels of the stratigraphy and at different locations. Most of them come from the choir and the transept crossing, both above and below the pre-Romanesque floor. Some fragments come from backfill formed during the burying of the sarcophagus. Some others come from the Northern transept or from areas lacking stratigraphic information. The collection studied includes 2784 fragments, broadly grouped according to their places of discovery. But this is only a part, about the quarter, of the total number of fragments that were uncovered. Portions of *in situ* wall paintings, mentioned above, were also part of the study.
The diversity of the provenances and of the motives that can be seen on the fragments suggests that they may belong to different decorative phases. So, the aim of the study was double. The first aim was to characterise the different wall painting fragments in order to propose a classification. The second aim was to connect the established groups to the stratigraphic context.

4. Methods

In order to reach these two aims, the methodology used was based on those employed by specialists in the field of Medieval and Roman wall painting, especially in the form of fragments, and of its constituent materials (Allag 1972; Barbet 2016; Boissard 2006; Coutelas 2009; Palazzo-Bertholon 1999; Sapin 1999).
The first step was to make an inventory of all the fragments of the collection: they were numbered and their principal characteristics, such as the aspect of the plaster, the painted patterns, the contextual information, were recorded in a database (Coutelas 2014). Afterwards, the database was completed with the information collected during the next steps of the research process and was eventually used to work out statistics.
The second step was a detailed characterisation of a selection of the fragments included in the collection, focusing both on the plaster as well as paint layers.
For the detailed characterisation of the plasters, 5 to 10 percent of the fragments from each group were examined macroscopically on fresh breaks with the help of pre-established criteria. A reference criteria sheet was created on the basis of existing reference criteria sheets developed by specialists as Marie Demelenne, Bénédicte Bertholon and Christian Sapin to study plasters and mortars (Demelenne 2013; Palazzo-Bertholon 2000: 225; Sapin 1999: 284). It included qualities such as general colours, the nature and proportion of the aggregates, the porosity and the state of conservation.
The detailed characterisation of the pictorial layers covered about a hundred fragments and focused on the observation of the application technique and on the determination of the nature of the pigments.

To study the application technique, the painted layers were examined both macroscopically and under the optical microscope[1]. A few samples were also taken to be observed in cross-sections. The information that was looked for was, for example, the existence of a whitewash or of a background layer and clues for the preparation drawing such as coloured lines, *sinopia* or incisions in the plaster.

To determine the nature of the pigments, the coloured surface was examined with a microscope in order to characterise the appearance of the particles and the existence of mixtures of pigments. Non-invasive analyses were also carried out at the Centre Européen d'Archéométrie (CEA) of the University of Liège.

First, Raman spectroscopy was used to obtain molecular information with a portable spectrometer.[2] This technique consists in sending a monochromatic light (laser radiation) on the material to be analysed. The device compares the light scattered by the material with the incident one and gives a spectrum that is characteristic of the molecule encountered by the laser light (Edwards 2012: 51-52). In the portable spectrometer used, laser radiation is conducted through optic fibres. It allows to take measures directly on the surface of the fragments or of the wall paintings *in situ*, without taking samples. Two laser lights were used: a red one (with a wavelength of 785 nm, used with a maximal power of 50 mW) and a green one (wavelength of 532 nm, used with a power between 10 mW and 20 mW). The spectra obtained were compared to the CEA homemade database of identified pigment Raman spectra using the software GRAMS AI.

Unfortunately, on many fragments, only calcium carbonate was detected. It is probably due to the fact that Raman spectroscopy is a surface technique and that a layer of calcite has formed above some of the paint layers over time. To try to fill in the missing information, X-ray fluorescence spectroscopy was used on certain coloured surfaces. This technique consists in sending an X-ray beam to the material, which in result emits X-rays characteristic of the atoms encountered, bringing elemental information. As the X-ray beam goes through all the layers of the painted plaster, this technique brings information about all the components crossed (Calvo Del Castillo 2012: 70-72, 78). The analyses were carried out using an XRF set up developed by the Centre Européen d'Archéométrie for point analysis and 2-D mapping purposes[3]. The data obtained were processed with the software PyMCA by Prof. David Strivay.

The combination of the microscopic images with molecular and elemental information allowed to make suggestions on the nature of the pigments used.

The information thus obtained on the plaster and paint layers made it possible to establish groups of fragments. These groups were then described in a catalogue.

The next steps focused on trying to link the different groups to the stratigraphy and chronology of the site. In order to do this, three aspects were considered.

First, some fragments have overlapping painted plasters. These configurations were observed to establish a relative chronology.

Secondly, the wall paintings and plaster layers present on the remaining structures *in situ* were also studied in order to compare them with the fragments of painted plaster previously described. A graphic survey of the wall painting remains decorating the early medieval apse was carried out (Fig. 3). The pigments of these wall paintings were also analysed *in situ* by Raman and XRF spectroscopy. The devices used were the same portable Raman spectrometer

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[1] Both digital and optical microscopes were used: a Dino-lite (model AM7115MZT) used with different magnifications (x20, x50, x250) and an Optical Microscope Olympus BX51 paired with a Camera Olympus XC50 also used with different magnifications (x50, x100, x200, x500).

[2] The portable Raman Spectrometer is a Portable EZRaman analyzer I-Dual-G, from Enwave Optronics.

[3] The device consists of a homemade XRF system: it contains a Moxtek Magnum X-ray tube (50 kV) with an Ag anode and a detector Ketek (25 mm^2) with a resolution from 132 eV to 5,9 keV. During punctual analyses the acquisition time was of 60 s. The surfaces covered by the mapping analyses measured 10 mm^2 with a XY step of 1 mm, a speed of 1 mm/s and an X acceleration of 50 mm/s^2 and with a tension of 40 kV and a current of 120 µA.

as described above and a portable XRF spectrometer[4] belonging to the department of geology of the University of Liège. In addition to that, some plaster samples were collected on other non-decorated walls belonging to contemporaneous structures and were examined with the same reference criteria sheet as the one used to study the plaster properties of the fragments.
The third aspect to consider putting the groups of fragments in context was to determine where in the stratigraphy these painted plaster fragments had been discovered and if this kind of information was relevant to establish their original provenance and chronology.

5. Results

In this study a total of at least four, maybe five, decorative groups were identified. A big part of the painted fragments seems to belong to the pre-Romanesque phase but at least 400 fragments, distributed in three groups, come from the identified early medieval structures. This article will only examine these three early medieval groups. They are described chronologically.
The first decoration phase includes more than 250 fragments and was probably adorning the Merovingian church, which was most likely occupied between the end of the 6th century and the beginning of the 8th century. A very similar plaster is noted both on the Merovingian apse and on the 250 painted fragments above-mentioned.
These fragments are very small. Their support is made of a grey, coarse and friable mortar containing many aggregates, especially binder nodules, sand, a lot of gravel and some *cocciopesto* (fig. 4a). This mortar is covered by a thin layer of whitewash roughly applied. The pigments were added on this whitewash. It is possible that incisions and coloured lines were drawn before the painting step.
The remains *in situ*, particularly the apse, are only painted in white or yellow ochre (fig. 5). The fragments of this phase present coloured motives, but it is difficult to interpret the complete decoration. Theses motives are mainly small flat tints isolated by black lines and coloured in white, beige, grey-blue, orange, green and red. Some white or green flat tints are punctuated by red dots. Some fragments present more complex decorations that suggest a larger, maybe figurative, decoration (fig. 6).
The pigments found on this painted layer are calcium carbonate for whites and carbon black for blacks. The presence of iron shown by XRF and the Raman spectra indicates that earth pigments were used for the red and beige flat tints (Helwig 2007: 88; Vandenabeele 2012: 350). The Raman spectra show the presence of red lead in orange areas, which is confirmed by the lead found by XRF (Vandenabeele 2012: 350; West Fitzhugh 1986: 120). As observed by the microscope and corroborated by the elements detected by the analyses, the grey-blue tint is obtained by a mixture of carbon back and calcium carbonate indicating the use of false blue (fig. 7a). This process is in use in the Medieval times in Northern Europe and takes advantage of the optical properties of the pigments to create the impression of blue (Howard 2003: 189; Sapin 1994: 94-95). In order to obtain the green colour, green earth seems to be mostly used, as iron was detected by XRF analysis (Grissom 1986: 147). In some places, copper particles are also detected. The microscope observation shows also blue particles mixed in uneven quantities within the green ones (fig. 8a). One of the possibilities is that Egyptian blue pigments were mixed to green earth in order to enhance the colour (Delamare 1990: 108). This pigment was mainly exploited in Roman times but may still have been in use in the early Middle Ages (Coupry 2016: 163; Howard 2003: 39-40; Riederer 1997: 27). Nonetheless, the use of a copper-based green pigment may not be dismissed (Vandenabeele 2012: 350).
The second and third decoration phases can be linked successively to the Carolingian church (from the first half of the 8th century to the beginning of the 10th century). They are still visible

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[4] The portable X-ray fluorescence spectrometer is a Thermo Fischer Niton XLEt with a 'GOLDD' detector. The X-ray tube has an Ag anode of 50 kV and 200 µA. The acquisition time used was 60 s.

on the remains of the apse *in situ* (fig. 9) and several fragments show superimposition of layers of the two phases.
The first Carolingian group includes 120 fragments. The support is made of a thick layer of light-coloured mortar containing aggregates. The colour is either white or light pink depending on the amount of *cocciopesto* mixed to the lime base matrix. There are also many white nodules of binder, some gravel and charcoal pieces (fig. 4b).
This type of plaster layers shows two main patterns. The first one represents green, yellow and pink slightly curved strips on a light background. Above, red curved lines intersect. It can be seen on the apse and on the fragments (fig. 10). The second one, only visible on the fragments, shows red, orange and pink dots organised in a grid on a green background (fig. 11). It is limited on at least one side by a yellow, red, orange and green border, which marks the angle formed by the support.
Iron and lead found by XRF analysis on the yellow tints indicate that yellow earths and maybe massicot were used. Red earths and haematite were detected by Raman analysis in the red areas (Helwig 2007: 88; Vandenabeele 2012: 350). The presence of lead in the orange tints suggests the use of red lead (Vandenabeele 2012: 350; West Fitzhugh 1986: 109). A small area of light and dark blue pigments was found by microscopic examination, but their nature has not been identified (fig. 7b). The microscope observation and the XRF-mapping show that the green areas are obtained by a mixture of copper-based green and blue pigments (fig. 8b). Iron, lead and zinc were also found. The main hypothesis is that it is a mixture of azurite and malachite, which come from the same ore and which were often used in medieval paintings (Eastaugh 2008: 39; Gettens 1993: 23; Howard 2003: 83; Vandenabeele 2012: 350), but other copper-based pigments may have been used. Another explanation is that, initially, only azurite had been used and that it had degraded into malachite (Gettens 1993: 27; Howard 2003: 49). In this case, the green motives were originally blue. Other green copper-based pigments may also have been used, such as verdigris. Finally, it is not impossible that the mixture is composed of green iron-based pigments (green earths) and blue copper-based pigments (Grissom 1986: 147; Vandenabeele 2012: 350).
The second Carolingian group concerns 84 fragments and superimposes itself on the first Carolingian phase, especially on the apse of the church (fig. 12).
Its support is made of one or two thin layers of plaster. This plaster is beige and more homogeneous than the previous one. The aggregates, formed by white binder nodules, sand nodules and *cocciopesto*, are smaller than those of the previous group (fig. 4c).
This phase presents various small patterns but the link between them cannot be defined. One of them consists of trefoils on a yellow-ochre background. Their surfaces are coloured with orange, red, grey and beige stripes and their outlines are highlighted with white lines. Incisions have been made in the plaster, probably with a compass, in order to construct this shape before its painting. Red flower shapes intersperse between the trefoil patterns. It is possible that this pattern is limited by a grey and orange border (fig. 13).
A second design is composed of stripes of different grey or yellow colours (Fig. 14a). This pattern can also be seen on the apse (fig. 12) and may be an imitation of drapes or marble.
Among the other patterns we can see various smaller and less organised stripes of blue, green, brown and black colour (fig. 14b), as well as red leaves on a white background (fig. 14c).
The pigments found on this group are calcium carbonate, carbon black, red and yellow earth pigments, as indicated by the presence of iron found by XRF analysis, as well as red lead, as shown by the lead detected in the orange areas (Helwig 2007: 88; Vandenabeele 2012: 350; West Fitzhugh 1986: 109). The presence of lead in smaller amounts indicates that, in certain cases, massicot and litharge seem to have been added respectively to the yellow and red colours (Eastaugh 2008: 247; Vandenabeele 2012: 350). It is also possible that lead white was used in the underlying layer (Vandenabeele 2012: 350). In this group, the microscope observation

indicates that the blue tint is also achieved with a mix of calcium carbonate and carbon black pigments (fig. 7c). The green colour is still more complex: the microscope observation signals a mixture of carbon black, calcium carbonate and a few green grains applied on a background layer of yellow pigments (fig. 8c). The copper detected by XRF analysis suggests that the green grains are copper-based pigments.

By this description we can see that various patterns were used to decorate the two early medieval churches which followed each other in Amay. If the corpus is too fragmentary to have a global vision of the decoration of each phase, some indications were furnished: the patterns are mostly geometric, but some clues seem to suggest the existence of a figurative decoration.

Each phase seems to present various decorative areas. Moreover, by the examination of the superimposition, we can assert that a same place was given a different iconographic treatment for each phase (fig. 15). The analyses of pigments also show that the pigment palette evolved between the phases, especially in the elaboration of blue and green colours (fig. 7 and fig. 8).

6. Comparisons with Other Contemporaneous Wall Paintings

Comparison could be made with contemporaneous wall painting in Western Europe such as those of Stavelot or Tongeren in neighbouring regions, Corvey and Paderborn in Germany, Auxerre and other sites in Burgundy, and the list could go on. Early medieval wall paintings discovered on the Saint-Denis site in France, for example, seem to show some iconographic similarities with the motives observed in Amay (Wyss 1994: 64-66). This comparison work was not covered in the master thesis and still has to be made, from a stylistic as well as a technical point of view. However, a succinct technical comparison can be provided with the site of Tongeren where the early medieval painted plasters were studied by Bénédicte Bertholon (Palazzo-Bertholon 2018). On the earliest phases, she identified similar pigments to the ones found in Amay around the same time, such as calcium carbonate, carbon black, yellow and red earths and red lead. Then she observed a diversification of the palette with the addition of yellow and red lead-based pigments, green earth and azurite (Palazzo-Bertholon 2018: 215, 221, 227-229). A more thorough comparison, especially for the chronology of the use of these pigments, could be interesting.

7. Short comparisons with window glass and wall mosaic from North-Western Europe

In order to compare these painted plasters with other contemporaneous forms of art, we chose to remain in the sphere of architecture. In the North of Europe, the increase of archaeological research around ancient religious buildings has shown that Northern churches and palaces were far from the dark picture portrayed so far. They were decorated with colonnades, marble, stuccoes and frescoes (Sapin 2006). For the early Middle Ages, even if their materials are quite different from those of the paintings, we decided to focus mainly on window glass and mosaics because they were decorating the walls and the inside parts of the buildings with polychrome motives. These compositions could have been placed next to the wall paintings. There, glass played an important role in the transmission and in the reflection of the light. It fully participated in the atmosphere within the building and in the scenography, highlighting specific areas. If glass was used next to coloured stones and painted decorations, the decorative program probably had to be designed as a whole and the different materials completed each other.

Regarding window glass, we haven’t preserved complete windows from the early Middle Ages and, apart from the Christ of San Vincenzo (Dell Acqua 1997), no real motive has been conserved. Still, recent discoveries brought to light large sets of pieces of coloured glass on several sites (for the different examples see Balcon-Berry 2009; Cramp 2006; Foy 2005; Van Wersch 2016). The shapes preserved correspond to geometric motives as well as figurative elements: heads, arms, feet, legs (Van Wersch 2016: 931-934). So, the comparisons between window glass and the wall paintings of Amay remain limited regarding the iconography. The only representative elements that can be used are the vegetal motives. On some pieces of glass, in Stavelot (unpublished data) as well as in a medieval church in Alésia (Whalen 2009: 64) and in Baume-les-Messieurs (Van Wersche 2016: 931-934), grisaille or traces of grisaille have been conserved. Some of the recognisable motives seem to be plant elements. In Alésia, drawings of leaves of palm trees were recognised (Whalen 2009: 64). Even if they are not strictly identified as vegetal motives, these kinds of patterns are also present on the wall paintings of Amay (fig. 15).

Next to these comparisons, the colours used in the window glass and those of the paintings have to be discussed. The most common colours in window glass seem to be the greenish tinges and the blue-green colours, probably the natural ones of the glass (Cramp 2006: 62-70; Perrot 1996: 212; Van Wersch 2016: 932). Next to these, even if the different proportions are not always known, amber, blue, pink, red and turquoise colours are attested (Balcon-Berry 2009; Foy 2005). Still, for the early medieval glass, the red and the deep blue or "cobalt blue" seem more difficult to obtain.

The red colour is one of the most complex colours to obtain for transparent glass (Kunicki-Goldfinger 2014: 172). It is due to copper and to reducing conditions maintained throughout the glass melting and working (Silvestri 2014: 52). In some pieces of glass, we can perceive attempts for glassmakers to produce this colour, namely in Jarrow (Cramp 2006: 68) or in Stavelot (Van Wersch 2014: 223). From the end of the 8th century, the use of wood ash glass, containing naturally colouring elements (Sellner 1979), seems to facilitate the making of the pink colour that will become more abundant. In some cases, this may have been used in replacement of the red. In wall paintings, as shown by the ones of Amay, red is quite common. It is generally obtained by ochre or iron oxides. Sometimes lead based red pigments are used in addition.

On the contrary, the deep blue colour seems to be a challenge for both kinds of artisans. For glass, the "deep blue" is obtained by addition of cobalt (Gratuze 2013). In order to obtain it, the recycling of Roman tesserae was certainly practised (Schibille 2013) and it is still attested in the 10-12th centuries for the window glass of Chartres, Pavie or York (Velde 2009). So, the production of "fresh deep blue" glass for the window glass in North-Western Europe might be questioned. Such as on other sites, in the wall painting collection from Amay, two phases out of three used a mixture of white and black pigments to create a false blue. In this manner, the grey-blue tint is achieved by an optical effect. It is possible that natural blue mineral pigments are not used in this case because of their high cost and the need to import them (Howard 2003: 40, 50). There are few mentions of these types of pigments found on early medieval wall paintings. For the Egyptian blue is known to be mostly used during the Roman period, sometimes in the beginning of the Middle Ages, and the azurite and lapis lazuli were generally found on later wall paintings (Gettens 1993: 25; Plesters 1993: 39; Riederer 1997: 27; Rollier-Hansellman 1997: 65).

Concerning the mosaics in North-Western Europe, we also lack evidence for complete masterpiece. The mosaics of Germigny-des-Prés are the only complete ones that have been preserved north of the Alps (James 2013). Next to these, many remains, tesserae and plasters found in different sites, testify to the existence of these pieces of art on several locations (Van Wersch 2019a). As for the window glass, the iconographic comparisons remain really limited. We can only notice the presence of vegetal elements in mosaics (Van Wersch 2019b: 3) as in window glass and possibly in wall paintings.

Regarding the colours, the yellow, orange and white glass are quite rare among the tesserae and, as in Byzantine mosaics (James 2017), clear stones were used to replace white glass (Van Wersch 2019b: 15). In Germigny-des-Prés, as on other sites, gold, silver, blue and turquoise are quite frequent. On the contrary to mosaic, in the wall paintings of Amay, the yellow, orange and white are frequent, gold and silver are absent, even if gilding techniques are used on wall paintings later in Europe (Mounier 2013). The deep blue was discussed above. So, it seems that mosaics were the only technique where this colour was frequent. Still, as far as we know, the "colbalt blue" tesserae might have been a recycling of Roman cubes (Van Wersch 2019b:19). The common tinges to mosaic and wall paintings are turquoise/green colours, frequent in both forms of art. Copper is the colouring element in turquoise tesserae (Van Wersch 2019b:20). In the wall paintings of Amay copper is found in green colours, which is sometimes made of blue and green pigments.

Finally, comparisons of materials between mosaics and wall paintings should be extended to the mortars, where the tesserae are inserted, as well as to the pigments still available between the cubes. Indeed, before putting these in the plasters, the artisans had first to prepare the composition, to draw the motives and paint the surfaces. The analyses ongoing on the site of Germigny-des-Prés as well as on the plasters found in the baptistery of Nevers should provide us with more data in the future.

8. Conclusion

The description of the early medieval wall paintings found in Amay shows the richness of the collection and highlights the necessity to study this type of material. Drawing comparisons with other forms of art, such as window glasses and mosaics, brings information from a technical as well as a stylistic point of view.

From an iconographic perspective, though similarities existed, the colours of glass and those used on wall paintings were different. They certainly completed each other in order to create rich polychrome decorations, contrasting with the common conception of a dark and poor early medieval architecture.

The comparisons that have been outlined in this paper point to common technical issues such as the apparent difficulty to make deep blue colour. But most of all we have to remind that the different materials were used jointly to be part of the very same decorative programme. New insights could be given by 3D models, used in order to propose reconstitution hypotheses rendering the medieval appearance of the inside of the buildings. Finally, considering the different forms of art together, regarding their material and technical aspects, could also help us to understand the organisation of the work and the means needed for the realisation of monumental programs.

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