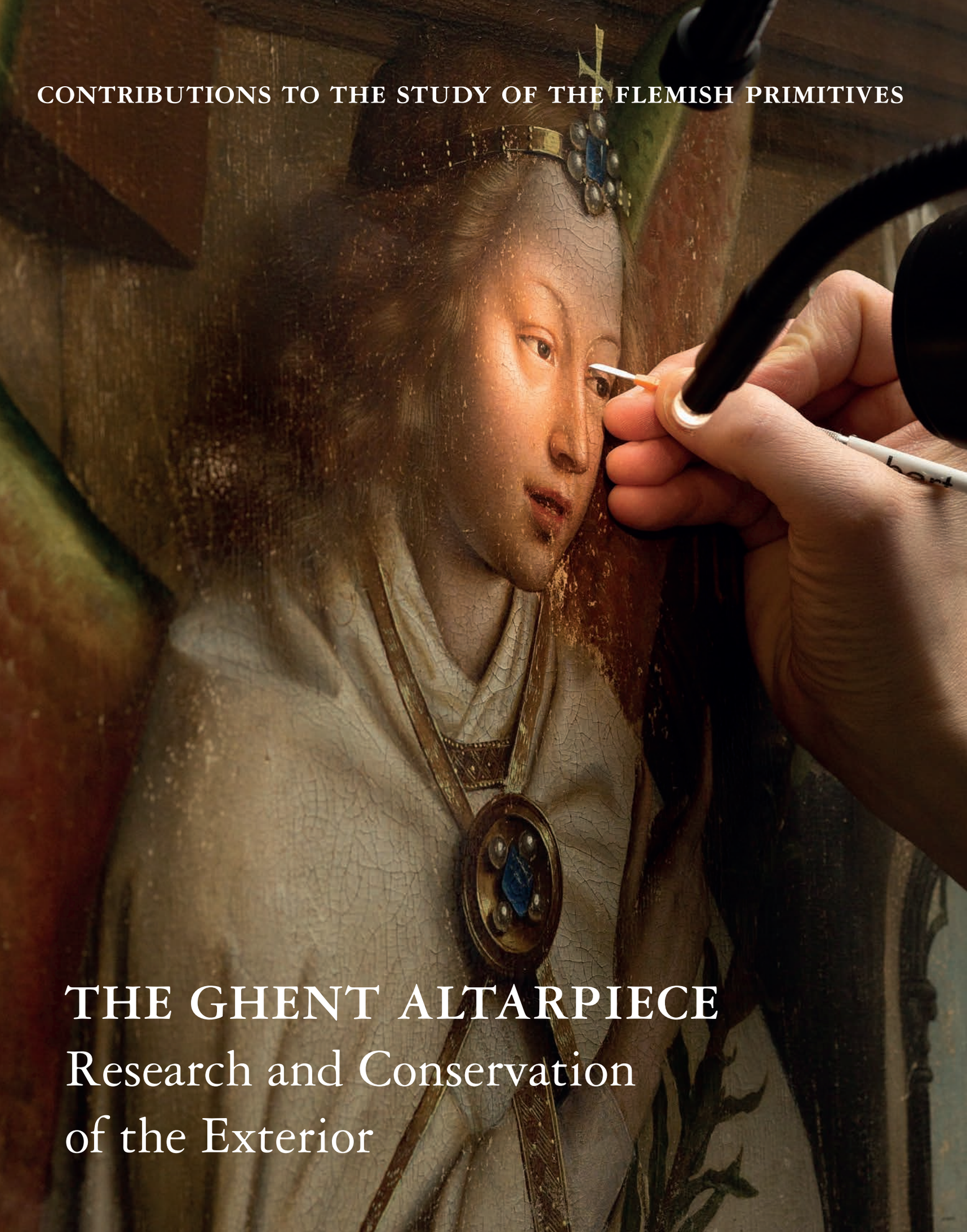
CONTRIBUTIONS TO THE STUDY OF THE FLEMISH PRIMITIVES



THE GHENT ALTARPIECE
Research and Conservation of the Exterior

The Ghent Altarpiece

Research and Conservation of the Exterior

Contributions to the Study of the Flemish Primitives

14

Centre for the Study of the Flemish Primitives
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The Ghent Altarpiece

Research and Conservation of the Exterior

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Foreword

It was almost sixty years ago, in 1962–63, during a sixth-form school trip that included St Bavo's Cathedral, that I first set eyes on the *Ghent Altarpiece*, then still in the Vijd Chapel, and bought an A5-sized reproduction as a souvenir. Thus began a love affair that endures to this day. Ten years later, while a seminary student in Ghent, I received from my classmates a wonderful birthday present, a copy of Elisabeth Dhanens's magisterial monograph on the polyptych, *Het retabel van het Lam Gods in de Sint-Baafskathedraal te Gent*. In 1986 I had a ringside view as the altarpiece was moved from the Vijd Chapel to the Villa Chapel. Eventually, in 1996, I became rector of St Bavo's Cathedral and in the process acquired some of the responsibility for what is said to be the world's most illustrious work of art. During a colloquium on panel paintings in 2009 I had occasion to talk to Ron Spronk and in the course of our conversation I mentioned how concerned I was about the condition of the altarpiece in the Villa Chapel. And so the ball got rolling…

That inspiring meeting with Ron Spronk led me to the enthusiastic Anne van Grevenstein, and ultimately to the preliminary scientific study begun in 2011 by the Royal Institute for Cultural Heritage (KIK-IRPA) in Brussels. The restoration report followed as a matter of course. Funds were provided by the Flemish Government with supplemental financing from the Baillet Latour Fund, and the project was supported by additional scientific research by the universities of Ghent and Antwerp, and the Gieskens-Strijbis Fund. Nothing could go wrong and everything would be finished within three and a half years. That was the plan. On 12 September 2012 the exterior wing panels left the cathedral for the conservation workshop in the Museum of Fine Arts in Ghent.

The realization that there were hitherto unobserved overpaints on the altarpiece grew from tentative suspicion into absolute certainty. The names of two mid-sixteenth-century artists, Jan van Scorel and Lancelot Blondeel, emerged. Just as quickly came the findings of the experts, the sighs of the restorers, the parliamentary questions and the recommendations of the *Topstukkenraad* (Flemish Masterpieces Committee), the necessary financial means from the Flemish Government. And there were the long and difficult meetings. But we persevered. And finally arrived at a literal revelation, a stunning beauty that leaves one speechless, lost for words with which to describe the astonishing result.

The extraordinary process of the rediscovery of the real *Ghent Altarpiece* is clearly set out in the pages of this book. It is a remarkably story. It is, moreover, only the story of the exterior panels. What the interior panels have to reveal can only follow in

the same direction and, if possible, make us look with even more wonder and admiration at what we have never seen before.

Beholding all the subtle beauty that is now displayed evokes enormous respect and praise for the restoration work and the scientific and academic framework in which it took place. And leaves us in even more awe of the *Adoration of the Lamb.*

Ludo Collin
Rector of St Bavo Cathedral

Preface

The history of the *Ghent Altarpiece* reads like an exciting adventure characterized by different restoration campaigns. The foundation of the Royal Institute for Cultural Heritage (KIK-IRPA) is inevitably linked to the twentieth-century restoration history of this extraordinary world masterpiece of Christian art. In 1951, together with an international advisory committee, our first director Paul Coremans coordinated the restoration of the *Ghent Altarpiece*, after its return from the salt mines of Altaussee at the end of the Second World War. The scientific approach to restoration was groundbreaking at the time, albeit still far removed from the level of sophistication it has reached today.

As its turbulent history of almost 600 years had left important marks on the altarpiece, it was no surprise that in 2012, when the conservation/restoration project started, a thorough treatment was deemed necessary, even though this may not have been immediately apparent to the visitor.

It was to everyone's surprise, including experts and restorers, that beneath the thick layers of varnish, overpaint covered more than seventy per cent of the original painted surface of the exterior panels. Overpaints were carefully and consciously removed, almost on a microscopic level, gradually revealing the real beauty of the work of the Van Eyck brothers. The whole transformation process was performed in a transparent way, in both public and scientific domains. From the very beginning visitors had the unique opportunity to witness first-hand the activities in the restoration studio at the Ghent Museum of Fine Arts. Entirely in the spirit of Coremans, the restoration project was carried out in an interdisciplinary way with the support of KIK-IRPA's laboratories and documentation department as well as the universities of Ghent and Antwerp.

Since the end of 2016 the exterior panels can again be admired in St Bavo's Cathedral in Ghent. The bell-ringing at noon invites visitors to participate in the ceremony of the closing of the polyptych and fully to enjoy the restored exterior.

The Royal Institute for Cultural Heritage wishes to express its warmest thanks to the Church Council for their confidence and to all partners that have contributed to this complex and intensive research and conservation project for their generous scientific and financial support: the Flemish Government, Ghent University, the University of Antwerp, the Ghent Museum of Fine Arts, the Baillet Latour Fund, the Gieskes-Strijbis Fund, the Getty Foundation and the Federal Science Policy. We wish to extend our gratitude to IPERION CH, without whose support this publication would not have been possible. It is particularly gratifying that this study can be published

as volume fourteen of our 'Contributions to the Study of the Flemish Primitives', a series started in the early 1950s, also in connection with the restoration of the *Ghent Altarpiece* and the publication of the pioneering study *L'Agneau Mystique au Laboratoire* (1953).

Today, almost seventy years later, we do believe that the profound conservation/restoration project of the *Ghent Altarpiece* contributes to a better understanding of our past and our identity in a broad societal, political and religious context, while opening new horizons in the fields of the technical examination of works of art, the social sciences and, indeed, art history.

Hilde De Clercq, Acting Director General, KIK-IRPA, Brussels
Christina Ceulemans, Honorary Director General, KIK-IRPA, Brussels

Introduction

Maximilaan Martens, Christina Ceulemans,
Ron Spronk and Anne van Grevenstein-Kruse

The Ghent Altarpiece: 1986–2010

In 1986, the *Ghent Altarpiece*, the world-famous masterpiece by Hubert and Jan van Eyck, was moved from its original location, the Vijd Chapel in the Cathedral of St Bavo, to a metal-and-glass cage in the baptismal chapel or Villa Chapel, north of the main western entrance to the same church. This relocation was first and foremost the result of safety concerns at the time and was further judged necessary in response to the increasing numbers of tourists visiting Ghent and its most precious artistic treasure. Due to its restricted size, the Vijd Chapel was no longer considered appropriate to safely exhibit and protect the altarpiece. The historical value of a major work of art still kept in its original location needed to be sacrificed with an eye to preventive conservation.

With the Villa Chapel's concrete reinforcement, bulletproof glass and the barrier formed by the cage between the polyptych and the visitors, it was deemed that every imaginable danger had been anticipated. The chapel had been transformed invisibly into a shellproof bunker with 30 mm-thick glass walls meant to protect the panels from theft and damage by vandalism.

However, the new presentation in the reinforced cage had serious drawbacks that were either not foreseen by the commission responsible for the reinstallation or simply regarded as unavoidable and taken for granted. The most noticeable disadvantage was that the polyptych was henceforth fixed and could not be shown alternatingly in its closed and opened positions. Visitors had to walk around the cage to see the reverses of the wings of the opened altarpiece, whose visibility left to be desired due to inadequate illumination and the shallowness of the viewing space. Moreover, the unity between the scenes on the exterior wings – not only the *Annunciation*, but also the row of prophets and sybils, as well as the donors kneeling before the two grisaille saints John – was lost. And finally, the visual impact of opening the altarpiece to reveal its essential iconological meaning, the salvation of mankind, could no longer be experienced by the viewer.

The housing of the altarpiece in the cage also introduced new conservation problems. The main problem resided in the lack of follow-up of the initial installation, resulting in the fluctuations in environmental conditions. The lighting system with large intense spotlights replacing the original conservation-grade lamps resulted in uneven illumination of the altarpiece. The heat emitted by the lamps and the fluctuations in temperature caused by their being switched on and off daily were

detrimental to the varnish and paint layers, especially of the panels of the lower register.

The electrical system itself implied a serious risk: in case of a fire due to a short circuit, the altarpiece would have been trapped in its cage. It would have taken at least six hours for trained art handlers to dismantle the altarpiece and clear the cage panel by panel from the cage through a backdoor. Another problem was the protective glass of the cage. At the time of installation, unbreakable glass of the required size and thickness existed only in a slightly greenish tint, which disturbed the chromatic balance of the painting.

The most important problem of the cage, however, was its lack of adequate environmental control. Fluctuations in relative humidity and temperature were often unacceptable for panel paintings. Indeed, after a routine periodic inspection in April 2008, Monumentenwacht Oost-Vlaanderen – the East Flanders Monument Inspection – reported serious concerns about the state of conservation of the *Ghent Altarpiece* and judged the climate conditions within the cage highly inadequate.[1] It was concluded that these conditions required urgent intervention so as to avoid serious conservation problems.

The Churchwardens of the Cathedral called upon KIK–IRPA, the federal Royal Institute for Cultural Heritage, to perform a follow-up inspection. The KIK-IRPA houses a considerable amount of documentation on the *Ghent Altarpiece*: its founder, the chemist and 'Monument Man' Paul Coremans, organized a pioneering photographic campaign of the paintings after their return from the salt mines of Altaussee in 1945. He also oversaw the interdisciplinary conservation and research project of the altarpiece which took place in 1950–51 and was followed by regular inspections of the condition of the panels until 1986. This dossier served as a basis for understanding the evolution of their state of conservation.

The Churchwardens simultaneously sought advice from experts in technical examination and conservation and from representatives of Flemish institutions active in the documentation and preservation of cultural heritage. In this way, an ad hoc advisory board was created to obtain critical advice on a broad range of issues in regard to art conservation and cultural heritage management. Later, in 2009, these meetings would be formalized in a standing *Adviescomité* (Advisory Committee).

KIK–IRPA disclosed the results of its follow-up inspection in a meeting on 23 May 2008, confirming the concerns from Monumentenwacht Oost-Vlaanderen.[2] The climate conditions in the metal-and-glass box were indeed considered inadequate for panel paintings, which are very sensitive to changes in relative humidity. Areas of tenting and lifting paint were observed, particularly in the modern copy of the *Just Judges*. The report concluded that a broader, more thorough examination of the individual panels of the altarpiece was needed, for which purpose the polyptych had to be disassembled. It was deemed particularly important for the wooden supports of the individual panels to be inspected.[3]

An examination of the individual, disassembled panels would allow for urgent conservation treatments, such as the securing of lifting paint and the freeing of locked cradle members. The main goal of this examination was to determine if this initial treatment was sufficient or whether a full restoration of the polyptych had become necessary. At that time, it was also recognized that the dismantling of the altarpiece

provided a unique opportunity for a thorough campaign of photographic and technical documentation, which had not been performed since 1986. The Cathedral invited KIK–IRPA to submit a budget for an examination and documentation project, in the awareness that provincial or regional administrations did not have programmes in place for such preventative, investigative treatments.

Preliminary research and urgent conservation

The preliminary research and urgent conservation treatment was supported by the *Panel Paintings Initiative* (PPI), a grant programme of the Getty Foundation in Los Angeles, for a project that proposed to combine three key activities: the examination of the altarpiece's structural condition, the necessary urgent conservation treatment, and a broad campaign of technical examination and documentation. This project, entitled *Lasting Support: an interdisciplinary research project to assess the structural condition of the Ghent Altarpiece*, ran from April 2010 through June 2011 and was directed by Prof. Anne van Grevenstein (University Amsterdam) and Prof. Ron Spronk (Queen's University, Kingston, Ontario, Canada).[4]

The urgent conservation itself took place in the Villa Chapel in St Bavo's Cathedral, where the public could follow the work from behind a glass enclosure. The dismantling of the altarpiece was coordinated by Jean-Albert Glatigny and performed by the art handler Mobull, aided by a team of junior panel conservators from the Getty PPI project. A team from KIK–IRPA and the Royal Museums of Fine Arts in Brussels examined the paint surface of each panel. Gathering and sharing information, removing surface dirt, and consolidating paint layers were the main objectives of this first period of investigation into the complex layer structure of the *Ghent Altarpiece*. In a second phase, the team removed small areas of varnish to evaluate their relative solubility with Gwendoline Fife from the Stichting Restauratie Atelier Limburg (SRAL) and took samples on cotton swabs for analysis by Steven Saverwijns (KIK-IRPA) and Henk van Keulen from the Instituut Collectie Nederland (ICN, now part of RCE (Rijksdienst voor het Cultureel Erfgoed), the Cultural Heritage Agency of the Netherlands in Amsterdam.

The dismantling of the altarpiece provided a unique opportunity for a comprehensive campaign of technical examination and documentation. All individual panels were documented with high-resolution macrophotography in visible and infrared light, and with infrared reflectography. These images, together with the X-radiographs that KIK–IRPA had made in 1986, would later result, under the direction of Ron Spronk, in the website *Closer to Van Eyck: Rediscovering the Ghent Altarpiece*.[5] This site enables fast, easy access to these multitudinous and very large files, and allows for unusually precise study of these documents in correlation to each other. *Closer to Van Eyck* not only quickly developed into an indispensable tool for the restoration team but is being accessed continuously by scholars and the general public worldwide.

As the conservation progresses, the website is being augmented with images made both during and after treatment as well as with relevant reports and other documents. Meanwhile, other works by Jan van Eyck and his workshop are being examined and documented with the same scientific imaging techniques. This new documentation

is being added to *Closer to Van Eyck*, converting the website into a crucial reference for comparative research on the complete oeuvre of Jan van Eyck and his workshop. The project, called VERONA (acronym for 'Van Eyck Research in OpeN Access') is directed by Bart Fransen, head of the Centre for the Study of the Flemish Primitives at KIK-IRPA and supported by the Belgian Federal Science Policy, BELSPO, and Bruges Museums.

In conjunction with *Lasting Support*, the climate conditions in the glass cage of the Villa Chapel were studied in a collaborative effort of the Getty Conservation Institute (represented by the late Shin Maekawa), the Klimaatnetwerk Vlaanderen/Nederland (Climate Network of Flanders and the Netherlands), KIK–IRPA, and Ghent University (research group of Prof. Arnold Janssen).[6]

During *Lasting Support,* it has become increasingly clear that the great complexity of the various paint layers, varnishes, and interventions from the past made a thorough diagnosis of the original build-up impossible. The microscopic examination and the data provided by technical imaging and paint-sample analysis did not offer sufficient information to treat larger areas of the painted surface, with all the differences in interpretation that the varying historical backgrounds of the panels would imply.

In the final report of *Lasting Support*, based on the large documentation gathered during this preliminary project, the conclusion was reached that a more ambitious conservation project of the entire *Ghent Altarpiece* had become indispensable.[7] After approval from all stakeholders and authorities involved, the conclusions of *Lasting Support* were used to formulate a tender for a new comprehensive conservation/restoration campaign.

Financing the Conservation/Restoration Project and related research

The *Ghent Altarpiece* is listed officially as an essential major work of Flemish cultural heritage, and as such it is protected by the *Topstukkendecreet* (Flemish Decree on essential movable works of cultural heritage) and listed as a 'Flemish Monument immovable by destination', associated with the Cathedral. Therefore, the conservation/restoration project is subsidized up to 80% by the Flemish Government (both the departments of Cultural Heritage and Immovable Heritage). The commissioner, who is responsible for the remaining 20% receives a subvention from the Baillet Latour Fund (Leuven). These subventions cover the personnel costs, infrastructure of the studio, and disposables, but no scientific research nor additional operating expenditure (scientific dissemination and publication), equipment or sub-contracting.

The Research Fund of Ghent University (UGent) granted a *Geconcerteerde Onderzoeksactie* (GOA, Concerted Research Action) for the project, entitled 'Archaeometrical Research of The Ghent Altarpiece' (2012–18, chairs: Professors Peter Vandenabeele, Archaeometry; Luc Moens, Analytical Chemistry; Maximiliaan Martens, Art History). The project was geared towards both applied research in support of the conservation and fundamental research triggered by issues raised by the conservation project (such as the development of Raman spectroscopic scanning or the application of novel trace element detection techniques). This grant covered personnel costs for 5 PhD's, the acquisition of a Hirox digital microscope with 3D imaging and 2D/3D

measurement capabilities and a dedicated stand for microscopic research on the panels, designed by em. Prof. Jaap Boon (UAmsterdam). Four PhD-students worked on Raman spectrometric and XR-fluorescence-applications, while besides her duties as a paintings conservator and research coordinator within the conservation team, Hélène Dubois prepared a PhD dissertation on the material history of the *Ghent Altarpiece*, a section of which is included in the present publication. In conjunction with this project, the research groups of Prof. Aleksandra Pižurica (UGent), in collaboration with Prof. Ann Dooms (Vrije Universiteit Brussel) and Prof. Ingrid Daubechies (Duke University), and other partners in the project, developed image processing tools with deep learning methods for automated detection of cracks and damage and inpainting.[8]

Meanwhile, paint samples taken during the previous restoration campaign under the direction of Prof. Paul Coremans in 1950–51, were also re-examined with modern analytical techniques at KIK–IRPA through a research project financed by BELSPO (Action 1, MO/39/011), and directed by Dr Jana Sanyova (2012–16).

The Research group of Professors Koen Janssens and Geert Van der Snickt (AXES, University of Antwerp) made MA-XRF scans of the panels, which allow imaging the spatial distribution of chemical elements. This analytical method, coupled with the analysis of new paint samples at KIK-IRPA proved to be crucial to characterize the overpaint and the state of preservation of the underlying original paint layers. This enlightening work aimed at a progressive insight in the condition of the panels was supported by the Gieskes-Strijbis Fund (Wassenaar, the Netherlands; 2014–18).

Setting up the Conservation/Restoration Project

In order not to deprive the larger public of one of the most admired cultural treasures in Flanders for many years to come, it was decided in agreement with the commissioner, the Churchwardens of St Bavo's, that the treatment would take place at a publicly accessible space in Ghent. Eventually an agreement was reached with the Museum of Fine Arts (MSK Ghent), where one of the larger exhibition spaces was transformed into a conservation studio. Through a large window the public would be able to follow the progress of the works.

Informing and involving the general public as a recognized stakeholder has been an important mission from the very beginning of the project. Other large conservation projects have stirred considerable commotion and even controversy when the final results were shown to the public, often after many years. The project leaders were well aware that information on several aspects of the conservation and restoration treatment helped the understanding and recognition of care for cultural heritage. Therefore, the on-site coordinator of the project, conservator Bart Devolder, was charged with meeting the public monthly to provide information and answer their questions.

Another important endeavour to inform the public on a permanent basis was the initiative of the Department of Culture of the Province of Eastern Flanders to mount an exhibition on the material history of the *Ghent Altarpiece* in its exhibition space Caermersklooster, the former cloister of the Carmelites in Ghent from 2012 to early 2018. This exhibition and changing sections focusing on specific themes: 'From Tree Trunk to Altarpiece', 'A Miraculous Garden: Flora on the Ghent Altarpiece', 'Mystic

Music', and finally 'restoration/ REVELATION: the exterior wings of the Ghent Altarpiece', were accompanied with trilingual booklets written in an accessible style.[9]

An imperative of the tender was that the project would be split up in three phases of eighteen months each: (1) the exterior wings (the focus of the present volume); (2) the upper register of the opened altarpiece; and (3) the lower register of the opened position. This way, during the whole process, estimated to last five years, one third of the altarpiece would be treated in front of the public, while two thirds would remain accessible in the Villa Chapel of the Cathedral. It was later decided to switch phases 2 and 3 for practical reasons.

The tender further stipulated the removal of the varnish layers applied after the previous restoration of 1950–51, consolidation of flaking paint, minimal retouching, and revarnishing, as well as a structural conservation treatment of the supports and a restricted treatment of the original frames. Charged with the project, KIK-IRPA constituted a team of eight painting conservators for the first phase: Livia Depuydt-Elbaum (head of the team); Bart Devolder (on-site coordinator, spokesperson); Hélène Dubois (research and international commission coordinator), Nathalie Laquière, Claire Mehagnoul, Marie Postec, Françoise Rosier, Griet Steyaert); panel specialist Jean-Albert Glatiny; and two conservators responsible for the treatment of the polychromy of the frames, Anne-Sophie Augustyniak and Laure Mortiaux. As the first phase consisted of the treatment of the eight panels of the exterior wings, each painting conservator was assigned one particular panel. Most members of this team collaborated as authors on essays in the present volume. As the reader will notice, the observations and ideas that the conservators continuously exchanged among each other and with other team members, based on the personal experience with 'their panel', was instrumental in the progressive understanding of the object and the decision-making process of the treatment, or at least in formulating well-argued proposals to the different committees.

Management structure

A project of this scope needs a management structure that incorporates the necessary checks and balances. Prof. Anne van Grevenstein, who advised the churchwardens on the conservation during phase 1, devised a structure of supporting, advising and controlling commissions. This structure consists of the following committees:

- Steering Committee (*Stuurgroep*): acts as the board that follows the daily progress, guarantees smooth collaboration among all stakeholders, decides on the logistics and takes initiatives for obtaining additional funding. It is chaired by Bressers Architects, the architectural firm responsible for the restoration of the Cathedral of St Bavo, of which the conservation/restoration of the *Ghent Altarpiece* is part. Its members are the main stakeholders.[10]
- Advisory Committee (*Adviescomité*): the assembly of all stakeholders, also chaired by Bressers Architects. It acts on advice from the Steering Committee, the International Advisory Commission and third parties.

– Site Monitoring Committee (*Opvolgingscommissie*): gathers the representatives of the funding authorities officially mandated to follow up on the works according to the tender.
– International Advisory Commission: assembles a large number of Van Eyck and early Netherlandish painting experts (conservators, museum curators, academics, researchers in conservation science). It has an advisory role in the decision-making process of each major step in the treatment based on concrete proposals formulated by the conservation team.

Besides these commissions, some working groups were formed that concentrate on specific issues: art history, communication, education, relocation, scientific research, technical imaging and web application. They consist mainly of members of the commissions listed above.

State of research after Phase 1

The present volume describes the work performed during phase 1 of the conservation/restoration treatment of the exterior panels and their original frames, as well as aspects of scientific and scholarly research. During removal of the youngest (post 1951) varnish layers and – subsequently, for the most part – of the older layers of varnish that had not been removed during the 1950–51 treatment, large areas of later overpaint, estimated to cover about 70% of the entire surface of the exterior wings, were discovered. Although nineteenth-century interventions were positively expected, no one could have anticipated that the altarpiece had already been thoroughly reworked in the sixteenth and all subsequent centuries. While it is true that written documents of old campaigns had been known for a long time, including the reference to Jan van Scorel and Lancelot Blondeel, who were called to Ghent to 'clean' Van Eyck's work in 1550, now, for the first time, material evidence has been found that can be cross-linked with those often nebulous archival and literary texts. That most of the areas of overpaint concealed considerably well-preserved original layers was a spectacular surprise that attracted international media attention.

Notwithstanding numerous intrusions into the material integrity of the original frames throughout the past centuries, the rediscovery of the original stone imitation was an amazing revelation too. This polychromy on silver leaf was preserved well enough to justify its restoration.

It goes without saying that with these findings much new knowledge has been accumulated: established views on the interpretation of the stratigraphic build-up of the *Ghent Altarpiece* have to be revised considerably, while new insight is gained into the original Eyckian technique and a much more nuanced view can be established on the altarpiece's material history. All this is treated in a detailed fashion in the following chapters.

These discoveries were world news, but they delayed the works considerably. As mentioned earlier, each phase was initially estimated to last eighteen months. However, phase 1 alone took four years to complete. This implied the need for drastically revising and renegotiating the budget.

On behalf of the whole team we would like to express our deepest gratitude to the International Advisory Commission for their immense support and for taking clear and courageous stands in the decision-making towards a thorough conservation and restoration treatment. We also thank the other commissions for endorsing time and again their well-argued professional advice. Our great appreciation goes out to the commissioner, the Churchwardens of St Bavo's Cathedral for taking the final decisions to allow revealing Van Eyck's splendour, and in doing so, often setting aside pressing short-term concerns for long-term durable results. Last, but not in the least, we are grateful to the financing institutions that made it all happen. We all are looking forward to the next steps in this adventure, or to quote Noah Charney in *The Guardian*: 'The fact that such a wealth of information has been revealed by the restoration of just one-third of the altarpiece is making many wonder what might be further revealed.'[11]

Fig. 1. Meeting of the International Expert Committee on 28 May 2018 in Ghent

Notes

1 Veerle Meul, Hilde De Smet and Anne-Cathérine Olbrechts. 'Inspectierapport 40393/2008/I', Ghent: Saint Bavo Cathedral, 2008. Unpublished report, Monumentenwacht Oost-Vlaanderen. The date of the inspection was 3 April 2008.

2 Livia Depuydt and Hélène Dubois, 'Verslag van de conditie controle van Het Lam Gods, Gent, Sint Baafskathedraal, 3 april 2008', KIK-IRPA, Brussels, May 2008 (File 2008.09837).

3 The eight panels that formed the two wing sections were originally all painted on both front and back, but six of these panels and their frames had been sawn through their thickness in Berlin in the late nineteenth century, and cradles were applied to the reverses to strengthen the resulting very thin supports. These (now twelve) panels were housed back to back, their cradles out of sight, within the metal auxiliary frame that was created during the 1950–51 restoration.

4 Project reports can be downloaded at http://closertovaneyck.kikirpa.be/#home/sub=documents.

5 The website application was the result of a collaboration of several institutions and individuals; see http://closertovaneyck.kikirpa.be/ - home/sub=wcredits.

6 De Backer, Janssens, Steeman et al. 2018, pp. 168–172.

7 Anne van Grevenstein and Ron Spronk, 'Lasting Support. An interdisciplinary research project to assess the structural condition of the Ghent Altarpiece. Final project report', October 9, 2011, p. 11, based on Anne van Grevenstein et al., 'Conservatie en materieel onderzoek van het Retabel van het Lam Gods, Gent, Sint-Baafskathedraal. Deel I: Verslag van het onderzoek naar de materiële conditie en van de urgente conservatiebehandeling (april tot november 2010)', 2011.

8 Pizurica et al. 2015.

9 Born, Martens 2013; Van Grevenstein-Kruse 2015; Van Crombrugge, Van den Bremt 2016; Royal Institute for Cultural Heritage 2016.

10 For names of this and other commissions and working groups, see http://closertovaneyck.kikirpa.be/ghentaltarpiece/#home/sub=credits.

11 *The Guardian,* 12 October 2016.

1
Transformations in the Sixteenth and Seventeenth Centuries

Hélène Dubois

Introduction

As is the case with most medieval altarpieces in the Low Countries, the original appearance of the Van Eyck brothers' *Adoration of the Mystic Lamb*, and, therefore, the visual impression it likely conveys to most, have been altered over the centuries. Disconnected from its initial liturgical function, the polyptych is now exhibited as a museum masterpiece in an artificially illuminated and secured glass casing. Each year, thousands of visitors from around the world pour into St Bavo's Cathedral to experience – in relatively close proximity – this complex creation by extraordinary artists. To a certain extent, its eventful history also contributes to its worldwide reputation as an icon of Western art.

In the past, the history of the altarpiece has been compiled from disparate archival documents and other texts. The accumulation of references to material changes, whether direct (restorations, transportation) or indirect (repairs/alterations/additions to the chapel and the foundation of a new altar), formed the basis for the reconstruction of the evolution of the altarpiece's original form to its present appearance. However, the actual impact of many of the recorded events had been rather subjectively interpreted until that evidence could be firmly connected to the altarpiece and placed within a well-documented context. This article reviews the most significant documented events that can be linked to important material alterations of this masterpiece up to the mid-seventeenth century. It focuses on the circumstances of the early restoration campaigns that transformed the reverse of the wings and of the frames in a manner which for centuries has remained unsuspected.

Fig. 1.1. (facing page) Abrasions and scratches in the *Virgin Annunciate* found under varnishes and retouchings

This essay is necessarily limited to the study of the outer wing panels, which were restored, studied and documented between October 2012 and September 2016. For the time being, pending the next phase of the restoration, the material history of the inner panels can only be touched upon in order to illustrate the context associated with the outer panels.

Archival sources and technical observations

Several archives preserve documents pertaining to the material history of the *Ghent Altarpiece*. Inventories of these documents as well as some transcripts have been published by several historians. The most significant contributions in this field are those by Victor Van der Haeghen, Gabriel Van den Gheyn, Jozef Duverger, Antoine De Schryver, Roger Marijnissen and Elisabeth Dhanens, all of whom provided particularly detailed information on the local archival sources and their historical context.[1] Church accounts and records, contracts, bills, correspondence, descriptions, inventories, restoration reports and photographs taken during the second half of the nineteenth century[2] partially reveal the circumstances leading to, and the nature of, the events that have altered the condition of the altarpiece.

In 1951, during the restoration carried out under the supervision of Paul Coremans in the Laboratoire central des Musées de Belgique (the precursor of the KIK-IRPA), a number of conclusions were drafted on the polyptych's material history by linking the historical and material evidence at hand.[3] Major conservation treatments often provide the ideal circumstances for clarifying the material history of the object: in addition to a long-term visual exposure to the object at close quarters and under various non-standard lighting conditions and angles, conservators – especially in recent times – have a multitude of modern scientific instruments at their disposal that can be invaluable in reconstructing the material history of the object. The interpretation of such observations may be significantly aided by modern technical examination and art-historical research leading to a more perceptive reconstruction of the history of the object.

During the current conservation project, a considerable amount of new information has been revealed through the application of this diversified approach, particularly regarding earlier restorations carried out in the sixteenth, nineteenth and twentieth centuries:[4] The altarpiece itself is a crucial source on why, how and when these restorations were carried out, and how they could reflect the appreciation of the masterpiece as an image, a work of art, and an object of devotion.

Liturgical usage, degradations, repairs and restorations: 1435–1618

Effects of the liturgical function of the altarpiece on its condition

On 13 May 1435, Joos Vijd and his wife, Elisabeth Borluut, secured through a foundation the financial means and the obligation to celebrate a daily mass before the altar of their newly built chapel. This radiating chapel is prominently situated at the beginning of the apse on the south side of the church, which was dedicated at the time to St John the Baptist. The extraordinary monumental retable that Vijd ordered from the Van Eyck brothers formed an integral part of the altar where masses would be said in perpetuity in the couple's memory.[5] The church registers confirm the agreed delegation of two priests to share with the sexton the duties of providing light, bread and wine for the services, and of ensuring the care of the ornaments.[6] Masses were

maintained, with some interruptions, during the religious troubles of the second half of the sixteenth century; their frequency then fluctuated until the altarpiece lost its liturgical function when perpetual masses were abolished under the French Revolutionary regime at the end of the eighteenth century and when the central panels were removed in 1794.[7]

The status of the Church of St John the Baptist, still a parish church at the time of the foundation, also increased considerably in the course of the sixteenth century, and political circumstances as well as private connections – as we will see – had an important influence on the material history of the altarpiece.[8] From 1540, St John's Church hosted the secular chapter of the Abbey of St Bavo which had been destroyed by order of Charles V and replaced by a military fortress in order to suppress civic protests.[9] The parish clerics and the chapter canons, headed by their provost, Lucas Munich (1492–1563), shared tasks within what had become the collegiate Church of St Bavo in a complex and fluctuating organization that was clarified in 1542.[10] The care for the foundation and for the altarpiece was taken over by the chapter. The Gothic structure, progressively replacing the smaller Romanesque building, was completed in 1559, when the church became the Cathedral of St Bavo of the newly erected diocese of Ghent. Munich, who maintained close contacts with the Habsburg authorities,[11] was succeeded by Viglius ab Aytta van Zwichem (1507–1577), a brilliant jurist and theologian who had headed the emperor's Secret Council since 1549 and played an important role in the restoration of the cathedral after the iconoclastic destructions of the *Beeldenstorm* in 1566.[12] The succeeding provosts and bishops had a varying input into the restorations of the altarpiece and of the Vijd Chapel. Bishop Antonius Triest (1577–1657), for example, a descendant of the Vijd family, increased the number of masses in the chapel and initiated its thorough renovation. This campaign comprised the installation in 1639 of a massive marble enclosure on which the identification of the donors figured prominently, thus reinstating the structural link between the foundation and the altarpiece.[13] The insertion of the altarpiece in 1663 in a portico altar with monumental twisted columns, presumably motivated by the chapter's wish to update the presentation to the late baroque standard prevalent in other chapels, necessitated important modifications of the polyptych's structure.[14]

As is generally the case, the original deed of foundation makes no reference to the maintenance of the altarpiece itself. Restorations would have been motivated by different factors, such as the repair of incidental damages, freshening-up the surface or more extensive presentation updates. Decisions and funding would have also come from several sources: capital from the foundation, donations (such as those collected during organized visits to view the altarpiece) and, possibly, sources external to the chapter.[15] Resolutions on restorations in 1588 (Raphael Coxcie), 1612 (Pieter or David Noveliers), or 1617–18 (Jan-Baptist de Bruyn), or on restrictions of access due to the declining condition of the structure in 1589, have been gathered from proceedings of the chapter meetings (*Acta capituli*) and from references to payments in the accounts of the church.[16] The arrangement, together with the costs incurred in order to facilitate the copy carried out by Michiel Coxcie for Philip II of Spain in 1557 and 1558, are well documented in correspondence and in the church accounts.[17] Unfortunately, there are considerable gaps in these archives, and some interventions given in more detail elsewhere, such as Jan van Scorel's and Lancelot Blondeel's cleaning in 1550,

could not be confirmed by primary written sources. Their work on the altarpiece is mentioned solely by the local historian Marcus van Vaernewijck in his chronicle of the Netherlands (*Den spieghel der Nederlandscher audtheyt*, 1568), and has consequently been dismissed by some as 'literary tradition'.[18] Conversely, early material damages, such as a candle burn on the frames and multiple degradations of the paint layers, had remained unsuspected until they were revealed during this restoration.[19]

The altarpiece was conceived to be maintained in a closed, and thus protected, arrangement, displaying the outer surfaces of the wings with the striking portraits of the donors. This can be clearly seen in the form of the mouldings of the frames that fit and firmly stabilize the altarpiece in its closed position.[20] The inner panels were revealed on feast days and possibly during daily masses (except perhaps during Lent).[21] The altarpiece was opened for organized visits until concerns about its deterioration led, from about 1589, to a restriction on the opening to the four High Feast Days (Easter, Pentecost, Christmas and All Saints).[22]

As in many polyptychs, the outer painted surfaces of the shutters were therefore potentially more prone to degradation. Bright sunlight could stream in on them from the right side, through the large clear south-facing windows of the Vijd Chapel; when the altarpiece was open, they would be situated near the stone columns and, on the right side, the outer wall. The more intense exposure of the wings on the right side is the likely cause of extended lifting of the ground- and paint layers along the wood grain, as well as the loss of multiple small paint flakes that were observed on the *Interior View*, on the *Portrait of Elisabeth Borluut* and, particularly, on *St John the Evangelist*. Rubbing of these fragile surfaces during careless cleaning would have aggravated paint loss. Damages by corrosive drips on the original surface of the upper register of the outside wings (discovered during the restoration underneath the overpaint layers, but also affecting their surface) could be related to bird and bat droppings.[23]

Visits to the altarpiece

From the very beginning the extraordinary reputation of the altarpiece attracted visitors from varied backgrounds.[24] The few early descriptions known to us refer to the inner composition, the *Adoration*, the large *Virgin Enthroned* and *St John the Baptist*, the *Angels*, or *Adam* and *Eve*. Sums resulting from donations relating to 'showing' the altarpiece (and thus revealing the inner panels) were recorded under separate headings in the annual church accounts (fig. 1.2). The receiver of these donations was given a portion of the collected sum in payment. The first recorded donations date back to 1529–30; by then it had already become a well-established tradition.[25] Income deriving from these private visits was reasonable, but it fluctuated: for example, it was greater in 1556–57, possibly in relation to Coxcie's copying activities, and in 1559–60, during the meeting of the Chapter of the Golden Fleece.[26] Income-generating private visits were interrupted during the religious troubles and the two iconoclastic outbreaks of 1566 and 1578. Donations via this route recovered slightly afterwards but disappeared again during the period of the Calvinist republic (1584–88).[27] It seems that despite its compromised condition after its reinstallation in the chapel in 1588, the altarpiece was

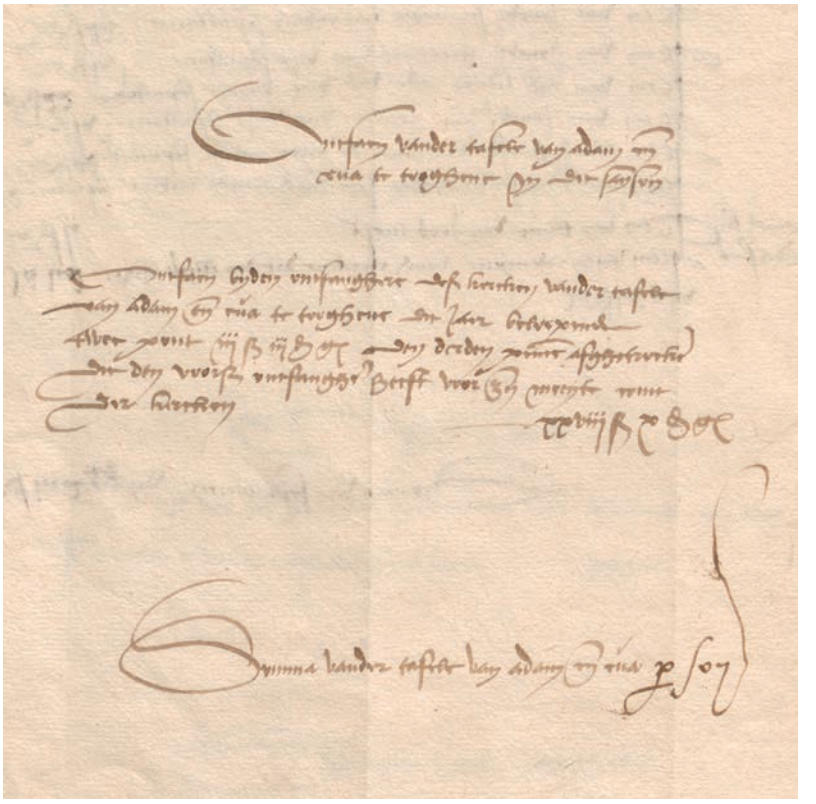


Fig. 1.2. Income for the visits to the 'tafele van adam ende eva', Rijksarchief Ghent, oude fabriek rekeningen, K60 (24.06.1549-23.06.1550), fol. 8v.

still accessible to visitors who could get hold of the key.[28] However, the church accounts explicitly record that no profit was derived from these visits from that time onwards.[29]

Since the 1560s erudite correspondence and literature express the admiration for the altarpiece as an irreplaceable monument, an 'excellent wonderful heavenly panel', revered, copied and emulated.[30] Karel van Mander describes in 1604 how on high feast days, when the altarpiece was exceptionally open, people would swarm in the chapel like bees or flies attracted by sweet figs. The crowd was so dense that people could hardly get close to it.[31] The regular income from the visitors, in addition to the annual income from the foundation, could have contributed to the financial support of restorations managed by the chapter.[32]

Material evidence of early restorations

The examination of the paintings during treatment have made it clear that, early on, the original paint layers had been severely abraded by cleaning, then varnished several times and retouched before they were extensively overpainted. Traces of scorching and scratching were found on several panels, and numerous small losses, microscopic cleavage of the paint layers, pitting and enlarged craquelure were recognized as the consequences of one or several damaging cleaning operations. Wide stripy scuffs

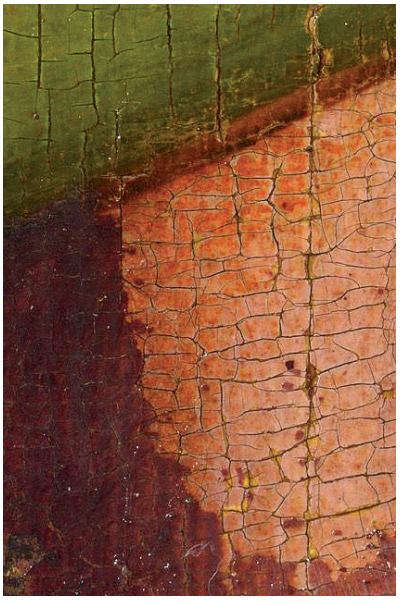
across the paintings and along the edges of the *Virgin Annunciate*, for example, could have been caused by wiping away corrosive cleaning agents with an abrasive tool (fig. 1.1).[33] Consolidation attempts carried out with strong glues, humidity and pressure, or the combination of several such treatments, could also have caused the local, microscopic cleaving of the paint layers observed in several panels.[34]

It is hard to imagine how incompetent and destructive work could have been allowed on such a precious and unique masterpiece, causing irreversible damage. Unfortunately, no historical sources so far indicate how these early 'restorations' were ordered and monitored. The only description known is of a disastrous cleaning that caused the destruction of a *'voet'*, (literally: a 'foot') – possibly some kind of predella – 'representing hell'. This intervention, mentioned by the local historian Marcus van Vaernewijck (1568) could also have seriously damaged the rest of the polyptych, although this is not claimed by the Ghent chronicler.[35]

The damages to the original paint surface were covered with varnish layers, applied in the course of different campaigns. The examination of microscopic paint samples during the latest conservation treatment has revealed that the thickness and the number of varnish layers varied considerably from one area to another, even on the same painting, ranging from two to five. This may be due to the fact that the altarpiece was varnished locally or, most likely, because varnishes applied to the whole surface were partially removed in the past, a frequent restoration practice ensuring a fast and effective heightening of the tonal contrast.[36] Large areas of the white draperies of the Archangel, the Virgin Annunciate and of the statue of the Evangelist on the lower register were harshly cleaned and most varnishes were removed locally before they were overpainted. This was not the case for the red and pink draperies of the donors, the Erythrean Sibyl and the Prophet Micah. Presumably because yellowed and hazy varnishes are less noticeable on those colours than on cool and light shades: varnish removal would not have been deemed necessary in these areas.[37] After a while, the early harsh cleanings, as well as the accumulation of degraded varnishes, would have made these pink and red zones appear rather dull and flat, particularly by veiling the dark and saturated tones of the shadows. This is probably why these areas were covered with thin pigmented glazes in the course of an early restoration (figs 1.3 and 1.4). This kind of glazing overpaint was also applied on flesh tones and on the Archangel's wings.[38]

In Joos Vijd's coat, other, possibly even older, restorations were also present: paint losses and the surrounding areas of the original surface of the tubular folds under his hands, the fur trimmings and the shadows on the sleeves had been broadly and clumsily retouched. Damages, mostly corresponding to the areas of thick and dark glazes in the folds on the right side of the robe had multiple causes: the thick, original paint in these areas, marked by a dense network of raised craquelure, was prone to flaking. This area was crudely retouched, in some places directly on the wood (fig. 1.5). Manipulation of the panels, and perhaps also the heat of altar candles, may have weakened their cohesion, and rendered them more sensitive than adjacent zones to harsh cleaning and abrasions.

A later and very extensive opaque overpainting covered and – unintendedly – protected earlier restorations. This situation is quite exceptional for, as opposed to polychrome sculptures, such extensive material evidence of old treatments is rarely



1.3

1.4

Fig. 1.3. Early, bright red glazing overpaint on Elizabeth Borluut's pale pink dress, uncovered during the removal of the opaque dark purple general overpaint

Fig. 1.4. Micro-photograph of the glazing overpaint and degraded varnishes covering craquelures in the original paint layer of Elizabeth Borluut's robe (X 140) (High-resolution microscope, UGent)

found on paintings in the Low Countries. This may very well be because restorations often involved either partial, or total removal of earlier varnishes and retouchings before starting over, particularly when paintings were taken out of their original religious context to be included in secular collections.[39] The function of the second overpaint was comparable to the first, namely to refresh the damaged original; however, it was more extensive and more opaque, consciously hiding abrasions, local damages and unsightly older repairs, renovating rather than enhancing the dulled original. In general the overpainting was skillfully applied on the draperies and respected the outer edges of the forms, but it modified the hues of the original colours, which were, however, already distorted by the presence of degraded, dirty varnishes and older restorations[40] (figs 1.6). Covering most of the draperies, this overpaint had been applied more parsimoniously on the worn flesh tones of the faces, and of the hands in the form of thin scumbles and thicker local highlights (fig. 1.7). Even the white of the eyes and such tiny details as the beads of *Joos Vijd*'s purse, or his shorn hair had been repainted (fig. 1.8). Most of the architecture and backgrounds were covered on all panels, except for the blue sky and the rooftops in the *City View*. However, the overpaint in these areas was gritty, thick and clumsily applied. Disrupted by abrasions and muddled by degraded varnishes, the original soft luminous tonal transitions in the background of the donor panels (with the suggestion of spider webs across a corner) had been covered in an opaque layer (fig. 1.9). Careful observation of the overlap of different zones by the conservators working on the paintings as well as the analysis of the stratigraphy and of the pigments carried out in the laboratories, indicated that, despite differences in the quality of the execution, all panels had been overpainted in the course of one overall campaign; probably together with large zones of the inner surfaces of the altarpiece. The craquelure pattern of these overpaints and

1.5a 1.5b

Fig. 1.5. Joos Vijd's robe before (a) and after (b) removal of the overall overpaint, revealing paint loss and older dark and clumsy retouchings in the shadows

the pigments used, such as azurite and kermes lake, indicate that this restoration was carried out in the early seventeenth century at the very latest. Kermes in particular has not been found in paintings dated later than 1550. The high grade of the azurite, used in large quantities in thick layers, and the choice of kermes rather than other red colourants would have implied high material costs.[41]

The intervention simplified details, muddled the fluid execution of the flesh tones and subdued Van Eyck's extraordinary modelling. Filling and levelling of superficial distortions previous to repainting ensured that the surface appeared perfect. Unlike the earlier, glazing overpainting, it covered the dark, saturated shadows and the

1.6a

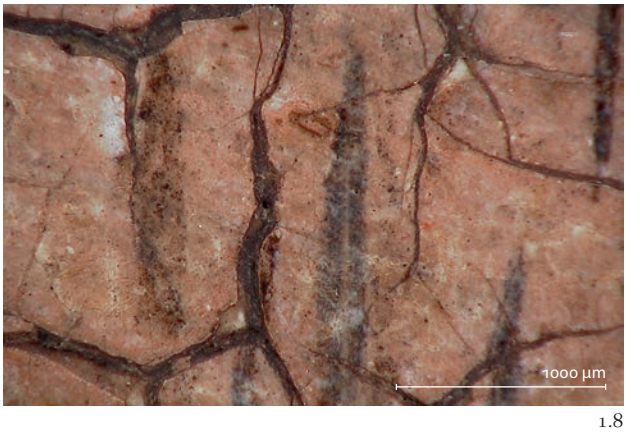
1.6b

Fig. 1.6. Lower part of Elisabeth Borluut's robe covered with the overall overpaint (2014) (a) and after overpaint removal and restoration (2016) (b)

typical fine highlights along the edge of the folds with a gradual, soft modelling aiming at a more naturalistic effect. The sharp, prismatic shape of Van Eyck's folds were softened and their structure was simplified (figs 1.6 and 1.10), while refined nuances in the backgrounds were completely covered. Despite these formal changes, it cannot be denied that this overpainting campaign was carried out by highly skilled, careful painters, who deceived art lovers and historians for centuries.

1.7

Fig. 1.7. Added highlight on the knuckles of Elisabeth Borluut's fingers



1.8

Fig. 1.8. Microphotograph of Joos Vijd's scalp showing original black hair (on the right), covered by a thin flesh-coloured scumble, and an added brown hair (on the left) (High-resolution microscope, UGent)

1.9

Fig. 1.9. The removal of opaque black overpaint in the portraits of the donors revealed the tonal gradations and nuanced textures of the wall

1.10a

1.10b

Fig. 1.10. Joos Vijd's hanging sleeve, before overpaint removal (a) and after cleaning and restoration (b), revealing the prismatic accentuation of the folds

Historically documented interventions on the altarpiece in the sixteenth and early seventeenth centuries

Lancelot Blondeel and Jan van Scorel, 1550?

When during the 1951 restoration campaign led by Paul Coremans extensive overpainting was discovered on large areas of the inner panels, it was suggested that several zones had been restored early on, possibly by Jan van Scorel and Lancelot Blondeel, in 1550.[42] This conclusion was based on Marcus van Vaernewijck's affirmation that these renowned artists cleaned the paintings[43] and that several features of the old overpainting are reproduced in the careful copy of the altarpiece that Michiel Coxcie painted for Philip II in 1557–58. Coremans also mistakenly concluded that the tower of the cathedral of Utrecht was actually added to the landscape of the *Adoration of the Lamb*. Since the tower was also reproduced by Coxcie, this observation reinforced the assumption that Van Scorel, canon of the Church of Our Lady in Utrecht, overpainted this area.[44] Due to the short period allotted for the conservation treatment, Coremans and his assistants could not conduct a thorough examination of the paintings on the reverse of the panels and did not see that they were also overpainted. Unfortunately, perhaps partly because of the complexity and the novelty of the material evidence presented then, the impact of this early restoration, if mentioned at all, has barely been taken into consideration in publications on the altarpiece. What is more, later technical studies that concentrated solely on the paint samples questioned the credibility of Coremans's and Thissen's analyses and contradicted their conclusions on the presence of overpaint.[45] However, their affirmation that the red mantle of the *Enthroned Deity* was extensively covered during an early restoration was confirmed by our new research, carried out in 2015. The technique of this overpainting is similar to that covering Joos Vijd's coat, and, furthermore, it is also reproduced by Coxcie, strongly indicating that both red draperies were overpainted at the same time.[46]

For the outer panels, the comparison between the original and Coxcie's copy is limited as he did not reproduce the lower register and the narrow panels representing Adam and Eve with the interior scenes on the outside are presumably lost. However, Coxcie clearly reproduced the *Annunciation* in its overpainted state.[47]

Van Vaernewijck's text is the only source on Van Scorel and Blondeel's intervention.[48] Since there is no first-hand written evidence known at this stage, as opposed, for example, to the payments and the correspondence concerning Coxcie's copy, the content and the historical context of this important passage needs to be evaluated carefully. Marcus van Vaernewijck was a prolific writer and rhetorician, who was very active in the civic organization of the city. He is best known for his vivid, first-hand descriptions of the religious troubles in Ghent and of the iconoclastic destructions of 1566.[49] His testimonials of contemporary events are considered quite reliable, but that is not the case for information gained through hearsay, and in September 1550 he was away, travelling to Rome.[50]

In his chronicle of Netherlandish antiquity (1568), Van Vaernewijck discusses the intervention in quite some detail: Blondeel and Van Scorel, both 'outstanding painters', came to Ghent and literally started to 'wash' the painting on 15 September 1550

(an unusually precise date in this book), 'so lovingly, that they cleansed this precious work in many places'. The church authorities recompensed them both with a gift; Van Scorel received a silver cup from which Van Vaernewijck drank when he visited the artist at his home in Utrecht.[51] Van Vaernewijck refers to the cleaning in a long, lyrical text on the *Ghent Altarpiece* and on the Van Eyck brothers. The text is in large part based on Lucas de Heere's *Ode*, which was hung in the Vijd Chapel in 1559, and published in Ghent in 1565.[52] De Heere praised the freshness of the colours, 'that have not faded in one hundred and fifty years, something that is rarely seen', but made no reference to a restoration.[53] Van Vaernewijck therefore must have used another source on the restoration campaign: presumably Van Scorel himself. His anecdotal, but vivid recounting of having drunk from the silver cup, a type of object commonly given in homage and gratitude, sustains the reliability of his claim.[54]

But what would have motivated these two well-established masters, Lancelot Blondeel from Bruges (1498–1561) and Jan van Scorel from Utrecht (1495–1562), to embark together onto this project away from their respective hometowns, precisely on 15 September 1550?

Blondeel is now largely underestimated as an artist, possibly because much of his work is lost.[55] He seems to have restored paintings throughout his career.[56] In 1559 he even cleaned paintings for the appreciative provost of St John's Church, Lucas Munich.[57] The reliance on Van Scorel for this project would have been motivated by other factors, such as his exceptional reputation both as an artist and antiquarian and his long-standing connections with powerful figures among the clergy and at the courts of Europe.[58] Canon since 1528, respectful both of the art and civilization of the past and of the church's authority, Van Scorel would have offered outstanding guarantees for an ambitious and difficult restoration.[59] The two artists had common professional groundings by the nature of some of their projects, such as the designs for the Joyous Entries of Philip II into their respective cities in 1549, cartography and engineering designs or commissions for Habsburg circles,[60] and they certainly would have known of each other before 1550.[61]

Since Coxcie copied the overpainted surface, including the modified folds of the archangel's drapery and of the prophet Micah's cape, as well as the Deity's monumental red robe, and as the materials and appearance of these areas are consistent with those of the rest of the second, overall overpainting, this entire campaign must have been carried out before 1557. Van Scorel and Blondeel, probably aided by assistants, would have been perfectly suited and connected to clean and restore the altarpiece.

However, at this stage, the attribution of the overpainting to these two artists cannot be supported by material arguments. Indeed, the pigments used, such as lead white, azurite, red lakes (kermes and madder), vermilion or hematite, were very common at the time and were used by many painters.[62] Both technically and stylistically, it is rather unreliable to compare overpaint with original creations: the colour and the texture of the superimposed layers are fundamentally influenced by the underlying original and the overpaint does not display any notable stylistic features. The adaptation of Van Eyck's draperies to a more naturalistic effect was not remarked upon for centuries, although Van Mander, interestingly, compared the draperies to Dürer's.[63] Furthermore, Van Scorel and Blondeel's paintings of the 1550s are now lost: Van Scorel's altarpieces in Delft and Amsterdam were destroyed during

the Iconoclastic Fury. The paintings closest in date – Van Scorel's altarpieces for Marchiennes (c. 1540) (fig. 1.11), which involved an important participation of the workshop,[64] and Blondeel's Bruges canvases, *St Luke Painting the Virgin* and *The Virgin an Child Surrounded by St Luke and St Eligius* (1545) (fig. 1.12) – do not offer much in common in terms of style and scale with the overall overpainting. It is worth noting, however, that Blondeel's St Luke wears the same green robe and the same fur-lined rose cape with slit sleeves as the prophet Micah on the *Ghent Altarpiece* (figs 1.13 and 1.14), indicating perhaps a certain familiarity with Van Eyck's masterpiece.

But what would have motivated such an extensive campaign? The poor condition and appearance of the altarpiece, caused by local damages, intensive use, shoddy restorations and varnishing campaigns would also have concerned refined onlookers. Prince Philip of Spain's 1549 visit to the Church of St John in the course of his Joyous Entry into Ghent would have been a likely trigger in initiating the restoration. During his first visit to the church, the prince climbed the high tower, and, the next day, took part in the ceremonies during which he was sworn in as Count of Flanders.[65] A fervent art lover and collector of old masters, Philip probably admired the altarpiece for the first time and may on that occasion already have considered having it copied.[66] An interesting figure in his entourage could have initiated the restoration: Antoine Perrenot de Granvelle, bishop of Arras and future cardinal, accompanied the young

Fig. 1.11. Jan van Scorel and atelier, *Altarpiece of Sts Stephen and James*, Douai, Musée de la Chartreuse, around 1540 (originally painted for the abbey of Marchiennes)

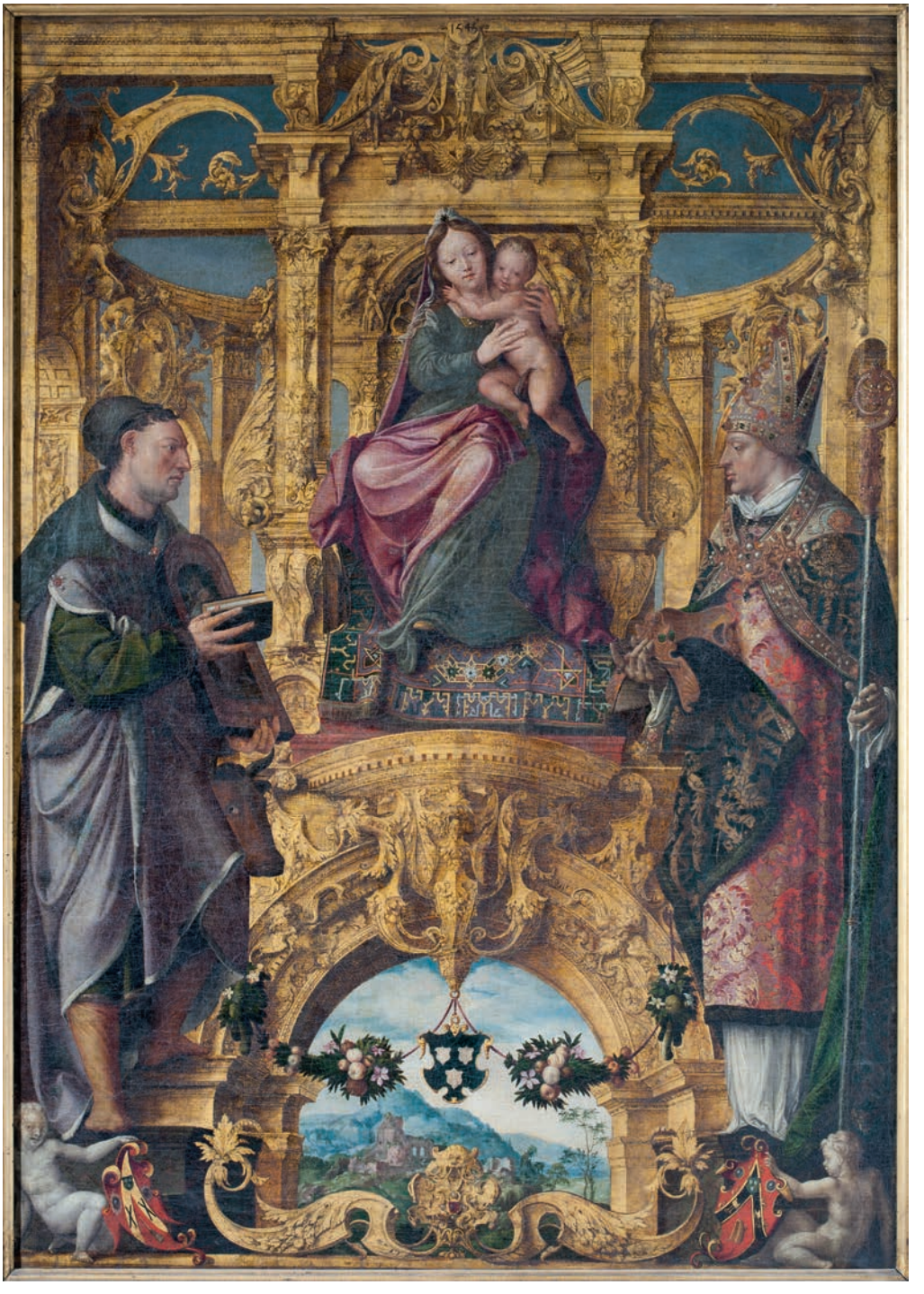


Fig. 1.12. Lancelot Blondeel, *The Virgin and Child Surrounded by Sts Luke and Eligius*, 1545, Bruges, St Saviour's Cathedral, canvas, 136 x 195 cm

1.13

1.14

Fig. 1.13. Lancelot Blondeel, *St Luke Painting the Virgin*, 1545, Bruges, Groeninge Museum, canvas, 144,5 x 103 cm (detail)

Fig. 1.14. The prophet Micah, *Ghent Altarpiece* (after restoration)

prince to the Low Countries to be introduced as Charles's successor and was a key figure in both Habsburg politics and in their refined artistic patronage. In 1550, Antoine Perrenot succeeded his ailing father, Nicolas, as personal adviser to the emperor.[67] Since 1535, Antoine had been a canon of the Church of Our Lady in Utrecht, where Van Scorel had resided since 1528, and, in 1537, he had become a canon of St John's Church in Ghent.[68] Furthermore, he was a friend of Lucas Munich, provost of this church.[69] His personal and artistic connection with Van Scorel, and their mutual bond with Anthonis Mor (fig. 1.15), would have persuaded him to recommend Van Scorel to execute this ambitious restoration.[70]

Most relevant to this essential episode of the material history, but also never as yet connected to Van Vaernewijck's reference, is that 15 September 1550 is actually the date of a document issued by the Council of Finance of the imperial court of accounts to instruct the receiver of East Flanders, Willem van Waellewyc, to control a donation of 15,000 Italian crowns which was made to complete the construction of the nave of St John's.[71] This gift coincides with an large number of donations and commissions in several churches by the court and the Catholic elite, investing in the artistic and monumental expression of Catholic dogmas discussed during the Council of Trent (1545–63).[72] The renovation and the stylistic update of the *Adoration of the Mystic Lamb*, antique and admired representation of the sacrificial nature of mass and of the dogma of the real presence of Christ in the Eucharist (transubstantiation), was probably ordered within the context of the affirmation of Eucharistic devotion, which was an essential focus of arguments against criticism from Protestant Reformers. The restoration of the altarpiece does not appear to be linked financially to building projects at St John's, but it seems likely that it was motivated by these circumstances and possibly also supported by the imperial court.[73] This respect for the antique form associated with a subtle modernization recalls specific instructions given for contemporary artistic commissions, such as sacrament towers. These recommendations

1.15

Fig. 1.15. Anthonis Mor, *Portrait of Antoine Perrenot de Granvelle*, 1549, canvas, Vienna, Kunsthistorisches Museum

were intended to support the promotion of the legitimacy of Catholic dogmas by their visualization as a modern form rooted in tradition.[74] This restoration should therefore be interpreted as a devoted valorization of the altarpiece. The high cost of labour and of fine pigments implied a considerable investment that would have benefited from the support of the Habsburg court.[75]

The reasons why this extensive 'cleansing' escaped the attention of early descriptions and eulogies of the altarpiece remain unclear. The campaign could have been carried out discreetly, by obstructing entrance to the chapel while the work was being done; and it may have been considered relatively unimportant for the artistic and cultural impact of the altarpiece. The young Lucas de Heere, born in 1534, who trained in his youth with Frans Floris in Antwerp, might not have been in Ghent around 1550. In that case, he would not have grasped the extent of the campaign that restored the freshness of the colours, which may explain why he did not refer to it in his well-known ode to the altarpiece.[76]

As far as we are aware, extensive overpainting of important older pictures by skilled artists was uncommon at the time in the Low Countries[77] and it has only rarely been possible to connect restorations observed on paintings to their historical contexts.[78] Many examples known from documents date from the late sixteenth and early seventeenth century after the Iconoclasm and the Calvinist period.[79]

Michiel Coxcie's copy of 1557–58

Coxcie's copy (figs 1.16–1.17) is a significant episode in the material history of the altarpiece since it involved manipulations of the panels, but also because it perpetuated the perception of the overpainted panels as the original Eyckian propotype.

King Philip II, who ascended the throne in 1556, ordered the copy from his court painter, Michiel Coxcie (1499–1592), who, in 1548, had beautifully reproduced Van der Weyden's *Descent from the Cross*, to replace the original secured from Leuven by Mary of Hungary.[80] Philip would have seen Van der Weyden's original in the chapel of his aunt's palace at Binche in 1549 shortly before he travelled to Ghent.[81] The copy of the *Ghent Altarpiece* for the Royal Palace of Madrid was a prestigious project that fitted into the Habsburgs' policies towards collecting earlier masters whereby sometimes several copies were commissioned if the original could not be acquired.[82]

Coxcie carried out the project, at least partly, in the Vijd Chapel, which the chapter had equipped according to his specifications.[83] Examination of the copy using infrared reflectography shows that he worked on the basis of tracings taken directly from the overpainted original, as he had done also for his copy of the *Descent from the Cross*.[84] These tracings were the basis on which Coxcie subtly modified the proportions of the figures and the folds of the draperies in an attempt to adapt and modulate them according to modern taste and canons.[85] Tracing paintings for reproduction was not uncommon at the time, and in fact a few years earlier, Gossart appears to have traced the heads of the enthroned figures on the *Ghent Altarpiece* in this way and in order to prepare his variation of the *Deesis* for Margaret of Austria (Museo Nacional del Prado, Madrid).[86]

1.16

Fig. 1.16. Reconstruction of Michiel Coxcie, copy of the *Ghent Altarpiece*, 1557-58. Open, panels (Berlin, Gemäldegalerie: *Deity* and *Adoration of the Lamb*); Munich, Alte Pinakothek (*Virgin* and *John the Baptist Enthroned*), and Brussels, Royal Museums of Fine Arts of Belgium: wings)

Coxcie could easily have had the shutters taken off and set down on the floor, since the hinges could be opened by lifting out the pins, but it is more likely that he worked on a wooden platform to copy the large central panels.[87] The whole copying process took around two years and Coxcie was handsomely paid.[88] Granvelle's correspondence indicates that another copy was planned in 1566 but never carried out, presumably because of the iconoclastic destructions perpetrated in Ghent in August of that year.[89]

Although Michiel Coxcie was a respected, learned painter, attached to the Habsburg court by 1546[90] and would have been perfectly suited to restore the altarpiece, there is no mention of any such restoration work in the many historical sources referring extensively to the copying process.[91]

Manipulations and displacements during the religious troubles: 1566–88

The altarpiece was spared from serious damage during the perilous period of the *Beeldenstorm*, whereby many works of art and churches in the Low Countries were damaged at the instigation of Reformist agitators and stimulated by the tense social and political circumstances.[92] In Ghent, the iconoclastic attacks lasted only a couple of days. Although considerable damage was caused to paintings and sculptures, altars,

1.17

Fig. 1.17. Reconstruction of Michiel Coxcie, copy of the *Ghent Altarpiece,* 1557-58, reverse of the wing panels, Brussels, Royal Museums of Fine Arts of Belgium

funerary monuments, columns and walls, many ornaments, relics and works of art could be hidden to save them from destruction. Marcus van Vaernewijck describes how, on 19 August 1566, two days before a mob ran amok in the former parish Church of St John, the panels were taken down carefully, and pulled separately ('in pieces') into the tower, where large spaces were available for safekeeping.[93]

Presumably wrapped up in cloth, they could have been hoisted through the two metres wide hole in the high vault that was used to lift bells into the tower with pulleys or a thread wheel.[94] All the wings, in their frames, would have fitted through this hole, but the frames of the large central panels and any ornament crowning the altarpiece were possibly dismantled in order to prevent hindrance in the course of these dangerous manipulations.

The carefully handled paintings escaped serious damage during this period. As Van Vaernewijck spontaneously stated: 'It would have been an unbearable shame if such a piece, better than anything to which Apelles, Zeuxis or Parrhasius could have aspired, had been wrecked by the hands of those filthy swine …'![95] However, the strains imposed on the joints of the frames during these manipulations are likely to have caused damage to their structures, already weakened by the load of the shutters when the retable was repeatedly opened. The Early, and rather clumsy, strengthening of the joints of the frames of the *Annunciation* panels and of some of the lower wings may have been carried out when the altarpiece was reinstalled in the chapel.[96]

Restorations of extensive damage to the interior of the cathedral, the funerary monuments, and countless works of art that could not be hidden, was carried out by local craftsmen and artists over the following years. A visitation report, drawn up in September–October 1567, lists the repairs yet to be carried out to windows, altars, pillars, a sacrament house, sculptures, paintings, and ironwork, but does not list the works of art and chapels belonging to private individuals, guilds and foundations, and thus does not refer to the Vijd Chapel or to the *Ghent Altarpiece*.[97] The shutters of the retable on the high altar were 'completely burned, rotten and broken'.[98] The painters Joris van Ryvieren and Franchois Horenbaut were entrusted with repairs to paintings and gilding. For example, the latter was paid 2 lb. 6 s. 8 gr. for repairing the two double-sided shutters of the *Altarpiece of the Holy Cross* on the almoners' altar, together with the joiners Adriaen Rooman, who re-joined and glued the said shutters, and Jan Scoremans, who mended the 'foot' (predella) under the retable.[99] The quality of these restorations, poorly paid and executed in the immediate aftermath of the iconoclasm and in a volatile political climate, is likely to have been quite weak.

The relocation of the polyptych from the tower to the chapel must have happened fairly quickly, since there is no interruption in the accounts of the *Oude Cotidiane*, relating to the expenses of the daily cult. The sexton was still paid to clean the chapel and maintain the ornaments as well as to deliver bread and wine for the masses.[100] In 1567, two chaplains were designated for the daily masses in the Vijd Chapel.[101]

During the second iconoclastic wave, in 1578–79, the cathedral was secured inside by servants of the church and companions, and an armed watch was set up outside for nineteen days and nights. It is possible that the panels were hidden in the tower again during this period.[102] In any case, they escaped the savage destructions that occurred in this period. Cornelius Breydel, receiver of the cathedral and formerly attached to provost Viglius's administration, recounted the displacement of the altarpiece to the town hall during the Calvinist republic, initially in order to give it to the Prince of Orange, who would have offered it to Queen Elizabeth of England.[103] It was not unusual at this time of unrest to move precious religious paintings from churches to civic buildings in order to protect these valuable assets from pillage and vandalism.[104] It is probably the same Franchois Rombauts, who had repaired paintings in St Bavo after the Iconoclastic Fury of 1566, who was paid to carry 'two pieces of the retable of Adam and Eve' from the town hall back to the church before 23 June 1584.[105]

The entire altarpiece was temporarily installed on a wooden structure by the joiner Elebrandt Meenenkinct in the smaller chapel of provost Viglius where it remained until sometime during the first half of 1587.[106] It was then replaced in the Vijd Chapel where important repairs and renovations had been carried out.[107] The profaned altar was altered and consecrated to All Saints on 13 January 1588.[108] Local repairs to the frames with metal braces could also have been done at the time by the joiners who worked in both chapels: Meenenkinct, and Laureins Bate, who constructed a new railing and made a base for the altarpiece in the Vijd Chapel.[109]

The state of conservation of the altarpiece was obviously problematic by then, and, on 7 May, the chapter resolved to have it restored.[110] A 'Master Raphael' was approached for this purpose. This was probably Raphael Coxcie, Michiel's son, who in the same year commenced the execution of the monumental *Last Judgement*, on panel, for the town hall. Since no other payments to Coxcie could be traced, it is unlikely that he

restored the altarpiece, perhaps because he wished to have it moved out of the chapel for this purpose, a situation that would have been uncomfortable for the chapter after the altarpiece had finally returned to its original location.[111] On 27 October, the chapter decided to keep the altarpiece shut, and in the following years the church accounts explicitly relate that no profit was made from showing it open. This restriction was meant to protect the paintings from further damage.[112] The condition of the structure, in particular of the frames and hinges must have been particularly worrying, but the paintings themselves could have suffered from the repeated manipulations, transports and installations in different locations during the preceding 22 years.

Restorations in the early seventeenth century

Yet, another fifteen years passed before the chapter entered into further negotiations for a restoration, this time with a painter who very much specialized in this line of work. In 1612, a certain 'painter Noveliers' is paid 4 lb. 1 s. 6 g. for his travelling expenses in relation to the restoration of the altarpiece, which he had agreed to carry out for the generous sum of 100 lb. gr.[113] Undoubtedly, this master belonged to the Noveliers family, well-connected painters, art dealers and restorers, based in Brussels and entrusted with the care of the collection of the Archdukes Albert and Isabella in Brussels and Tervuren.[114] Pieter Noveliers (1550/60–1618/23) the father, was named court painter on 9 November 1605, a title also attributed in 1618 to his younger son Salomon (1587/94–1661),[115] who took over his father's function.[116] Both Pieter and his elder son David (1580/90–after 1640) are known to have been entrusted with the restoration of important paintings outside the archdukes' collection. In 1608 Pieter was paid 600 (Rhenish) guilders to clean and repair Rogier van der Weyden's four *Justice Panels* and other works at the Brussels town hall, an operation overseen by the archdukes' advisor, the engineer-architect and painter Wenzel Coberger.[117] In 1627–28, David 'repaired and treated' the early, sixteenth-century *Lamentation over the Dead Christ*, currently attributed to the Master of Frankfurt (fig. 1.18), and an *Adoration of the Magi* from the Church of Our Lady of the Assumption in Watervliet, for the sum of 33 lb. 5 s. 8 g.[118] and, in 1628–29 he restored Dirk Bouts's *Justice Panels* (presently in the Royal Museums of Fine Arts, Brussels) and other paintings from the town hall of Leuven[119] (fig. 1.19). For this work, he was paid 450 (Rhenish) guilders. Noveliers was to 'improve the said paintings and return them without any damages, as if they were new'.[120] This project is the only one where Noveliers's restorations have been tentatively identified: large areas of the panel representing the *Beheading of the Innocent Count* were completely overpainted and others extensively retouched, presumably partly in order to complete this panel, left unfinished upon Bouts's death.[121]

In any case, despite Pieter Noveliers's obvious expertise in this matter, the restoration for which he was approached did not take place: only five years later, the chapter initiated a restoration campaign as well as improvements to the decoration of the Vijd Chapel. Another painter from Brussels, a certain Jan-Baptist de Bruyn, was charged with the repair of the whole altarpiece after proving his skill on part of the paintings. He was paid 41 lb. 13 s. 4 g. in four instalments, for cleaning and repairs

1.18

1.19

Fig. 1.18. Master of Frankfurt, *Triptych with the Deploration of Christ*, Watervliet, Our Lady of the Assumption

Fig. 1.19. Dirk Bouts, *The Justice of Emperor Otto* (1469-1475), Brussels, Royal Museums of Fine Arts of Belgium

over a period of five months (16 November 1617 to 20 April 1618; fig. 1.20).[122] De Bruyn, whose name is often Italianized as 'Bruno',[123] actually had registered the previous year as a master in the Brussels painters' guild and as a burgess in the city.[124] He must therefore have come from elsewhere. He may have been connected to the Noveliers family and have worked at the court, although nothing is known a possible activity there.[125] He certainly continued in the same line of work and apparently moved to Antwerp: on 21 October 1633, a certain Johannes Baptista Bruno, from Antwerp, is entrusted with the repair of Quinten Metsys's *St Anne Altarpiece* (1509; fig. 1.21) by the chapter of St Peter's Church in Leuven. He is then recommended for this task by the Antwerp aldermen, possibly because het restored important pictures in that city (fig. 1.22).[126] His work on the triptych, housed since 1816 in the Royal Museums of Fine Arts in Brussels, has not been identified.[127]

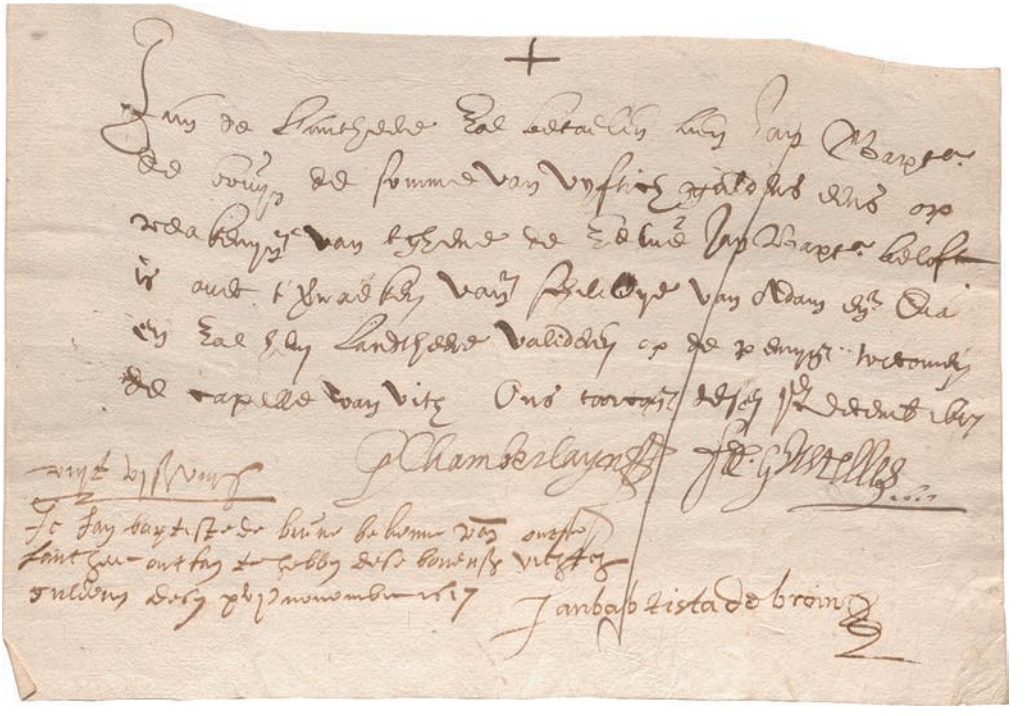
De Bruyn's remuneration of over Flemish 41 lb. gr. for this work is difficult to assess in relation to similar payments made to members of the Noveliers family, since neither the number of paintings they restored in each case nor the precise nature of the interventions are clearly specified. The total sum is higher than the payment made to Noveliers for the Watervliet altarpieces, but the surface De Bruyn had to cover is larger. Furthermore, the different parameters and circumstances of these different commissions (material costs, prestige of the commission, economic issues of competitiveness) are not documented.[128] In any case, De Bruyn must have been a skilled practitioner and his activity needs to be further investigated.

Conclusion

During the two first centuries of its history, the intensive liturgical usage of the *Ghent Altarpiece*, as well as violent episodes and stormy political circumstances, determined the evolution of its condition. Restorations preceding the extensive overpainting likely carried out by Jan van Scorel and Lancelot Blondeel appear to have been local and clumsy, even destructive in places. The political and religious tensions developing during the first half of the sixteenth century seem to have triggered their extraordinary campaign of 'renovation'. It is this campaign that fundamentally altered the appearance of the reverse of the wings, rather than restorations carried out after the violent political instability of the second half of the sixteenth century.

This restoration campaign is now well documented from a technical point of view. It can be connected by inference to Van Vaernewijck's reference to Van Scorel and Blondeel, by using much circumstantial evidence from the historical context of the period and from the professional and personal connections of the two masters.

The impact of other important restorations on the appearance of the altarpiece, such as Jan Baptist De Bruyn's work of 1617–18, still need to be evaluated. The continuation of the present restoration and of associated interdisciplinary research will no doubt shed further light on the complex material history of the polyptych.



1.22

Fig. 1.20. Receipt for restoration work on the *Ghent Altarpiece* by 'Janbaptista Debroin' (Ghent, Rijksarchief, Bisdom Gent, B 5036)

1.23

Fig. 1.21. Quinten Metsys, *Triptych of the Brotherhood of St Anne in Leuven* (1509), Brussels, Royal Museums of Fine Arts of Belgium

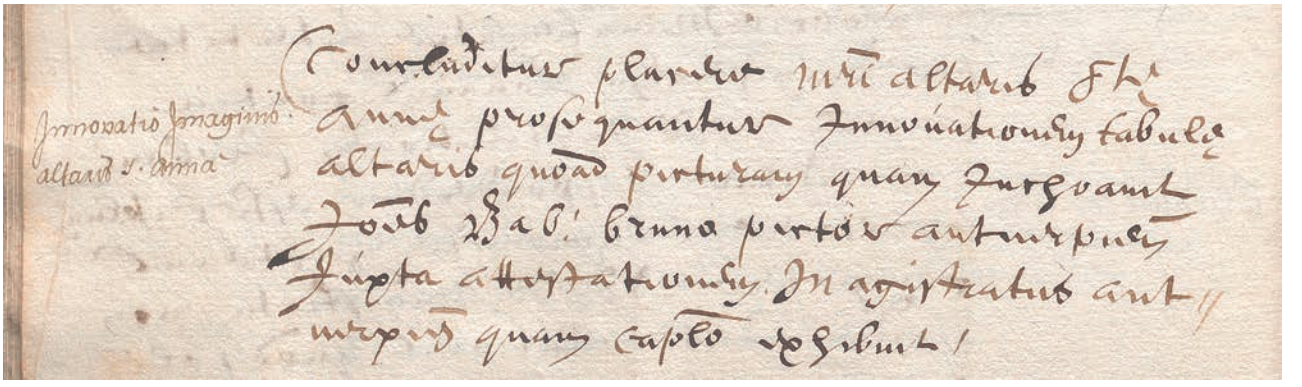


Fig. 1.22. Attribution of the restoration of the triptych of St Anne to 'Johanes Baptista Bruno pictor Antwerpiensis' (Leuven, Rijksarchief, Kerkelijke archieven 130, *Acta Capituli S. Petri Lovaniensis*, fol. 12v).

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Notes

1 See especially Van Den Gheyn 1913, 1926, 1936 and 1945; Duverger 1945; De Schryver, Marijnissen 1953; Dhanens 1965, 1969–72, 1975, 1976, 1977.

2 A vast selection of photographs of the wings, taken in Berlin between the 1860s and the beginning of the twentieth century have been located in the Friedländer Archives at the RKD, The Hague, and in the Deutsches Dokumentationszentrum für Kunstgeschichte – Bildarchiv Foto Marburg. On the history of early photography of the *Ghent Altarpiece*, see Peters 2017.

3 Coremans 1953, Dhanens 1969–72, Van Asperen de Boer 2004, Steyaert 2015 and Verougstraete 2015 (pp. 191–235) proposed a reconstruction of the original presentation and of the evolution of the structure of the altarpiece based on published

archives, on a study of the panels and frames and of old photographs. On Coremans and the *Ghent Altarpiece*, see Claes, Dubois, Sanyova 2018.

4 On nineteenth-century restorations of the wings in Berlin, see Stehr, Dubois 2014. On the 1937 restoration by Jef van der Veken and Albert Philippot, see Rosier et al. 2016 and the contribution 3 by Sanyova et al. in this volume.

5 Dhanens 1965, p. 89–93 and Dhanens 1976, pp. 10–12. The lease from their pastures in the polders of Verrebroek (Land of Waas), designated for this purpose by the foundation, insured regular income. The location of these lands cannot be precisely identified because of the changes brought on to the lands by flooding. Dhanens 1976 detailed the evolution of the foundation from its creation until the middle of the eighteenth century, based on a systematic examination of church archives. On the function of the chapel and the altarpiece as monuments rooting the families Vijd and Borluut in the collective conscience of the time, see Ridderbos 2017b; Buylaert, Verroken 2019.

6 The sexton is referred to as *cleene vicaris* or 'small vicar': *Oude Cotidiane* (excerpten en regesten), 1484–85, fol. 8. Verso: *'item havo vanden broucke vicarc als coster vander voors. Capelle voer dienst, licht, broot ende wijn iiij lb. g. Item omme de ornamenten vander zelve capelle xij s.g.'*. Later registers, from 1558–59 to 1574–75, steadily record these expenses. Dhanens 1976, pp. 11 and 43.

7 Dhanens 1976, pp. 42–48.

8 On the history of the church and the chapter, see Roegiers 2000.

9 The secularization of the chapter was secured in 1537: Roegiers 2000, p. 109.

10 The parish church of St John became the collegiate church of St Bavo on 11 May 1540 and the emperor clarified the relationship between the parish and the chapter and listed their respective functions and responsibilities through an act dated 30 January 1542. The provost was to contribute financially to the achievement and installation of the building: Roegiers 2000, pp. 111 and 113, referring to Rijksarchief Gent (RAG), SBAB 03453, published by Miraeus 1723, II, pp. 1056–59.

11 *Monasticon belge* 7, vol. I, 1988, pp. 65–67.

12 Waterbolk 1974; Postma 2000.

13 Dhanens 1976, pp. 27–32. On Triest's patronage: Duverger 2000. Before this, the chapel was separated from the ambulatory by a railing (*'traegle'*), on which candles could be lit: De Schryver, Marijnissen 1952, p. 9 and Annex II, p. 14, referring to a document in SAG, *Jaerregister* 1438–39, fol. 129.

14 Dhanens 1976, pp. 33–34; Kemperdick 2014b, p. 60, proposed that the wings were no longer attached to the central panels in order to fit those behind the columns. However, he description of the churches of Ghent by De Sadeleire, around 1734, cited by Piot 1883 (1996, p. 126) implies that the central panels and the wings were presented together: '*het autaer stuk, verthoonende het paeschlam, op welckers deuren geschildert staen Adam ende Eva, is van den vermaerden schilder Joannes Van Eyck, die eerst de olie verwe heft gevonden*' (the altarpiece, showing the Paschal Lamb with shutters on which Adam and Eve are painted …). In fact, extensive adaptations carried out in the course of the construction of the Baroque altar were likely required to fit the shutters to the central panel frames and enable their opening in front of the columns. Later descriptions, including those by Descamps (1753, I, pp. 2–3) and Mensaert (1763, II. p. 20), are not reliable because they are based on Van Mander's description, which mistakenly situates *Adam* and *Eve* together on a wing on the right side of the altarpiece (Van Mander 1604, fol. 200r). On the replacement of the hinges, see contribution 4b by Augustyniak and Mortiaux in this volume. On the baroque installation, see also Verougstraete 2015, pp. 225–28.

15 Dhanens 1976, p. 12.

16 See below.

17 Suykerbuyck 2017, pp. 79–80.

18 Dhanens 1976, p. 14. Van Vaernewijck's reference is discussed below.

19 See the contributions 4a and 4b by Depuydt et al. and Augustyniak and Mortiaux in this volume.

20 See contribution 2 by Ketels and Glatigny in this volume. Sliding bolts apposed at the bottom of the frames of the *Annunciation* were locking into the frames of the *St John* panels to maintain them aligned. It is not clear whether these bolts, visible on photos taken before the transformation of the frames in 1894, were original or later additions.

21 Dhanens 1977, p. 153.

22 Dhanens 1976, doc. 3, p. 47 and n. (f), p. 48: RAG, K60, Accounts *Oude fabriek*, fol. 28v, 1589–90; De Schryver, Marijnissen 1953, nn. 18 and 48. The first known references to a lock date from 1588: Dhanens 1965, p. 39, Dhanens 1976, p. 21, and doc. 14, p. 53: RAG, K9, *Acta Capituli*, Minutes, fol. 50, 27 October 1588 and K53, *Registrum* 1540–1734, fol. 14 . A lock may have been in use before this date, or possibly a swivel hook (Verougstraete 2015, p. 218).

23 On the damages, see contribution 4a by Depuydt et al. in this volume. A curtain was installed sometime before 1569, when pulling ropes were bought: Accounts *Oude fabriek*, 1568–69, fol. 20: De Schryver, Marijnissen 1953, p.37, and Dhanens 1976, p. 16 n. 2. The function of this curtain is unclear. It could have been installed to protect the altarpiece from dirt and damages, but it may also have had a liturgical function.

24 The first recorded visit is dated 1433: on 20 November, the abbot of the St Peter's Abbey in Ghent gave 18 shillings 4 deniers parisis tot the almoner when he talked to Joos Vijd in order to see the retable: RAG, Sint-Pietersabdij, 1st series, no. 866, fol. 1819, transcribed by Duverger 1945, p. 67 n. 231; Dhanens 1965, pp. 89, 65; and De Schryver, Marijnissen 1953, p. 34 n. 2. For the early descriptions by visitors, see Dhanens 1965, pp. 89, 102–04; De Schryver, Marijnissen 1953, pp. 34–35.

25 Dhanens 1977 and Dhanens and 1976, pp. 46–48; RAG, K60, Accounts *Oude fabriek*, 1529–30 to 1624–25.

26 Dhanens 1976, p. 48 n. (e).

27 The altarpiece was probably taken to the town hall at the time (see below).

28 '*Dese verhaelde Tafel, oft dit uytnemende werck, worde niet ghesien, oft open ghedaen, dan voor eenighe groote Heeren, oft soo yemandt, die den Sluyter goede vereeringhe dede*': Van Mander 1604, fol. 201r.

29 The post does not appear in the accounts after 1624–25: Dhanens 1976, pp. 47–48.

30 Van Vaernewijck 1560, sonnet 92, estimates the visit to the table worth ten others.

31 Van Mander 1604, fol. 201r, '*Oock somtijden op eenighe groote heylighe daghen. Alwaer dan soo grooten ghedrangh was, datmer qualijck mocht by comen: want de Capelle daer dit te sien was, den heelen dagh vol was van alderley volck. Hier saghmen Schilders, jongh en oudt, en alle Const-beminders ontrent swermen, even gelijckmen des Somersden Byen, en Vliegen, nae de soeticheyt siet om den Vijgh, oft Rozijn-korven hangen, en schermen*'. This description reflects the circumstances of the rare opening of the retable after the religious troubles: Dhanens 1976, p. 48 n. (f).

32 As suggested in passing by Dhanens 1975, p. 13.

33 Past cleaning products included highly corrosive alkaline products such as lye, potash, old urine (ammonia), or acids, alcohol, concentrated essential oils (such as lavender, spike, turpentine), which could be combined with abrasives such as wet smalt or metal filings wrapped in a cloth. See for example Marijnissen 1967, pp. 65–73; Kern 2005.

34 See contribution 4a by Depuydt et al. in this volume.

35 Van Vaernewijck 1568, fol. 119: '*Item een helle heeft den voet van deser tafel gheweest, door den zelven Meester Joannes van Eyck van waterverwe geschildert, de welcke zommighe slechte schilders (zoo men zecht) haer hebben bestaen te wasschen, oft zuyveren, ende hebben dat miraculeus constich werc, met hun calvers handen uutgevaecht de welcke met de voorn. tafel, meer weert was dan 't gout dat men daerop ghesmeedt zoude connen legghen*' ('Also the foot of this picture was a hell, painted in watercolour by the same Master Jan van Eyck, which some bad painters (or so it is said), have had the nerve to wash or to clean, and have erased this wonderful and masterly work of art with their *calvers handen* [lit. 'calves' hands'; writing about the iconoclastic fury Van Vaernewijck frequently uses *calvers* (dunces) as a term of abuse for the Calvinists] which together with the said picture, was worth more than the hammered gold with which one could cover it) (author's translation;). The use of the term 'calvers' does not imply that this destruction happened during the *Beeldenstorm*: Van Vaernewijck documented this period very well and declared the altarpiece escaped damages (see below) Even though this intervention is mentioned later in the same book (fol. 119), it is generally assumed that it occurred before the 1550 cleaning by Van Scorel and Blondeel (fol. 117v). Van Vaernewijck, however, makes no connection between the two. Van Mander 1604, fol. 200v, recounts the event and specifies the iconography: '*De principael Tafel hadde eenen voet, daer sy*

op stondt, desen was gheschildert van lijm, oft Ey-verwe, en daer in was een Helle ghemaeckt, daer de helsche knien, oft die onder d'aerde zijn, hun knien buyghen voor den naem Iesu, oft het Lam: maer alsoo men dat liet suyveren oft wasschen, is het door onverstandighe Schilders uytgewischt en verdorven gheworden.' ('The original picture had a predella upon which it stood, painted with glue or egg paint and depicting hell in which the infernal race, or those of the underworld, kneel before the name of Jesus, or the Lamb: but when it was cleaned or washed, it was erased and destroyed by incompetent painters') (transl. from Miedema 1994–99, i, p. 61). Van Mander seems to have relied on a more precise source than Van Vaernewijck, possibly his master Lucas de Heere, with whom he worked in Ghent between 1566 and 1568: Sabine van Sprang, 'De Heere, Lucas', in *Dictionnaire des peintres belges* 1995 (http://balat.kikirpa.be/peintres/Detail_notice.php?id=1421). Van Mander does not mention Van Scorel and Blondeel's restoration.

36 On different aesthetic approaches to the cleaning of paintings, see Hedley 1993.

37 See also Sanyova et al. in this volume.

38 These thin restoration glazes, applied on top of already altered varnishes, were documented on the entirety of Elisabeth Borluut's robe, where they enhanced the pale tones of the fabric. On other draperies, they were applied locally. See also the contributions 3 and 4a by Sanyova et al. and Depuydt et al. in this volume.

39 On different historical attitudes to cleaning and restoration, see Sitwell, Staniforth 1998.

40 The pale blue overpaint of the *Erythrean Sibyl* was originally light purple, a colour possibly imitating the pink original, covered with an older, thin purple glazing overpaint and degraded varnish. The pink organic pigment of the overall overpaint had faded almost completely. In the draperies of *Elisabeth Borluut* and of the *Prophet Micah*, the overall overpaint is much darker than the original, which was also covered with varnishes and an earlier restorer's glaze when the second overpaint was applied.

41 Sanyova et al. in this volume.

42 Coremans 1953, pp. 98–99 and 101–117: the red and green draperies of the singing angels (pp. 98–99), the brocades and the tiles by the enthroned figures (pp. 101–05), the faces of the *Virgin Enthroned* and *John the Baptist* (p. 102) and large parts of the *Adoration* (pp. 106–17) were thought to be overpainted.

43 Van Vaernewijck 1568, fol. 117v. This passage is discussed below.

44 Van Scorel had been canon of the Utrecht church of St Mary since 1528 (Faries 1997, p. 107). Dhanens (1975, p. 114) indicated that the later addition of the tower was unlikely since it also figures in the landscape of Jan van Eyck's *Virgin of Chancellor Rolin* and in a miniature dated around 1480. See also Pächt 1956, p. 268; Duverger 1954, p. 53. Examination of the *Adoration of the Lamb* during the second phase of the restoration project revealed in 2017, however, that the tower was not added, but that a (presumably original) version was overpainted together with many other buildings, the sky and large areas of the landscape. This discovery will be explored in future publications.

45 Brinkman et al. 1988–89, pp. 35–37. For these researchers the complex build-up of the paint layer is original and there is no evidence that the draperies of the *Angels* and the *Enthroned Deity* draperies were overpainted. In his technical study of the polyptych, Van Asperen de Boer nuanced Coremans' conclusions as he found it difficult to conclude on the base of the available research that so many prominent areas were overpainted. He proposed anyhow that some restorations were carried out very early on, perhaps by others than Van Scorel and Blondeel, and in any case before 1557, since details that he considered as added are reproduced on Coxcie's copy. Other changes were introduced later: he made no references to overpainting on the reverse of the panels that were treated in this first phase of the project: Van Asperen de Boer 1979, pp. 155–63, 172–78.

46 The MA-XRF scan of the dismounted panel, carried out in the Villa chapel by Geert Van der Snickt and Stijn Legrand (AXES-Group, University of Antwerp), the study of paint samples by Alexia Coudray and Jana Sanyova and the interpretation of the documentation by Hélène Dubois were supported by the Gieskes-Strijbis Fund and presented to the international commission of experts on 26 October 2015. See Dubois 2017, pp. 103–04, and Sanyova et al. in this volume.

47 Bart Devolder noticed not only that Coxcie copied the Archangel's overpainted drapery, but also that the Eyckian folds at the bottom left of Gabriel's robe were reproduced in a little drawing, possibly Upper Rhenish and dated c. 1475–1500 in the Berlin Kupferstichtkabinett (See Buck 2001, no. IV, pp. 284–92). Livia Depuydt further revealed that in the *Virgin Annunciate*, Coxcie reproduced the overpainting on the coat of the prophet Micah and on the green cloth of the prie-dieu (See contribution 4a by Depuydt et al. in this volume). As noted already by Karel van Mander, Coxcie did not literally reproduce all details. For example, he omitted the scrolls of the sibyls and prophets and modified the awkward position of the prophet Micah's right arm. IRR investigation has shown that Coxcie also introduced multiple subtle alterations in the draperies and proportions at different stages of the drawing and painting process: Dubois 2017.

48 Unlike his reference to the terrible cleaning operation and the destruction of the *voet*, Van Mander, who relied greatly on Van Vaernewijck and De Heere for information on the altarpiece, did not refer to the two artists' intervention in his extensive biography of Van Scorel, nor in the passage on Blondeel. Studies on Van Scorel and Blondeel generally accept this information, principally on account of Van Scorel's prestigious reputation at the time.

49 His manuscript relating the events of 1566 (*Van die beroerlicke tijden in die Nederlanden en voornamelick in Ghendt 1566-1568*) is kept at Ghent University; see Van Vaernewijck, Van der Haeghen 1566 (1872).

50 Nowé 1936–38, Lamont 2005, pp. 54–55.

51 '*ooc Meester Lanchelot van Brugghe ende Meester Jan Schoore Canonic van Utrecht ooc trefflicke schilders, sijn te Ghendt ghecommen, ende begonden dees tafel te wasschen, anno XV. hondert vijftich, den vijfthiensten Septembris, met zulcker liefden, dat zy dat constich werck in veel plaetsen ghecust hebben, waeromme hemlieden die Heeren van S. Baefs, voor een gratuiteyt elck een gheschinck ghedaen hebben, als Meester Jan Schoore eenen zilveren cop daer ic te Utrecht tsynen huyse ghedroncken hebbe.*':Van Vaernewijck 1568, fol. 117v. The word *ghecust* has been interpreted in different ways: as 'kissed' by Hymans 1902, note 1; Hoogewerff 1923, p. 97; for Dhanens (1975, p. 115) too it means 'kissed', like in earnest love, referring to 'met zulcher liefden'. Van Rijckevorsel (1929, p. 592) discussed the possibility of another interpretation, that of 'cleaned'. Indeed, *cuuscen* (*cusscen, cuyscen*; modern lemma: *kuisen*) were both used to signify 'to clean',' to purify', 'to cleanse' (literally and figuratively); other synonyms are *purgare, mundare*: GTB 2007–10 http://gtb.inl.nl/iWDB/search?actie=article&wdb=-MNW&id=24516&lemmodern=kuisen (accessed September 2017). Both interpretations of 'ghecust' are possible, the second one appears more fitting to describe a motivation for the pre-1557 overpainting campaign.

52 Van Vaernewijck 1568, *vierden boek*, XLVII. De Heere (1565, XI, pp. 35–38) describes the altarpiece in detail and refers to Jan, Hubert and their sister Margaretha, to the patronage of the Philip the Good and to Coxcie's copy, The ode expresses the prestigious status of the altarpiece, that was already considered as a local antiquity, a 'mirror of nature' rather than a painted scene (Göttler, Meganck 2015, p. 342). According to Karel van Mander, who had trained with De Heere, the ode was hung in the chapel (Van Mander 1604, fol. 201r). The ode is one of the sources on the altarpiece used by Lodovico Guicciardini and Van Mander: De Heere 1969, p. 118.

53 '*Die in hondert vijftigh iaren niet en zijn vergaen T welcke men nu ter tijt niet veel en siet ghebeuren*': De Heere 1565, vv. 45–49. Van Mander (1604, fol. 200v) further emphasized the technical perfection and the seemingly eternal beauty of the colours, which appear as if they had just been painted '*Maer om in een summa dit werck te verhalen, het is van Teycken-const, Actituden, gheesticheyt, van Inventie, suyverheyt, en nettichеyt uytnemende, en verwonderlijck, nae sulcken tijt te rekenen: de lakenen zijn ghenoech nae den aert der ployen, op de maniere van Albertus Durerus, en de coleuren, blaeuwen, roon, en purpuren, die zijn onsterflijck, en alles so schoon, datse noch versch gedaen schijnen, en alle ander schilderije overtreffen*.'

54 Snoep 1977, p. 41. Silver items were common prestigious presents at the time in different social circles, from the nobility and clergy to the middle classes (Gezels 2010, pp. 276–83). In 1551 Van Scorel was given by the city of Utrecht a silver cup with a lid as well as some velvet, worth 94 guilders and 10 *stuivers*, in payment for his work on the 1549 Joyous Entry of Philip II: Utrecht, Het Archiefdienst,

inv.no. 13; *Des Raads Dagelyks Boek* Anno 1551, fol. 25v, published in Utrecht-Douai 1977, no. 9, p. 63. Silver drinking cups were commonly given by new masters upon entering their corporations: Dambruyne 2002, pp. 109–18.

55 Duverger, Roobaert 1959–60, pp. 95–97; Martens 1997, pp. 108–20. For recent studies on Blondeel and further references, see Bruges 2017, pp. 129–41.

56 Duverger, Roobaert 1959–60, pp. 98–99.

57 Letter dated 21 July 1559 from Lucas Munich to Jan van Groelst, RAG, Bisdom, B4853, 39 : Munich refers to two paintings Blondeel brought him, which the bischop of Arras (Antoine Perrenot de Granvelle) would appreciate to see. Van Groelst is charged to present the paintings to Perrenot and recompense Blondeel for 'cleaning' them (*Purgeren,* 'to clean', 'to purify', GTB 2007–2010: http://gtb.inl.nl/iWDB/search?actie=article_content&wdb=MNW&id=44451 '… *Hutwelken verstaen dat Lanceloot van Brugge twee stucken scylderye voor ons gebracht, dwelcke Mijnheere van Atrecht siende anghenaem ende ghenoegen; gy sulse presenteren van onsen weege ende Lanceloot contenteren … Opdat pas besigh met purgeren …*' See Duverger, Roobaert 1959–60, transcription in annex 1, p. 105. The authors, p. 102, thought the two (unknown) paintings were included in Granvelle's collection. The reference to cleaning was noted by Martens 2017a, p. 129.

58 Faries 1997; Hoogewerff 1923; Snoep 1977. Van Scorel's function of curator of the papal antiquities at the Belvedere in Rome under Pope Adrian VI over the years contributed to his outstanding reputation as a humanist who introduced Italian art and antiquity in the Netherlands. In his series of portraits of famous painters of Germania Inferior (*Pictorum aliquot celebrium praecipuae Germaniae Inferioris effigies*), published in 1572 by Volcxken Diereckx, the widow of Hieronymus Cock, the humanist Domenicus Lampsonius elected three artists to speak in the first person: Jan van Eyck, Quinten Metsys and Jan van Scorel: Göttler, Meganck 2015, p. 338. Van Scorel is singled out for introducing the art of Rome in the Netherlands: 'Through all centuries I shall be said to have been the first to have taught by my example the excellent Belgians to be envious of Rome in painting. For he is not worthy of the honour of a true artist, who does not use up a thousand pencils and pigments, and paint pictures in that school' (translation from the Latin after http://www.courtauld.org.uk/netherlandishcanon/image-tombstone/20.html). See also Van Mander 1604, fol. 234 and 236v.

59 The necessity of a reliable religious identity is worded by Francisco de Holanda in his 'dialogue' between Michelangelo and Lattanzio Tolomei (1548): a painter of devout images should be both very wise and technically gifted as well as leading a pious life (De Hollanda 2013, pp. 201–11). With many thanks to Astrid Harth for this reference.

60 One prestigious commission was the design of the ornamental chimneypiece of the Franc in Bruges, honouring Charles V (1527). In 1550 Blondeel visited the court in Brussels, perhaps in connection with his design of the funerary chapel for Margaret of Austria in the Clarisse convent in Bruges: Martens 1997, p. 117. On Blondeel's designs for the Joyous Entry in Bruges in 1549, see Jansen 2002. For recent literature, see Bruges 2017. On Van Scorel's diverse work, see note 58 above. Prince Philip bought a large distemper painting on canvas representing the *Sacrifice of Abraham* from Van Scorel when he was in Utrecht in 1549 (Van Mander 1604, fol. 236r). Van Scorel painted several portraits of nobility connected to the Habsburgs, and of high court officials: Faries, Ubl 2017.

61 The two artists might even have had personal connections: according to Paul Huvenne, Pieter Pourbus's early work shows Van Scorel's influence, indicating that the young painter, originating from Gouda,
is likely to have trained with the Dutch master before he entered Blondeel's atelier in Bruges (personal communication, September 2016).

62 On Van Scorel's painting technique, see Faries 1987 and Faries 2011a and 2011b.

63 *'de lakenen zijn ghenoech nae den aert der ployen, op de maniere van Albertus Durerus'*: Van Mander 1604, fol. 200v.

64 Balligand et al., pp. 51–90

65 Calvete de Estrella 1873–74, II, 1873, p. 86.

66 No evidence of negociations on an acquisition could be found so far

(Duverger 1954, p. 58). According to Guicciardini (1567, p. 97), the prince did not dare to take it away. Van Mander (1604, fol. 200v), affirmed that Philip had the altarpiece copied by Coxcie in 1557–58 so as not to deprive the city of Ghent of this jewel.

67 On Granvelle's political career: Van Durme 1953 and Van Durme 2000.

68 Roegiers 2000, p. 111. Antoine Perrenot was recommended by the emperor for this position. Through the years, Granvelle cumulated several, non-residential canonry such as in Mechelen, Antwerp, Utrecht and Liège (Roegiers 2000 note 23, p. 232). In Utrecht, Perrenot was dispensed of service in 1540 and resigned in 1564: Rijksarchief Utrecht, St. Marie, inv. 64, fol.77v., as referred to by Faries 1997, n. 39, p. 113.

69 In a letter dated 1556, Granvelle cordially invites Munich to his private residence, Cantecroy Castle in Mortsel near Antwerp: *'J'espère de vous voir aussi quelques jours à Cantecroy'*, RAG, Bisdom, B4854/5, as transcribed by Baelde 1968, p. 607 n. 15.

70 A portrait of Granvelle by Van Scorel, now lost, is recorded in the inventory of Peter Paul Rubens's possessions after his death: Vlieghe 1980; Faries 1997, p. 112; The abbey of Marchiennes for which Van Scorel's atelier painted several altarpieces was situated in his diocese (Arras): Van Gelder 1966–67, p. 12. Mor, who trained with Van Scorel, became Granvelle's personal painter from at least autumn 1549, see Woodall 2000.

71 The sum was exclusively reserved for the fabric of the church and was strictly controlled: Baelde 1968.

72 Van Bruaene 2016.

73 No references are made to the altarpiece in the detailed accounts of the building site (RAG, B4952).

74 See, for example, Van Eck 2012 and Suykerbuyk, Van Bruaene 2017.

75 For the cost of pigments, see contribution 3 by Sanyova et al. in this volume.

76 The dates of De Heere's apprenticeship with Floris are not known. He was likely back in Ghent in 1555 since he drew cartoons for Coxcie's monumental glass windows, which were installed in St John's in the 1550s: Waterschoot 1974, pp. 18–23.

77 Extensive overpaint of older works was common in Italy already in the fourteenth century: Thomas 1998, Conti 2007, pp. 2–14.

78 This intervention inherently differs from Pieter Pourbus's censure of Jan Provoost's *Last Judgement* in 1550, as required by the city of Bruges in accordance with Charles V's placard forbidding castigating representations of the clergy: Huvenne 1984, p. 29, after *Ordonnancien, Statuten, Edicten ende Placaeten*, 2nd edition, Ghent 1639, pp. 157–59. Most of Pourbus's overpaint was removed during a restoration carried out in 1956. See Janssens de Bisthoven 1957-1958.

79 See, for example, the restorations carried out in Bruges, including Van Eyck's *Virgin and Child with Canon Joris van der Paele* restored in 1599 by Pieter Claeissens (Janssens de Bisthoven 1981, pp. 205, 224 docs. 7–8) or Pieter Pourbus's *Last Supper* (Cathedral of Our Lady), restored by Antoon Claeissens in 1589 (Huvenne 1984, pp. 64–65). A striking example of recycling damaged works to create a new form is the transformation, after a botched restoration in 1594–95, of a ruined triptych into the reliquary shrine of the St Gummarus Church in Lier by Gilliam van Haecht and Frans Francken II: Schwarz 1996, pp. 45–46; Leemans 1972, pp. 299–300. About the family Noveliers, specialized painter-restorers, see below.

80 Kemperdick 2010.

81 Woollet 2012, pp. 80–82.

82 On the Habsburg's collection of earlier masters and copies, see Woollett 2012, pp. 79–84.

83 Dubois 2017 and Suykerbuyk 2017, who transcribed the archive documents on the payments to Coxcie and the costs incurred by the chapter.

84 Dubois et al. (forthcoming).

85 Dubois 2017; D'Olne, Dubois 2006; Suykerbuyk 2017.

86 Museo del Prado, Madrid. See Finaldi, Garrido 2006, pp. 102–13, and Ainsworth 2010, pp. 213–17 on Gossart's pasting the tracings on the ground to use them directly as a base for the painting process.

87 See Dubois 2017, p. 82; Kemperdick 2014b, pp. 46-47.

88 Suykerbuyk 2017.

89 Morillon to Granvelle, 5 May 1566: *'J'ay escript à Vandenesse que M^e Michiel est content de fere la table de Gand au mesme pris qu'il a faict l'aultre endedans deux ans et deux mois et*

que le tout considere, il est force la fere sur bois ou sur toille, car les metaulx mortifient les couleurs' (Piquard 1947–48, p. 142). Morillon to Granvelle, Brussels, 7 July 1566: '*Je n'ay encores resolution de Sa M^té^ touchant la table de Gand, qu'elle veult estre faicte par Maistre Michel, qu'il est force faire sur tablez de bois bien liéez*' (Poullet 1877, I, p. 349). It was not unusual for the Habsburgs to order more than one high-quality copies of the same masterpiece, in order to purvey their different residences. Woollet 2012, p. 84; Suykerbuyk 2013/14.

90 Jonckheere, Suykerbuyk 2013, p. 32.

91 Dhanens (1975a, pp. 115–16) suggested that Coxcie could have intervened on the original during his long copying campaign.

92 Decavele, Janssens 2016.

93 Van Vaernewijck 1872, p. 146. '*Dese uutnemende wonderlicke hemelsche tafele, … was wijselic afghedaen, ende upghewonden met sticken upden turre, upden XIXen augustij, twee daghen te voren eer dees brekijnghe ghebuerde, dwelck duer Godts beschicken es gheschiet …*'

94 Dhanens 1976, p. 16. The diameter of the hole was recently measured by the architecture office Bressers. A thread wheel is still preserved in the bell tower of the St Rombaut's Cathedral in Mechelen.

95 '*… thadde een onverdraghelick jammer gheweest, dat zulck een stik dat noch Apelles, Seuxis, noch Parrhasius weercken te wijcken en hadde, alzoo van die vuul veerckens handen zoude bedorven gheweest hebben …*' (Van Vaernewijck 1872, p. 146). The salvage of the altarpiece was confirmed by Morillon in a letter to Granvelle, dated 21 august 1566: '*Aussi at esté saulvée la table d'Adam et Eva avec les relicques et ornementz de sorte que le dommaige n'est tourné sinon sur les imaiges qu'ilz apellen Idôles …*' Poullet 1877, I, pp. 443–44.

96 These reinforcements are described in Augustyniak and Mortiaux in this volume.

97 RAG, Bisdom Gent, B496, (minutes), transcribed in Decavele, Jansens 2016, p. 116 n. 1, pp. 233–39.

98 Ibid., p. 235

99 The total sum for work on this retable came to 3 lb. 2 s. 9 gr. More work on the sculptures was yet to come: RAG, Bisdom Gent, B4960, fol. v, transcribed in Decavele, Jansens 2016, pp. 237–38.

100 Dhanens 1976, p. 16 and p. 43, doc. 2.

101 According to the service regulations of 1 April 1567 (RAG, Bisdom Gent, K 4841), referred to by Dhanens 1976, Table II, pp. 95–96. In 1568–69, some income is noted for visits to the retable: Dhanens 1976, p. 47.

102 Dhanens (1976 pp. 16–17) argues that the term *gheweert* used in the payments refers to hiding the retable to protect it: '*Item betaelt zeker persoonen die gheweert hebben de tafele van Adam ende Eva ende andere die Ghewaect hebben binnen de kercke iij lb. ij s. iiij g. vj d. g.*' RAG, Bisdom Gent, K 171, *Nieuwe fabriek*, account 1 August 1576–31 July 1577 (receipts) and 1 August 1577–31 July 1578 (expenses), fol. 4v–fol. 5 (Dhanens 1976, p. 51, doc. 9).

103 According to Breydel, the loss of the altarpiece could be halted through the intervention of Josse Triest of Lovendeghem, descendent of the Vijds. RAG, K 10245/4, 15r, partial transcription by Kervyn de Volkaersbeke 1857/58, vol. 1, *Pièces justificatives*, VI, pp. 256–57. Thanks to Anne-Laure van Bruaene for her critical insight in this document.

104 For example, after Philip II and Elizabeth of England attempted unsuccesfully, in 1577, to buy Quinten Metsys's *Altarpiece of the Cabinetmakers* (KMSK, Antwerp), then placed on the guild altar in Antwerp Cathedral, the protestant city magistrate bought the triptych in 1582 'so that the city of Antwerp would not be deprived from such an artistic jewel'; De Bosque 1975, p. 101. In 1581, several Antwerp guilds and crafts asked the magistrate's permission to clear their altar in the cathedral (Prims 1938–39, XIII, p. 340). Frans Floris's *Altarpiece of the Gardeners* (KMSK, Antwerp) was then presumably moved to the craft chamber (Van de Velde 2009, pp. 111–15).

105 Dhanens 1976, p. 17, p. 51, doc. 10: '*Item betaelt franchois hoorebaut van zulcx als hij verleijt hadde in tdraghen van twee sticx vande tafele van Adam ende Eva van up stadthuus tot inde kercke ij s. g.*' (RAG, Bisdom Gent, K73, *Oude fabriek*, and K173, Accounts *Nieuwe fabriek,* also published by De Schryver, Marijnissen 1953, p. 38). On the basis of this document, Elisabeth Dhanens proposed that only the panels of *Adam* and *Eve* had been transferred to the town hall, rather than the entire altarpiece. This argument is not convincing in view of the evidence of the transfer of other altarpieces to civic buildings in this period.

Verougstraete 2015 p. 215 interpreted the 'twee sticx' as two separate altarpieces (as in two separate registers of the *Ghent altarpiece*).

106 Dhanens 1976, p. 51, doc. 10: *'Item betaelt den selven* [*Elebrandt Meenenkinct scrijnwercke*] *voorstellen vande tafele van Adam ende Eva in Viglius capelle iiij s.g.'*

107 Dhanens 1976, p. 52, doc. 11.

108 De Schryver, Marijnissen (1953, p. 23 n. 17, as well as 1952, p. 10 n. 29) refer to a small consecration charter found in the altar in 1951.

109 Dhanens 1976, p. 52, doc. 11.

110 Dhanens 1976, pp. 52–53, doc. 12 (RAG, Bisdom Gent, K9, *Acta capituli*, minuten, fol. 45v).

111 Dhanens 1976, p. 53, doc. 14, and pp. 19–20.

112 '*… ende oem datse min verarghert soude wesen duer het openstaen …*': RAG, Bisdom Gent, K60, *Oude fabriek*, fol. 29v, 1591–92: Dhanens 1976, p. 47, doc 3.

113 '*… Item den XIXen may betaelt den schilder noveliers, die anghenomen hadde van zijn eerw. Maes te repareren ende hulpen het tafereel van Adam ende Eva staende naest de backers capelle ende dat voor hondert ponden grooten ende by ordonnantie van mijn heer Del Rio archidiaken, Meganck thresorier en Chamberlain archiprebystere, den zelven over zijn reysen …*'; RAG, Bisdom, K186, *Nieuwe fabriek*, account 1 February 1612–31 January 1614, fol. 30; Dhanens 1976, p. 54, doc. 16, and p. 24. This reference to Noveliers was also given by Duverger 1945, pp. 49 and 54, but without references, by De Schryver, Marijnissen 1953, p. 38 n. 19, and Duverger 1954, p. 61.

114 Van Sprang 2014, pp. 332–33.

115 De Maeyer 1955, pp. 220–22, and p. 228, where the author concluded that the ageing Pieter Noveliers was the painter mentioned here.

116 De Maeyer 1955, p. 222.

117 Duverger 1974, pp. 97–98.

118 Vanaise 1966, p. 57. These restorations were not identified when the badly damaged painting was restored again at KIK-IRPA: Goetghebeur et al. 1966.

119 Stroo et al. 1999, pp. 56–78, 99, doc. 15.

120 '*…Die heeft die selve't synen laste genomen voers. Schilderyen te beteren en die in staete te stellen en te leveren gelyck oft die selve nyeuwt waeren en sonder letsel …*'(Leuven, Stadsarchief, n° 316, fol. 171v-172r)

121 Stroo et al. 1999, p. 77, fig. 25.

122 Dhanens 1976, pp. 25–26, 55–56, doc 19–21. 16 November 1617: *'Over t'vermaeken van de schilderye van Adam ende Eva'*; 22 December 1617:*'Over het vermaecken ende wasschen vande taeffle van Adam ende Eva'*; 29 March 1618: *'Voer schoone maeken vande schilderye van Adam ende Eva'*; 20 April 1618: *'Over t'repareren vande schilderyen van Adam ende Eva'* (RAG, Bisdom Ghent, B 5036).

123 The painter signed the receipts as *Janbabtista debroin*, but his family name is spelled differently on each document: Jan Baptista de bruyn, Bruijne, Le Bruyn, Le Broin.

124 Pinchart 1877, p. 309; Caluwaerts 2005, p. 45 (1615–16).

125 As noted by Dhanens 1976, p. 24, after Stenoy 1934, pp. 87–94, other painters by the family name of De Bruyn appear in documents in relation with the court in Brussels.

126 Rijksarchief Leuven, Kerkelijke archieven, 1301, *Acta Capituli S. Petri Lovaniensis*, 21 October 1633, fol. 12v: *'Concluditur placere magistri Sanctae Annae, prosequantur innovationem Tabulae altaris quoad picturam, quam inchoavit Johanes Baptista Bruno pictor Antwerpiensis, juxta attestationem magistratus antwerpiensis quam capitulo exhibuit.'*

127 The triptych has since been restored several times: De Bosque 1975, p.93.

128 It is also unreliable to compare this work to artistic commissions. For example, Rubens was paid 600 guilders (100 lb.) for his monumental canvas of the *Conversion of St Bavo* in the cathedral (Vlieghe 1972, p. 108), but it is not clear whether this was for the whole project or only a part of it. On the other hand, the worth of Raphael Coxcie's *Last Judgement*, a monumental work on panel he painted in 1588–89 for the Ghent town hall, was estimated over 233 lb. (or about 1400 guilders) by a visitation committee of painters from Antwerp: De Busscher 1863, p. 19; 1863–64, p. 308; 1864, p. 212; 1866, p. 121; D'haeseleer 2007, p. 45.

2

Frames and Support: Technique and Structural Treatment

Jochen Ketels, Jean-Albert Glatigny and Anne-Sophie Augustyniak

In the work of Van Eyck, as this restoration has proven once again, painted panels and polychrome frames were intended as a coherent and indivisible unity – both visually and in terms of construction. Unfortunately, ever since its first public display on 6 May 1432 – according to the quatrain – the *Ghent Altarpiece* has experienced a turbulent history during which it was repeatedly displaced, confiscated, hidden, sold or stolen. The damage caused by these countless manipulations led to restorations and even some drastic transformations.

In the course of the 2010 campaign of in-depth research and documentation,[1] a team of specialists in the conservation of panel paintings investigated the original technique and the structural condition of the seventeen panels and frames of the *Ghent Altarpiece*. The team,[2] led by Jean-Albert Glatigny and with the support of the Getty Foundation's Panel Paintings Initiative, also tried to assess the different structural modifications. With the exception of Jef Van der Veken's copy of the *Just Judges*, located on the far left in the lower register,[3] all supports were examined.[4] However, due to the limited space and accommodation of the Villa Chapel in St Bavo's Cathedral, it was not possible to critically evaluate all observations made during the thorough conservation and restoration campaign of 1950–51.[5] The current restoration phase provided a unique opportunity to reconsider the observations of Coremans's *Agneau mystique au laboratoire*[6] on the one hand and the 2010 analysis of the exterior wings on the other, and to compare them to the present condition. In addition, the conservation studio in the Ghent Museum of Fine Arts provided the necessary accommodation for a profound study of the technique and structural conditions of panels and frames, as a result of which some previous observations could be refined and even adjusted.[7] But above all, more insight was gained on the evolution of the frames of the exterior wings and especially on the different types of historical hinges. Unless otherwise stated, the arguments are based on the observations made during the restoration campaign by Jean-Albert Glatigny.

Based on the 2010 experts' observations,[8] a suitable structural treatment was recommended for both frames and supports. As part of the first restoration phase of the altarpiece, the eight exterior wings[9] were treated between September 2012 and October 2016. The present contribution focuses on the condition of the wooden supports and on the structural interventions carried out by Jean-Albert Glatigny.[10]

Fig. 2.1. (facing page) Detail of the lower left corner of the *Adam* frame

Technique of the supports and construction of the frames: original assembly and alterations

Originally, all panels of the exterior were painted on both sides. Thanks to the presence of *barbs,* the raised lip of accumulated ground and paint along the edges of the painted surface,[11] we know that the panels were slotted into their frames before being painted – an indisputable indication that panels and frames were originally treated as a visual and structural unity (fig. 2.4).

During a downright drastic intervention in Berlin in 1894, all panels and their original frames – except the two central ones in the upper register of the exterior, which never left Belgium – were sawn along the grain (through their thickness). All split panels were then reinforced at the back with a pine cradle while their frames were modified into rebated ones. As a result, for the exterior, a structural distinction has to be made between two groups: the cradled and split panels,[12] and the *Adam/City View* and *Eve/Interior View*[13] panels with their (almost) original frames. In the course of this late nineteenth-century modification, most of the original tool marks along the edges were erased. As these marks are found on the unpainted surfaces (original or otherwise), they are of the utmost importance for the study of the original technique and for the assessment of previous modifications. This goes especially for the central panels of the exterior, which are still painted on both sides and very much retain, in our view, their original proportions.

Panels

Each of the eight panels of the exterior[14] is composed of three[15] vertical, quarter-split, perfectly radial-sawn boards of Baltic oak (*Quercus robur* or *Quercus petraea*) (fig. 2.2).[16] The individual planks differ widely in width – between 65 and 264 mm, depending on the dimensions of the panel – and are invariably butt-jointed with dowels. For both the *City View* and the *Interior View*, the dowel pins – respectively five[17] and four[18] – are spread rather irregularly along the central vertical joint. All these pins are visible in raking light and on the X-radiographs. However, the pin in the face of the Cumaean Sibyl is more readily discernible as its contours show through ground and paint layers (fig. 2.3). Judging from the wood fibres clearly visible in the crack pattern, it must have been grazed during the planing of the panel.[19] This supports the hypothesis that the dowels had no other purpose in the assembly than to keep the edges fixed in position during the gluing process. Part of a dowel hole can be noticed at the back of the *Archangel* panel as well as on its former reverse, the *Singing Angels*. Observations on the back of the cradled panels and X-radiographs revealed that the dowel pins were about 6 or 7 mm in diameter but varied in length. Dowels of about 50 mm were measured in the *Evangelist* panel while those of the *Baptist* panel were up to 80 mm long, although both panels are of comparable size. The dowels were almost evenly distributed lengthwise except, as mentioned above, in the two central panels.[20] The central planks of the panels consisting of three boards (except the *Vijd* panel) are always significantly narrower than the two flanking boards, which are positioned in such a way that their growth direction faces the joint (fig. 2.2).[21]

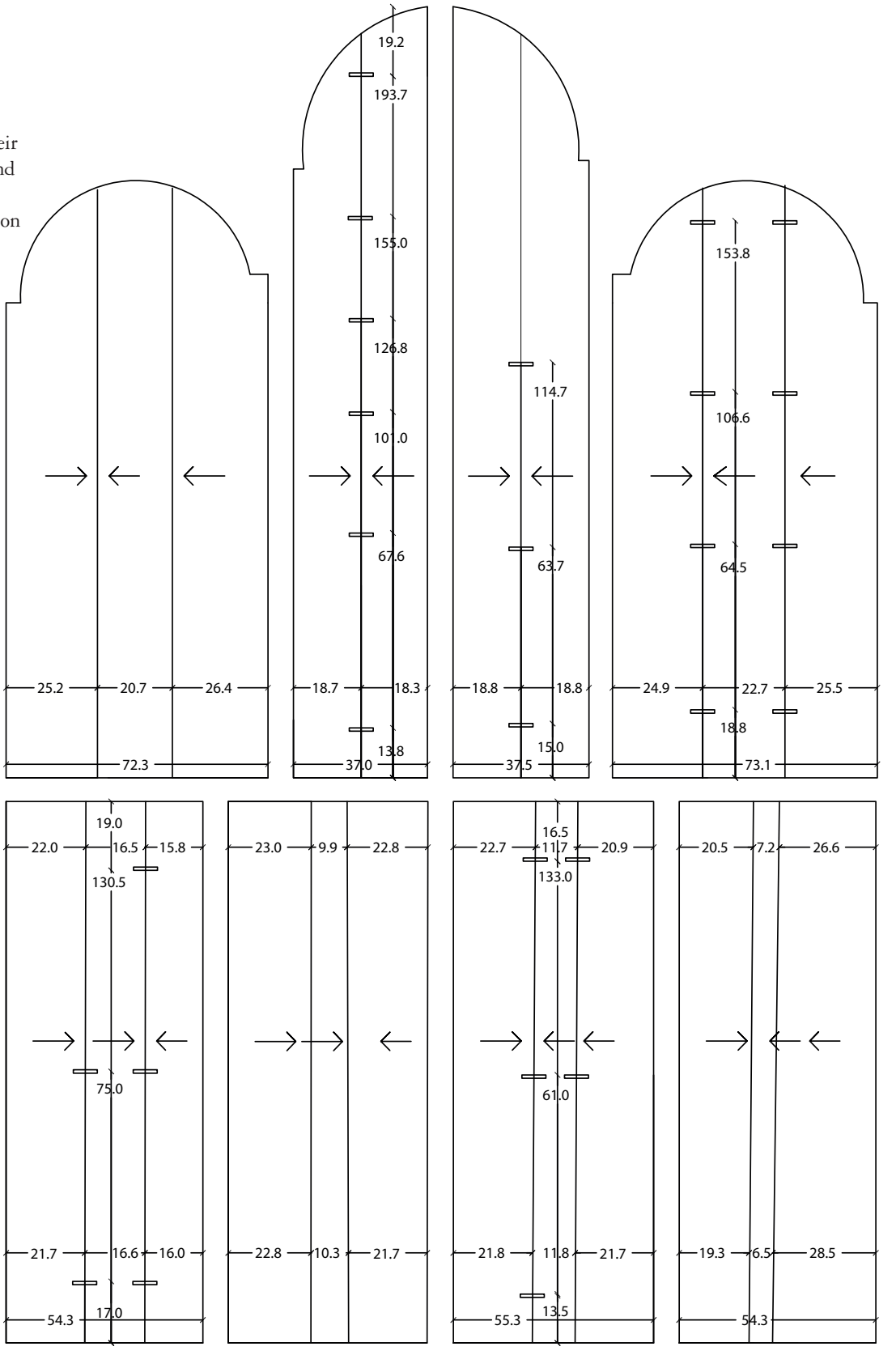


Fig. 2.2. Scheme of the composition of the support of the exterior; boards, their dimensions, split and growing direction as well as the position of dowels

Fig. 2.3. The pin in the face of the Cumaean Sibyl

While the above suggests a carefully considered assembly, some less meticulous details should be noted as well. It is very likely that the central plank in the *Archangel* panel still contains some *sapwood* on its right-hand edge, although this should have been removed during the assembly. Differences in the growing speed of the different boards reflected in the width of the tree rings, have been observed even within the same panel. In the case of the *City View*, the combination of fast-growing wood, with rings even wider than 4 mm, must have led to more significant shrinkage than in the other panels and has most likely prompted some alterations to its frame.

The variation in the thickness of the boards is considerable, not least because of the adjustments made in Berlin and the thinning along the edges enabling assembly in the (altered) frame. Panels that were split vertically are between 3 and 6 mm thick. The thickness of the two central panels of the upper register varies between 7 and 15 mm. The difference in finish and smoothness between the (original) obverse and reverse surfaces is commonly seen in early fifteenth-century double-sided panels. The outer surface, the reverse, is slightly more irregular. Sometimes, as can be seen along the unpainted edge of the *Baptist* panel, the use of a scrub plane even ripped out parts

Fig. 2.4. Detail of the panel of *St John the Baptist*, with '*barbs*' (a) and bevelled edge (b)

of the wood. On account of these irregularities, a thicker ground had to be applied to the reverse, which may have contributed to a more striking crack pattern in the paint layer.[22]

The panels of the upper register are 'curved'[23] at the top while those of the lower register are shaped into upright rectangles. All the exterior panels were bevelled along most of their edges. Both *Adam/City View* and *Eve/Interior View* show a slight bevel on all sides of both faces, except at their arched tops. The average width of the bevels is 20 mm for *Adam* and 25 mm for *Eve*.[24] The lower edge of the Archangel panel is slightly bevelled, but the curved upper edge shows no traces of thinning. It seems more than likely that both the Archangel and Virgin Annunciate panels were bevelled before they were cut into their arched shape. All the panels in the lower register have a bevel of about 20 mm, along all four edges, except for the portrait of *Elisabeth Borluut*, which is only bevelled along its lateral edges. It is our hypothesis that these bevels not only served as guides for the positioning of the frames but also had a structural function. The joiners took account of the potential shrinking and expanding of the wood in reaction to environmental factors. In spite of this effect and irrespective of its shape or size, a panel should be kept tight inside the frame and remain straight at all times. This may explain why the bevels of the larger panels are wider. Besides the fact that a bevelled shape allows the panel to slide vertically, it will stay fixed in the grooved frame thanks to its wedge-shaped edges.

Frames

The evaluation of the original construction of the frames must take two important factors into consideration. Firstly, the fundamental differences in format between both registers: panels of different width and height, curved or arched at the top in the upper register and straight rectangular formats at the bottom. Secondly, the far-reaching modifications carried out in Berlin in 1894.

Since their adjustment at the end of the nineteenth century, the six split frames have been glued to a pinewood backing into which a rebate was cut (fig. 2.5). Through these modifications they lost their original thickness. This makes the study of the most original and presumably even unaltered frames of *Adam/City View* and *Eve/Interior View* of the utmost importance with an eye to understanding the original construction technique. Both frames, which are remarkably narrow and tall, were carefully dismantled as in 1951, in order to carry out essential structural repairs. This gave us the opportunity to precisely study the joints in their disassembled form. Moreover, despite the major structural alterations of the other frames of the upper register, the study of the individual parts of the *Adam/City View* and *Eve/Interior View* frames sheds light on their original construction.

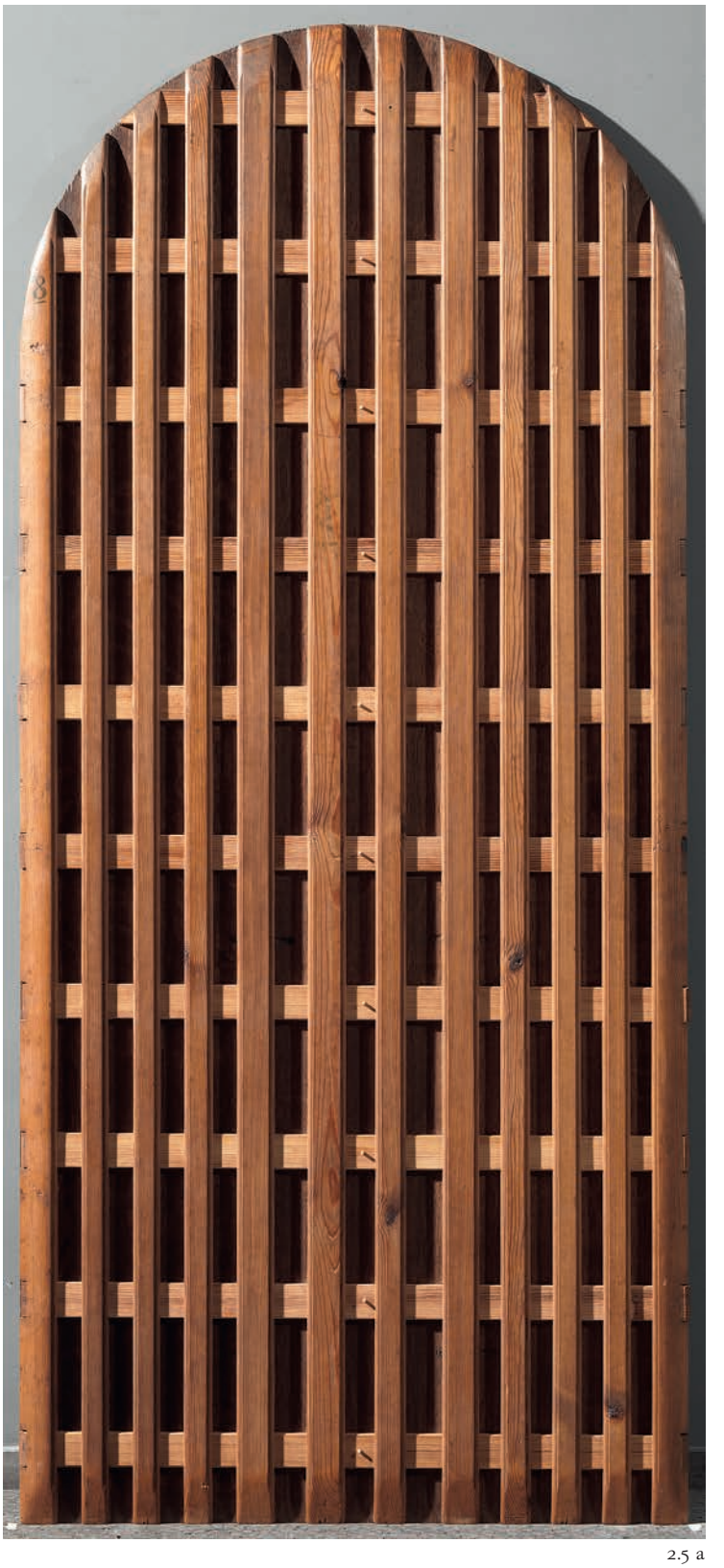
Although the structure of the frames of both registers is fundamentally different, as will be shown below, panels and frames were designed as coherent wholes: it holds for both registers that form originally followed function.

The upper register

The two central frames in the upper register (*City View* and *Interior View*) are made up of six elements: a bottom and a median rail, a curved upper rail consisting of two separate pieces, and two upright members: a shorter and a taller stile (fig. 2.8).[25] It is striking that different techniques were used for all their connections.

Starting from the top, the stepped shorter stile has two horizontal setbacks or recesses, so that its base is significantly wider than the top. Both frames are rounded at the top in the form of a quarter circle pointing outward. 'Split by the panel', the curved rail consists of two separate parts joined by six pegged mortise and tenon joints (fig. 2.6 and fig. 2.7). As a result, and because of the fact that the dowels are attached in pairs to one of the curved upper rails and pass through the panel, the panel is 'clamped' at the top. This fixes the panel and suspends it between the curved upper rails rather than vice versa, as suggested, for instance, by Verougstraete.[26] The result is a highly unusual partly engaged frame.

The curved upper rails are not joined to the stiles in the traditional way. Despite the fact that they widen towards the top, they rest primarily on the shorter stile with seemingly only minor support provided by the taller stile. The shorter stile widens here for the first time and terminates in a triangular peg, with the longest edge on the side of the panel covered entirely by the upper rails. Once again, the two elements of the frame are not joined with one another here. Slightly lower, just above the floating median rail, this stile widens again and is connected to the moulding of the adjacent frame with the *Annunciation* scene. Traces of the original hinges can still



2.5 a

2.5 b

Fig. 2.5. The pinewood backing of the *Archangel* (a) and a close-up of the thickness of the thinned and cradled panel (b)

Fig. 2.6. Detail of the upper edge of *Interior View* showing the dowel holes

Fig. 2.7. Dismantled upper part of the frame of *Eve / Interior View*: the paired dowels (1) and (2) are clearly visible as well as all of the individual connections.

Fig. 2.8. Dismantled part of the frame of *Adam / City View*: the floating median rail with both half-lap dovetails

2.9 a

2.9 b

2.9 c

2.9 d

2.9 e

2.9 f

Fig. 2.9. Details of the type of corners of the frame of *City View* during restoration: upper tallest corner (a); upper lowest corner (b); connection with the floating median rail (c); connection with the floating median rail right with traces of historical hinges and the connection with the adjacent frame (d); lower left corner (e); lower right corner (f)

be found in this zone (fig. 2.9). It appears that these were only fixed in the stile, since no traces of fitting were detected in the connection with the 'floating' median rail,[27] which is also located in this zone. This rail was placed only on the closed side of the wings and separates the architectural scenes from the Sibyls. As noticed by Verougstraete, the rail was placed on top of the panel rather than embedded in and is not connected to the panel.[28] Although the joint with both stiles has been referred to as both *half-lap dovetail,*[29] close-up examination after cleaning of the original polychromy has revealed a straight ending at the upper connection with the largest stile.

The straight lower rail is attached between the bottom edges of the stiles using a single-pegged mortise and tenon joint with square-cut shoulders. Due to this connection, a vertical joint is visible between stile and rail. It should also be noted, lastly, that in its current form at least the taller stile narrows considerably towards the top.

Fig. 2.10. The frames of the upper register during restoration. It is clearly visible how the arched shapes of adjacent frames are perfectly aligned and fit together.

It is noteworthy that the other frames of the outer wings in the upper register have a peculiarly shaped rounded top and recessed stiles of uneven length (fig. 2.10). Their tallest stile ends at about the height where the shortest stile of the *Interior View* and *City View* wings have their first horizontal setback. Although these frames have not been dismantled, their original assembly can be reconstructed to a certain degree, based on observation and the X-radiographs, as well as on comparison with both central frames. The frames of the *Archangel* and the *Virgin Annunciate* probably consist of eight elements. As in the adjacent frames, they have two stiles of unequal length, a lower rail with single-pegged mortise and tenon joints at each corner, and a floating median rail below the lunettes with the Sibyls. Presumably, the median floating rail is attached to the stiles by a half-lap dovetail joint type.[30] Compared to the frames of both central panels, these connections are less visible. It has become apparent during the cleaning of the polychromy, moreover, that various repairs have been done here in the past, including wooden inserts.

The semicircular arched rail at the top most likely consists of four elements; two quarter-circles on each side of the panel, 'clamped' onto the panel with dowels. The dowel holes are visible in the X-radiographs.[31] Glue remnants on the unpainted edge of the rounded top of the *Virgin Annunciate* panel indicate that the curved top rail was originally glued to the panel.

The lower register

In contrast to the assembly of the upper frames, the frame construction in the lower register is typical of the period: each frame consists of two stiles of equal length and two horizontal rails, with single-pegged mortise and tenon joints, all of them cut square, at the corners.

The panel with the portrait of *Elisabeth Borluut* is the only one in the lower register where incised lines were observed with certainty. Along the perimeter of the panel, even underneath the paint layer, several lines were incised parallel to the edge. This was done after the planing of the lateral bevels. Remarkably, these incised lines were not found on the *Hermits,* its former reverse. Moreover, the unpainted edges bear knife and planing marks.

Form followed function?

Because of the unusual, even astonishing construction, it has been suggested that the top parts of the frames in the upper register, including both central ones, have been altered.[32] Verougstraete considers that the (remaining) triangular peg on the short stiles of the *Interior View* and *City View* is the remnant of an earlier tenon, 'owing to sawing in the 16th century of the upper part of the wing'. [33] However, as already suggested by Aline Genbrugge and Jessica Roeders,[34] there is plenty of evidence to indicate that this is not the case: the form of the frames has indeed been less modified than presumed and could be considered authentic.

Remnants of a ground layer have been observed on the top of both central frames. As the top of the lowest stile of the *City View* frame still bears original tool marks, this part does not appear to have been modified in length. In both frames, the bevel on the outer side of the curved upper rail continues on top of the shorter vertical element. Given that only original tool marks were observed at the top of the lower stile of the *Interior View* frame, its length cannot have been modified either. Moreover, in this area, several parallel lines can be observed on both frame and panel. These have been interpreted as original marks of a knife or chisel and seem to indicate that the curved shapes of frame and panel are authentic. In addition, original tool marks have been noticed in a small, triangular cavity at top left of the *Interior View* panel (fig. 2.6). This is clearly an imperfection of the support covered by the frame, which would seem to suggest an economical use of wood. What is more, the cleaning of the original mouldings of the frames revealed that the surface of the tallest board was bevelled perfectly all along its length to fit into the groove. The curved top of this board was planed from the inside out, which could only have been done before the panel was glued together. It follows that the top cannot have been reworked. In addition, the bevel on the outer side of the curved element on the reverse of the frame continues on the top of the stile. If the panels – and frames – had a different shape originally, any adjustment of form would have left traces.

Although the aforementioned tool marks distinctly indicate that the asymmetrically curved shape is original, it remains a unique example. And the same goes for its construction technique. In this partly engaged frame, only the bottom and lateral edges of the panel are covered by the frame. It is exceptional that this is not the case with the top edge.[35] However, it is highly likely that the exceptional format of the altarpiece and the manipulations of the wings would have motivated this unusual construction.

When a panel is supported by a rebated bottom rail, the entire load of the panel is supported by this rail. In the case of slender panels like *Adam* and *Eve*, which are considerably taller and narrower than the other ones, this type of construction causes the weight of the panel to be distributed over a much shorter distance. This greatly increases the load on such bottom rails and their corners. Yet, as previously mentioned, the top of the two central frames of the upper register are clamped in between the curved parts of the frame. As the dowels of the curved upper rail go through the unpainted edge of the wooden support of the panel, the panel is in fact suspended at the top (fig. 2.11-A), as a result of which the pressure on the bottom rail is reduced considerably. The effect is especially noticeable in tall and slender panels such as *Adam* and *Eve*.

For this reason, the remarkable shape of the upper rail could be in fact a well-considered choice (fig. 2.11). Due to the curved shape of the top rail, the weight of the panel is transferred to a stile (fig. 2.11-B) instead of the bottom rail. Firstly, this makes it necessary that the load be supported by a sufficiently strong stile. Because the load increases downwards, the base of the stile should ideally be wider than its top – hence its stepped profile. Secondly, for the frames of the *City View* and *Interior View*, the downward thrust is transferred to the shortest stile only. This is also the stile to which the historical hinges were fixed and which was connected to the adjacent panel/frame. If, due to a different form of the upper rail, the load of the panel had to be carried by

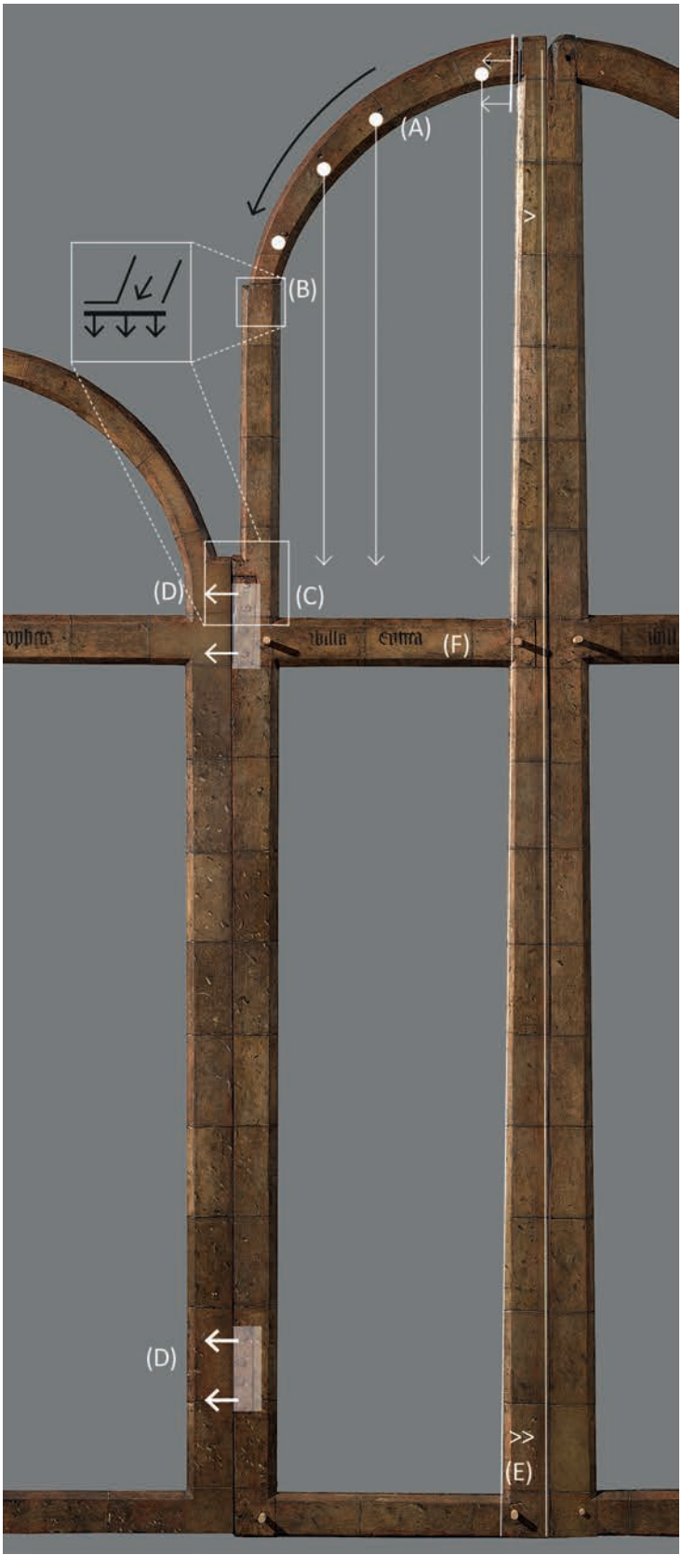


Fig. 2.11. Scheme of the presumed load bearing principle for the upper register

the tallest stile as well, this would have resulted in a greater load on the corner joints of the bottom rail, which in turn could have led to distortions and jamming of the adjacent panels.

Where the curved upper rails butt against the short stiles, the width of the stile is considerably larger than that of the rails (fig. 2.11-B). Consequently, the weight is distributed over a larger area. The same principle is applied a second time where the central frames are joined to the adjacent frames of the Annunciation scene (fig. 2.11-C). Both frames were originally fixed at this point to the historical hinges, of which only a few remnants and traces are now visible (fig. 2.11-D). Since the transmission of forces occurred entirely via these connections, the stiles needed to be of sufficient size. A similar principle was applied to the taller stile too (fig. 2.11-E). Given that this stile was barely connected to the curved rails, the floating median rail is essential. The dovetail joints not only connected both stiles but also kept them in place. This made it necessary that the floating rails remained separated from the panel (fig. 2.11-F). Verougstraete already mentioned that they were intended to diminish the load by spreading it. Although we agree that it helped to spread the load towards the hinges through its construction, we are inclined to believe that, for the central frames, it was an essential element in keeping the construction square. For the same reason, and in order to allow for lengthwise expansion, only a fairly flexible connection between the curved upper rail and the taller stile was possible. In this way, a dimensionally stable unity was aimed at that would allow to efficiently support the exceptional shape and size of the panel. This structural logic was more than likely extended to the adjoining frames, in which the floating median rails continue across at the same height, albeit with a larger cross-section, adjusted according to the increasing load. The dimensions of their stiles will have been adjusted for the same reason (fig. 2.11-D).

All this makes it more than likely that the peculiar outline of the upper register with its curves and characteristic setbacks was the result of a well-considered concept rather than the outcome of adjustments and modifications. Indeed, in terms of both principle and appearance, it might be compared with the idea of Gothic buttresses.

It was essential to carefully prepare the elaboration of such a complex structure. Construction lines were found on different panels of the upper register, as well as on the unpainted area underneath the crossbar of the frame of the *Virgin Annunciate*. These marks indicating the position of the dowelled moulding of the frame correspond to the original construction, as is obvious from the old nail holes – five on the left and four on the right – which became visible underneath the crossbar of the frame. As the incised lines served as guides for the frame, this would mean that the frame was made to fit the dimensions of the panel. Several traces (presumably in ink) along the unpainted edges may have served the same purpose.

We measured the track of the incised lines, which is more precise than the lines indicated by the barb or by the edges of the panel (which have, moreover, been cut down). The lines incised around the panel might have indicated the edge of the frame and correct squaring. This could then be used as a reference for the final insertion of the panel in its frame. Examination confirms that the diagonals are equal. The absence of a bevel at the bottom could be explained by the type of assembly. The lower and upper rails terminating in tenons were engaged on the panel first, with the incised lines on the panel used to identify their precise position. The stiles (with mortises)

were then fitted laterally, the incised lines serving here to ensure proper squaring. This aspect will be further investigated on the reverse side, once the thick layer of varnish has been removed and the structure can be studied properly.

Historical hinges

All the manipulations have evidently had an impact on the frames, above all by increasing the fragility of the framework of the articulating parts. If we look closely at early photographs and at the marks left on the frames by the hinges, those joining the four pairs of shutters to the central framework appear to have been replaced in four separate campaigns. The replacement hinges can be discerned by the drill holes (screws were inserted into the stiles to hold the new hinges), by cavities left on the surface by the metal leaves and by inserts on the ridges of the upright members where the pins were located.

Originally, eight lateral hinges were inlaid and nailed to the edges of the frames of the four wings of the *Archangel*, the *Virgin Annunciate*, *Joos Vijd*[36] and *Elisabeth Borluut*, allowing the shutters to be closed in pairs on the central corpus of the polyptych (fig. 2.12a). The material history of the altarpiece indicates that it was decided as early as 1588 that the polyptych could only be opened four times a year in view of its damaged state. In *L'Agneau Mystique au laboratoire*,[37] Antoine de Schryver and Roger Marijnissen mention the placing of a lock in 1591–92, quoting the relevant archival record:[38] 'As a protective measure, the altarpiece will only be opened on feast days.' The reference to protective measures suggests that, by the end of the sixteenth century, the original hinges were worn and fragile and probably had to be replaced. They were

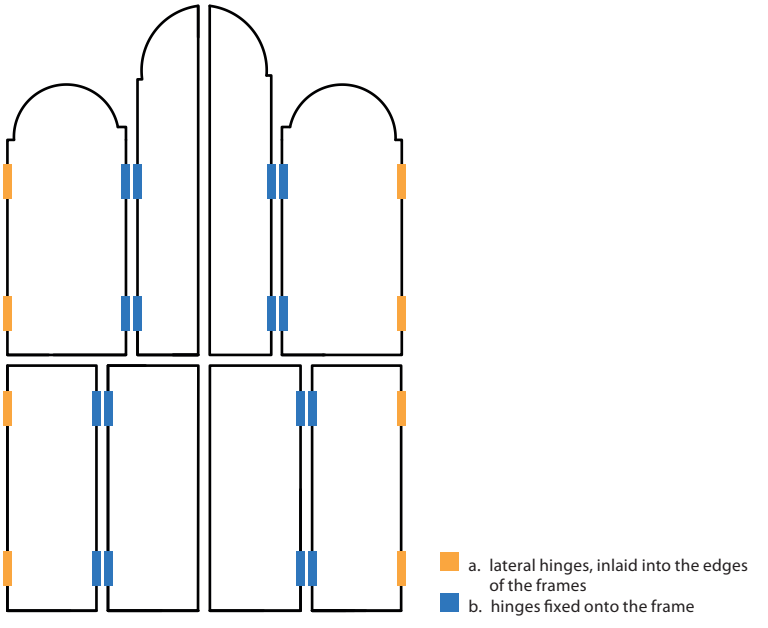


Fig. 2.12. Schematic indication of the placement of two types of hinges

indeed replaced by a series of hinges attached to the stiles (two for each), on the outer side of the polyptych, fixed with three to five screws whose ends, on the inner side of the polyptych, were fastened into wooden inserts (fig. 2.13). No indented marks have been detected around the screw-holes within these notches. This suggests that the ends of the screws fitted into the metal leaves inserted into the notch. Each notch was then covered summarily with a piece of oak nailed over it – these pieces of oak are visible in old photographs of the lower register. The outer sides of the stiles onto which the hinges were affixed were notched on their axis of rotation.

The second series of eight hinges was not to withstand the ravages of time and was also replaced, this time by very large square hinges, screwed to the four shutters closing on the frames of the *Adoration of the Lamb* and the *Deisis*.

These square hinges also reinforced the corner joints. Eight or nine metal bolts passed through the stiles. Their rounded heads were visible on the surface on the inner side of the polyptych. The hinges were placed on the outer side and as they were threaded, no nuts were needed to fix them. Once the hinges were in place the shanks of the bolts were trimmed flush with the metal leaves. Just before the new hinges were fixed, small pieces of (non-polychrome) wood were inserted to level out the rectangular notches left by the former hinges, on the left- and right-hand stiles of the frames of the *Soldiers of Christ* and the *Hermits*.

It can be assumed that the other pieces of non-polychrome wood added to reinforce some of the frames on the front side are contemporary with this intervention. Although the date at which the new hinges were affixed is difficult to determine, some clues are provided by the material history of the frames, the traces left by older hinges on the frames and by early photographs. The second series of eight square hinges, which seem to have been hand-made, was replaced by very large ones. These were screwed to the shutters joining the frames of the *Adoration of the Lamb* and the *Deisis*. These hinges may have been fitted in 1662–63 by the master joiner Boudewijn van Dickele when the polyptych was remounted in the Baroque portico altar. It is important to note that these hinges partially hid the quatrain: on the frame of *Joos Vijd* the hinge leaf covered the beginning of the quatrain 'Pictor Hubertus Eeyck', while on the frame of *Elisabeth Borluut* it hid the end of the quatrain '*…ocat acta tueri*' (fig. 2.14). Worth remembering is that a transcription of the quatrain was made by the epitaph writer Christoffel van Huerne[39] between 1616 and 1623. It is thus safe to say that the quatrain was still legible at the beginning of the seventeenth century. The square hinges were obviously affixed after this re-transcription. This third set of hinges affixed to the outer stiles was partially removed during the nineteenth century.

Fig. 2.13. Historical hinges onto the frames of *Joos Vijd* and *St John the Baptist*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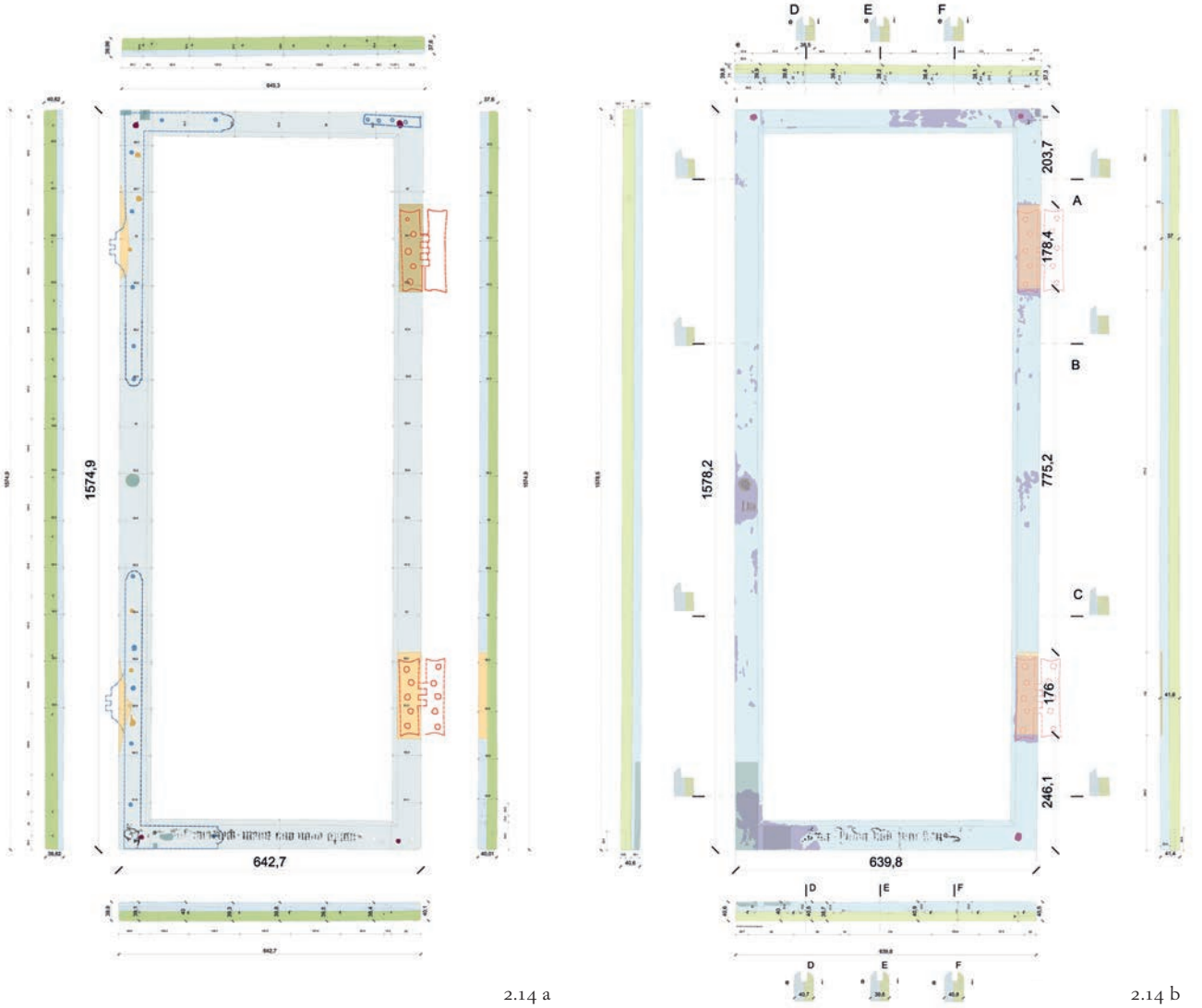
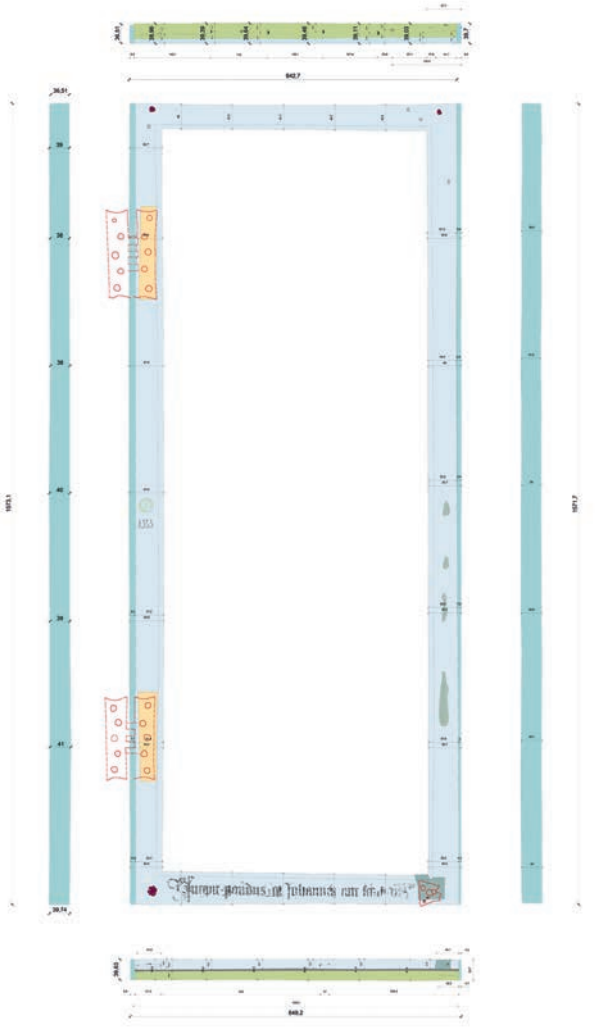
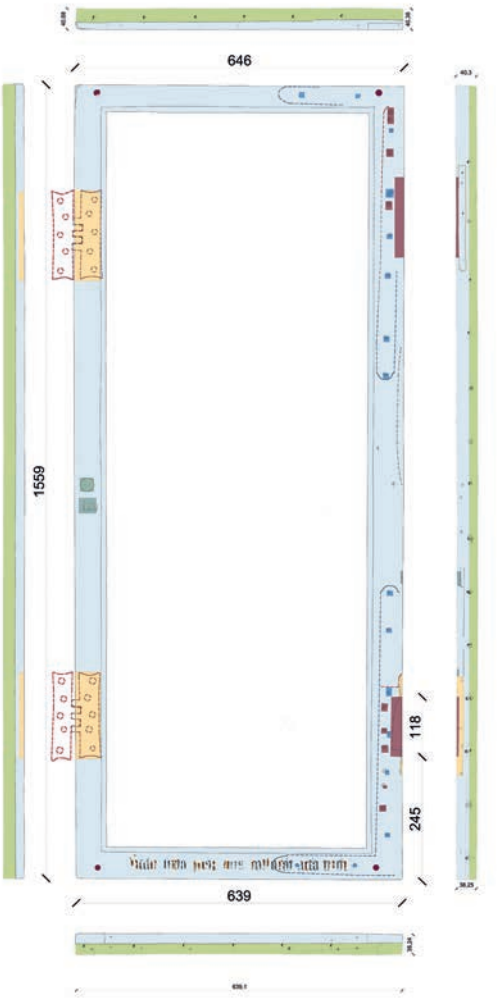


2.14 a 2.14 b

Fig. 2.14. Schematic drawing of the types of hinges onto the frames of the lower register: *Joos Vijd* (a), *John the Baptist* (b), *John the Evangelist* (c), *Elisabeth Borluut* (d)



2.14 c



2.14 d

INTERVENTIONS

The Berlin mutilation

In 1894, after three generations of hinges and several types of applied or countersunk metal reinforcements, the original frames appeared to be in a rather poor condition. Wilhelm von Bode, the then director of the Gemäldegalerie, where, except for the *Adam* and *Eve* panels, the altarpiece was kept,[40] wished to present all the paintings side by side and ordered that the panels and frames be sawn through their thickness. With a steam-powered, horizontal reciprocating saw, the six wings were split into twelve individual paintings that could be displayed next to each other.[41]

The stiles and rails of the frames were individually sawn by hand. Once they were split, the frames were reassembled and reinforced so as to become fully autonomous structures. Several pieces of limewood thus had to be inserted and broken parts fixed. For the frame of the *Archangel*, a total of eighteen pieces and 25 pegs of limewood were used to fill the cavities of the old hinges and old nail or screw holes.

Following the splitting of the panels, the thinned original oak fronts were combined with a pinewood backing into rebated frames. On the interior the distinction between the original and added pieces can easily be made. The remaining thickness of the oak frames varies from about 15 mm for the straight elements of the *Archangel* panel to 20 mm for *Elisabeth Borluut* and the *Virgin Annunciate* and up to 22 mm for *St John the Baptist*. The original arched upper rail of the frame of the *Archangel* is about 7 mm thick and is reinforced with a 30 mm backing. This is slightly thicker than the average 22 mm thick pinewood boards used to strengthen the straight parts. This means that the average total thickness of the original frames, taking into consideration the thickness of the blade and the sawcut, would have been comparable to the 39 mm of *Adam* and *Eve*.[42] Since the 1894 interventions, the thinned panels are being held in place in the rebate using rectangular blocks screwed onto the pinewood back frame. For the arched panels, pitch-pine quarter-round mouldings were screwed onto the top of the frame and the bottom rail of the frame.

The split panels were reinforced with a pitch-pine cradle (*Pinus Rigida*). Both the vertical fixed bars and the 'sliding' crossbars show several knots.[43] Their number varies from hardly any in the fixed elements at the back of the *Annunciation* to as much as twelve in the vertical slats of *Elisabeth Borluut*. Due to their presence in the cradle attached to the backs of the panels of *Joos Vijd* and *St John the Evangelist*, resin has leaked onto the support. The cradles have an irregular pattern because two different sections have been used for the vertical bars – 40 mm wide for the bars on the lateral edges and for those covering the joints between two planks, 30 mm for all others.[44] The slender 9 mm thick sliders appear to be 38 mm wide in each cradle.

A considerable number of construction lines or assembly guides were noticed on the different panels of the upper register. Apart from the original traces mentioned during the assessment of the initial construction, these marks dated from the 1894 adaptations and included compass points on the *Archangel* panel. The eight points underneath the crossbar of the *Virgin Annunciate* seem to be connected with repeated attempts to determine the centre of the curvature during the treatment and resizing of the panel in Berlin: a semicircular pencil line traced from one of the compass points

is visible alongside the left unpainted edge of the curved top. Similar pencil lines are visible on the inner side of the frame and on the panel with the *Archangel*.

Twentieth-century interventions

In 1920, after the Treaty of Versailles, all the panels of the *Ghent Altarpiece* were reunited in Belgium and incorporated into a metal frame. The reinforced altarpiece was placed in the Baroque altar surround, which was still present at that time in the Vijd Chapel. It remained there until 1950, when the altarpiece was brought to Brussels for a conservation and restoration treatment in the 'Laboratoire central des musées de Belgique', KIK-IRPA'S predecessor. During treatment, the cradled panels were impregnated at the back with warm beeswax, using the heat of infrared lamps.[45]

In 1951, a new and better secured metal supporting structure was designed for the altarpiece. It enclosed all the framed panels and prevented the wings from being moved independently. Several brass reinforcements were added to the frames (for instance at the corners) to reinforce them and to integrate them into this new anti-theft system. This metal structure is still in place today in the Villa Chapel in St Bavo's Cathedral.

Additional observations on undated interventions

During treatment, several imprints and nail holes were found, for instance underneath the floating crossbar of the panel with the *Annunciation*. Their purpose, however, and that of the two small nail holes in the middle of the upper edge of the panel of *Elisabeth Borluut* remains unclear.

OBSERVATIONS ON THE CONDITION OF FRAMES AND SUPPORTS AND THEIR STRUCTURAL TREATMENT

Panels and cradles

As already mentioned after the preliminary research of 2010, only limited interventions had to be carried out since the supports appeared to be in a good condition. Most of the observations on the condition were related to the alterations made in Berlin and their effect on the original support. In addition to these issues, damage to the original support was – fortunately – very limited.

On account of the unpainted edges that had become visible between the painted surface of the panels and the stiles of the frames, it was a well-known fact that all panels had shrunk several millimetres. The more significant shrinkage of the *Adam* panel as opposed to that of its counterpart *Eve* had prompted some previous modifications to the painting's frame.[46] This excessive shrinkage was due to the fast

growth of the left plank of the *Adam* panel. In all the other panels, shrinkage after cradling was minimal: there is barely any difference between the length of the horizontal sliding bars and the width of the panel. What is more, the warping of the panels turned out to be very limited, with the maximum gap between the back of the panel and the fixed elements of the softwood cradle ranging between 0.2[47] and 0.5 mm[48] and a maximum of 2 mm for the panel with *St John the Evangelist*. Since they are higher than wide, it is not surprising that their vertical deformation is more significant. In spite of their different dimensions, the horizontal warp appears to be about 2 mm, while the vertical deformation ranges from 3 mm (*Virgin Annunciate* and *Elisabeth Borluut*) to 4 mm (both Saints John).

Rather than the warping of the panel itself, it was the 1950–51 impregnation with beeswax, the subsequently accumulated dust and dirt and some provisionally added nails that failed to be removed which caused the tensions in the panel and the obstruction of the cradles in the panel of *Elisabeth Borluut*.[49] Two observed alterations demonstrated that this was a recurrent problem. Apart from the damaged vertical faces of the movable crossbars in the cradle of the *Archangel,* two crossbars in that cradle and in that of the *Virgin Annunciate* appear to have been thinned during a previous intervention.[50] Additionally, some of the fine nails used during the construction of the cradle to temporarily keep the bars in position while they were being glued,[51] had not been removed properly and were constraining the mobility of the crossbars. However, none of this was the case with the cradle of the *Joos Vijd* panel, where dust and dirt were the only obstacles for the movable parts.[52]

In addition to the problems noticed during the preliminary investigation of 2010, a joint in the lower part of *Adam* and one in the area of the foot of *St John the Baptist* had become apparent and some dowel pins had begun to show through the ground layer.[53] Close-by examination showed that the joint in the *St John the Baptist* had been reglued before the cradle was applied without being sufficiently levelled.

Parallel to the surface, three radial cracks were noticed during restoration at the top of the panel with *Eve* and the Cumaean Sibyl. Two of them were caused by the screws fixing the metal supporting structure in 1951. The third one, near the joint, is due to the notch made to fix the pivot of the rotating presentation system in de Royal Museum of Fine Arts.[54] These opened cracks were reglued with a solution of 25% HTFG and clamped to dry for twelve hours. Due to a 6 cm long crack at the edge of the *Adam* panel, a splinter of 2 cm in length had broken off. The same problem was noticed at the unpainted border on the top of the adjacent *Archangel* panel, where three splinters had broken off as well. The splinter at the top, in the middle of the curve, was attached using sturgeon glue.

Although it clearly predates the cradling, seeing that the pinewood was applied onto it, the precise cause and date of a locally thinned area at the top of the *Joos Vijd* panel remains unknown. Due to an accidental manipulation, the original thickness was locally reduced to 3 mm. Unfortunately, it is not known if the original obverse, the missing *Just Judges*, also showed the same alteration. Normally, Baltic oak – at least heartwood – is not affected by insects. However, a group of different slits parallel to the wood grain at the back of the panel with *Elisabeth Borluut* and visible between two vertical bars of the cradle are probably traces of rectilinear galleries made by forest insects when the wood was recently cut ('green wood'), i.e. before it was seasoned

long enough to evaporate its internal moisture. Moreover, examined from close by, it appears that the brown spots under the floating crossbar of the *Archangel* panel are traces of oxidized metal rather than burn marks.

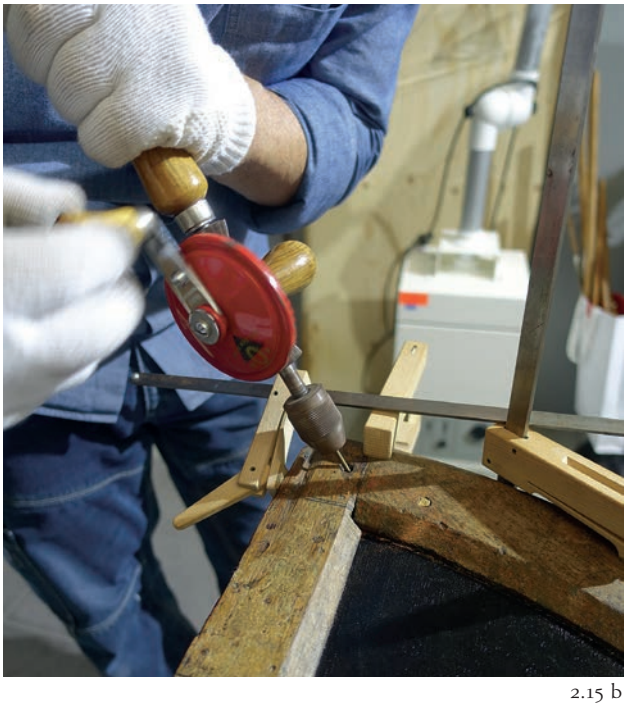
During treatment, all dust was removed from the back of the cradled panels.[55] The nails that had remained in the sliding laths since the assembly of the cradle, were removed by drilling. Thereupon the accumulated wax was removed mechanically from the sliding laths. In addition, the crossbars were planed down on all their faces, reducing their width by about 0.5 mm. To facilitate their movement, the laths were polished with an agate stone and their edges slightly rounded. Finally a thin layer of paraffin wax was rubbed onto the surface of the crossbars and bamboo stops were glued onto them to prevent them from sliding out of the cradle. All cradled panels were planed to flatten out their backs after the lengthwise splitting of the wings and show marks of a toothed plane. A horizontal saw trace remains visible between the cradle bars in the lower part of the *Virgin Annunciate*. Another horizontal and rather superficial groove at the back of the same panel is presumed to have served as a guide for the depth when the panel was planed after sawing. Scriber traces were observed along nearly the entire perimeter of the unpainted edge. Unfortunately, the interventions of 1894 have erased most of the original tool marks.

Frames

Despite their turbulent past, the frames appeared to be in a satisfactory structural condition so that only few interventions had to be carried out. However, this was not the case for both central frames. Intensive research conducted in 2010 had already pinpointed structural deficiencies which had caused damage in several places. All these damages, including cracks, open joints, shifted connections and even broken or missing parts, seem to be the result of deformation of the frames. Although all the frames were treated, the *Adam* and *Eve* frames were the only ones that had to be dismantled entirely. Only in this way could all their components be treated properly and their unstable lower corners be strengthened.

The shortest stile of the frame of *Adam* had become unstable since the mortise had split from the dowel hole downwards (fig.2.16). Because part of the wood between the bottom side of the lowest edge and the bottom side of the rail was missing, the structural integrity of the whole frame had become compromised. Perhaps this was the result of modifications to the mortise and tenon connection, whereby the tenon was reduced by 3 to 4 mm.[56] It seems likely that in this way previous restorers tried to fit the shrunken panel better into the groove of the right-hand stile and thus to make the unpainted edge of the painting less visible. The problem at the lower corners of the frame of *Eve* was rather similar, although here previous restorers had attempted to strengthen the mortise and tenon construction by adding a small piece of wood.[57] Because this inserted piece had come loose and was even out of level, it was no longer of any use. Wooden inserts were used to reinforce the assembly of several other frames too, for example on the lower corner of the *Virgin Annunciate* frame. The broken part at the corner of the lower rail of the *Adam* frame was reglued and the cavity at the lower end of the lowest stile filled with a piece of oak to reinforce the

2.15 a



2.15 b

2.15 c

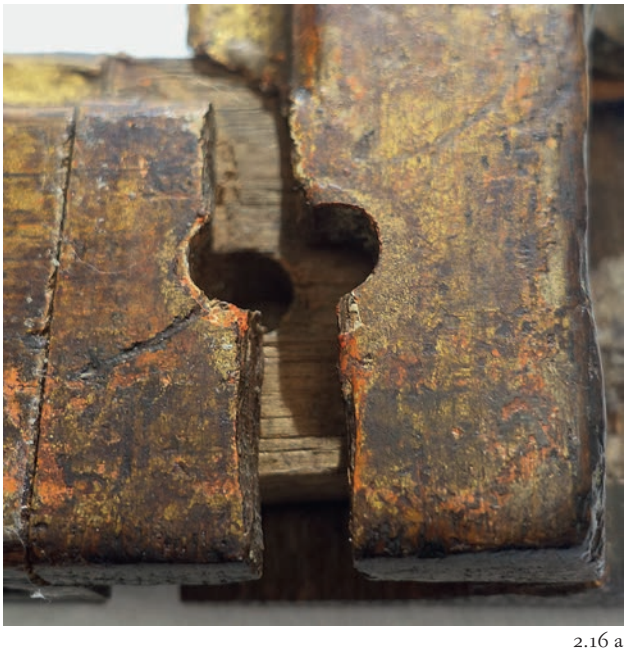
Fig. 2.15. Several pictures during the restoration of the frames of *Adam* / *City View* and *Eve* / *Interior View*

mortise and tenon joint. The instability of the lower corner of the tallest stile of the *Eve* frame was corrected in the same way. New dowels were used to connect the stile and rail.

Although less obvious, the other damages were also the result of deformations. In the frame of *Adam*, some loss of material had become visible next to a crack starting from the dowel hole. Moreover, the lower right corner of the dovetail had broken off (fig. 2.15c). This was a result of the movement of the individual parts of the frame, visible through apparent joints in several places. In both central panels, this was the case for the dovetail connections of the median rails. The joint between the curved top rail and the vertical stile in the frame of *Adam* had opened as well. To deal with this stability problem, the corner had been reinforced with brass screws in the past, albeit without properly realigning the connection. In the frame of *Eve*, the floating median rail had even become detached completely owing to the dowel and the dovetail connection moving out of position. In some cases, the movement had caused cracks and loss of material. Small and local cavities, such as at the corners of the half-lap dovetail of the floating median rails, were treated using a mouldable filling material. The crack in this median rail was reglued from the back. The cavity between the panel of *Eve* and the tallest frame stile was filled with a thin piece of oak.

During previous restorations, vertical oak laths were attached onto both sides of the frame of *St John the Baptist* and along the right stile of the frame of *Eve*. These additions to let the frames fit into the metal support had become very noticeable during the cleaning of the original polychromy of the frame. For the frame of *St John the Baptist* it was decided to reduce their thickness. By planing down about 5 mm of these two non-original vertical oak laths, the surface was made level with that of the metal structure. In the *Eve* frame, the apparent joint in between both materials became disturbing and had to be restored.

Fig. 2.16. Restoration of the unstable mortise at the shortest stile of the frame of *Adam*



2.16 a

2.16 b

Reframing

Once the wings had been sawn through their thickness in 1894, the thinned panels were kept in a fixed position in the back frames, using pieces of pine and cork and a continuous felt ribbon. But the cork had crumbled and the felt had come loose in several places, so that the screws fixing the laths onto the back frame presented a risk for the fragile edges of the panels. What is more, as neither the panels nor the frames were perfectly right-angled, the panels had to be repositioned so as to align the mouldings of the frames with the barbs of the painted borders of the painting. After the old felt and the traces of glue were removed,[58] a new and narrower museum felt was applied. The panels were repositioned using pieces of American cedar, a soft type of wood. The vertical and horizontal wedging was obtained by using blocks of balsa, which were fixed onto the back frame with a polyvinyl acetate glue (fig. 2.18). To keep the panels in their frames, a more flexible solution was applied. Each panel is now held in place by plates of plywood,[59] screwed onto the pine backing (fig. 2.17). The light pressure applied by the elastic strip on top of the plywood guarantees that the panel remains safely fixed inside the framework.

Conclusion

Based on all the observations and despite the *Ghent Altarpiece*'s turbulent conservation history, both the wooden supports of the panels and their original frames were found to be in a remarkably good structural condition. This is highly exceptional, for both panels and frames have been altered in size, restored using different types of wood (oak, pitch-pine cradles and limewood inserts), and – except for the central panels of the upper register – sawn apart. Moreover, after having been thinned significantly, their thickness was adjusted drastically with pinewood back frames and cradles.

Thanks to the satisfactory condition of frames and supports, the present restoration could be limited to the structural interventions on the frames of both *Adam* and *Eve*, in addition to consolidating joints, cleaning and unblocking cradles and providing a probate system to keep the restored panels in position in their original frames.

Due to the extensive approach of this restoration campaign, in particular the complete disassembly of the two central frames and the cleaning of the original polychromy, additional observations could be made about the construction of frames and supports. Material evidence gathered during this campaign has demonstrated more clearly than ever that the shape of the frames was altered much less than has often been thought and that their exceptional layout and construction resulted from a unique concept. Several of these aspects will be further analysed and verified against the study of the wooden supports of the other panels and frames during the following phases of the *Ghent Altarpiece* conservation project.

Fig. 2.17. Repositioning of the panels using plates of plywood

Fig. 2.18. Alignment of the panel in the frame using wedges in balsa

2.17

2.18

Notes

1 March–November 2010.

2 Jean-Albert Glatigny (panel painting and sculpture conservator) assisted by a team of panel conservators: Aline Genbrugge (paintings conservator, Brussels, KIK-IRPA), Renzo Meurs (furniture conservator, Amsterdam) and Jessica Roeders (paintings conservator, Haarlem, Frans Hals Museum). The full report can be consulted on the Closer-to-Van Eyck website.

3 The original panel, stolen in 1934, was replaced by Jef Van der Veken's copy in 1941.

4 It should be mentioned, however, that all panels were unframed, except those of *Adam* (with *City View* on the reverse) and *Eve* (with *Interior View* on the reverse). Both paintings have never been unframed (or had their frames dismantled) since the 1950–51 restoration campaign by Paul Coremans and Albert Philippot.

5 Treatment by Paul Coremans and Albert Philippot.

6 Coremans 1953.

7 Since both technique and condition were already investigated in 2010, this article summarizes and completes the individual condition reports made by Jean-Albert Glatigny and Aline Genbrugge and, for the condition, builds largely on the structure of their reports.

8 Glatigny et al. 2010.

9 Frames and support of: *Archangel*, *Adam/City View*, *Eve/Interior View*, *Virgin Annunciate*, *Joos Vijd*, *St John the Baptist*, *St John the Evangelist* and *Elisabeth Borluut*.

10 This contribution expands, refines and complements the information of the 2010 report by Glatigny, Genbrugge, Roeders and Meurs.

11 The raised edge of ground and paint proves conclusively that panel and frame originally formed a whole and that the size of the painting has remained unchanged.

12 Frames and support of: *The Archangel, City View, Interior View, Virgin Annunciate, Joos Vijd, St John the Baptist, St John the Evangelist* and *Elisabeth Borluut*.

13 Since in the first phase of the restoration the exterior panels have been treated, we have chosen to refer to the central upper panels (and their frames) as much as possible as the *City View* and the *Interior View*. If *Adam* or *Eve* are used, this has been done to indicate the specific orientation of (part of) the frames.

14 Unless stated otherwise, by this we mean the reverses of the original panels, visible when the altarpiece is closed.

15 Except for the two tallest and narrow central panels with the *City View* and the *Interior View*, each consisting of two boards only.

16 For a thorough description of the results of the dendrochronological analysis on the altarpiece between 1986 and 2013, see: Fraiture 2017, pp. 76–95.

17 At 138, 676, 1010, 1268 and 1937 mm from the bottom. Therefore, the distances between the dowels are respectively (138), 538, 334, 258 and 669 mm.

18 At 150, 637, 1147 and 1811 mm from the bottom. Therefore, the distances between the dowels are respectively (150), 487, 510 and 664 mm.

19 The X-radiographs of this area revealed a thicker preparation layer that completely fills the space between dowel pin and hole.

20 At 170, 744 and 1324 mm from the bottom. Therefore, the distances between the dowels are respectively (170), 574 and 580 mm.

21 As a consequence, each of the panels of the exterior wings were placed into the grooves of the frames with the hardest and narrower side of the board, which was bevelled to perfectly fit.

22 The greater exposure of the outer panel surfaces to fluctuations in temperature and relative humidity has presumably contributed to the development of different crack patterns.

23 We use the term 'curved' in accordance with the standard work of Verougstraete. However, further on in this essay, we will make a distinction referring to the shape of the *Adam* and *Eve* panels as *curved* and the Annunciation panels as *arched*.

24 The bevel on both vertical edges of the *Archangel* panel even measures 30 mm.

25 For a more extensive description, see Verougstraete 2015, pp. 195–202.

26 'The curved upper rails attached to the panel are not joined to the stiles: one end slightly overlaps the longer stile, the other butts onto the shorter stile.' Verougstraete, 2015, p. 199.

27 Verougstraete 2015, p. 199.

28 During dismantling it was clearly noticed that the median rail really 'floated' above the painted surface, a gap of several millimetres between painting and rail having been observed on the face with the *Interior View*.

29 Verougstraete 2015, p. 199.

30 Compared to both the *Adam* and *Eve* panels, these connections are less visible.

31 No traces of dowel holes are preserved on the panels because the edges were trimmed in Berlin.

32 Verougstraete, 2015, pp. 199-204.

33 Verougstraete 2015, p. 200.

34 Genbrugge, Roeders, 2017, pp. 99-101.

35 Verougstraete-Marcq, Van Schoute 1989, p. 278.

36 The nail hole on the left edge of *Joos Vijd* (26 cm from the bottom) is a remnant of the original hinge and can also be seen at the same place in the original framework. One of the nails of the original hinge pierced the frame and penetrated into the edge of the panel.

37 Coremans 1953.

38 De Schryver, Marijnissen 1953, p. 23, 47.

39 Kemperdick 2014, p. 19.

40 Stehr, Dubois 2014, pp. 123–137.

41 Before the frames were sawn in two, all the metal elements, as well as the remains of the original hinges on the inner and outer stiles were removed.

42 The *Singing Angels* and the *Archangel*: 37 ± 2 mm, The *Musician Angels* and the *Virgin Annunciate*: 37 ± 2 mm.

43 Vertical bars: *Archangel* (0), *Virgin Annunciate* (6), *Joos Vijd* (2), *St John the Baptist* (3), *St John the Evangelist* (3), *Elisabeth Borluut* (12). Horizontal bars: *Archangel* (very few), *Virgin Annunciate* (no data), *Joos Vijd* (no data), *St John the Baptist* (0), *St John the Evangelist* (a few), *Elisabeth Borluut* (0).

44 Although in the cradle of the panel of *Joos Vijd* they have a width of 25 mm.

45 Hot beeswax (about 40°C), liquefied with turpentine. Coremans 1953, p. 90.

46 Adjustments to the lower right corner of the bottom rail.

47 For the panels with the *Archangel* and *Joos Vijd* (0,3 mm). For *St John the Baptist*, no exact measurement is available.

48 For the panels with the *Virgin Annunciate* and *Elisabeth Borluut.*

49 The first, second and seventh crossbar in the cradle of this panel had become locked. The 2010 investigations had however proved that the knots in the pitch-pine back frame had not caused any significant deformation of the original frames.

50 The second and sixth crossbars of both cradles are significantly lighter in colour. In addition, the scratch on the tenth crossbar of the *Virgin Annunciate* clearly indicates previous manipulations.

51 The incised lines along the vertical fixed bars observed on all the cradled faces, will have been caused by the removal of excess glue.

52 In the course of this restoration, it appeared that some of the crossbars of the panel with the *Archangel* had not been re-placed in their original position after a previous intervention. The crossbars had been marked previously with a grey pencil. Some of them, including number 6, had been wrongly put back upside-down. Crossbars 4 and 5 of the same cradle were swapped in the process.

53 A pin in the face of the Cumaean Sibyl on the reverse of *Eve*, as well as a dowel just on top of the right wing of the dove in the *Virgin Annunciate* panel can be distinguished from close by.

54 The two holes on the top and bottom edge of the *Baptist* panel, on the left and right unpainted edges, however, were presumably made by a fixing structure during the Berlin treatment.

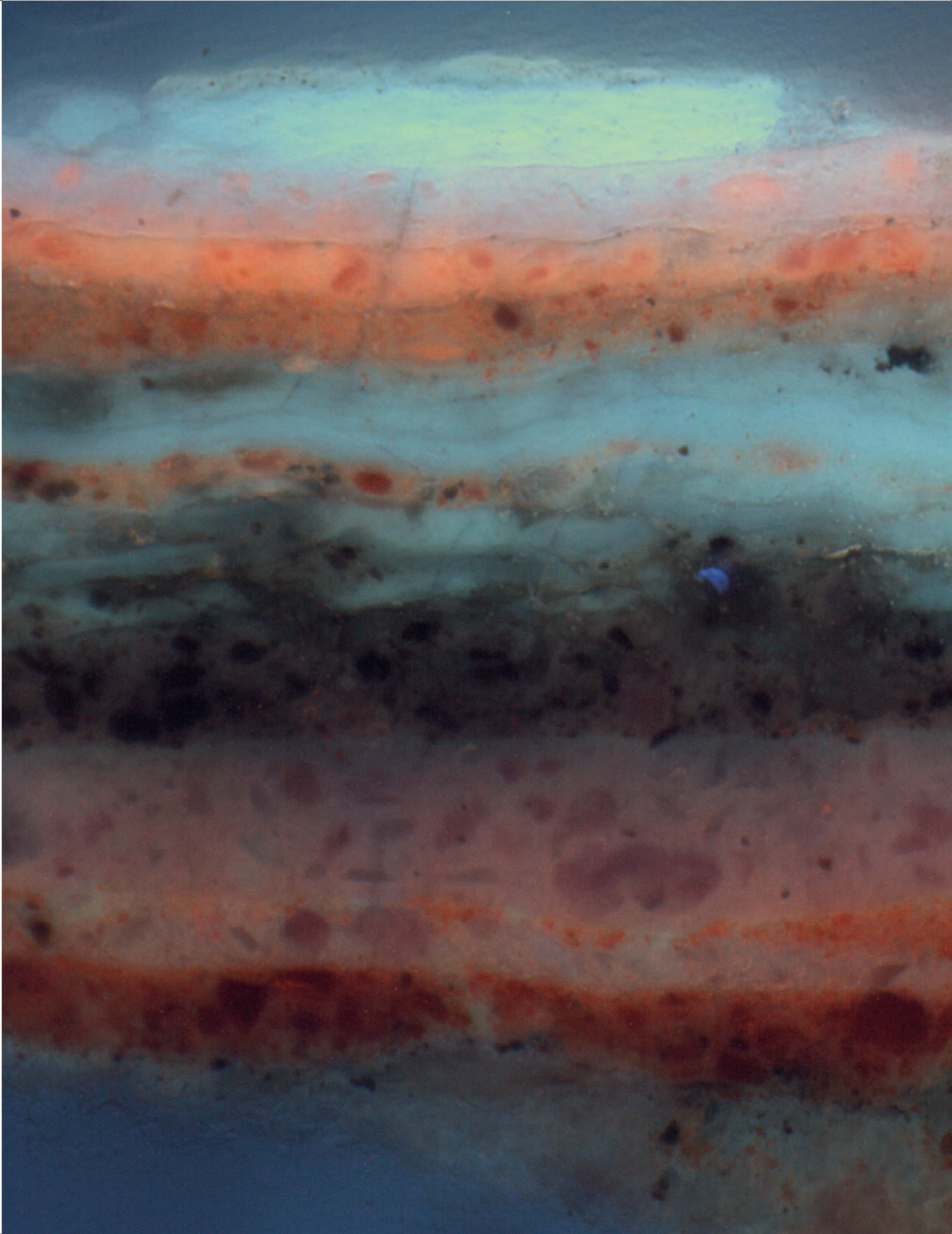
55 This was done with the support in a vertical position, using a duster and vacuum cleaner.

56 This was done with a blade of about 6 mm, most likely during the 1950–51 treatment, for this type of saw blade was not used in the fifteenth century.

57 The insert shows no traces of red paint and therefore must be a modification of the historical construction.

58 Manually, using compresses of acetone.

59 Pieces of Finnish birch plywood of 70 x 35 x 3 mm.



3

Paint and Polychromy: Chemical Investigation of the Overpaints

Jana Sanyova, Geert Van der Snickt,
Hélène Dubois, Alexia Coudray, Koen Janssens and Peter Vandenabeele

When, in 1950–51, Paul Coremans and his colleagues studied the *Ghent Altarpiece* in view of its conservation-restoration treatment, the application of the natural sciences for conservation purposes was still in its infancy.[1] Coremans had a remarkable vision of interdisciplinarity, and, while promoting a scientific methodology, he gave equal importance to laboratory examination, art-historical study and to the visual and intuitive assessment of works of art, based on practical experience. Infrared (IR), ultraviolet (UV) photography and x-radiography (XR) were used for macroscopic examination, while polarized light microscopy (PLM) and microchemical tests were employed to study the build-up of the paint layers at the micro-scale. Since then, many scientific methods to examine the technique and condition of paintings have been developed or improved and are being implemented routinely. At the microscopic level, the accuracy of spectroscopic and chromatographic methods has increased and the required quantity of sample material necessary for accurate results has decreased. At the macroscopic level, the digitization of imaging techniques and the introduction of high-resolution three-dimensional microscopy significantly improved the visual examination of the paint surface and contributed to a better interpretation of chemical analysis in general. Furthermore, the introduction of non-invasive chemical imaging on a macroscopic scale is undoubtedly the biggest step forward in this field in the last twenty years.[2] Clearly, the current conservation-restoration process of the *Ghent Altarpiece* is supported by a wider array of advanced techniques than in Coremans's time. Moreover, the collaboration of the Universities of Antwerp (UA), Ghent (UGent) and Louvain-la-Neuve (UCLouvain) has made it possible to diversify and supplement the KIK-IRPA laboratory instrumentation and expertise.[3]

Methodological approach

Fig. 3.1. (facing page) Paint cross section under UV illumination from the red drapery of Joos Vijd

In the early stages of the current study and treatment of the altarpiece, some surface features that had been hidden by thick degraded varnishes pointed to the presence of old overpaints on the outer panels.[4] The re-examination of some cross-sections taken in 1950–51 also revealed non-original layers that had never been described before since previous technical studies had focused on the interior of the altarpiece.

Instrumentation of partners

Non-invasive simple point analyses (UGent)

The *in situ* point-by-point chemical analyses were performed using two complementary analytical methods. handheld X-Ray Fluorescence (hXRF), providing elemental analysis data and portable Raman spectroscopy (p-RS), giving information on the molecular structure. Difficulties in understanding the complex stratigraphy of paint layers were bypassed by studying the surfaces with a high-resolution 3D digital microscopy set-up mounted on a rigid structure (fig. 3.2).

The handheld XRF spectrometer was positioned on a tripod, few millimetres in front of the area under investigation, which is relatively large (typically 0.5 cm in diameter). This technique provides an overview of the elemental composition of all components present in this area. Its main advantage lies in the speed of measurement and easy handling of the instrument. Raman spectroscopy, on the other hand, uses low power laser-light to analyse the material on the paint surface. The laser spot was focussed to a spot size of ca 50 µm, and the fibre optics probe head is positioned and focused by using micropositioners mounted on a tripod. A green (532 nm) and red (785 nm) laser were available, and were to be selected as needed to avoid possible interferences.

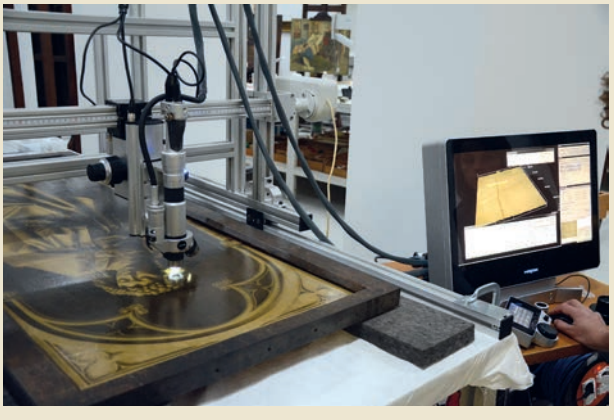


Fig. 3.2. High-resolution 3D digital microscope

Macro X-Ray Fluorescence imaging (MA-XRF) (UA)

MA-XRF scanning is a diagnostic technique that was recently developed at the Universities of Antwerp (www.uantwerpen.be/AXES) and Delft to improve the technical study of paintings and other polychromed surfaces (Alfeld et al. 2011). In contrast with established imaging techniques such as X-ray radiography and infrared reflectography, MA-XRF makes it possible to identify chemical elements inside the paint layers and to visualize their distribution over the painting. In most cases, these chemical elements can be linked to specific painting materials. The result of a MA-XRF scan is a set of images, with each image showing the distribution of a specific chemical element/painting material over the paint surface. Information on the distribution of these materials at and just below the surface (up to 0.1–0.2 mm) is obtained. In this way, the artist's technique and painting practice can be studied with unprecedented detail. The most important innovation of this method is that complex chemical data are transformed into visual images that can be further interpreted by conservators and art-historical scholars. Since its development (c. 2010–12), mobile MA-XRF instruments (fig. 3.3) have travelled to museum galleries worldwide, contributing to the technical knowledge and conservation of key works of art by Van Gogh, Rembrandt, Rubens, Pollock, Magritte etc.

The use of penetrative X-rays renders this spectrometric method particularly helpful for looking below the upper paint layer and revealing hidden features, such as changes in the composition. For the *Ghent Altarpiece*, this ability was employed successfully for documenting the original paint layers by Van Eyck that were hidden below later overpaints. In addition, the chemical maps allowed assessing the condition of the original, overpainted composition, an aspect that played an important role in the discussion on the removal of the overpaints. Chemical imaging of the entire *Ghent Altarpiece* was considered to be particularly challenging in view of its large surface and the corresponding wealth of spectral data (Van der Snickt et al. 2017).

The outer side of the eight wings, measuring about 8 m² was divided into 37 separate scan areas and more than 16 million XRF spectra were collected. In this manner, a large (> 1 GB) hyperspectral XRF data cube was obtained per panel. Next to the lengthy data collection, an additional challenge was the time-efficient and artefact-free processing of the data set. Adaption of existing deconvolution software (AXIL) was necessary to achieve reliable and time-efficient background subtraction and net X-ray line intensity determination.

Multi-analytical investigation of micro-samples (KIK-IRPA, UCLouvain)

The build-up of overpainted areas of the reverse wing panels is complex, comprising various traces of successive restorations and alterations. The analysis of each layer of the paint samples was necessary to fully understand the paint structure. At the beginning of the conservation project, the number of existing samples taken in the altarpiece mostly during the 1950–51 conservation campaign by the KIK-IRPA were regarded as sufficient to answer questions concerning the initial conservation treatment. 28 samples remained from the eight outer panels and 45 from the frames. However, the sampling location was not always clearly documented and, as reprocessing of the old samples progressed, only about one half of the cross-sections were found to be suitable to answer questions regarding overpaint characterization and removal. New samples, focusing mainly on the old restorations, were taken when a non-invasive approach was unable to provide answers. The collected samples were used for the study of the structure and characterization of the paint components. This was performed on the cross-sections (samples embedded in a polymethylmethacrylate resin and polished to provide a lateral view on all superposed layers) by microscopic and spectroscopic methods and on the non-embedded loose micro-samples by chromatographic methods.

The cross-sections were first observed at high magnification (up to 1000x) using a polarized light microscope (PLM Axio-Imager M1, Zeiss, equipped with Infinity, DeltaPix camera) with transmitted, polarized and ultraviolet reflected light. The combination of these illuminations allows to study the stratigraphy and appearance of the layers. Then, the cross-sections were used for material characterization. The elemental information was obtained by scanning electron microscopy, (SEM-EDX, Jeol JSM6300 and EVO Zeiss with a Tetra – Oxford Instruments BSE detector, High Resolution FESEM Tescan MIRA 3 LMU with EDS Bruker Quantax 2000) coupled with energy dispersive X-rays spectroscopy (Pentafet Si(Li) X-ray, Oxford Instruments). This was completed by micro-Raman spectroscopy (MRS, inVia Raman Microscope, Renishaw, with red [785 nm] and green [514 nm] laser sources) and by Fourier transform infrared spectroscopy (FTIR Hyperion 3000, Bruker coupled to a Mercury-Cadmium Telluride – MCT detector and Focal Plane Array – FPA detector), both techniques dedicated to molecular characterization. FTIR analysis was performed on non-embedded samples or cross-sections. Non-embedded samples,

Fig. 3.3. Mobile Macro X-Ray Fluorescence (MA-XRF) instrument for chemical imaging

compressed in a diamond cell, were analyzed in transmission mode with the MCT detector. FTIR in attenuated total reflection mode (ATR – Germanium crystal) coupled to a FPA detector was used on the embedded samples (Spring et al. 2008). In collaboration with the UCLouvain, a time of flight – secondary ion mass spectrometry (ToF-SIMS) was also used for investigation of cross-sections. The measurements were performed using an IONTOF V instrument (IONTOF GmbH, Muenster, Germany) equipped with a bismuth primary ion beam source. The pre-sputtering was performed with a giant argon cluster ion beam using Ar_{3000}^{+} at 10 keV on a 750 x 750 µm² surface (Vermeulen et al. 2014). Samples were bombarded under an incident angle of 45° to the surface with Bi_3^{++} liquid metal ion source. Charge neutralization of the embedded resin surface during experiments was achieved with a low energy electrons flood gun (20 eV). ToF-SIMS spectra were obtained by collecting the secondary ion signals in the mass range $0 < m/z < 700$ on a 300 x 300 µm² sample area.

The last step of the sample investigation involved the chromatographic study of the organic components. During the project, both liquid chromatography and gas chromatography have been employed. The high-performance liquid chromatography (HPLC, Spectra-SYSTEM, Thermo Scientific) was used for the characterization of organic dyes after their mild extraction from the lakes (Sanyova 2008). The pyrolysis-gas chromatography-mass spectrometry (py-GCMS, Thermo-Finnigan Trace GC Polaris Q) was used for the identification of binding media in paints and varnish layers after their methylation with tetra-methyl-ammonium hydroxide.

Consequently the presence of old overpaints on the outer wings had never been recognized before this project. The progressive discovery of extensive overpainting implied complex and crucial treatment issues, in particular their irreversible removal which would require a full understanding and documentation of the paint stratigraphy. The natural sciences played an essential role in this research. A range of analytical techniques and methods was made available by four institutions (KIK-IRPA, the University of Antwerp (UA), Ghent University (UGent) and the University of Louvain-la-Neuve (UCLouvain); see insert). All these methods, commonly used in cultural heritage science, have their strengths and weaknesses, and only their association, combined with the conservators' visual observations, have made it possible to decode the intriguing material history of this masterpiece.

The assessment of the condition of the original Eyckian paint layers was a crucial part of the decision-making process and a requirement for the development of the treatment methodology.[5] Macroscopic X-ray fluorescence scanning (MA-XRF) was particularly suitable for this purpose. Furthermore, once overpaint removal was initiated, the conservation team still needed scientific assist both to support the treatment and, via analyses, to chemically document removed material.

Chemical analysis and its impact on the decision-making process

The identification of the old, extensive overpaint was presented in March 2014 to the International Commission for the Conservation of the *Ghent Altarpiece.*[6] The conservators faced an extensive range of challenging tasks for which the laboratory researchers provided essential analytical support and undeniable proof of the presence of overpaint. Conservation scientists had to tackle issues such as the chronology of the interventions through the understanding of the layered structure, the chemical differentiation of the overpaint from the original through the detailed analysis of micro-samples or the evaluation of damage in Van Eyck's original strata under the overpaint through the location and characterization of paint loss and fillings by MA-XRF.

Chronology and description of past conservation interventions

Old overpaints

The *Ghent Altarpiece* has a very complex history. Since its presentation in the church in 1432, it has been subjected to numerous modifications and damages, influencing the present condition of the paint and polychromy.[7] The restoration project initiated in 2012 implied renewing the study of the material history initiated by Coremans and his colleagues in 1951–53 and to link documents to observations made on the panels and frames.[8] While *in situ* non-invasive analyses give an overview of the inorganic pigment distribution, the *ex situ* microscopic and spectroscopic investigations carried out on paint samples provide an insight into the stratigraphy and the composition of

the layers accumulated over time. The following text will highlight some laboratory findings which contributed to the understanding of the material history and to the decision-making process of the conservation treatment. The re-examination of paint samples taken from the reverse of the wing panels in 1950–51 already provided an insight into the stratigraphy in the early stages of varnish removal. The observation of microscopic cross-sections already aroused the suspicion of the presence of overpaints before the extent of these old restorations could be observed on the paintings. In particular, the stratigraphy in one sample of Elisabeth Borluut's dress revealed four pink to purplish paint levels alternating with varnish layers (fig. 3.4). One of these upper layers filled existing losses in the lower paint layers, as shown by the microphotographs taken under UV illumination. However, because Elisabeth Borluut's dress has always been thought to be of Eyckian origin and because of the limited representativeness of micro-samples,[9] the presence of several paint levels with intermediate varnishes at first was tentatively explained as a repair carried out in the course of painting in Van Eyck's studio.[10] Indeed, the use of an intermediate varnish layer in the original paint build-up had been recently identified in the scarlet dress of Jan van Eyck's 1439 portrait of his wife Margaret (Groeninge Museum, Bruges).[11]

Only after thorough microscopic study of the paint surface of all panels, has it become possible fully to understand the layer structure of Elisabeth Borluut's dress. Up to three overpaints were covering the altered original paint layers and were separated from each other by one or two varnishes. A similar layer structure was observed later on other samples taken from overpainted areas, mostly from the donors' clothes.

Fig. 3.4. Paint cross-section under UV illumination (b) from the purple drapery of Elisabeth Borluut, sampled in 1951 on the edge of a paint loss on the sleeve (a). The microphoto-ghraph shows three overpaints (1,2,3) covering the original layers. On the left, the second overpaint (2) fills a loss in the lower paint layers.

3.4 a

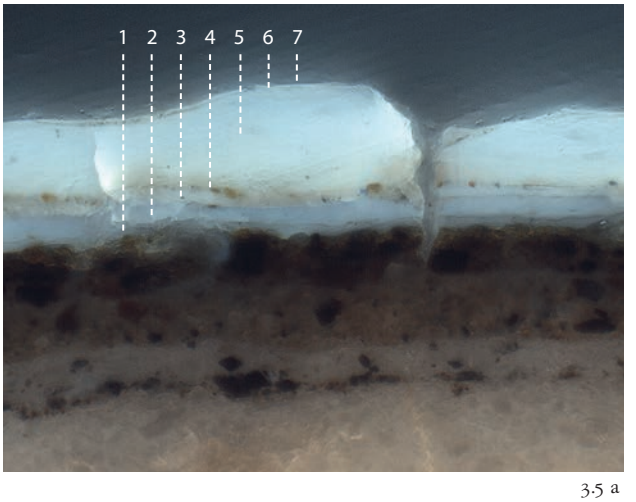
3.4 b

However, in several areas these intermediate old varnishes are absent, undoubtedly because the original surface was thoroughly cleaned before application of the overpaint. This was the case of the Virgin's white robe and of the green cloth on the prie-dieu in the same painting. The interpretation of such stratigraphy is more challenging, since similar white and green pigments (lead white and verdigris), were used in the original and the earliest overpaints. Their differentiation had to be based on other parameters, such as the nature of impurities of the layers, their fluorescence under UV light or the pigments' particle size. Together with the observations carried-out by the conservators (difference in texture, overlap on the original barb and unpainted edge, formal incoherence), it was finally possible to conclude that some of these areas were overpainted.[12]

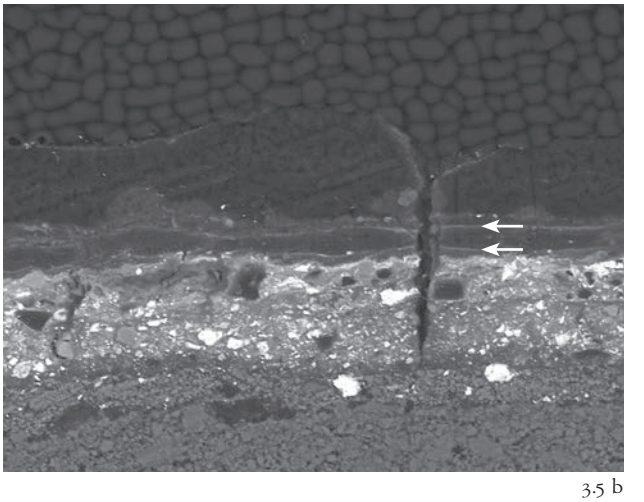
Old surface varnishes

The surface of all the paintings was covered by accumulated altered varnishes and thin patinas layers of dirt and degradation products. No less than seven layers were counted in a sample taken in 1951 in the brown area of the architecture of the *Virgin Annunciate* (fig. 3.5).[13] A close examination of this cross-section with SEM-EDX revealed very thin calcium and lead-containing crusts between the oldest varnishes (fig. 3.5b). Such crusts, also observed on top of intermediary varnishes between the original paint and overpaint layers in samples from overpainted areas, are probably degradation products that formed on the surface when it was exposed to light and humidity.[14] The evidence of such intermediate crusts suggests a certain time-lapse between the interventions, and indicate that past revarnishing was not necessarily preceded by the removal of previous altered varnishes.

Fig. 3.5. Paint cross-section from a sample from the dark brown area of the low wall under the column on the left side of the *Virgin Annunciate*. The microphotograph under UV illumination (a) shows the accumulated altered varnishes, and the back-scattered electron image (b) shows very thin light grey crusts, indicated with arrows, on top of the two oldest varnishes.



3.5 a



3.5 b

Recent retouching

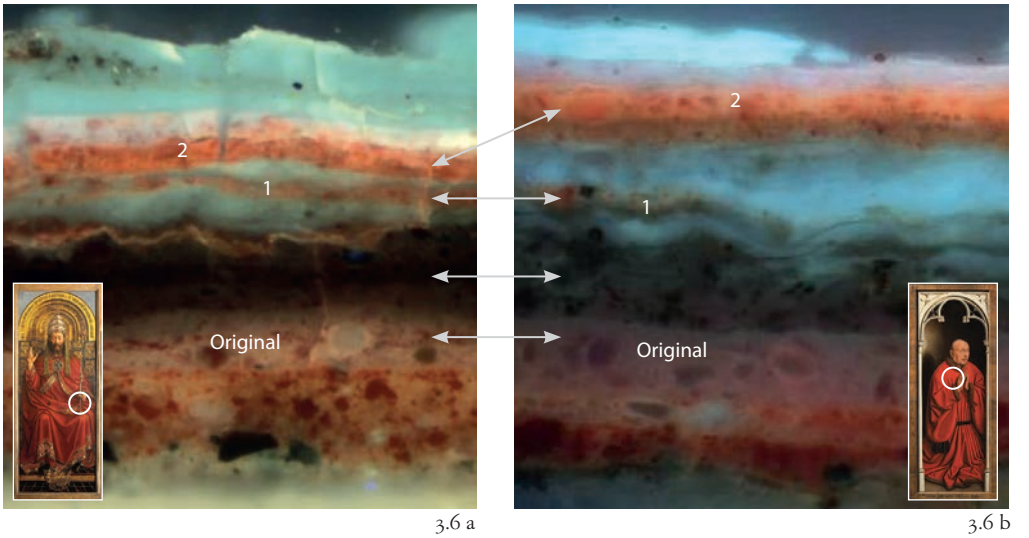
Less frequently, a layer containing modern industrial pigments was found to be part of the stratigraphy, indicative of a recent restoration campaign. The conservators noticed that these retouching layers are often very thin because of the very fine grain size of the industrial pigments, dating back to the nineteenth century, as discussed below.

Characterization of the overpaints

Stratigraphy of the old overpaints

During the study and treatment carried out in 1950–51, Paul Coremans's team observed old overpainting on the inner panels of the altarpiece, which they tentatively attributed to a restoration by Jan van Scorel and Lancelot Blondeel in 1550.[15] The published material evidence on these overpaints, such as on the red robe of the Enthroned Deity was rather tenuous, and was contradicted by later researchers.[16] However, the stratigraphy of the thin section[17] prepared in 1951 from the sample of the Deity's drapery is very close to the structure observed in samples from the overpainted red drapery of Joos Vijd. It shows the identical build-up of overpainting campaigns, with two interventions separated by intermediate varnishes (fig. 3.6).

The striking similarity of the layers themselves suggests that both draperies were overpainted twice in the same way and that both restoration campaigns were carried out extensively on the entire altarpiece. Although micro-samples do not constitute in themselves a proof of the presence of overpaint, they significantly contribute to the general conclusions based on the conservators' observation of the paintings under different conditions (incident and raking light), wavelengths (XR, UV, IR) and



3.6 a 3.6 b

Fig. 3.6. Paint cross-sections under UV illumination from the red draperies of the Deity (a) and Joos Vijd (b). The micro-photographs show an identical succession of two overpainting campaigns.

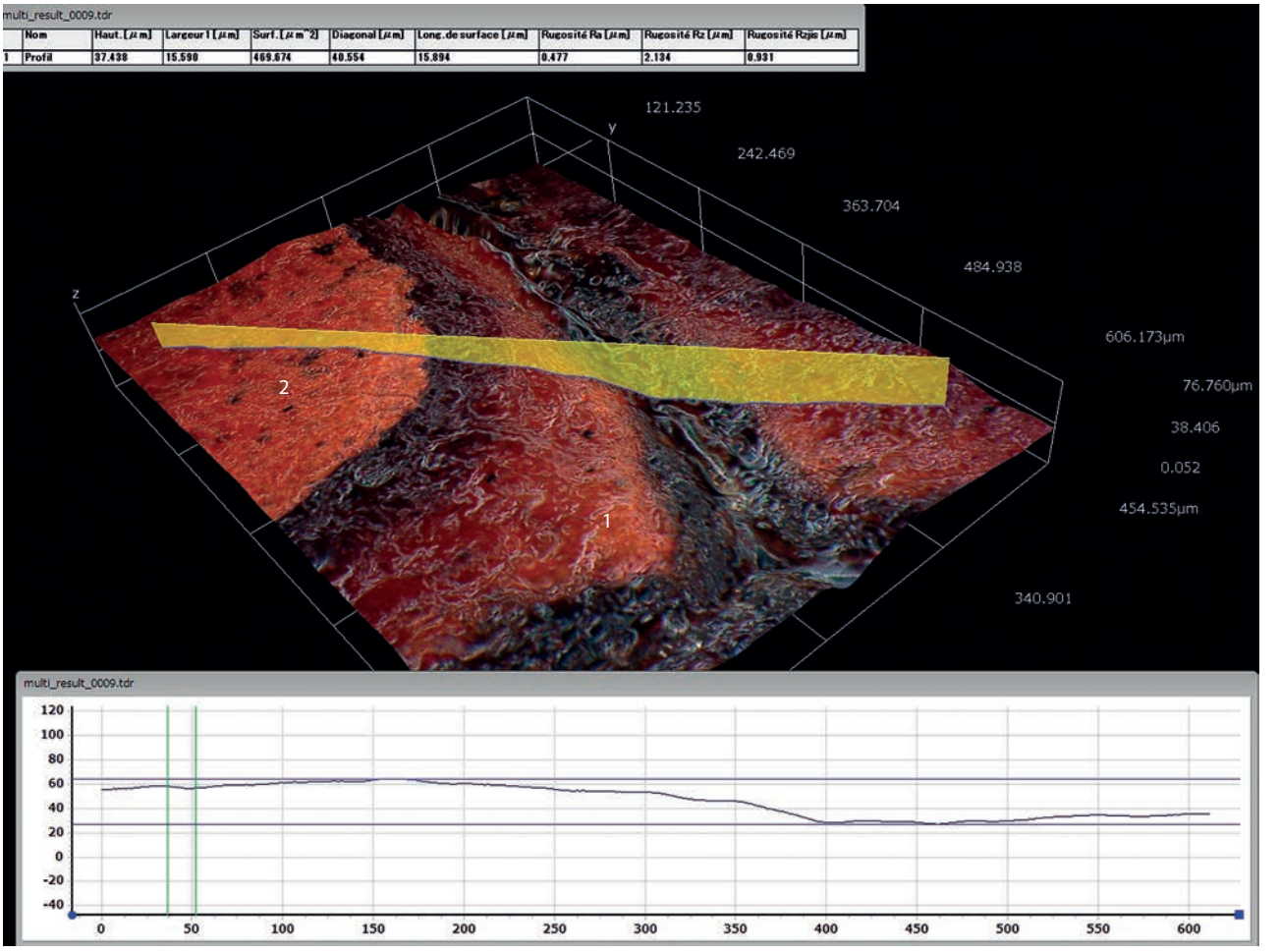


Fig. 3.7. 3D image and profile of the surface in Vijd's overpainted cloak (500x), taken before varnish removal. Two main levels are visible, both covered with a thick varnish, filling the age crack on the right : (1) original surface and (2) overpaint. The thin, first layer of overpaint is not visible here.

magnifications (binocular with optical zoom up to 80x and 3D HD stereomicroscope with digital zoom up to 1000x, fig. 3.7), assisted by elemental imaging (MA-XRF).

The recurring stratigraphy, comprising a first thin, lightly pigmented overpaint and a second, thick and opaque overpaint, was consistently revealed by new samples which had to be taken to assist the conservators' work. These two phases were found in pink and red draperies. The first overpaint consisted of a very thin pigmented glaze layer, with a low pigment concentration. It was not applied directly on the original paint layer, as shown by cross-sections from several areas. Two and sometimes three thin varnishes separated the surface of the original paint from this first overpaint, suggesting that at least two revarnishing (and perhaps cleaning) campaigns took place before this intervention. It was observed on parts of several draperies and in the Archangel's wings. Other old, local, unskilled restorations were also present under the second overpaint in Joos Vijd's red cloak.[18] This layer was thicker and opaque, generally consisting of three pigmented layers. It was covering large areas of all restored panels, where it completely hid Van Eyck's original surface.

The succession of restoration campaigns, observed on the outer panels and in paint samples can thus be schematized as shown below (fig. 3.8).

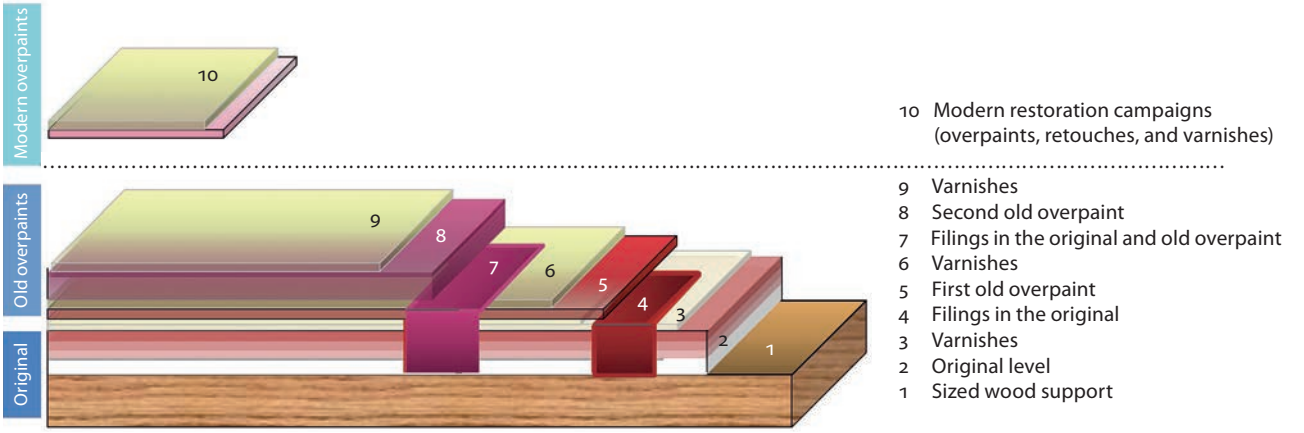


Fig. 3.8.
Representative layer structure observed on the panels and in cross sections of paint samples, pink and red draperies

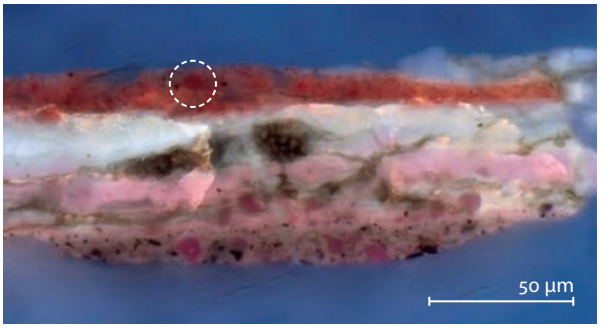
Chemical characterization of overpaints

The molecular composition of many components found in the old overpaints may only be reliably identified in samples analysed in laboratory conditions, for the *in situ* elemental chemical investigations could not discriminate between two old restorations that are so close to each other and carried out with similar materials. Furthermore, the first overpaint is extremely thin (fig. 3.6) and discontinuous in some areas, rendering accurate sampling difficult without any contamination from other layers of the stratigraphy.

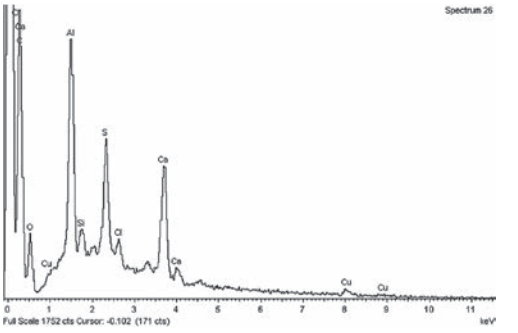
First overpaint

The glaze-like first overpaint formed a very thin (typically less than 10 µm) and transparent paint layer with a low amount of pigments in the light areas, and was more densely pigmented in the shadows. It mainly contained red lakes, lead white, red earth, and calcite as well as glass powder.[19] Natural ultramarine was also found in a few samples. The transparency of this layer suggests that the restorer would not have significantly altered the original shape, but rather aimed at reviving the colour (fig. 3.13). Observation of cross-sections under UV light showed several intermediate, fluorescent varnish layers (fig. 3.6). The red lake pigments contained in this first overpaint layer have a specific orange-pink UV-fluorescence (figs 3.6a and 3.9), suggesting that the lake in this layer was prepared from dyestuffs extracted from madder (*Rubia tinctorum* L.). This ties in with the results obtained by HPLC analysis of a sample containing both overpaint layers, taken during overpaint removal from Elisabeth Borluut's dress. Analysis revealed the presence of purpurin and alizarin, indicative of madder dye, together with other dyestuffs from kermes and cochineals which were later identified in uncontaminated samples of the second, overall overpaint layer. The lake particles are small and contain a significant amount of aluminium and some calcium, as shown by the EDX spectrum in figure 3.9c.

3.9 a



3.9 b



3.9 c

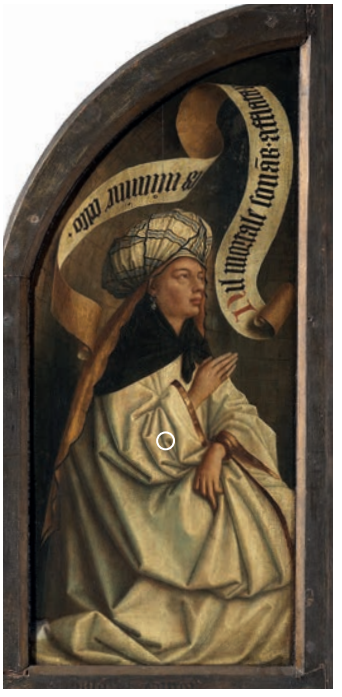
Fig. 3.9. Paint cross-section under UV illumination from the purple drapery of Elisabeth Borluut (a), sampled after removal of the second, overall overpaint. The microphotograph (b) shows the red layer of the first overpainting campaign, separated by two coats of varnish from the original paint layers. The EDX spectrum (c) reveals the elemental composition of the encircled red lake particle in the overpaint.

All identified materials are commonly found in fifteenth- and sixteenth-century Flemish painting and thus cannot be used to narrow down the date of this first overpaint layer. Natural ultramarine blue (made from ground lapis lazuli), identified in this layer in the Archangel's wing and in the Erythraean Sibyl's drapery (fig. 3.10) can be regarded as a specific material of the first overpaint layer. The omission of azurite, which is abundantly present in the second overpaint, is also a significant difference between these two old restoration campaigns.

Earliest fillings

Early restoration in the form of dark red fillings in the lower part of Joos Vijd's red coat (fig. 3.11) had been visualized by MA-XRF imaging before overpaint removal (fig. 3.11d), as discussed below. They were certainly applied during a restoration preceding the overall second overpainting campaign. Two levels of red fillings were observed in this area; each of these is composed of more than one layer, as shown in the cross-section of the sample taken before the removal of overpaints. They are separated by a fluorescent varnish (fig. 3.12).

The oldest fillings had been applied directly on the sized wood, where some calcium carbonate-containing layer (sizing or residual ground) was found. They contain some vermilion (HgS), red ochre (Fe_2O_3), carbon black (C), a little red lake, calcium and potassium sulphates ($CaSO_4$, K_2SO_4), and some zinc compound(s).[20] ToF-SIMS also provided evidence for the presence of several starch particles.[21] The older fillings in this area have a high zinc content whereas those corresponding to the second overpaint are iron-based. Figure 3.28 shows the distribution of lower zinc-based and the upper iron-based fillings. The upper fillings that were applied to prepare the surface before the second overpaint, include also large protein-containing madder lake particles, as evidenced by the ToF-SIMS map of the cross-sectioned sample taken in the damaged area (fig. 3.12).[22]



3.10 a

3.10 b

Fig. 3.10. Paint cross-section under UV illumination from the bluish drapery of the Erythraean Sibyl (a), taken before restoration. The microphotograph (b) is showing two overpaint strata (1,2) covering the original layers. The first overpaint contains a large particle of natural ultramarine (white circle).

3.11 a

3.11 b

3.11 c

3.11 d

Fig. 3.11. Details of Joos Vijd's red dress showing the damages, the clumsy fillings and retouchings discovered after the removal of the second, overall overpaint layer (b, d). The zinc map on that area (c) shows that these old fillings and retouchings contain zinc compounds.

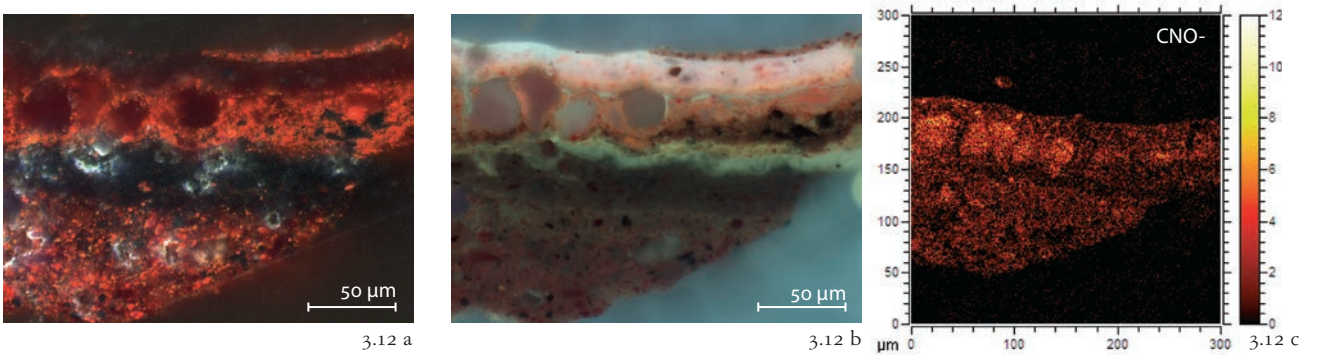


Fig. 3.12. Paint cross-section from the red drapery of Joos Vijd in a damaged area. The microphotographs under visible light (a) and UV illumination (b) reveal two restoration campaigns (1,2). The UV microphotoghraph (b) shows an intermediate varnish layer between both campaigns. The SIMS map (c) of the same sample shows that the large red lake particles in the second filling are protein based, characterized by the specific CNO fragment (m/z 42).

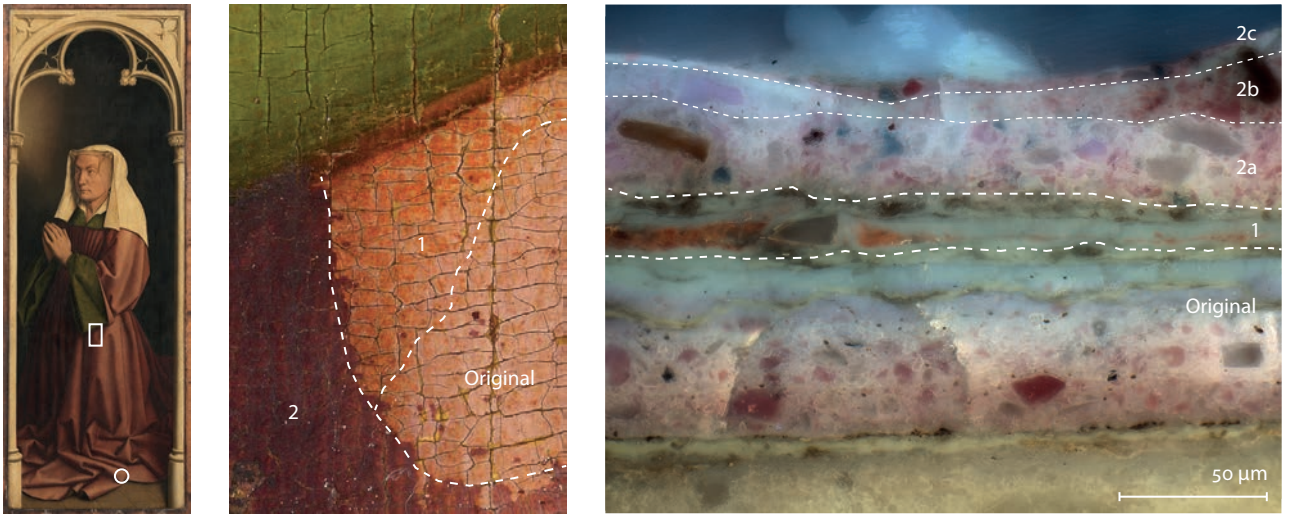
Overall second overpaint

Although similar materials were used, the layers applied during the two overpainting campaigns look very different. The second overpaint layer, much thicker (over 50 µm) and therefore more opaque, covered a very large fraction – over 50% of the Eyckian paint surface.[23] Its presence is evident in samples taken from all outer panels, mainly from the clothes, the architecture and the donors' hands. The build-up of this overpaint comprises often two and sometimes three or four paint layers that can be observed under UV illumination, for instance in the sample from Elisabeth Borluut's purple dress (fig. 3.13). This cross-section shows once more two overpaints over the original, separated by intermediate varnishes. Here, the original paint stack is composed of four layers with a pinkish fluorescence under UV light, all containing red lakes dispersed in a lead white matrix (fig. 3.13).

In the portraits of the donors, losses were filled with a red material, principally iron oxide and lake-based putty, also generously applied on the surrounding original surface, in order to level out distortions before overpainting. The presence of these losses was well documented by MA-XRF, as described further on in this article.

Various pigments and additives, commonly used in fifteen- and sixteenth-century paintings, were identified in samples from this overall overpaint: lead white, calcium carbonate, earth pigments coloured by iron oxides, carbon black, coarse azurite, kermes red lake and manganese-containing powdered glass, used as an additive. These last three materials are typical of this restoration campaign.

The complex build-up in three or four paint layers of the overall overpaint and the use of large amounts of costly kermes lake and azurite, suggest that this carefully executed restoration also implied a substantial economic investment.[24]

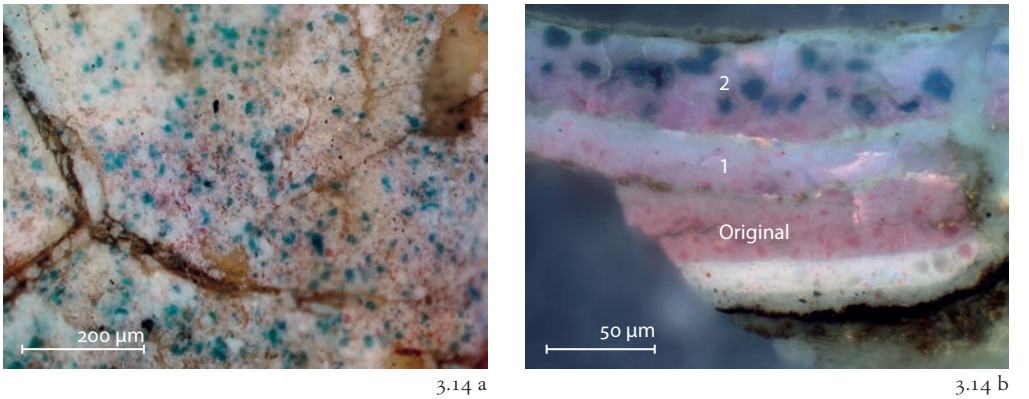


3.13 a 3.13 b 3.13 c

Fig. 3.13. Detail of purple drapery of Elisabeth Borluut (a) during the progressive removal of overpaints showing the visual aspect of the original paint, and of the two overpainted areas (b). Paint cross-section sampled before removal of the second overpaint (c). The microphotograph under the UV illumination shows the built-up of the layers applied during the overpainting campaigns: (1) simple layer (first overpaint) and (2) three layered structure (second overpaint).

Azurite

High-quality azurite, an expensive blue pigment in European late Medieval and Renaissance painting is very abundant in this second overpaint (fig. 3.14). It was used in this layer in Elisabeth Borluut's and in the Erythraean Sibyl's dress, in the Archangel's sleeve (fig. 3.15) and in the draperies of both prophets. Azurite was used there mainly in combination with red lake to produce purplish colour tones. Different



3.14 a 3.14 b

Fig. 3.14. Photomicrograph (350x) of the bluish overpaint of the drapery of the Erythraean Sibyl (a). Unfaded red lake particles, which had been protected from light by later retouchings, are visible. The microphotograph under UV illumination of a paint cross-section from the same area (b) sampled before removal of the overpaints shows the discoloration of red lake in the uppermost part of the second overpaint (2) as well as the first overpaint (1) and the original layer structure: glazes cover the light pink underlayer, grey imprimatur, black-brown underdrawing and white ground.

shades were obtained by varying their proportions. In the dress of the Erythraean Sibyl, where the overpaint was composed of azurite, lead white and kermes,[25] the lake particles in the uppermost layers lost their colour so that the overpaint became blue. The initial purplish hue was closer to the Eyckian original covered with the first overpaint (a purplish glaze containing red lake and some natural ultramarine) (fig. 3.14).

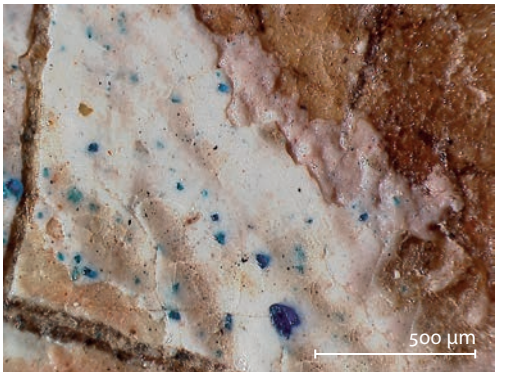


Fig. 3.15. Photomicrograph (200x) of the bluish overpaint of the Archangel's sleeve, showing large, bright particles of azurite in a matrix of finely ground lead white (second, overall overpaint).

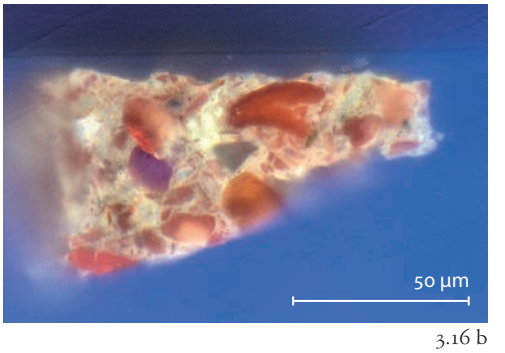
Red lakes

Red lake pigments were also extensively used in the overall overpaint. Various quality grades were available in the fifteenth and sixteenth centuries; the finest grades could be as expensive as azurite.[26] The dyestuffs present in the paint layers and in the filling of the overall overpaint were analysed by HPLC. The identified coloured molecules originate from scale insects and from vegetal sources: kermesic and flavokermesic acids from kermes (*Kermes vermilio* Planchon 1864), carminic acid from one of the European cochineals (*Porphyrophora polonica* or *hamelii* L.), pseudopurpurin, purpurin and alizarin from madder (*Rubia tinctorum* L.). The red lakes were mixed with azurite and powdered glass in the fillings of shadow areas of the dress of the Erythraean Sibyl, and with some glass and chalk in the *Interior View* panel (fig. 3.16). Glass was a common paint additive in the fifteenth and sixteenth centuries, as discussed below. A small addition of indigo (*Indigofera tinctoria* L.) or woad (*Isatis tinctoria* L.) was detected in the purple overpaint of Elisabeth Borluut's drapery (fig. 3.13).

As previously stated, the first restoration consisted of a very thin glaze that is difficult to separate physically from the second level, which implies that the sample for HPLC analysis could be contaminated.[27] Kermes lake was identified as principal component in all lakes found in the second overall overpaint of the draperies in the donors' panels (lower register) as well as those of the Prophet Micah and the Erythraean Sibyl panels (upper register).

The lakes found in the fillings are different for each register. The large, overlapping, iron-rich fillings in the lower register contain madder lakes only (fig. 3.12), while those in the upper register contain a mixture of kermes and madder lakes. The cross-section of a filling in the wall in the *Interior View* panel shows two red lakes under UV illumination: one with an orange and the second with a violet fluorescence (fig. 3.16).

3.16 a



3.16 b

Fig. 3.16. Detail of the low wall in the *City View* panel (a). Paint cross-section under UV illumination from the filings (b). The microphotograph shows two red lakes, one with an orange and the second with a violet fluorescence.

The madder lakes found in the fillings of both registers were prepared from scarlet wool textile shearings, a recycled waste product of high quality wool 'scarlet' cloth, the production of which was flourishing in medieval and Renaissance Flanders.[28] This is indicated by the particle size of the lakes and the presence of proteins in the substrate (fig. 3.12). However, their dyestuff composition is quite different; the fillings of the upper register contain pseudopurpurin, which was not found in those from the lower register. This indicates that they were not prepared with the same method. It is nevertheless difficult to say whether they were applied in the course of different overpainting campaigns. The restorers of the second overpaint may have left older fillings in place in the upper register before overpainting.

It is likely that all lakes used in the old restorations were prepared by using textile shearings from crimsom-dyed cloth (kermes and cochineals) and/or by using madder dyes. Their different dyestuff and substrate composition as well as their different particle size are due to the application of various preparation methods. The substrate of lakes used for the glazes contains hydrated alumina ($Al(OH)_3$) with some calcium and potassium salts, and in some cases, proteinaceous sulphur-containing organic material. The smaller lake particles, with a higher aluminium content were mainly found in the thin upper layers of the second overpaint layers. Large particles with a low amount of aluminium, containing residues of wool shearings, were clearly identified and visualized by FTIR and by ToF-SIMS (fig. 3.12) in the filling materials.

Among the most expensive organic red pigments were lakes with a purplish crimson hue prepared from kermes.[29] Madder lakes usually were more orange in tone and less expensive.[30] The composition of the substrate on which the extracted dyestuff was precipitated also contributed to the hue and intensity of the colour as well as its permanence and transparency, while it also influenced the working properties of the produced pigment. Lakes with a high content of hydrated alumina are more stable than those containing the remains of wool shearing used as a source of dyestuffs.[31] The evidence from written technological sources from the fifteenth and sixteenth centuries suggests that the dyes used for the kermes and madder lakes were almost always extracted from silk or wool shearings. Many recipes in a late fifteenth-century Southern Netherlandish manuscripts actually specify using 'red shearings that are from good cloth of the best wool' as the source of the dyestuff, which is extracted in an alkaline solution containing potassium carbonate (K_2CO_3).[32] To the obtained extract is added the acidic solution of potash alum ($KAl(SO_4)_2.18H_2O$). This causes the precipitation of the amorphous hydrated alumina on which the extracted dyestuffs is chemisorbed and adsorbed.[33] When a lake is prepared from the shearings of dyed silk, HPLC analysis detects a small amount of ellagic acid, originating from the silk preparation with a solution of a tannin source, such as oak galls.[34] Since no ellagic acid was found in any sample of the overpaints containing a shearings-based lake, we can conclude that the lake was prepared from wool waste, presumably obtained from a local production of scarlet cloth.

The importance of kermes in European medieval economy decreased after the discovery of New World and the arrival of Mexican cochineal (*Dactylopius coccus* Costa), which was imported in Europe in the sixteenth century. Because of its higher dyestuff content and the intensity of its colour, Mexican cochineal quickly became more popular than kermes and European (Armenian and Polish) cochineals. The first arrival

of New World cochineal in Europe was recorded in 1518, and in 1540, this dyeing material was available in Antwerp.[35] This availability is reflected in the occurrence of red lake pigments in European paintings. The earliest identification of cochineal lakes in the second half of the sixteenth century (Joachim Beuckelaer, *The Four Elements*, 1569–70, National Gallery, London, NG 6587) corresponds to the declining occurrence of kermes and Old World cochineal lakes.[36] As far as we are aware, on the basis of published research as well as analyses carried-out at KIK-IRPA, these Old World lakes were not found in paintings postdating 1550.[37] This would indicate that in that period, red lakes based on New World cochineal were more readily available.

Additives in glazes

Lake pigments are known for their inhibiting effect on the oil binder. Therefore, it was very common to add materials to organic glazes in order to improve their drying properties (siccatives), such as copper- or lead-based pigments, white vitriol (zinc sulphate) or powdered glass, all identified in several laboratory studies of paintings by Van Eyck.[38]

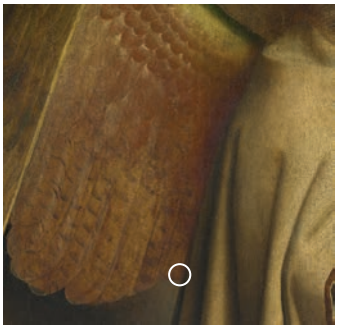
The present study revealed that colourless powdered glass was not only added to the red glazes in the original paint layers, but also in both old overpaints. In all those cases, the glass particles are of different composition; in the original paint layer it seems to be wood ash, in the first overpaint wood ash lime and in the second overpaint soda ash.[39]

In the original paint, the glass powder was only used in Joos Vijd's and Elisabeth Borluut's clothes and not in the red glazes of the upper register paintings. In general, the authors of the overall second overpaint have used higher amounts of powdered glass than the Van Eyck brothers did in the donors portraits.

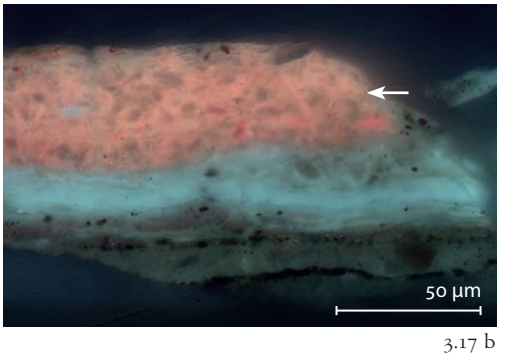
A high proportion of soda ash glass powder was also found in the second overpaint of the Archangel's wings. The back-scattered electron SEM image of the cross-section from this area (fig. 3.17) shows a large amount of glass particles, with a size ranging from 3 to 10 µm in the second overpaint.

The addition of glass powder is mentioned in many historical documentary sources and has been often identified by laboratory analysis in both Northern and Southern European paintings.[40] The earliest examples of this studio practice, common in the fifteenth and sixteenth centuries were found in Jan van Eyck's *Arnolfini Portrait*, painted in 1434 (National Gallery, London), and in the *Annunciation* of 1438 (National

Fig. 3.17. Detail of the Archangel's wings (a). Paint cross-section from the red shadows of the wing (b, c). The microphotograph under UV illumination (b) and back-scattered electron SEM image (c) reveal a high density of glass particles in the second overpaint indicated by the white arrows.



3.17 a



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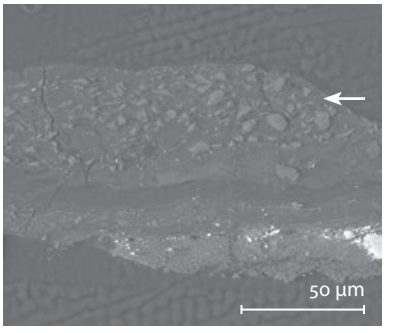


3.17 c

Gallery of Art, Washington).[41] The glass powder found in Netherlandish paintings in London's National Gallery has low sodium, but high potassium and calcium content, with a significant amount of magnesium, indicating the wood ash type of glass. The same kind of glass powder was found in the samples taken from the outer panels of the *Ghent Altarpiece*. The soda ash type glass, that was found in the second overpaint, would not be expected in the fifteenth-century Northern European painting but comes in later, during the sixteen century.[42]

Nineteenth- and twentieth-century restorations

More recent restorations can be localized by means of MA-XRF imaging as the chemical composition of industrially prepared pigments is quite divergent from that of historical pigments.

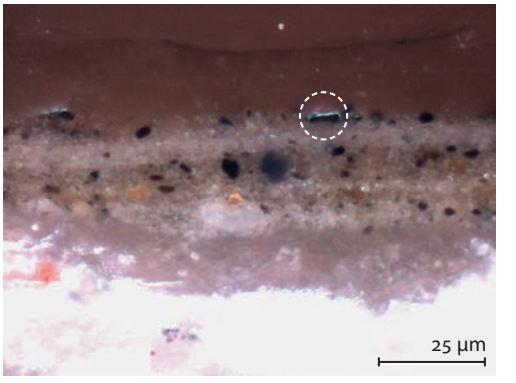
It has been possible in some cases to correlate such interventions with archival evidence. This can be illustrated by a sample taken in the large reconstruction of the loss in the robe of St John the Evangelist, an intervention that was carried out before the oldest known photographs of the panel were taken, probably in the 1860s.[43] Cobalt blue (cobalt(II) oxide-aluminium oxide), a pigment commercialized in the early nineteenth century, was identified in a layer of the retouching, indicating that at least part of this restoration was done in the first half of the nineteenth century at the earliest, and most likely when this panel was in Berlin between 1821 and 1920[44] (fig. 3.18). Cobalt blue was also identified in retouchings in the Prophet Zachary, suggesting that these interventions were performed at the same time.

The modern overpaints in the green drapery of the Cumean Sibyl are another good example of well-documented recent restorations. The paint surface of the drapery appeared very heterogeneous and stained due to an early, rough cleaning. The surface examination as well as the cross-section from the green area shows copper-based glazes, comprising original and old overpaint layers, covering some damages and abrasions in the original green. Handheld-XRF analysis detected high amounts of titanium, barium and zinc in various altered areas of the drapery, indicating the use of modern pigments. In particular, evidence was found of the presence of anatase, a form of titanium dioxide supplied only from the mid-1920s onwards.[45] The study of

Fig. 3.18. Detail of St John the Evangelist's drapery, before cleaning, showing the large nineteenth-century reconstruction in the drapery (a: VIS; b: IRR). The paint cross-section under visible light from the same area (c) shows a particle of cobalt blue in a modern retouching.

3.18 a

3.18 b



3.18 c

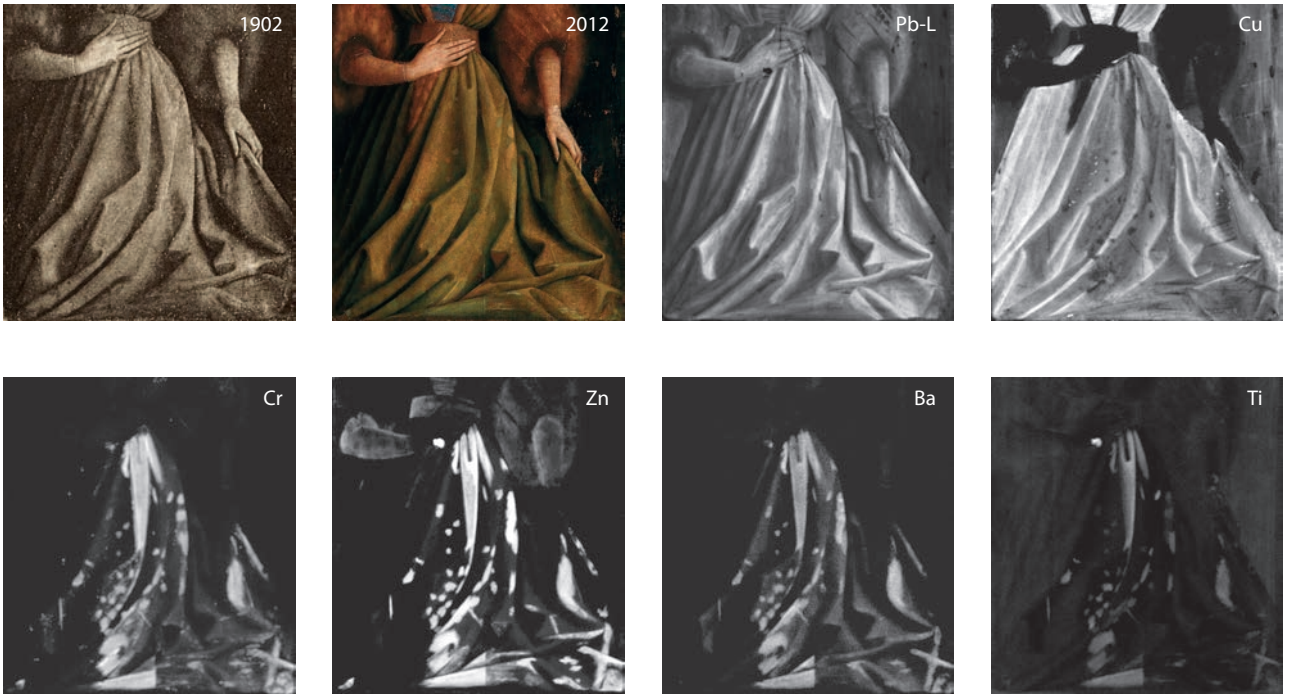
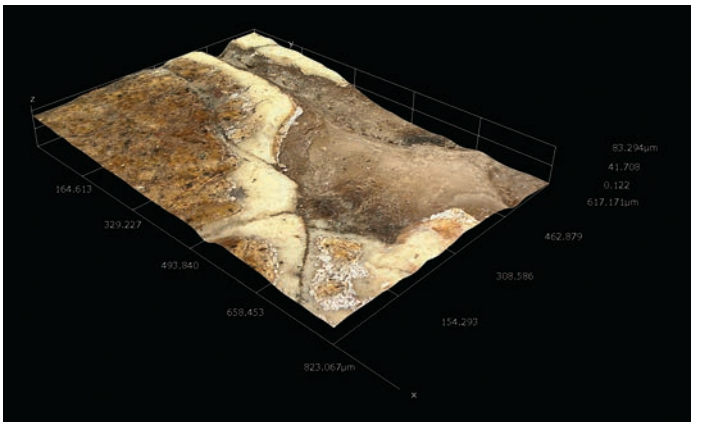


Fig. 3.19. Photographs taken in 1902 and 2012 and MA-XRF maps of the drapery of the Cumaean Sibyl: the map of lead (Pb-L), visualising lead-containing underlayers, barely shows any losses, while the copper map (Cu) shows losses in layers higher up in the stratigraphy, presumably copper-containing glazes. The maps of barium (Ba), chrome (Cr), zinc (Zn) and titanium (Ti) correspond to the retouching and overpaints of the folds carried out by Van der Veken and Philippot in 1937, which are not visible in the photo taken in 1902. These restorations were removed during the recent campaign.

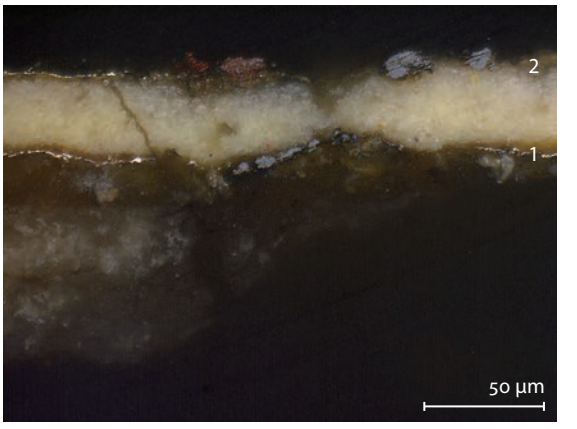
archival documentation and historical photographs indicates that the shape of the green drapery of the sibyl were altered during Jef Van der Veken and Albert Philippot's restoration of this panel in 1937.[46] The MA-XRF distribution maps of titanium, zinc, chromium and barium correspond to the shape of the folds visible in the photograph taken in 1937 and later, but differ from the folds documented on earlier documents. These chemical elements are components of the modern pigments used by these restorers (fig. 3.19).

Polychromy of the frames

The polychromy of the outer frames was also transformed through several restorations. Two old and several modern interventions were detected on the frames, with the original and overpaints separated by two or three varnishes. The earliest restoration was found exclusively on the right side of the frame of *John the Baptist*. Here, the altered areas were covered with a glazed silver foil applied on a grey mordant, and red and yellow glazing imitating the original polychromy. This is the second level of silvering that can be discerned in the sample taken after removal of modern overpaints (fig. 3.20).



3.20 a



3.20 b

Fig. 3.20. 3D detail of the frame of the *John the Baptist* panel (a) and paint cross-section from the same area (b) showing the superposition of two silver foils (1: original and 2: restoration)

The next overpaint consists in a light green layer which was very probably uniformly applied on all outer frames. It had been preserved on the *City View* and the *Interior View* (fig. 3.21) which remained in Ghent, as opposed to the other wing panels and frames, which were sold in 1816 and ended up in the Royal Prussian Collection in Berlin in 1821. The green overpaint was removed from these frames in the course of two treatments carried out in Berlin in 1823 and 1894.[47]

No time-specific pigments were identified in this layer. It contains a complex mixture including yellow and brown kaolin-based ochres, coloured by goethite and hematite (no green clay minerals were found), large particles of lead white, some vermilion, carbon black, calcium carbonate and in one case, a grain of natural ultramarine was identified.[48] This green layer covered abrasions and damages to the polychromy and varnishes, as well as metal reinforcements with new hinges on the outer edge of the *Annunciation* and the donor panels. These reinforcements were likely fitted in 1663, when the altarpiece was placed in a baroque altar. The green overpaint could either be contemporary to this change in presentation, or might have been applied later.[49]

The interventions applied to the frames in Berlin in 1823 and in 1894 were very different. In 1823, the old green overpaints were removed locally, where they were covering inscriptions. In 1894, they were removed all over the outer frames, as well as from all hinges and metal reinforcements. The frames were sawn through their

3.21 a

3.21 b

Fig. 3.21. Detail of the frame of the *Interior View* after partial removal of the modern overpaints (a) and paint cross-section from the same area before removal of modern overpaints (b). The microphotographs show two restorations: brown (3) and green (2) layers covering the original polychromy (1).

thickness and the original polychromy was reconstructed.[50] The original, sophisticated imitation of a stone construction on glazed silvering[51] was well observed by the German restorer who imitated it quite precisely, albeit using different materials. The losses were filled with calcium carbonate which was covered with a thin orange layer imitating the orange mordant for the original silvering, and containing a mixture of red lead (minium) and some earths, together with modern pigments (barium sulphate, lead chromate, cadmium sulphide and some earths). The glazed silver foil was imitated with a bronze paint composed of three kinds of metallic flakes: white tin, reddish copper and yellow brass.[52] The reconstitution of the coloured details (the coloured spots and the joints) of the stone were carried out with various pigment mixtures, containing lead white, barite, vermilion, Naples yellow, calcite, bone black and carbon black.

The frames of the *City View* and the *Interior View*, which remained in Ghent, were also restored during the nineteenth century. The flat parts of these frames were covered in a dark brownish layer (see layer 3 in the fig. 3.21) containing a mixture of yellow lead chromate, chromium oxide, Prussian blue, red and brown earth pigments, bone black, calcite and gypsum. The chamfers were coated with a layer of bronze paint, containing copper and zinc flakes in an 82:18 ratio.

When the altarpiece was reunited in 1920 after the First World War, the frames were glazed with a brownish transparent layer, in order to unify their appearance before displaying the ensemble in the cathedral. The following pigments were identified in this dark brown layer: bone black, carbon black, brown earth pigments, calcite and gypsum with the addition of small amounts of coloured pigments, such as vermilion and cobalt blue.

Assessing the condition of the original paint

Once the conservators and scientists had established the presence of extensive overpaints, an essential concern was the condition of the underlying composition by Van Eyck. It became clear that only a thorough understanding of the layer build-up and more in particular, an assessment of the quality and condition of Van Eyck's hidden paint, would allow sound decision-making regarding the potential removal or preservation of the superimposed layers.[53] The *Ghent Altarpiece* is the first work where MA-XRF was used systematically with the specific aim to supply objective arguments to feed the scholarly debate concerning the conservation strategy. The ensuing distribution images were especially helpful to estimate the condition of Van Eycks underlying composition, as illustrated in the next few paragraphs. MA-XRF images showing the distribution of the heavier elements, with atomic numbers typically ≥29 (Cu), proved most informative on the hidden paint layers. In particular, the fluorescence radiation of >8 keV emitted by elements from Cu onwards, was able to penetrate the superimposed strata and ambient air on its path to the detector. Further analyses of cross-sections in the KIK-IRPA laboratories were essential to confirm the interpretation of the scans and to augment the understanding of the layer structure on the macroscale.[54] Compositional information was collected from the entire paint surface by means of MA-XRF imaging, but the text below focuses on several details to facilitate the understanding of specific aspects.

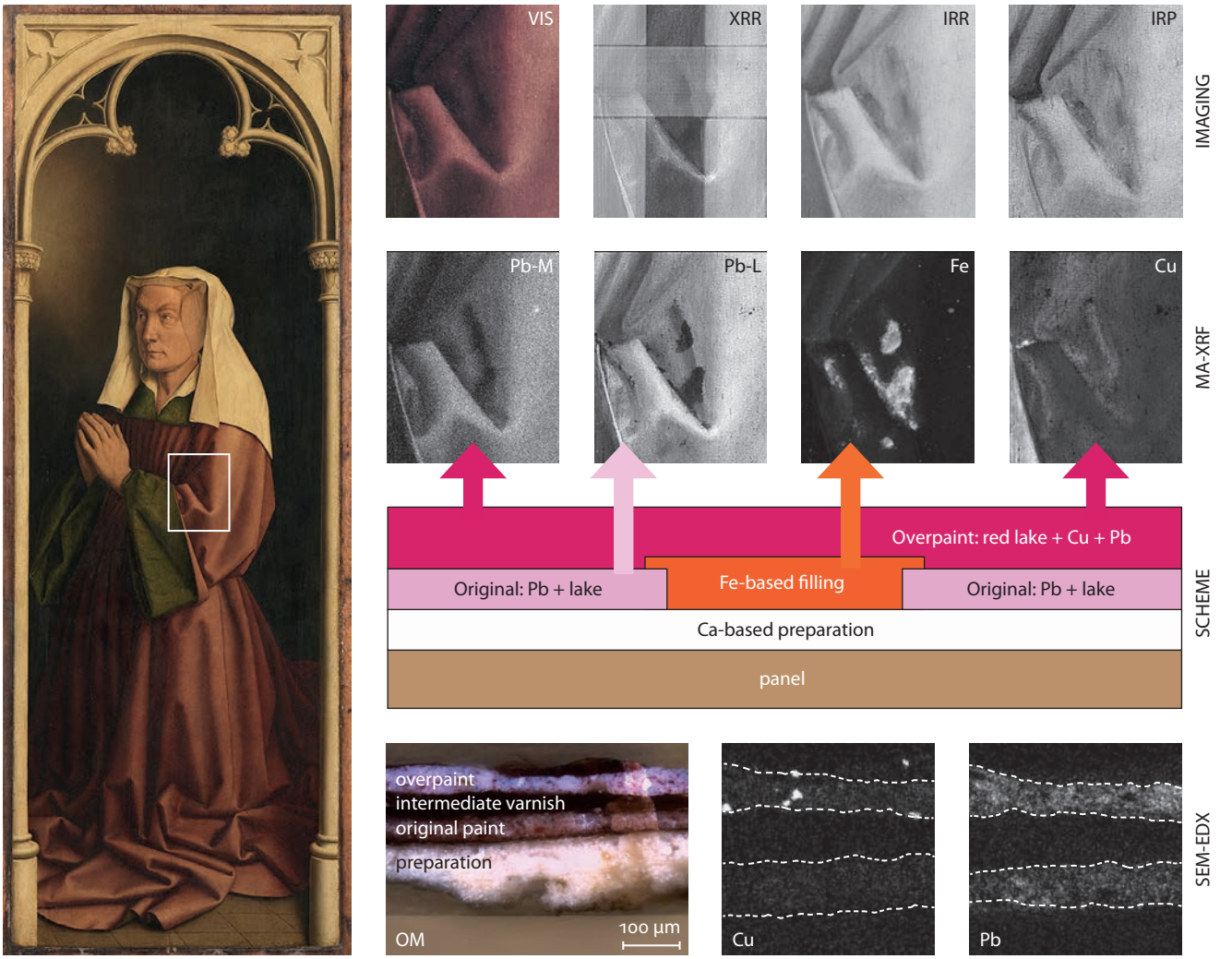


Fig. 3.22. *Elisabeth Borluut*. The white rectangle indicates the area imaged by means of MA-XRF scanning. Top row: Conventional imaging techniques, from left to right: visual macro photo, XR, Infrared Reflectography and Infrared Photography. Second row: MA-XRF images showing the elemental distribution of of Pb-M, Pb-L, Fe-K and Cu-K. Third row: scheme showing a hypothetical stratigraphy deduced from interpretation of the elemental maps. Below: microphotograph of a cross-section extracted from the scanned detail area with corresponding Cu-K and Pb-L maps collected by means of SEM-EDX, confirming the hypothetical stratigraphy.

For instance, the detail scan of the sleeve of the female donor shown in figure 3.22, clearly illustrates the added value of MA-XRF imaging. Shortly after the discovery of the overpaint by the conservators, the collected elemental distribution maps supplied further and conclusive proof on its presence as discrete losses were visualized in areas where the painting surface presented a pristine appearance.

The detail in figure 19 demonstrates that the surface paint of the dress is optically free of defects or retouching in this area. Nevertheless, the black areas in the lead image (Pb-L) clearly disclose a number of openings in the lead-rich paint system. As

such, this finding implies that an earlier but damaged pictorial layer is present underneath the intact surface paint. This laminated build-up can be further validated by contrasting the Pb-L and Pb-M distribution maps (fig. 3.22). Although both maps visualize the distribution of the same element, the Pb-M image is clearly free of the hidden paint losses that are so clearly visible in the Pb-L map. This difference is due to the fact that the detected Pb-L signals stem from deeper inside the paint stratigraphy than the Pb-M signals, which originate from the surface only. Being of relatively high energy (10.55–12.61 keV), the Pb-L emission lines have a higher penetrative power as compared to the Pb-M signals (approx. 2.3 keV). Although the information depth is difficult to calculate in XRF experiments on historical paintings, in this case it is clear that the detected Pb-L signal mostly stems from the earliest paint layers, while the Pb-M radiation can only escape the paint matrix from the upper coating. The information depth of the emission lines is strongly dependent on their energy and the instrumental set-up (excitation energy, voltage, geometry) on the one hand and the thickness and material density of the paint layers on the other hand.[55] The heterogeneous character of historical paint coatings combined with their unknown and variable thickness usually prevents an accurate calculation of the information depth for polychrome works of art.

On a larger scale, the fact that the outline of these hidden defects emerged as well-defined dark areas in the Pb-L maps allowed to estimate quantitatively which percentage of the area of the underlying original paint was damaged per panel. This was less clear from the conventional imaging techniques such as infrared photography, infrared reflectography and X-radiography. The infrared images give only a faint impression of the iron-based material that was applied to level the gaps before overpainting (fig. 3.22). As discussed in the next section, these fillings cannot be used as an accurate measure to estimate the size of the losses as they were abundantly applied, largely exceeding the actual size of the defects. Also in XR images, not all gaps seem to stand out clearly. This is especially the case in areas where the X-radiographs are clouded by the cradles that were attached to the back of the panels or, in the case of the interior scenes, by the paintings on the front side, showing Adam and Eve. As such, the objective and accurate information supplied by MA-XRF played an important role in the consideration that eventually led to the uncovering of the original, Eyckian paint layers that had been obscured from view for several centuries.

Cross-section analysis (see fig. 3.22) suggests that the source of the detected lead signal is lead white in both original and overpaint. Lead white grains were mixed in variable quantities with red and blue pigments to obtain the desired hue of the overpaint. The burgundy shade, the translucency and the deep saturation of the dress was indicative of a (semi-transparent) organic red pigment. Although the dyestuffs themselves cannot be detected by means of XRF, often the inorganic substrate does show up in MA-XRF images. In this case, the garment of Elisabeth Borluut appeared rich in potassium, an element often associated with lake pigments. Potassium salts are formed during the preparation of the lake when alum, a hydrated potassium aluminium sulphate, is added to the alkaline solution of dyestuffs. These resulting potassium salts are partially removed during the washing of the lake and partially absorbed in the lake substrate.[56]

Besides lake and lead white, the scan imaged the presence of copper in the overpaint layer. This copper pigment, identified as azurite ($2CuCO_3.Cu(OH)_2$) in cross-sections, was commonly used in fifteenth- to seventeenth-century Netherlandish painting as discussed elsewhere.[57] The concealed losses (as established by the Pb-L map) do not show in the copper distribution, since the detected Cu is exclusively present in the upper layer and is not part of the original Van Eyck paint. The discovery of azurite in the overpaint indicates that this intervention predates at least the eighteenth century since this pigment was progressively replaced by Prussian blue, first produced in 1704, and other synthetic blue pigments in the following decades.[58] Ultimately, given that cochineal gradually took the place of kermes in the course of the sixteenth century, HPLC detection of Kermes dyestuffs in the lake set back the execution of the overpainting to an even earlier period.[59]

Location and characterization of the paint loss fillings

In contrast with the burgundy-coloured garment of his wife, Joos Vijd's coat displays a brighter red colour, chiefly based on vermilion, a mercury sulfide pigment. Similar to the portrait of *Elisabeth Borluut* discussed in the previous section, openings in the underlying paint system come forward as well-defined black spots in some elemental images, in this case rather in the mercury map than in the lead map. These small, hidden defects, particularly concentrated in the lower right corner of the *Vijd* panel, had not been visible in the intact surface paint. In contradiction with Van Eyck's acclaimed subtle paint handling, broad paint strokes can be discerned on the Hg-L map, particularly in the hanging sleeves (fig. 3.23). Both findings suggest that most of the detected Hg-L signal originates from deep inside the paint system rather than from the surface, i.e. from a relatively freely applied underpainting blocking in the colour of the coat and setting up the base of the modelling with vermilion.[60]

The examination of the elemental distribution maps recorded on the panel of *Joos Vijd* (see fig. 3.23), showed that the hidden Van Eyck paint was in relatively good condition as well. Contrary to what was feared, the Hg-L images did not show signs of severe abrasion, while relatively few and small losses became visible, except on the more extensively damaged lower right side of Vijd's drapery. Furthermore, the scans revealed an elevated concentration of iron and calcium and some mercury in and around the losses, suggesting that the paste used for levelling the cavities prior to overpainting contained iron oxides and some vermilion. The original paint and the fillings were then covered with a thin overpaint containing iron and mercury: hematite, a red iron oxide (Fe_2O_3), was used in the paint together with vermilion, resulting in a red-brown coloured layer with a good hiding power that facilitated hiding the fillings and reworking the folds. The laboratory analyses of the fillings provided further details on their composition.

Comparison of the Fe-K with the Hg-L maps in figure 3.23 shows that the iron-based fillings were rather unevenly applied, and, as in the portrait of Elisabeth Borluut, clearly exceeding the dimensions of the actual gaps which are sharply visible in the mercury image.

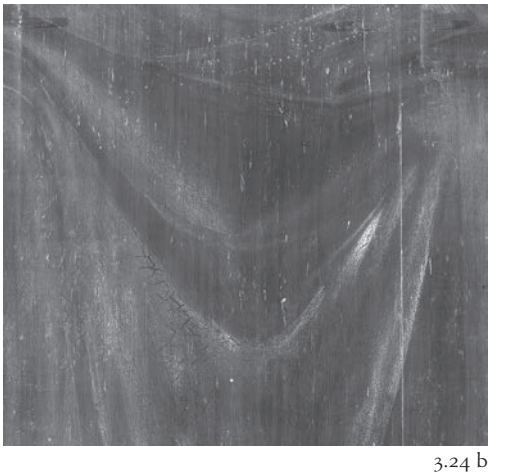
Fig. 3.23. *Joos Vijd*, after varnish removal and small overpaint removal test, with MA-XRF maps. The maps of lead (Pb-L) and mercury (Hg-L) give insight into the condition of the original composition underneath the overpaint. The Ca-K map shows the presence of calcium in brown and black tones. It also illustrates losses in the background as the chalk of the ground gives a strong signal where the paint is missing. The iron (Fe-K) map shows fillings from different interventions, while the copper (Cu-K) distribution is related with that of carbon black, present both in original and overpainting layers.

During the lively interdisciplinary debate that accompanied the actual treatment, the MA-XRF images provided clear and unbiased chemical information that can be easily apprehended by the art historians, conservators and other non-XRF experts composing the international commission of experts, but also a broader public. In this way, the insights obtained by MA-XRF scanning supported the pending choice to proceed with a global removal of the overpaint and re-expose Van Eyck's supreme paint handling. In the course of the first phase, all stakeholders were legitimately concerned about the pending treatment of the inner panels in the next phase and in particular the evaluation of the extent of overpaint. MA-XRF was again very helpful in this regard. The Deity's red drapery was an ideal candidate for a preparatory examination since the results could be directly compared with the earlier scans of Vijd's red coat (discussed above). It was considered essential to scan a relatively large area to be able to interpret the scans correctly, more particularly to characterize the application method of the overpaint.[61] The choice of the area to scan was guided by a study of the existing documentation. The X-radiograph shows striking hitherto unreported differences with the surface paint, such as drying cracks in the folds, invisible to the naked eye on the painted surface (fig. 3.24).[62]

MA-XRF (fig. 3.25) revealed a more intensive use of lead in the Deity's drapery, as compared to Vijd's dress where lead was only employed sparsely. The detected lead signal was considered to stem largely from a hidden layer, as the shape of the folds seem much stiffer than in the (more realistic) overpaint (fig. 3.25, Fe-map). Van Eyck may have deliberately given the dress of the Deity the visual effect of a more monumental, hieratic sculpture.

The iron scan presumably corresponds to the use of red iron oxide. The iron-rich areas coincide with folds that are visible to the naked eye, but are covering up the vermilion-rich highlights of the original drapery (fig. 3.25, Hg-map). The iron-based opaque red earth was used by the restorer to cover the deepest shadows and stronger highlights and achieve a softer modelling in a manner similar to the overpaint of the portrait of *Joos Vijd*. These similarities between the red drapery of Vijd and the Deity indicate that both draperies have been covered at the same stage and confirm the hypothesis formulated in 1951 stating that the red drapery is completely overpainted.[63]

3.24 a



3.24 b

Fig. 3.24. Detail of the Deity's drapery, in visible light (a) and X-radiograph (b)

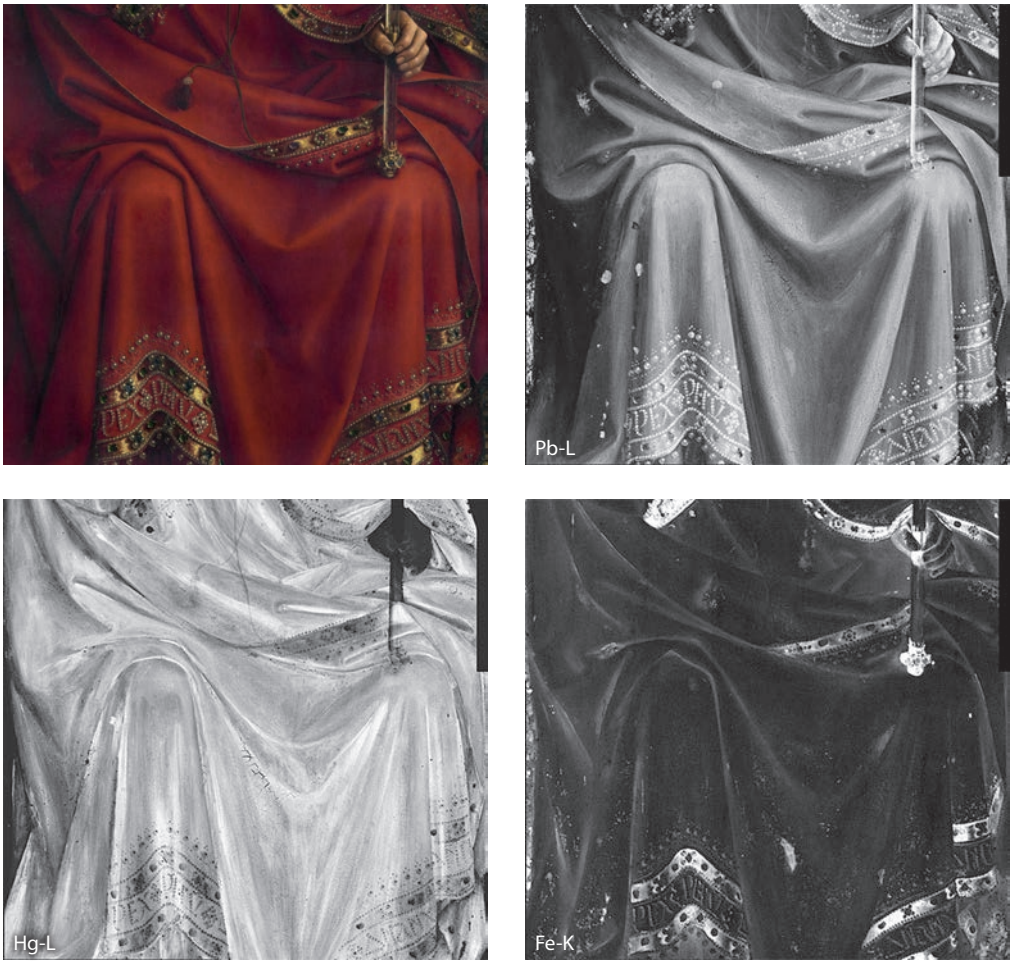


Fig. 3.25. Central zone of the Deity's drapery in normal light, and MA-XRF maps for lead (Pb-L) and mecury (Hg-L) show the original folds, whereas the map for iron (Fe-K) corresponds to the visible surface (overpaint). This is particularly clear around the Deity's proper right knee and in the central folds.

The condition of the drapery is expected to be in a better condition than that of Vijd as the MA-XRF images revealed only a few losses and no extensive fillings.

Documentation of the conservation treatment by chemical imaging

When the overpaint removal process was halfway, MA-XRF maps were again recorded from selected areas on the donor panels to verify the interpretation of the previous scans.

The removal of the overpaint on the portrait of *Elisabeth Borluut* revealed that the original dress of the sitter displays a lighter hue then the later overpaint. This chromatic contrast is illustrated by figure 3.26, showing an early cleaning test that was carried out around a large paint loss. After removal of the deep burgundy-coloured overpaint, a lighter, more pinkish paint surfaced that exhibits a stronger and more sophisticated contrast between shadows and highlights. For instance, after uncovering, a delicate red line is exposed on the left side of each fold, a feature that was predicted

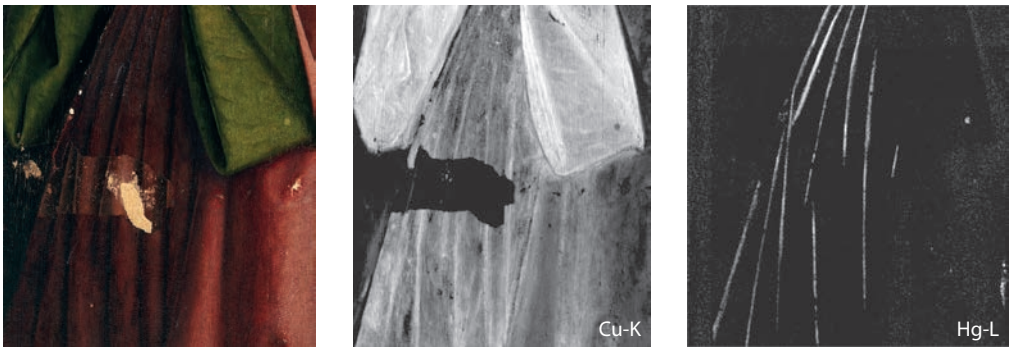


Fig. 3.26. Test window where the second overpaint was removed. MA-XRF scan of copper (Cu-K) and mercury (Hg-L) during the removal

by the MA-XRF mercury maps. The mercury distribution in figure 3.26 shows these thin lines, even in areas where the overpaint had not yet been removed. This highlight edging along the folds, but also along the face of Elisabeth Borluut, for example, is situated on the opposite side of the light source and is a feature typical of Van Eyck found in many of his paintings.[64] These details were systematically covered by the overpaint, in this way softening the contours.

The cleaning front is clearly discernible in the copper (Cu-K) maps. As illustrated by figure 3.27, the copper signal has disappeared completely in the area where the overpaint was removed. Figure 3.27 shows the lower part of Borluut's dress in a later

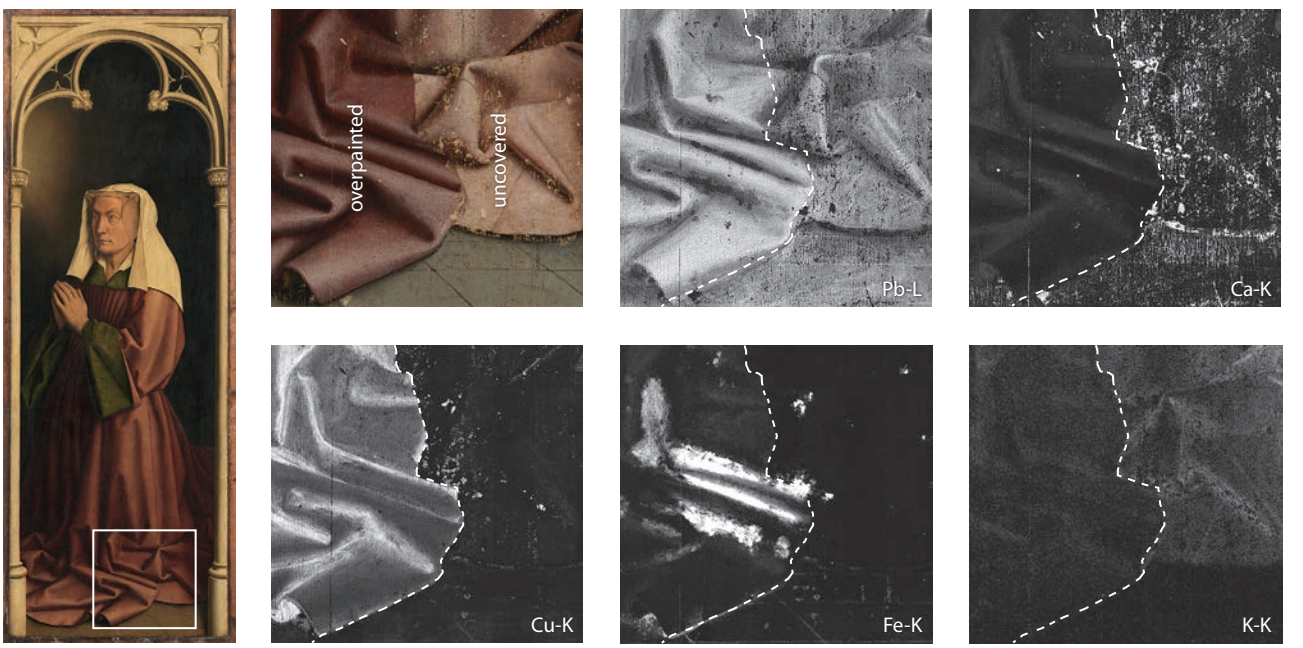


Fig. 3.27. The white rectangle on *Elisabeth Borluut* indicates the location of the detail maps shown on the right. The elemental maps of lead (Pb-L), calcium (Ca-K), copper (Cu-K), iron (Fe-K) and potassium (K-K) were collected when removal of the overpaints was halfway. A dotted white line indicates the cleaning front. Note how the copper (in the overpaint) and the iron (in the fillings) signal disappears as the cleaning progresses.

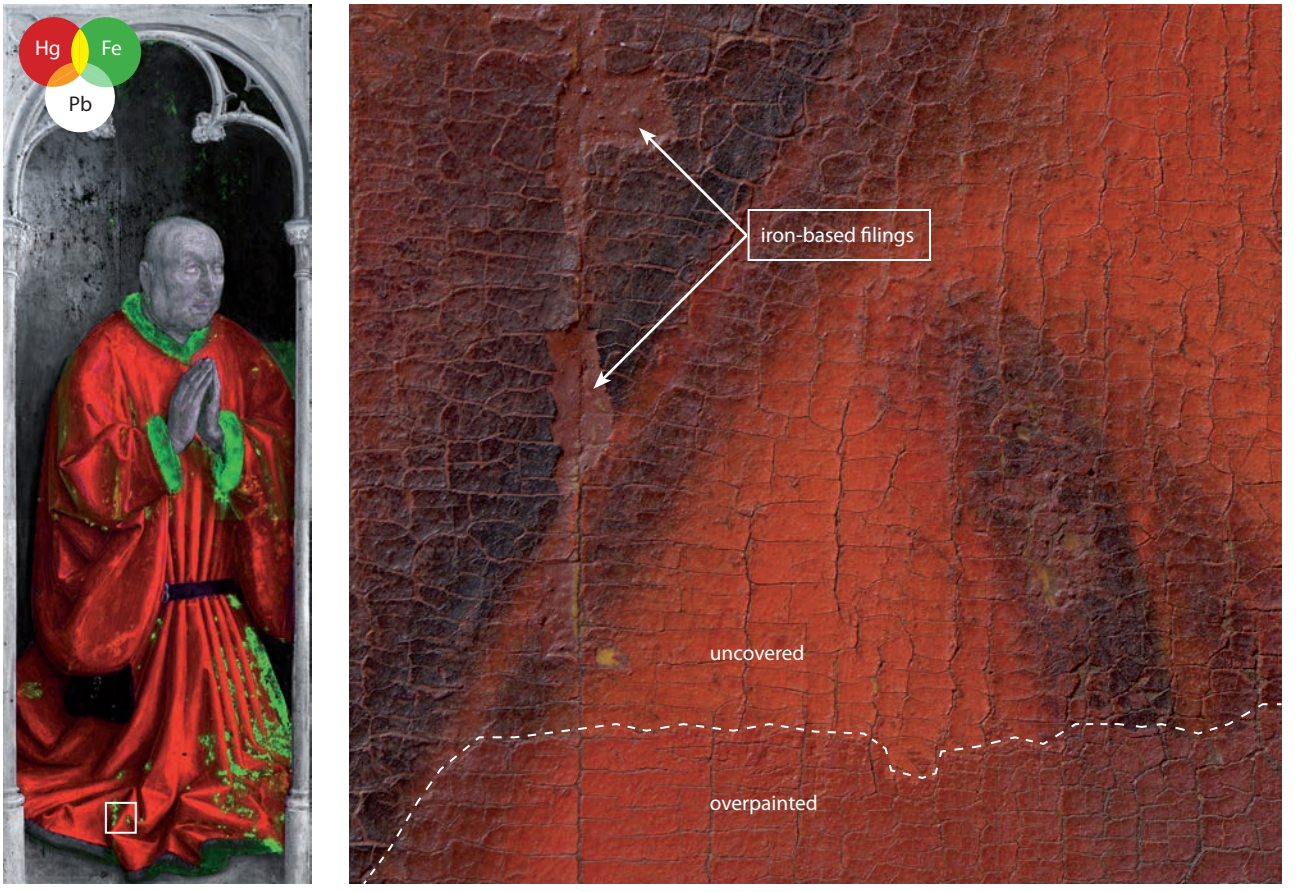


Fig. 3.28. Left: false colour composite elemental map of *Joos Vijd* recorded before treatment, with the distribution of mercury (Hg) in red, lead (Pb) in white and iron (Fe) in green. The white rectangle indicates the detail area shown on the right. Right: detail of the paint surface during removal of the overpaints. In the cleaned area, the iron-based fillings showed up exactly as predicted by the MA-XRF maps.

phase of the treatment, when the removal was halfway. The figure illustrates how the copper signal gradually vanished with the removal of the azurite-containing overpaint. The iron signal too is mostly absent in the uncovered area, since the conservators removed the iron containing fillings in the paint losses along with the overpaint during cleaning.

The Pb-L maps recorded on the partially cleaned areas confirm that both the overpaint and the original paint layers contain lead, as was predicted by the MA-XRF maps recorded before overpaint removal (see fig. 3.27), a finding that was confirmed by SEM-EDX analysis on cross-sections. After removal of the overpaint, it became clear that the original paint displays numerous minute defects that were not detected by MA-XRF scanning. These maps thus demonstrate the limitations of the chemical 'see-through' imaging technique. The same losses show up in the Ca-K image as the paint losses expose the underlying chalk ground layer. Potassium is present both in the uncovered and overpainted areas. The source for K is most likely alum, a hydrated

potassium aluminium sulphate that was commonly used for precipitation of organic red dyes and sometimes remains in the resulting lake substrate, as discussed earlier.

After the overpaint removal, the abundantly applied reddish fillings surfaced in the original paint layer exactly as anticipated by non-invasive MA-XRF scanning. For instance, figure 3.28 shows a composite MA-XRF map recorded before overpaint removal on the portrait of *Joos Vijd*, with indication of the fillings in green.

The MA-XRF maps recorded halfway on this panel (fig. 3.29) also demonstrate that Zn was present both in the original paint and in the filling material. As shown in figure 3.29, a spatial correlation between Fe and Zn can be observed in the still overpainted areas of the panel. After removal of the overpaint and the filling material, the Zn maps show a distribution that is no longer related to that of Fe but resembles that of K and Mn. At the positions where the highest Zn intensities are encountered, also some traces of Cu are visible. These findings suggest that Van Eyck used a paint containing organic red lakes with additives to promote its drying, i.e. a zinc dryer and glass that is rich in potassium and manganese, to realize shadowed areas on Vijd's red coat. Cu is also present in black areas such as Vijd's purse, his belt and the background, and is possibly associated with the use of a copper-based salt such as verdigris (copper acetate) or blue vitriol (copper sulfate), employed as siccatives for the slow drying blacks and red lakes.

Fig. 3.29. The lower and most damaged part of Joos Vijd's red mantle, with corresponding MA-XRF maps recorded during the removal of the overpaint. The white dotted line indicates the area where the overpaints and fillings were still present.

Notes

1 Coremans 1953, p. 11. On Coremans's development of interdisciplinary expertise for the study of works of arts, see Claes, Dubois, Sanyova 2018 and Dubois, Deneffe 2018.

2 Janssens et al. 2016.

3 Research projects: 'The Mystic Lamb in the laboratory 60 years after Paul Coremans. The contribution of new analytical techniques', Belgian Science Policy project MO/39/011 (2012–16), 'Aanvullend onderzoek Lam Gods', Gieskes-Strijbis Fund (2014–18); 'Archeometrical Study of the Ghent Altarpiece', GOA project Ghent University (UGent) (2012–17).

4 See contribution 5a by Postec and Steyaert in this volume.

5 The chemical analysis and the characterisation of the original paint materials and techniques are still ongoing. The results of this complex research will be published at the end of the conservation process.

6 Session of the International Commission for the Conservation of the Ghent Altarpiece, Museum of Fine Arts, Ghent, 17 March 2014; see contribution 4a by Depuydt et al. in this volume.

7 See contribution 1 by Dubois in this volume.

8 This research is conducted by Hélène Dubois, as part of her doctoral research: 'The *Ghent Altarpiece* and its material history. A contribution of the analysis of its condition by combining technical examination with the investigation of historical sources' (Supervisor: Prof. Maximiliaan Martens, Kunstwetenschappen, UGent). See also contribution 1 by Dubois in this volume.

9 The size of micro-samples varies between 0.1 and 0.4 mm^2 and the surface of the small wing panels in the *Ghent Altarpiece* is approximately 1 m^2 or 1,000,000 mm^2.

10 The possibility of damages occurring to the panels during an early state of the execution was raised during the meeting of the international commission of 27 May 2013. See also contribution 5a by Postec and Steyaert in this volume.

11 The sample from Margaret's dress was studied by the National Gallery scientific department in London during the restoration that was carried out there by Jill Dunkerton in 2008–09. See: https://www.nationalgallery.org.uk/paintings/research/the-restoration-of-margaret-the-artists-wife/margarets-red-dress, accessed 12 June 2017.

12 See contribution 4a by Depuydt et al. in this volume.

13 Some varnish samples taken along the edges of the *Archangel* panel, were analysed by pyrolysis-gaz chromatography-mass spectrometry (py-GCMS) by Steven Saverwyns. The resulting chromatograms revealed, beside oleo-resinous old varnishes composed of linseed oil and pine resin, the presence of modern varnishes and consolidation materials used in the 1951 campaign and later: Polycyclohexanone, dammar resin and beeswax. See Van Grevenstein et al. 2011, p. 90.

14 Poli et al. 2017.

15 Coremans 1953, p. 105. See also contribution 4a by Depuydt et al. in this volume.

16 Brinkman et al. 1990; Van Asperen de Boer 1979.

17 As opposed to cross-section, the spectroscopic re-examination of a thin section is limited. The thin section is prepared from the cross-section reducing the thickness of the embedding resin block to 30–40 µm. Consequently, the sample is transformed into a thin and transparent plate in which the pigmented layers, mainly those containing large particles, can easily become disintegrated.

18 See contribution 1 by Dubois and contribution 4a by Depuydt et al. in this volume.

19 The use of this component is discussed below.

20 This compound could correspond to zinc sulphate ($ZnSO_4$), used in the past as a drying additive; see below.

21 The identification of starch was based on the distribution map of a carbohydrate fragment obtained in negative mode, as it was carried out in the research on Rembrandt's ground by Sanyova et al. 2011.

22 The upper fillings are described in more detail in the next paragraph.

23 See contribution 4a by Depuydt et al. in this volume.

24 See contribution 1 by Dubois in this volume.

25 The identification of kermes dyestuffs in the lakes of this overpaint has been carried out by HPLC analysis on scrapings collected during overpaint removal.

26 Kirby, Spring, Higgitt 2005.

27 The sample to be analysed by HPLC should imperatively contain one layer, in order to correctly interpret the obtained results.

28 Kirby et al. 2005. The shearings (or clippings) were produced in the final processing of dyed cloth, in order to obtain a high-quality fabric for luxurious clothes. The short fibre ends were first raised with teasels and then removed from the surface of the cloth with large cropping shears. The waste produced by the operation was recycled for many purposes, including as a source of dyestuffs for the manufacture of lake pigments.

29 Kirby, Saunders, Spring 2006.

30 Kirby 2008.

31 Kirby, Saunders, Spring 2006.

32 Spring, Morrison 2017.

33 Kirby, Spring, Higgitt 2005.

34 Kirby, Spring, Higgitt 2005. Before being dyed, the silk was washed and then weighted. This last step includes the treatment with a solution of oak galls or some other source of tannin in order to restore some of the weight lost during washing.

35 Hoffenk de Graaf 2004, p. 76; Cardon 2003, p. 491.

36 Kirby 2008.

37 The most recent painting of the Southern Netherlands in which kermes lakes were detected is Lambert Lombard's *Coriolanus Receiving his Wife and his Mother* (c. 1550; Musée d'art moderne et d'art contemporain Liège, inv. 944); see Sanyova, Saverwyns 2006 and Sanyova 2008. Among Italian paintings, the most recent kermes lake was found by HPLC in Lorenzo Lotto's *Portrait of Giovanni della Volta and his Family* (c. 1515, National Gallery, London, NG 1047); see Kirby 1996.

38 Spring, Morrison 2017.

39 Further quantitative characterization of encountered glass particles is planned for the next phase of the project.

40 Spring 2007; Spring 2012a; Spring, Morrison 2017.

41 Spring 2012a.

42 Spring 2012a.

43 On the large damage in the Evangelist's robe, see contribution 4a by Depuydt et al. in this volume. For the restorations carried out in Berlin, see Stehr, Dubois 2014. The retouching could have been carried out by Jakob Schlesinger who worked on the panels before 1830. On old photographs of the panels taken in Berlin, see Peters 2017.

44 See below in the section on frames.

45 The anatase was available from the mid-1920s, but not accepted by artists until the 1930s, because of its negative effect on the paint medium: Eastaugh, Walsh 2004.

46 The panels of *Adam* and *Eve* were restored in 1937 by Van der Veken and Philippot in the Royal Museums of Fine Arts of Belgium in Brussels. Coremans 1953, pp. 30 and 65; Rosier et al. 2016.

47 See contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

48 In the frame of the *Interior View*.

49 See contribution 6 by Jones, Augustyniak, Dubois; contribution 1 by Dubois; contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

50 See Stehr, Dubois 2014 and contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

51 See contribution 5b Augustyniak, Mortiaux and Sanyova in this volume.

52 The brass flakes are composed of copper and zinc in the proportion 87 to 13, respectively.

53 See contribution 4a by Depuydt et al. in this volume.

54 Van der Snickt et al. 2017.

55 Van der Snickt et al. 2016.

56 Kirby, Spring, Higgitt 2005.

57 Van der Snickt et al. 2011.

58 Eastaugh, Walsh 2004.

59 See discussion on lake pigments in the *Chemical characterization of overpaints.*

60 See contribution 5a Postec and Steyaert in this volume.

61 MA-XRF scans of this area required dismantling the panel and taking it out of the glass case. The church fabric had agreed to close the access to the chapel to the public for five days in order to perform the scans. The Lamb in the Adoration was scanned over a day and the Deity over four days. This examination was an important

part of the research project on the condition of the altarpiece, that has been supported by the Gieskes-Strijbis Fund since 2014: 'Aanvullend onderzoek Lam Gods'. We are particularly grateful to Anne van Grevenstein for advice on this project.

62 Different shapes in the folds were noted by Coremans 1953, p. 105.

63 Coremans 1953, p. 105.

64 See contribution 5a by Postec and Steyaert in this volume.

4a
Conservation and Restoration Treatment
The Painted Surface

Livia Depuydt-Elbaum, Françoise Rosier,
Bart Devolder and Nathalie Laquière

The conservation and restoration of the *Ghent Altarpiece* had to be performed in three phases, so that only one third of the altarpiece would be temporarily removed from St Bavo's Cathedral in Ghent at any given time.[1] Three groups were constituted to this end: the upper inner register, the lower inner register and the reverses. The phases had to be aligned with the registers so as to enable the restorers to maintain an overall view during treatment, especially where a single scene is developed across several panels.

It was decided to start with the conservation of the reverse sides of the polyptych (fig. 4a.1). This first phase, carried out in conjunction with ground-breaking technical research, brought to light Van Eyck's original concept with regard to the appearance of the closed polyptych. It is this fascinating journey from simple surface dirt removal to the uncovering of Van Eyck's exquisite original brushwork – hidden for centuries under early overpaint – that will be related in this chapter.

The exterior first: a strategic choice

Several factors prompted us to begin with the treatment of the exterior of the polyptych in October 2012. First of all, commencing treatment with the reverses of the panels forming the upper and lower registers gave us an overall view of the current condition of the paint layers and supports, while also facilitating a relatively complete technical examination of the polyptych's construction. Secondly, the fact that the exterior of the altarpiece had only been subjected to limited material intervention in the 1950s[2] presented us with a more complete sequence of successive interventions, which allowed for a more effective study of the polyptych's material history. Thirdly, the reverses have polychrome frames, making it important to achieve a complete view of the work, given that the frames play a crucial role in the overall perception of the polyptych. Studying them would provide useful information on their condition and their original construction. This information could then be incorporated in our consideration of the whole. Starting with the exterior of the altarpiece was also a means of guaranteeing their treatment, as it can sometimes happen with a major project of this nature that once the interior of the polyptych has been restored, treatment of the exterior is abandoned due to timing or budget constraints.

Fig. 4a.1. (facing page) The closed altarpiece before treatment

The exterior paintings and the frames were duly transferred to the Museum voor Schone Kunsten (MSK) in Ghent for restoration in secure, climate-controlled conditions.

Notwithstanding the fact that an overall view of the polyptych is of fundamental importance during the conservation and restoration treatment, the reverses may be viewed as a distinct entity, given that the exterior of the wing panels cannot normally be viewed at the same time as the interior.[3] The polychromy of the frames – an important colouristic and architectonic element – had to be considered within the context of the work as a whole. It forms a unifying and inseparable part of the painting and creates a link between the closed altarpiece's various wing panels. In fifteenth-century Flemish painting and especially in the work of Jan van Eyck the polychrome frame is an integral element of the painted panel. Consequently, the paint layers of the panels and the polychromy of the frames must be observed, studied and treated together as a single entity (fig. 4a.1).[4]

Starting the treatment of the *Ghent Altarpiece* was no simple task – not only for practical reasons, given the scale of the assignment and the requirement that the restoration be carried out in public,[5] but also because of the need to achieve a balanced result with a Conservation Team[6] made up of restorers with different sensibilities, backgrounds and knowledge. In the end, this diversity actually proved to be a strength at times, in terms of both the restoration and study of the work.

Condition

Preliminary visual examination and scientific imaging (UV, IR, IRR and XR) were essential prior to any intervention in order to establish the condition of the paintings and to study the techniques used in their execution. A full-size print on paper of the infrared reflectograms and X-radiographs was produced for the eight panels to facilitate their examination and comparison as well as to encourage discussion and the exchange of ideas between restorers, scientists, art historians and other experts.

The reverses displayed an accumulation of surface dirt, visible in the form of a greyish veil over the paint layers and frames (fig. 4a.2).[7] Beneath this significant veil of dust, there were numerous layers of varnish, both modern[8] (ketone) and historical[9] (resin or oil-resin) (fig. 4a.3), most of which were quite degraded, attenuating colour contrasts and depth effects. The exterior of the polyptych presented conservation problems.[10] Significant instances of lifting paint layers had been trapped by the varnishes and only the latter's removal would allow the paint flakes to be consolidated and put back in place (fig. 4a.4). A number of conservation issues were also detected in the wooden supports (fig. 4a.5).

We focus here on painting layers, in the first instance on the question of cleaning, by describing the decision-making process that led to the removal of varnish layers and successive overpaints. We will then describe the conservation and restoration treatment, the purpose of which was, first and foremost to stabilize the material condition of the supports and the paint layers.

Fig. 4a.2. Detail of *St John the Baptist* before treatment: substantial accumulation of surface dirt

Varnish removal

When setting out to clean an ensemble of such importance with a team and within a limited time-frame, it is important to tackle the paintings' layers progressively, so as to maintain a coherent and balanced view of the polyptych. A gradual approach in tackling the original paint layers allows a better understanding of their condition, as they are shaped by a complex material history that differs from panel to panel.[11] Determining the precise extent of losses, retouches, both glazed and opaque overpaint allows the cleaning to be carried out with a thorough knowledge of the material facts and hence to work on a more considered basis. Issues can then be anticipated and the cleaning can be adjusted where necessary or halted in time to avoid material considerations taking precedence over the image.[12]

Fig. 4a.3. Detail of *St John the Evangelist* before treatment: heavily yellowed varnish

Fig. 4a.4. Detail of the *Virgin Annunciate* before treatment: severe cupping of the paint layer

Fig. 4a.5. Detail of *Joos Vijd* before treatment showing cupping of the paint layer and unstable panel joints

First cleaning phase

The cleaning of the exterior panels began with the surface cleaning (fig. 4a.6)[13] followed by removal of the different layers of ketone varnish applied during the twentieth century.[14] Lastly, we proceeded to thin the resin varnishes, while provisionally leaving retouches intact, where technically possible, so as to maintain a balance between the image, the state of conservation and the material history of the paintings.

The removal of ketone varnishes and the thinning of the resin varnishes substantially improved the colour values and the sense of space throughout the scenes. The change was already significant at this stage. The exterior panels retained a harmonious aspect, without revealing the imperfections associated with their actual material condition. This first cleaning allowed the rediscovery, albeit only partial, of the refined play of light, characteristic of the Van Eyck brothers' art (fig. 4a.7 and 4a.8). A clearer view of the actual state of conservation of the painted layers was also possible at this stage. It swiftly became apparent that earlier restoration campaigns had affected the paintings unevenly. Given the differences in the material history experienced by the wings[15] certain panels were in a fairly good condition while some showed numerous retouches and/or overpainting and others were relatively abraded.[16]

We examined the polychromy of the frames in parallel.[17] This revealed that despite the assumed poor condition of the original layers, a significant percentage of the original polychromy remains. It represents a dressed masonry construction in trompe l'œil, with variations in the nuances of the stones.[18]

Fig. 4a.6. Detail of the Erythraean Sibyl: before (left) and after surface cleaning (right)

4a.7 a 4a.7 b

Fig. 4a.7. *St John the Baptist* before (a) and after (b) removal of the first varnish layers

New cleaning tests were performed to determine the continuation of the treatment and to decide the most appropriate degree of cleaning. The issues identified were complex. The remaining layers that still covered the original paintings were multiple, irregular and heterogeneous: layers of dirt, oily layers and significant overpainting. Given the historical character of some of the interventions and the extremely abraded condition of some of the scenes, we consulted the International Committee in order to include its opinion in the decision-making process.

Simplified diagrams showing the probable extent of the overpainting, as well as the location of losses in the paint layers and frames,[19] were created for each panel to provide the experts and the public with a clear view of the overall status of the reverses of the polyptych.

Two treatment options were open to us at this stage. The first was to accept the degree of cleaning we had achieved already, which had brought about a considerable improvement in colour values. This would allow a coherent image to be retained of the reverse of the polyptych, while offering a reading of the work in which a significant place would be afforded to the additions forming part of its material history. On the other hand, this presentation would pass up the opportunity to reveal the original

4a.8 a

4a.8 b

Fig. 4a.8. The *Virgin Annunciate* before (a) and after (b) removal of the first varnish layers

material. The second option was to continue the cleaning process in order to rediscover the original work, which would entail removing the various remaining varnish layers, abundant retouches and historical overpainting. This option would reveal the technical and pictorial quality of the original painting, but also the sometimes incomplete and abraded condition of certain panels. The Conservation Team presented these two technically possible options to the International Committee.[20]

The conservation of the polyptych was a crucial argument in the decision to continue the cleaning process, since removal of the remaining varnish layers would allow the paint layers to be consolidated more effectively. What is more, removal of the old varnish layers was still possible at that point, which might no longer be the case in future years.[21] Secondly, more thorough cleaning would reveal the pictorial quality of the original works. This choice meant that the uneven state of conservation

4a.9 a

4a.9 b

Fig. 4a.9. The *Virgin Annunciate* during (a) and after (b) the second cleaning phase

of the paintings had to be taken into account, although the differences in condition could be compensated for during reintegration. Attention was also drawn to the fact that the overpainting largely respected the original composition, without making any fundamental formal or iconographic changes. And finally, the criterion of uniqueness[22] was taken into consideration, the *Ghent Altarpiece* being the sole surviving monumental work attributed to Hubert and Jan van Eyck.

The International Committee ultimately took the view that the result of the cleaning, following removal of the ketone varnishes and thinning of the resin varnishes, was unsatisfactory. It therefore advised the Conservation Team to continue cleaning for both conservation and aesthetic reasons, even though more thorough cleaning would draw attention to the variable condition of the different exterior panels.[23] The committee also endorsed the desire to subject the frames to in-depth treatment in

conjunction with the paint layers. The dismantling of the frames entailed by this more fundamental treatment, would moreover enable dendrochronological analysis of the panels with the *City View* and the *Interior View*, which had yet to be studied at that point.[24]

Second cleaning phase

A more thorough cleaning of the paint layers was thus performed, comprising the removal of the residual resin and oil-resin varnishes,[25] glazed[26] and opaque overpainting[27] associated with earlier restoration campaigns. This decision proved beneficial to the reading of the image and appreciation of the quality of the original painting's execution, despite areas of losses in several panels.[28] In similar areas in the upper and lower registers[29] test zones were selected for more thorough cleaning in order to gain a better understanding of the visual link between the different images. Adjacent zones were favoured on account of the fact that the different panels of the *Annunciation* were conceived as a single scene stretching across four panels.

On completion of this second cleaning stage, the colour range of the paint layer was found to be brighter, more vivid and more luminous (fig. 4a.9). The original paint layer appears extremely thin, smooth and at times very transparent. The pictorial execution is relatively rapid (fig. 4a.10). The correspondence between the scenes has thus been greatly improved. In the upper register, the similar appearance of the ceilings and floors of the *Annunciation* scene after cleaning indicated that this was indeed a common space, still interrupted at this stage by the presence of historical overpainting in the architecture (fig. 4a.11).[30] Other significant overpainting related to the flesh tones and drapery of the Angel and the Virgin, the two sibyls, the Prophet Micah and the prie-dieu. Damage to the paint layer was also revealed, some of it specific to the upper register. This early damage included small, scattered droplet-shaped losses, possibly caused by a corrosive agent. These splash marks appear to have been left when the panels were still together at the cathedral. Given their restricted location in the upper part of the altarpiece and their presence in the four panels of the upper register, they might have been caused during work on the chapel walls or by bird or bat droppings (fig. 4a.12).

Still in the upper register, hurried cleaning with an aggressive product seems to have significantly damaged the original paint layer and to have caused micro-losses. Traces of this intervention follow the shape of the frame in some cases, indicating that the paintings were cleaned hastily without being removed from their frames (fig. 4a.13). This is clearly visible in the lunettes in the dark tones and the banderoles, as well as in the panel with the *Virgin Annunciate*, in which the light tones have been particularly affected by damage of this type (fig. 4a.14).[31] The dark niche of the Cumaean Sibyl lacked depth and nuance, probably due to the aforementioned drastic cleaning. The underdrawing of that area appears to indicate that the two sibyls are housed in a shared niche. The Erythraean Sibyl is located in the most brightly lit part of the structure, the Cumaean Sibyl in the more shadowy part, although it appears that the modulations here have been lost. In other words, the lunettes do not comprise a sequence of prophets and sibyls in separate niches, like the figures represented in the

Fig. 4a.10. The Prophet Zechariah: the colour changes resulting from the two phases of cleaning are visible in the prophet's ermine-lined cloak

lower register; instead, the niche shared by the two sibyls introduced a formal variation that avoids the strict repetition of the lower register's rhythm. It is also apparent that the green glazes, which are more sensitive to aggressive products, have been abraded in several places, notably in the gown of the Cumaean Sibyl and in the robes of the Prophet Micah. The aggressive cleaning appears to have been carried out on all panels of the upper register (fig. 4a.18), indicating that it must have been done before the wings with the *Annunciation* were removed, namely prior to 1816.[32]

Similar observations were made for the lower register regarding the colour range and pictorial execution (fig. 4a.15). Thorough cleaning of the paint layers revealed old abrasions on the ridges of the vertical craquelures resulting from previous cleanings. This damage was particularly visible in the dark backgrounds of the panels showing the donors, Joos Vijd and Elisabeth Borluut, and in the figure of St John the Evangelist (fig. 4a.16). The greater degree of wear in the Evangelist compared to John the Baptist is probably attributable to the position of this wing in the context of the cathedral. When the polyptych was open,[33] the surface of this panel in the lower register must have come into close proximity with the exterior wall and the stained-glass window, which could have encouraged lifting of the paint layers. It is most likely this contextual factor that explains the difference in condition between the two saints John. These alterations and the positioning of the panels probably explain why Elisabeth Borluut, St John the Evangelist and Joos Vijd were overpainted across virtually their entire surface. Lastly, the removal of the varnish meant that early reintegration efforts were

also rendered more visible, notably the significant loss that was reconstructed in the Evangelist's drapery.[34] Its dark and altered appearance considerably affected the reading of the image, necessitating its removal (fig. 4a.41).

Fig. 4a.11. The unframed upper register of the closed altarpiece during the second phase of varnish removal

Fig. 4a.12. Detail of the *Virgin Annunciate*: traces of a corrosive agent that has damaged the paint layer

Fig. 4a.13. Detail of the banderole of the Prophet Micah: micro-paint losses following the shape of the frame caused by an aggressive cleaning agent

Fig. 4a.14. Detail of the Virgin's robe and hair: micro-losses in the paint layer

The overpainting issue

The identification of overpaint on the reverse of the wings was carried out progressively. It was not mentioned clearly in *L'Agneau Mystique au Laboratoire*[35] – other than with reference to the presence of possible early interventions – or elsewhere in the abundant literature devoted to the polyptych. From the material point of view, overpainting was extremely difficult to discern below the substantial layers of altered varnish, but also because of its extent and the similarity between its craquelures and that of the original painting. The overpainting in question was thus done at a very early date. It was first detected in the architectural elements, then in the flesh tones and lastly in the drapery (fig. 4a.19).[36]

Timeline for the identification of the overpainting

The first overpaint that the restorers detected was located in the architectural elements in the upper and lower registers (fig. 4a.20) and in the figure of St John the Evangelist. They were identified through the presence of small, suspicious losses. These had been interpreted in the preliminary study as lifting of the original layer, but actually revealed a problem of adhesion between the overpaint and the original layer, linked to the presence of an intermediate varnish.

Fig. 4a.15. Detail of *St John the Baptist* after the first and during the second phase of varnish removal; the right-hand part is completely stripped of varnish.

Fig. 4a.16. The lower register of the closed altarpiece after the second phase of varnish removal

Fig. 4a.17. Detail of *St John the Baptist* after the second phase of varnish removal: veined and polished marble

It did not come as a surprise to learn that the panel with *St John the Evangelist* incorporated numerous retouches and overpaints. Its abraded state was predictable in light of the scientific documents and the very significant loss detected in the drapery.

In the case of the architecture, attention was drawn chiefly by the spatial inconsistencies, in particular the overpainting of the low walls in the *City View* and the *Interior View*, which disrupted the continuity of the space of the *Annunciation* scene. As for the lower register, overpainting was detected in the backgrounds, which were too uniform and complete to be authentic, and in the arches of the niches, the appearance of which was stained and irregular.

Removal of the overpaint from the low walls and from the floor of the *Annunciation* scene revealed brown stains that remained very disturbing (fig. 4a.21).[37] This alteration of the original paint layer was also observed, albeit to a lesser degree, in the panels with the *Archangel* and the *Virgin Annunciate* (fig. 4a.18), but not in the paintings of the lower register. Stains of varying shape and size were present in both bright and dark tones. Under a stereo microscope the presence of a brown substance was detected, which in some cases was visible as an excrescence in the form of crusts on top of the original paint layer, in others incorporated in it, thus making it impossible to remove these decomposition products without damaging the original.

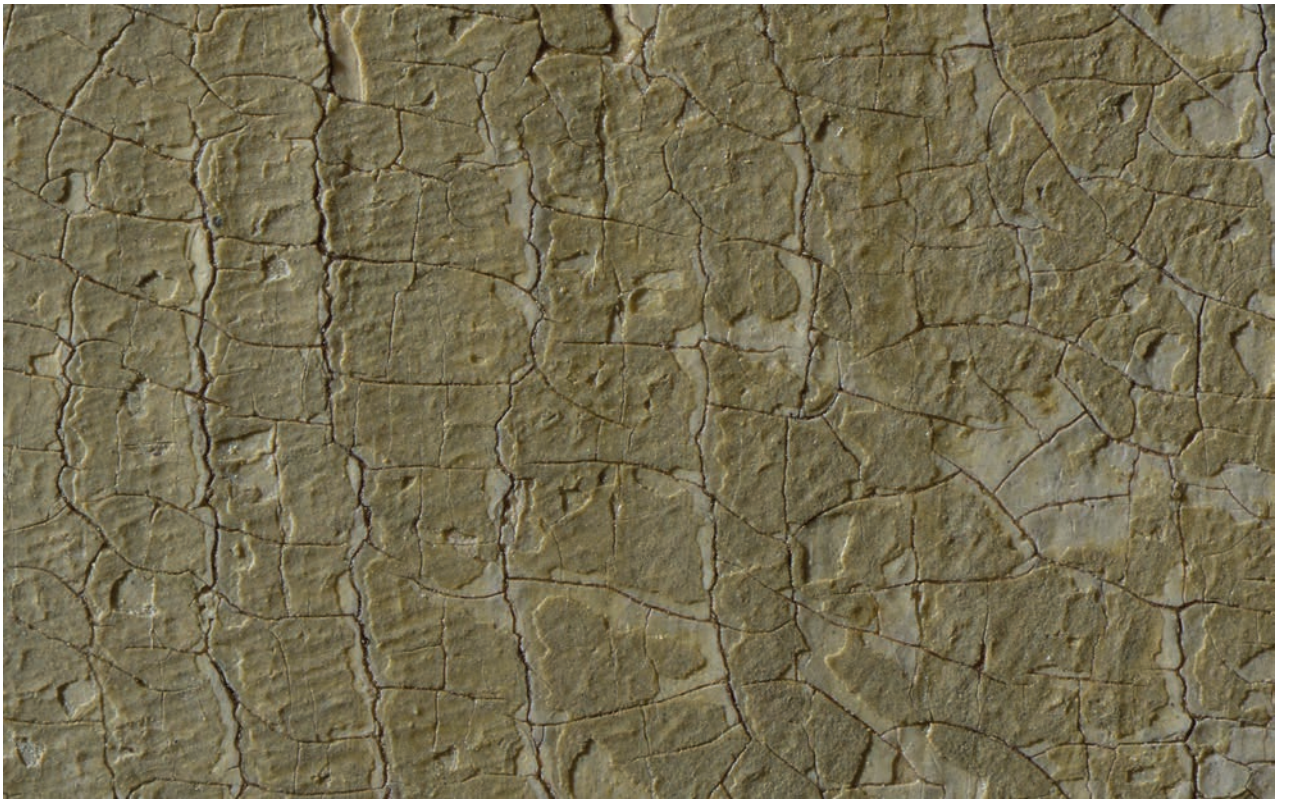
The samples examined in the laboratory have shown that this substance consisted of lead soaps, calcium oxalates and pigments, in some cases with wax or resin (varnish deposits?).[38] Study of this specific decomposition and its long-term evolution are still underway. The presence of these stains, limited to the four parts of the *Annunciation*, argues in favour of an alteration process linked to a restoration campaign rather than one arising directly from the original technique. The stains in question were discovered beneath the old overpaint,[39] but it is difficult to say at this stage whether they are one of the reasons for the application of the overpaint or whether it was the presence of an intermediate varnish below the overpaint that triggered the decomposition of the material. This varnish may have penetrated the paint layer after drastic cleaning had rendered it more permeable locally.[40]

Thick, fragmented highlights in the flesh tones of the Archangel were swiftly identified as overpaints (fig. 4a.22).[41] However, before intervening and possibly removing them, it was necessary to confirm their presence using different methods of examination. Minor local overpainting was detected meanwhile in the drapery of the Archangel and the Virgin, followed by the discovery of significant overpainting in the left part of the Archangel's drapery. The change in the shape of the fold following removal of the overpaint in the Angel's drapery was spectacular and challenging in terms of the stylistic characteristics that have traditionally been attributed to Van Eyck. Certain original folds were revealed to be closer in appearance to those found in fourteenth-century painting[42] than to what we are used to seeing in fifteenth-century Flemish painting. Moreover, the folds differ from the ones in the copy of the triptych that Michiel Coxcie painted in 1557–58 on behalf of King Philip II of Spain (fig. 4a.35).

Visual examination also revealed that the flesh tones of the donors displayed an abnormal modelling technique for a fifteenth-century work: they showed impastoed highlights in a brighter pink than the original. It turned out that these were actually localized overpaints intended to bestow a certain brilliance to the figures. They

Fig. 4a.18. Diagram showing the alterations of the paint layer. Marked in red are abraded areas attributable to early overcleaning (before 1816); marked in blue are brown stains on the paint layer (diagram Jochen Ketels).

Fig. 4a.19. Diagram showing the amount of overpainting throughout the centuries (diagram Jochen Ketels)



4a.20

4a.21 a

4a.21 b

Fig. 4a.20. Ochre overpainting of the architectural elements in *St John the Evangelist*

Fig. 4a.21a. The wall and window sill of the *City View* during the removal of successive over-paintings. The stripped paint layer on the right is lighter and more luminous but shows disturbing brown stains

Fig. 4a.21b. This detail of the floor of the *Interior View* seen in raking light shows excrescences in the form of crusts at the location of the brown stains

4a.22

Fig. 4a.22. Thick overpainting on the forehead with losses and micro-losses in the paint layer at the brow of the Archangel

Fig. 4a.23. The granular impasto of the pinkish overpainting covering the eyelids of Joos Vijd can also be seen in the bright line under his eye. The tiny losses have been erroneously identified as cleavages in the paint layer.

4a.23

comprised a pinkish, granular layer laid across painted elements of the face, the male donor's eyelashes (fig. 4a.23) and the deep folds in the flesh tones of his hands. Similar highlights were observed in the female donor's flesh tones (fig. 4a.24). The material, colour and opacity of the overpainting contrasted with the subtle nuances and smooth character of the original painting. Previous studies had already identified blistering in the flesh tones of the donors[43] and the Archangel,[44] but interpreted this as having occurred within the original material. In reality, the fragility of the paint layer was due to the existence of a layer of oxidized varnish located between the layers of overpaint and the original material. The presence of this intermediate, oxidized varnish layer provided irrefutable proof of the non-original character of these highlights (fig. 4a.25).[45] High-resolution photographic documentation was carried out by KIK-IRPA's photographers to record the historical interventions.

Fig. 4a.24a-b. Thick granular pinkish overpainting on the hands of Elisabeth Borluut

Fig. 4a.25a-b. The pinkish highlights on the hands of Joos Vijd were at variance with fifteenth-century pictorial technique (a). The presence of a degraded varnish underneath confirmed the presence of an overpainting (b).

This discovery prompted the restorers to take a fresh look at the works, and they soon discovered that the robes of the two donors had also been completely overpainted. Certain anomalies had been identified in Elisabeth Borluut's dress at the outset of the treatment: minor losses, covered using the colour of the drapery and visible in the X-radiographs, had initially been interpreted as irregularities in the ground and were attributed to the monumental aspect of the work or even to damage to the underlying layers suffered during the execution of the painting, which was spread over several years (fig. 4a.26).[46] Armed with their fresh knowledge, the restorers re-examined the drapery and earlier cross-sections were analysed in the laboratory.[47] In addition, following varnish removal, bright red filler was found beneath the drapery, adding another unusual element and one which at that stage could not be explained.

Efforts were then made to determine why Elisabeth Borluut's gown presented these anomalies. Visual examination was supplemented by precision analysis using MA-XRF[48] and by creating a micro-test window in the overpaint. The details captured by MA-XRF proved to be a substantial help in understanding the situation and so this examination was extended to the surface as a whole.[49] New samples were then taken by the laboratory to verify the interpretation of the images provided by MA-XRF.[50] A similar procedure was adopted for the male donor's mantle. By combining these different approaches, it could be formally determined that the donors' robes had in fact been entirely overpainted.

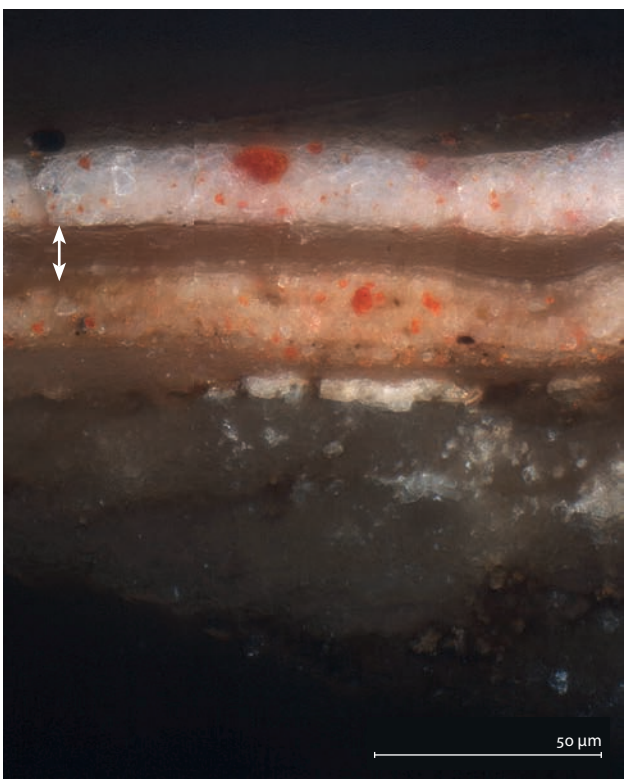
The micro-test windows were enlarged and the MA-XRF images of the total surface of the donors' robes allowed it to be determined that the original underlying layers were in relatively good condition, apart from the proper left part of Joos Vijd's mantle. The map showing the distribution of the element iron enabled us to visualize a historical restoration campaign using filler that spilled over from the losses onto the paint layer; the filler comprised red earth. This filler was not detected by X-radiography, as iron does not display a distinctive density. It corresponded with the abnormal reddish colour detected visually by the restorers.

MA-XRF analysis also provided information regarding the original painting technique in Elisabeth's gown. The lead distribution map revealed the original paint layer, consisting notably of lead white.[51] The mercury distribution map in Joos Vijd's robes also showed that the original paint layer consisted of vermilion highlights in the donor's right sleeve.

4a.24 a

4a.24 b

4a.25 a



4a.25 b

4a.26 a

4a.26 b

Fig. 4a.26a-b. This detail of the lower part of Elisabeth Borluut's robe after varnish removal shows careful overall overpainting (a). Suspicious small losses in the paint layer indicate that it was completely overpainted (b).

The Conservation Team presented these observations to the responsible authorities for the polyptych[52] and to the International Committee. The experts were asked whether it was justified to remove this old overpaint in the flesh tones and draperies, or whether it ought to be kept as evidence of the painting's material history.

The encouraging results obtained with the test windows convinced the experts. While acknowledging the undeniable historical importance of the overpaint, it was felt that this value was relative and secondary to the unique and exceptional character of the *Ghent Altarpiece*, justifying the return of the work to its original splendour. Removal could be carried out, since it was technically possible without endangering the original paint layer.[53]

MA-XRF was extremely useful but did not provide any information on the condition of the organic pigments, such as the red lakes that were most likely used for the glazes and hence for the variations within Elisabeth Borluut's robe and Joos Vijd's mantle. New test windows were therefore defined and executed at different locations in the garments of the respective donors, in order to determine the condition of the original glazes. It turned out that the red lakes present in the donors' draperies were in a good state of conservation.[54] The original tonality of Elisabeth Borluut's gown was painted in a much paler pink in the light areas and with much subtler modulations in the shadows, comprised of red lakes. Joos Vijd's mantle consisted of a vermilion with deep shadows, with the plasticity of the folds heightened using a light vermilion line, as we often find in Van Eyck's paintings.[55]

Examination of the paint layers continued, revealing that other draperies in the upper register had been similarly overpainted, notably those of the Erythraean Sibyl,[56] the Prophet Micah[57] and the prie-dieu.

Important photographic documentation was produced: macrophotographic images taken under the stereo microscope and images captured using the high-resolution digital microscope.[58] This enabled the restorers to support their visual observations with physical evidence.[59]

These discoveries naturally had repercussions in terms of timing and budget. The technique for removing the overpaint had to be refined, for instance, and the duration of the additional treatment estimated, following which approval of the governing bodies had to be awaited. At the end of 2014, the Conservation Team was given the green light to remove the newly discovered overpaint, thereby revealing the work of the Van Eyck brothers that had lain hidden for over four centuries!

Methodology followed to remove the overpainting

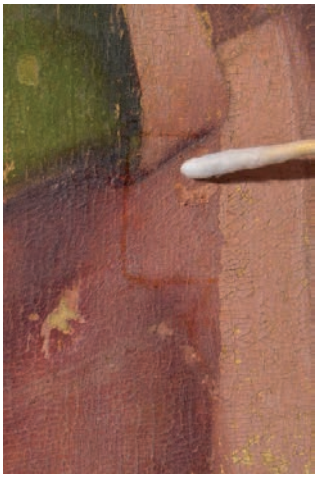
The year 2015 was essentially devoted to the removal of this early overpainting. Our understanding of the successive interventions was further refined in the course of this work. A second diagram showing the combined extent of all historical overpainting was produced during treatment to provide an updated view of the overpainting on the exterior panels (fig. 4a.19). The thickness and extent of the overpainting varied from one location to another, even within the same setting or figure. This justified the application of different methods using solvent gels (chiefly ethanol-containing mixtures), either with the aid of compresses or mechanically with a scalpel under a

stereo microscope. The use of ethanol gels fragmented the material comprising the overpaint, so that the residues could then be removed more easily with a scalpel. The original paint layer was exposed using non-woven compresses[60] soaked in a mixture of solvents[61] and covered with a sheet of Melinex © for a period varying in accordance with the thickness or the nature of the layers to be removed, and ranging from several seconds to several minutes. The overpaint was then eliminated with a cotton swab and the uncovering of the original paint layer completed with a scalpel under the stereo microscope (fig. 4a.27). The third method employed comprised the dry mechanical exposure of the paint layer using a scalpel under the stereo microscope (fig. 4a.28).

As a general rule, it was possible to expose the paint layer thanks to the presence of an old varnish layer beneath the overpaint. In locations where the underlying varnish was absent, it was very difficult, not to say almost impossible to accomplish without damaging the original paint layers. The old varnish also had a significant visual impact, due to its iridescent, browned or opaque appearance. Having removed the overpaint, the haze caused by the presence of the varnish meant that it had to be

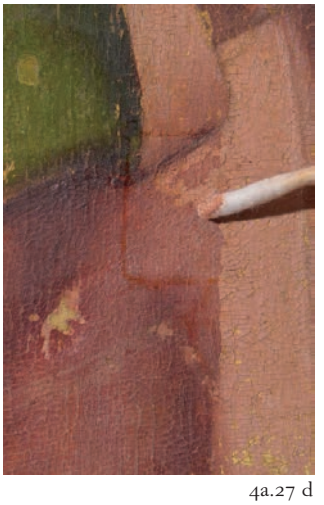
4a.27 a

4a.27 b

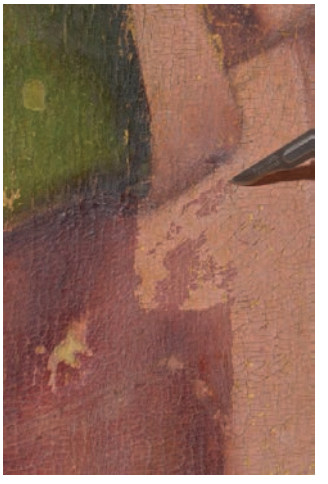


4a.27 c

Fig. 4a.27. Successive stages in the removal of the overpainting of Elisabeth Borluut's robe using compresses, cotton swabs and – finally – a scalpel.



4a.27 d



4a.27 e

4a.27 f

Fig. 4a.28a-b. Details of the robe of the Erythraean Sibyl during the uncovering of the original pinkish paint layer. The thicker blue over-painting closely follows the crackle of the original painted surface.

4a.28 a

4a.28 b

thinned. Use of compresses humidified with water blanched the varnish, facilitating its localization and its precise removal by scalpel under the stereo microscope.[62]

The overpaint was removed wherever technically possible and where sufficient evidence had been provided as to its presence. However, certain zones have been left pending, because the underlying layers were in a poor state of conservation, because removal entailed a risk for the original paint layers or because there was insufficient evidence of the presence of overpaint.

In the upper register, for example, the authenticity of the Cumaean Sibyl's veil was questioned because of its weak execution. The veil was painted with lead white, a material in keeping with the period of the work's execution, which meant that – based on pigment analysis – the veil could not be proved conclusively to be a later addition. Moreover, traces of its placement in the underdrawing suggest that the veil was intended from the outset. We also refrained from significant intervention in the green gown of the Cumaean Sibyl, as stratigraphic examination revealed that the underlying green layer had altered.[63] Similarly, in the case of the Virgin's gown, the fragility of the original paint layer and the difficulty of clearly identifying the extent of the overpaint due to its material similarity to the original, altered material, limited the potential for removal.[64] This was also the case for the green drapery of the Prophet Zechariah and the Archangel's left sleeve, where evidence for the presence of overpaint was deemed to be insufficient.

The results for the zones where it was possible to eliminate the overpaint are nevertheless spectacular and the *Annunciation* scene has regained its full sense of space, depth and unity (fig. 4a.31). The rapid brushwork of the paint layer is thin and transparent. The shifting colour values of the Erythraean Sibyl's gown are breath-taking. The removal of the light blue overpaint, consisting of lead white, granules of blue and a red dye, has revealed a drapery with slightly different folds, painted in pale pink tones, with shadows in deep red lake – a tonality that echoes the pink robes of the prophets and the other sibyl. The uncovering of the outside of the Prophet Micah's mantle, overpainted with a brownish layer consisting of red lake and azure blue pigments, also revealed – along with the prophet's hair – a pink tone that contributes to this clearly conceived harmony, in which greens and pinks alternate within the register.

This alternation of greens and pinks in the figures contained in the lunettes appears slightly modified in its current state: the red glaze of Zechariah's robe seems somewhat attenuated in comparison with the intense glazes that shade the folds of the Erythraean Sibyl's gown, possibly because the glaze could have been partially shielded from light in the latter case by the presence of the early overpaint. The alteration of the Cumaean Sibyl's pink sleeves is especially pronounced. The discoloration of the red glaze, which has turned brownish in places, reveals the pink underlayer, confusing the reading of the image.

The uncovering of the left part of the Archangel's drapery was equally spectacular – the drapery now appears more fluid and airier. Modulations were achieved through a subtle paint handling, incorporating the underdrawing in the construction of the shadows, while the highlights are emphasized by a thin, light line. The same observations can be made regarding the uncovering of the towel in the *Interior View*, the overpaint of which imitated a starched white fabric with pronounced,

rigid folds, whereas the original suggests a more fluid and supple weave. The fabrics of the Virgin's prie-dieu have also regained their fluidity and luminosity following the removal of the added folds. The tonality of the greens following exposure is closer to that of the other scenes in the closed polyptych. The transition between the Virgin's gown and the green drapery of the prie-dieu is now also gentler and subtler.

The removal of the coarse overpaint in the flesh tones of the donors in the lower register is spectacular. The original paint layer reveals fine and smooth flesh tones, with more refined modulations, such as those observed in other works attributed to the master.

While uncovering the donors' clothing, two earlier interventions that predated the generalized overpainting, were revealed. These early interventions were occasionally crude, with oil-based retouches applied directly to the wood,[65] while others were more extensive and refined. It was not possible to establish with certainty[66] the local or more general character of these first overpaints in the two robes. Some of the early, localized overpainting in Joos Vijd's drapery was also left alone, as it could no longer be removed without damaging the original paint layer. The removal of successive overpaintings in Joos Vijd's mantle, however, allowed the rediscovery of a very subtle drapery, painted in red vermilion (fig. 4a.29). The deep shadows in red lake are regularly emphasized using a fine line of light vermilion to heighten the plasticity, volume and monumentality of the mantle. In the case of Elisabeth Borluut's gown, the most surprising discovery, as noted earlier, was a pale pink garment, comprising lead white and a red lake, also emphasized by deep shadows in red lake (fig. 4a.30). Above all, however, the structure of the original folds is entirely different, as the overpainting did not always faithfully follow the folds in the original drapery. The rediscovered original folds are more complex, with a subtle interplay of shadow and light (fig. 4a.32). The shadow of the column on Elisabeth Borluut's gown was also revealed and highlighted.

Fig. 4a.29. Detail of Joos Vijd's robe during the uncovering of the original paint layer, the result of which can be seen in the lower part of the picture (next page).

Fig. 4a.30. The partly removed overpainting of Elisabeth Borluut's robe (on the right) reveals the orginal paint layer (next page).

After removal of the overpaint, the robes of the two donors are integrated in the niches with greater three-dimensionality, with drop shadows heightening the sense of the figures' reality and plasticity. The viewer understands better now that they are located in a niche with an angular background (fig. 4a.31). The spider or dust webs in the corners reappeared when the paint layer was uncovered. They recall the ones seen in the panel with the *Virgin Annunciate* and testify to the care the artist took to incorporate details that would heighten the sense of reality of the scenes.

The localized overpaint removed in the figure of John the Baptist revealed a painting in an exceptional condition, which offers a good illustration of the pictorial quality originally seen in the altarpiece as a whole. This figure also shows the care that the artist took to render the effects of textures and surfaces, such as the veined and polished white marble of the sculpture (fig. 4a.17).[67] As for John the Evangelist, despite a highly abraded paint layer, the representation and volume of the stone[68] for the figure and the marble for the pedestal were rediscovered, having previously been obscured by the overpaint.

4a.29

4a.30

Results

The cleaning and uncovering of the original paint layer re-established an overall view of the polyptych, with coherent and harmonious colour relationships. The sober tonalities of the exterior panels (ochres, pinks and greens) serve to highlight Joos Vijd, the commissioner of the polyptych, in his magnificently executed red vermilion robes. The removal of the overpaint also allowed the unity and spatiality of the *Annunciation* scene to be rediscovered, as well as the space of the niches in the lower register. The gown of the Erythraean Sibyl and the Prophet Micah's mantle, both of which are in very good condition, once again fit into a rhythmic, chromatic alternation of greens and pinks in the upper register, but also with the lower register and Elisabeth's gown. The rendering of the newly discovered folds in the drapery of the Archangel and of Elisabeth Borluut, meanwhile, renews our knowledge of the style hitherto attributed to Van Eyck. The illusion that the two saints John were intended to produce – as paintings imitating sculptures, with distinctive textural effects – has also been restored and can interact once again with the depiction of the donors.

The early restorations ought nevertheless to be placed in the context of how the restorer's profession has evolved: the task was formerly entrusted to painters, which probably explains the excessive character of these first interventions. For the most part, however, they are evidence of a commitment to fidelity to the original work, even if certain zones have been interpreted differently or have been updated in terms of style and colour, as in the case of the draperies (fig. 4a.32 and 4a.33).

The presence of losses or damage probably justified these preliminary interventions in the donor paintings, but is unlikely to have been the only reason. The state of conservation of the original paint layers below some of the overpaint is remarkably good. The condition of the Erythraean Sibyl's drapery and the outside of the Prophet Micah's mantle, for instance, suggests that the overpaint was carried out primarily to conceal the underdrawing, which had become more visible over time (fig. 4a.38).[69] In the case of the Erythraean Sibyl, the visual effect of the underdrawing below the faded original pink paint layer made the drapery appear purple in places.[70] This might explain why the sibyl's drapery was overpainted using a purple paint mixture, which, at the time of removal, had faded to a bluish white due to the degradation of the red pigment used. [71] There seems to have been a desire over the centuries to make the exterior panels resemble the paintings in the interior of the polyptych more closely, thereby losing sight of the symbolic progression that was originally pursued. Beginning with the sober appearance of the closed polyptych, one moved into the sacred part of the altarpiece, embodied by the interior paintings, with their much more luminous and varied range of colours.

The experience gained from a visual and material point of view will be an undeniable asset for the future. It will allow the X-radiograph and infrared images to be interpreted more effectively, which will be valuable in turn during the subsequent stages of the polyptych's treatment.

The differences in the paint layer detected prior to treatment via the X-radiographs and infrared reflectograms were indeed initially interpreted as adjustments in the composition or as a stage during the set-up of the modelling, rather than as overpaint. Thanks to this experience, we now know that much more attention and vigilance is required when interpreting scientific images. It is also desirable for MA-XRF to be performed over the entire surface of the work, preferably before intervention.[72]

Fig 4a.31. The closed altarpiece, unframed, after removal of the overpainting

4a.32 a

4a.33 a

4a.33 b

4a.32 b

4a.33 c

Fig. 4a.32a-b. Detail of Elisabeth Borluut's robe before removal of the overpainting (a) and after restoration(b)

Fig. 4a.33a-c. Detail of the Erythraean Sibyl before treatment (a); after complete varnish removal (showing bluish over-painting) (b); and after uncovering of the original paint layer (c)

4a.34 a

4a.34 b

4a.34 c

4a.34 d

4a.34 e

4a.34 f

Dating the overpainting

The treatment performed opens up new research perspectives, from both a stylistic and a technical point of view. The material history of the altarpiece, already well documented by the written sources[73] cited in *L'Agneau Mystique au Laboratoire*, can now be supplemented by new information concerning the polyptych's earliest material history. The same historical restoration was observed across all eight panels. While this intervention was evidently early in character, it proved difficult to date precisely. Comparison of the scenes of the *Archangel* and the *Virgin Annunciate* with the copy that Michiel Coxcie painted in 1557–58 on the request of King Philip II of Spain, proved extremely interesting in this regard (fig. 4a.34). Coxcie altered certain significant elements; for instance, he omitted the banderoles in the upper register, changed the position of the Prophet Micah's hand and modified the folds of the draperies. Despite these differences with the Van Eyck brothers' painting, the copy provides a chronological reference for dating the overpainting campaign.[74]

Examination of the copy at the time of the exhibition 'Michiel Coxcie: the Flemish Raphael'[75] at M – Museum Leuven (February 2014) immediately revealed that when it was executed, the early overpainting identified during the current conservation and restoration campaign was already present in the polyptych painted by the Van Eyck brothers. A first example is visible in the lower part of the Archangel's drapery: Van Eyck created deep folds, while Coxcie painted less pronounced ones, with rounded edges. The most spectacular, however, is undoubtedly the left part of the Archangel's drapery, where the overpainting matches Coxcie's version, whereas the original drapery painted by the Van Eyck brothers is entirely different (fig. 4a.35). Examination in situ of a drawing of the same Archangel in the Kupferstichkabinett in Berlin, attributed to an anonymous Rhenish master and dated to the last quarter of the fifteenth century,[76] shows that it reproduces the original folds of the Archangel's drapery as painted by the Van Eycks (fig. 4a.36).

The comparative study of the Virgin's drapery is more complex, given the changes in composition in the original draperies at the underdrawing stage and during the execution of the painting. Coxcie reproduced the Virgin's gown in his copy, but also altered the composition, as he was not satisfied with the fall of the folds. Comparison with the original work is therefore not possible.

Our intuition that Coxcie based himself on a work that had already been modified by an earlier intervention is supported by the discovery, by visual observation, of overpaint on the outside of the Prophet Micah's mantle.[77] Following removal of this overpaint, a fine, smooth and transparent paint layer was discovered through which the underdrawing can be made out (fig. 4a.38). This zone is, incidentally, in very good condition: the drapery has been carried out in pink tones with the prophet's hair painted subtly on top. Comparison of this figure with Coxcie's copy reveals that the latter has reproduced a fold that corresponds with the overpaint and is not found in the original work (fig. 4a.37).

Comparative examination of the underdrawing (in IRR) of Coxcie's copy with the Van Eyck brothers' altarpiece likewise confirms that Coxcie copied the overpainting.[78] In his underdrawing Coxcie did not copy the depth of the fold on the far left of Micah's mantle, which was not visible, having already been overpainted.

Fig. 4a.34a-c. The *Archangel* and the *Virgin Annunciate* by the Van Eyck brothers before (a, d) and after treatment (c, f); copy by Michiel Coxcie (Royal Museums of Fine Arts of Belgium, Brussels) (b, e)

4a.35 a

4a.35 b

4a.35 c

4a.36 a

4a.36 b

4a.37 a

Fig. 4a.35a-c. Detail of the Archangel's robe by the Van Eycks, before (a) and after treatment (c); copy by Michiel Coxcie (Royal Museums of Fine Arts of Belgium, Brussels) (b)

4a.37 b

Fig. 4a.36a-b. The *Archangel Gabriel*, drawing, North Rhine region (?), 1475–1500, Berlin, Kupferstichkabinett (15.3 x 8.8 cm) and detail of the robe with the same drapery scheme as in the Van Eyck panel

4a.37 c

Fig. 4a.37a-c. The Prophet Micah by the Van Eycks before removal of the overpainting on the outside of the mantle (a) and after uncovering the original paint layer and reintegration of the losses (c); copy by Michiel Coxcie (Royal Museums of Fine Arts of Belgium, Brussels) (b)

4a.38 a

4a.38 b

Fig. 4a.38a-b. Detail of the mantle of the Prophet Micah, after treatment (a) and IRR of the corresponding detail before treatment (b), showing the fine underdrawing and the drapery folds planned from the outset

Fig.4a.39a-c. Detail of the drapery of the Virgin's prie-dieu by the Van Eycks before removal of the overpainting (a) and after treatment (c); copy by Michiel Coxcie (Royal Museums of Fine Arts of Belgium, Brussels) (b)

The overpainting of the prie-dieu in the *Virgin Annunciate* was discovered at a late stage. When the exterior panels were viewed in their entirety, following removal of the most significant overpaintings, the greens were still very heterogeneous in appearance, especially the prie-dieu. The International Committee had emphasized this lack of coherence and requested further study, namely stratigraphic analysis. This study, combined with the MA-XRF, enabled us to determine that we were looking at a total overpainting of this drapery. It was observed, thanks to the comparative study, that Coxcie also reproduced the overpainted drapery and its distinctive broken folds, which do not feature in the original work (fig. 4a.39), as well as the tricoloured fringes.

In view of these material elements and the large number of examples, it is now certain that the overpainting of the *Virgin Annunciate* and *Archangel* panels dates from the sixteenth century, prior to Coxcie's copy in 1557–1558.[79] It might have been carried out during a restoration campaign mentioned in the documents,[80] which was entrusted to Jan van Scorel and Lancelot Blondeel and reportedly began in 1550. It is interesting to note that the sixteenth-century overpaint displays a lack of understanding of Van Eyck's original handling and execution. The overpainting imposed a systematic rigidity on the various textiles represented, whereas the Van Eycks had taken extreme care in differentiating them and adapting their rendering to the specific characteristics of each fabric.

Restoration and study of the polyptych's interior panels are sure to bring new elements to the study of its material history and to our understanding of the successive campaigns of restoration.

4a.39 a

4a.39 b

4a.39 c

Consolidating the paint layers

The panels benefited from a first round of consolidation at surface level in 2010 during the preliminary study. More thorough consolidation was impossible at this stage, as the lifting paint was trapped in multiple varnish layers. Removal of the varnishes, retouches and overpaints allowed the effective conservation of the paint layers, which was one of the primary objectives of the treatment. The presence of lifting paint varied from one panel to another. The differences were linked in part to the location of each wing panel within the polyptych and in the cathedral, to past restorations and, to a lesser extent, to the execution technique.[81]

A difference in condition can be observed in the upper register between the panels that were cut through their thickness in Berlin[82] and those that have retained their structural integrity. The *City View* and the *Interior View* – the only two wing panels that were not split, display less lifting as a consequence.

The paintings of the lower register display specific lifting in the direction of the wood fibres. Stratigraphic examination shows that the paint layers of this register are thicker, prompting the question of whether this difference in appearance might reflect the greater thickness of the paint layer.

At times during restoration, it was necessary to consolidate the paint layers – especially when uncovering the donors' robes. Systematic fixing could only occur, however, following removal of the principal varnishes and overpainting. The paintings were consolidated with 4% sturgeon glue in demineralized water using Japanese paper, a Melinex® sheet[83] and a heated spatula. An improved surface condition was obtained in this way, albeit without achieving a perfect result in terms of flatness. But this was not the objective, the slightly irregular surface has become part of the work's material history. The prime objective was to ensure the adhesion of the ground and paint layers.

Reintegration of losses and varnishing

Filling, reintegration of losses and varnishing all contribute to the final presentation of the work. This reconstruction process demands a methodological and rigorous approach and overall critical reflection, in which the polychromy of the original frames must also be taken into account. The final result must be coherent and must support the idea of the ensemble as originally conceived.[84] Colour reintegration is directly linked to the choices made during the cleaning of the paint layers, which is why the two operations have to be considered together. Difficulties that could not be solved by cleaning or by removing overpaint were addressed by retouching.

As we have seen, different restoration campaigns have been detected in the exterior panels, as evidenced by the presence of white fills, cracked fills and coloured fills, some of which were found to be radio-opaque when analysed using X-radiography. The fills in question were studied and documented to determine the chronology of their application and to complete the polyptych's material history. Darkened or coloured fills were mostly removed for fear they would hinder retouching. On the other hand, old fills that did not present problems of adhesion, surface condition or colour were

conserved. This was the case, for instance, with the fills used for the substantial lacuna in John the Evangelist's drapery, which was retained,[85] since its hue was close to the appearance of the original ground and formed a favourable basis for retouching (fig. 4a.41).[86]

To enhance the reversibility of the interventions, an isolation layer was placed over the original material to protect it from the additions. The logic of this approach is clear when it is recalled how much the presence of an old intermediate varnish layer beneath the early overpaint facilitated the latter's removal. To this end, we protected the original paint layer using a thin film of damar varnish applied with a cloth.[87] This intermediate layer serves several functions: to seal off the recently added products and to protect the paint layers during filling and colour saturation with a view to colour reintegration. Although damar varnish yellows slightly over time, its aesthetic, light-reflecting qualities and its reversibility over the centuries remain substantial.[88] We hope that the conditions in which the work will now be kept – an environment without UV and with controlled temperature and relative humidity – will ensure the stability of the varnish.

Losses were then levelled in the original paint layer using a chalk and animal glue filler to re-establish the surface continuity (fig. 4a.40). The fills were applied with a spatula or paintbrush,[89] in such a way as to achieve a structure close to the current surface, but – in keeping with the ethical and deontological code of the profession – without seeking to imitate the craquelures.

The reintegration proper of the losses was started progressively to determine the degree of retouching necessary for formal reconstruction. Progressive reconstruction allowed the degree of reintegration to be adjusted according to the issues presented by the different panels and by the frames, the polychromy of which presented substantial losses and a significant degree of abrasion.

Preliminary reintegration of the losses in the paint layers was performed using watercolours[90] from a strictly limited palette of colours, close to that defined in the 1950s by Laura and Paolo Mora.[91] The aim of this first retouching was to attenuate the presence of the white filler to allow the original tones to be perceived more clearly and to assess the potential of reviving the original paint layer. In a second stage the watercolour retouching was pushed to the maximum to approach the original tonality as closely as possible. Most of the losses were small in size and reintegration could be deduced directly from the original material. Only the extensive losses in John the Evangelist's drapery proved more difficult for formal reconstruction. The fact that these comprised both the ground and paint layer ruled out any possibility of basing the retouching on the underdrawing, as had been the case for the drapery of Joos Vijd. Several formal reconstructions were proposed on paper and/or computer[92] for discussion within the team and with the International Committee, before the most persuasive proposal could be applied to the actual work.

This first reintegration phase was protected by a second film of damar varnish applied with a cloth. Once the continuity of the image had been restored and the image understood in its entirety, the reintegration of abrasions and the finishing of the reintegrated losses was continued in an illusionistic manner, without imitating the craquelure at structural or pictorial level, so that the original and retouched zones can be distinguished close up by an experienced eye. There were numerous discussions

4a.40 a

4a.40 b

4a.41 a

4a.41 b

Fig. 4a.40a-b. *Joos Vijd* (a) et *St John the Baptist* (b) after filling of the lacunae

Fig. 4a.41a-b. Details of the large damaged area in the mantle of *St John the Evangelist*: (a) conspicuous contrast between the dark tints of the old retouching and the lighter tonality of the original mantle; (b) the uncovered filling of the area after removal of the old darkened inpainting

and sharing of experience regarding the type of resin to be used to reintegrate the losses. It was clearly important to deal with the retouching and the modelling of the drapery progressively, particularly in the case of the significant loss in the figure of John the Evangelist. Use of different binding media would allow for any necessary corrections during execution. Moreover, given the very smooth character of the original painting, it was important that the pigments used for this second stage of retouching be finely ground – preferably industrially ground. Certain industrial retouching products mentioned in laboratory studies are no longer available on the market,[93] while the products intended to replace them have not yet been subject to sufficient research to guarantee their long-term stability and reversibility.[94] A solution was found by using industrially ground pigments bound with Paraloid B72, prepared by the Kremer company especially for the project.[95] Twenty-four pigments were selected and palettes made up with the pigments blended with the resin. Paraloid B72[96] has demonstrated its stability and reversibility in numerous studies published in this area,[97] as well as in the experience that the KIK-IRPA has built up over thirty years.[98] Carrying out retouchings bound in Paraloid B72 then allowed a layer of damar varnish to be applied by brush without dissolving the retouchings. The difference in solubility in the retouching products[99] also means that the varnish can be removed from the paint layers if necessary in the future without removing all the reintegration stages at once.[100]

Following this second phase of reintegrating losses and abrasions with Paraloid B72, a layer of damar varnish was applied by brush.[101] It was important for the brushed and sprayed varnish to present a similar final appearance across all the panels. To maximize the likelihood of achieving this result, varnishing was carried out per register, by the same person on a single day. Varnish application by brush per register delivered a good result. The retouches and final glazes were completed using Gamblin Conservation Colors, prepared industrially and consisting of pigments mixed in Laropal A81.[102]

Finally, the paint layers were sprayed with a thin layer of varnish (damar once again). Two cross passes with minimum nozzle opening were sufficient to obtain the desired satin finish. Spray varnishing was performed by the same person for the two registers and the volume of varnish applied was measured: 40 ml was used for each register.[103]

The retouching and varnishing of the paintings was considered in conjunction with the retouching and varnishing of the frames (fig. 4a.42). It was important to restore the illusion of a stone facing, despite the abraded condition of the polychromy and the presence of significant losses. The specific condition of the frames justified a slightly less interventionist degree of reintegration. Detectable retouching ensured the honesty of the intervention.[104] The treatment of the frames profoundly affected the way the painted scenes are perceived; the latter are now set behind a clearer architectural element that contributes to the three-dimensional perception of the painted images. The frames are deliberately more matte in finish than the paintings, so as to emphasize their different spatial status. The illusion is complete.

Particular attention will need to be paid in future to avoid multiple varnishings of the paint layers, so as to restrict the cycle of varnishing and varnish removal[105] that is so prejudicial to the future conservation of the work. Special attention to the environmental conditions will also be crucial.

Fig. 4a.42. The two Saints John after treatment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Conclusions

The first objective in treating the exterior of the polyptych – including the paint layers, the panels and the polychrome frames – was to ensure the works' conservation. This mission was successfully completed thanks to the removal of successive varnish layers and early overpaint and the consolidation of the paint layers.

The second objective of this restoration was to achieve an overall vision of the polyptych that would be homogeneous and balanced, while respecting its material history. The latter could have been achieved in several ways, for example through a historical reading of the work in which cleaning would be restricted to the historical restorations common to all the panels. Cleaning to this degree would not have done full justice to the quality of the original work, nor would it have led to the fundamental discoveries that have now been made. A second option was to prioritize the rediscovery of the original work. Ambitious though it was, it was this latter approach that was ultimately adopted, with the approval of the relevant authorities. This bold choice proved extremely interesting: the exceptional quality of the paintings can once again be appreciated and the exterior of the polyptych can function once more as a single entity.

The third objective was to treat the polychromy of the frames in conjunction with the paint layers, given the inseparable character of the frames and the essential role they play in the perception of the polyptych as a whole. In architectural and colouristic terms, the relationship of the colour values between the polychromy and the painting influences the way the image is perceived. Restoration of the frames' original polychromy played a significant part in the resurrection of the exterior of the polyptych. The paintings have been reunited with their frames, thereby creating a physical and visual connection between the different parts of the closed altarpiece. Restoration highlighted the care that the Van Eyck brothers took in both the frames and the paintings to represent the texture of the different materials (textiles, stones, glass, parchment, etc.) and their unequalled skill in the realistic rendering of light and shade. The illusion is perfect (fig. 4a.43).

This description of the conservation and restoration of the reverses of the *Ghent Altarpiece* (panels and frames) highlights the extent to which this treatment was not limited to a simple technical operation. The choices made – especially regarding the elimination or conservation of early overpaint – were underpinned by constant critical reflection, which could not have been carried out without thorough and meticulous study. Progressive treatment allowed this critical reflection, whereby each step was evaluated in terms of cleaning and the reintegration of abrasions and losses, in order to achieve a homogeneous and harmonious ensemble. We now have a good knowledge of the work's condition, its intrinsic nature and its material history. An approach of this kind means that the restorers and other experts need to be given time during restoration to carry out the necessary study and reflection to make properly founded choices.

The overall view of the altarpiece's treatment was fundamental when it came to doing full justice to a work that is unique and complex in several respects. The exterior of the polyptych had to wait 450 years to be revealed once more in its original splendour. This conservation and restoration treatment has provided an entirely different view of the exterior of the *Ghent Altarpiece* and a new chromatic, material, technological, formal and stylistic reading of the Van Eyck brothers' work.

Fig. 4a.43. The closed altarpiece after treatment

Acknowledgments

Our warmest gratitude goes to the members of the International Committee, who advised, guided and supported the restorers in their choices. The International Committee met five times during this restoration campaign, which lasted four years (including documentation, research and treatment). The Committee convened twice at our request, on 27 May 2013 and 17 March 2014. Crucial questions were raised. The expertise and professionalism of the Committee members – not to mention their courage, given that the decisions in question were not easy ones – fully supported our reflections during the prolonged rebirth of the polyptych. We warmly thank them. None of this could have been achieved without their support.

We are also extremely grateful to Valentine Henderiks for her support, encouragement and her critical and informed reading of the text and to Christina Currie and Karen Bonne for their proofreading.

Fig. 4a.44. Detail of *Interior View* after treatment

Notes

1 Requirement set out in the specifications drawn up in 2010 following the preliminary study. See Van Grevenstein et al. 2011, p. 204, [*http://data.closertovaneyck.be/legacy/data/Conservatie%20en%20materieel%20onderzoek%202010.pdf*].

2 The deadline for the operation carried out in 1950–51 was reduced to eleven months, with a single restorer. See Coremans 1953, p. 10.

3 A variety of hypotheses have already been proposed in the literature for the open and closed configurations of the altarpiece. Steyaert 2015, pp. 74–84. See also contribution 7 by Fransen, Glatigny in this volume.

4 Verougstraete-Marcq, Van Schoute 1989; Depuydt-Elbaum 2002; Depuydt-Elbaum 2003.

5 See contribution 8 by Devolder in this volume.

6 Restorers: Head of the Polyptych Conservation and Restoration Project: Livia Depuydt-Elbaum; On-Site Coordinator: Bart Devolder; Research Coordinator: Hélène Dubois; Nathalie Laquière; Claire Mehagnoul; Marie Postec; Françoise Rosier; Griet Steyaert; Anne-Sophie Augustyniak (study and treatment of the frame polychromy); Laure Mortiaux (treatment of the frame polychromy and paint layers); Jean-Albert Glatigny (treatment of the supports).

7 Some initial dirt removal was carried out in 2010 during the preliminary study by Hélène Dubois, Marie Postec and Griet Steyaert, under the direction of Anne van Grevenstein. See Van Grevenstein et al. 2011. http://closertovaneyck.kikirpa.be/#home/sub=documents (consulted 24/8/2017)

8 Various varnishing campaigns have been carried out since 1950 with the application of ketone and damar varnishes. KIK-IRPA interventions in 1951, 1954, 1957, 1966 and 1974 for the ketone varnishes (Talens) and 1978–79 and 1986 for recent damar varnishes.

9 The GC-MS analysis performed in 2010 by Steven Saverwyns at KIK-IRPA and Henk van Keulen at the ICN using cotton swabs soaked in solvent to test the removal of several historical and modern varnish layers detected the presence of polycyclohexanone, drying oil (no doubt linseed oil), pine resin and mastic resin, as well as wax.

10 Van Grevenstein et al. 2011. http://closertovaneyck.kikirpa.be/#home/sub=documents. The report refers in its conclusions to problems caused by delamination of the varnish layers, which could have resulted in losses in the paint layer.

11 The paintings in the lower register as well as the Virgin and the Angel of the

Annunciation, for example, were subjected to substantial restoration in Berlin in the nineteenth century. De Schryver, Marijnissen 1953, pp. 21–68; Stehr, Dubois 2014, pp. 123–37.

12 Philippot 1990a, pp. 405–08.

13 To this end, the restorers prepared an aqueous solution to which synthetic mucin and Tween® 20A (non-ionic detergent) were added.

14 We chiefly used acetone-based mixtures with an aliphatic hydrocarbon to concentrate the action in the modern varnishes without affecting the older layers. Choosing this solvent range facilitated a progressive approach to cleaning. Certain modern retouches were eliminated during this preliminary cleaning phase. These generally consisted of local retouching, some of which had been done quite carefully. The interventions in question already resembled modern restoration techniques, in that they were localized and limited to the damage they were intended to conceal.

15 See contribution 1 by Dubois in this volume.

16 See diagrams of the alterations in the paint layers in this article (fig. 4a.18).

17 The initial project in 2010 envisaged the treatment only of the frames of the *City View* and the *Interior View*. To achieve a comprehensive study, we also proposed an examination of the other frames of the reverse of the polyptych.

18 The study of the polychromy was begun by the restorers of the Conservation Team. The approval of the estimate for the treatment of the frames allowed an additional restorer to be recruited for their comprehensive study and treatment. See contribution 4b by Augustyniak and Mortiaux in this volume.

19 See contribution 4b by Augustyniak and Mortiaux.

20 Committee meeting of 27 May 2013, attended by various specialist restorers, art historians and chemists. See the list of members of the International Committee in Project Participants in this volume. Representatives of the church wardens also attended these meetings, to allow joint decisions to be reached.

21 Phenix, Wolbers 2012.

22 Barbara Appelbaum mentions the criterion of rarity as one of the contextual values associated with cultural goods. Appelbaum 2007, pp. 194–231.

23 Expert Committee report, 27 May 2013.

24 The *City View* and the *Interior View* were not subject to dendrochronological examination at the time of the 2010 study, as they had not been removed from their frames. Fraiture 2017, pp. 77–95. Their dismantling in 1951 was photographically documented. See Genbrugge, Roeders 2017, pp. 96–105, fig. 6.2.

25 Analysis of varnish samples by Steven Saverwyns during this cleaning stage revealed the presence of boiled oil, colophonium and terpene resin (damar or mastic).

26 Non-original coloured layers, composed of oils and a low proportion of pigments and applied over large surfaces to conceal their flaws.

27 Layers composed of oils and a high concentration of pigments, lending the layer an opaque and covering appearance. The term 'overpaint(ing)' is used when the underlying, original layer is in a good condition. Bergeon-Langle, Brunel 2014, pp. 378–80.

28 The losses principally affect the panel showing *St John the Evangelist*, the left part of Joos Vijd's mantle and Elisabeth Borluut's gown. In most cases, the losses occurred prior to the historical restoration campaigns.

29 In the case of the upper register, the level of the banderoles in the lunettes, and for the lower register, the right-hand columns of the niches.

30 Aside from their darker colour, the overpaints were distinguishable from the original painting by the presence of an old intermediate varnish, which demonstrated their inauthentic character.

31 Unlike the losses caused by splashes, which are precise and localized, these losses affect whole areas of the composition. They are angular in shape and not very visible when the paintings are examined with the naked eye. Nevertheless, they are present across the entire surface, regardless of the areas of colour.

32 De Schryver, Marijnissen 1953, p. 25. Sale on 18 December 1816 of six wing panels to the Brussels art dealer L. J. Nieuwenhuys.

33 See contribution 1 by Dubois in this volume.

34 Laboratory examination indicates that this retouching occurred after 1802, as suggested by the identification of pigments like cobalt blue, which came onto the market around that date.

35 Philippot, Sneyers 1953, p. 79. The interventions and study performed in 1950–51 appear to have focused more on the interior paintings of the altarpiece.

36 Postec et al. 2016, pp. 153–71.

37 The existence of these could not have been foreseen based on the scientific documents prior to the removal of the overpaint.

38 The identified constituents were the same in the four samples taken of this brown substance, but the latter was heterogeneous and the quantities of each varied from one sample to another. These compounds display a particular fluorescence and are insoluble. See Jana Sanyova's ongoing research project: 'MetOx Project (2017–21), Metal-oxalates in 15th and 16th Century Southern Netherlands Oil Paintings'.

39 Probably a campaign common to all eight paintings.

40 The location of the brown stains does not correspond with the areas of lifting, which rules out consolidating as a possible cause.

41 Wrongly identified as losses in the original paint layer in Philippot, Sneyers 1953, pl. LXIII, fig. 2.

42 Stroo 2009; Depuydt-Elbaum 2009, pp. 87–120.

43 Van Grevenstein-Kruse, Dubois 2017, pp. 3–33, p. 22, fig. 1.16a–b, detail of Joos Vijd's face.

44 Identified as losses in the original paint layer in Coremans 1953, pl. LXIII, fig. 2. See also Van Grevenstein-Kruse, Dubois 2017, p. 22, fig 1.16a–b, detail of Joos Vijd's face.

45 The artist seems to have applied an intermediate varnish layer to the paint layers in the red gown in the *Portrait of Margaret van Eyck*: Dunkerton 2008, see https://www.nationalgallery.org.uk/paintings/research/the-restoration-of-margaret-the-artists-wife/margarets-red-dress (consulted 1/9/2017)
Dunkerton, Morrisson, Roy 2017, pp. 271–90. In our case, the varnishes had been oxidized, indicating their exposure to light; a thin layer of surface dirt is also visible in certain places in the stratigraphic sections. These elements demonstrate that this cannot have been an original varnish.

46 Irregularities or damage of this kind could have occurred during the execution of the painting, when they might have been considered of secondary importance for a work intended to be viewed from a distance.

47 'L'Agneau mystique au laboratoire 60 ans après Paul Coremans'. Interdisciplinary research project financed by the Belgian Science Policy (Belspo) in the context of Action 1-MO/39/011); project coordinated by Jana Sanyova.

48 Macro-X-ray Fluorescence is a non-invasive method enabling us to identify the elements constituting the painting. Developed by Prof. Koen Janssens and Dr Geert Van der Snickt of the University of Antwerp (UA) and Delft University.
Van der Snickt et al. 2017, pp. 4797–801. See contribution 3 by Sanyova et al. in this volume.

49 The copper scan is black (absence of copper) where the overpainting of the gown has been removed, whereas copper is present everywhere else. The overpainting contains azurite, a carbonate of copper, which made it easy to visualize the extent of the overpainting.

50 Stratigraphic analysis of the robes revealed the presence of intermediate varnish layers and two restoration campaigns. Stratigraphic section no. 11 – C010.040.

51 Laboratory analysis determined that the base tone of the drapery consists of red lake, lead white and carbon black.

52 Steering Group and Advisory Committee, 2 December 2013.

53 International Committee report, 27 May 2014. The Committee also endorsed the restorers' request for additional research funding. The latter was supported by the Gieskes-Strijbis Fund. Martens 2015. http://ceroart.revue.org/4765 (consulted 1/9/2017)

54 The degree of discoloration might have been influenced by the nature of the red lake, the environment, its proportion in the blend of colours, and so on. Red lakes can discolour when the blend of colours includes lead white, and so fading can occur in the light tones of the pink drapery, while the shadows retain their intensity. This tends to heighten certain contrasts. Early overpainting might have protected the lake from discoloration.

55 See contribution 5a by Postec and Steyaert in this volume.

56 This overpainting clearly covered the age cracks, indicating that a certain period had elapsed between the completion of the painting and the application of the overpaint. What is more, the overpaint was separated by an intermediate varnish layer similar to the one already observed for the other overpainting.

57 This overpaint was present in a minor loss and crossed the prophet's hair.

58 A high-resolution digital microscope allowing the surface of the paintings to be examined in 3D while maintaining a sharp focus up to very significant enlargements (2000x). The image is viewed on screen and can be digitized. The Ghent University microscope was loaned as part of the project 'GOA Archeometry of the Ghent Altarpiece', headed by Peter Vandenabeele, Maximiliaan Martens, Luc Moens.

59 An early oxidized varnish can be seen beneath the white highlights in the Prophet Micah's sleeve. Some overpainting also covers areas of early craquelure.

60 Non-woven Sontara©, Dupont (70% cellulose, 30% polyester, weight: 75 g/m²). Use of a compress avoids the problem of residues when employing gels. The compresses were placed beneath Melinex © to slow down the evaporation of the solvent.

61 Mixture: Acetone: ethanol (1:1).

62 The International Committee had expressed the wish that the underlying varnish layer close to the original paint layer should be conserved as much as possible. However, its opaque and irregular appearance disrupted the reading of the work, notably in the light tones of the gowns of Elisabeth Borluut and the Eritrean Sibyl.

63 The original green glaze has darkened and turned brown. The gown of the Cumaean Sibyl also shows brown stains different to the ones described earlier. Their appearance is smooth on the surface and it appears that the glaze itself has been altered by a product. These damages are unsightly and irreversible but stable.

64 MA-XRF analysis did not provide conclusive information in this instance, as the original paint layer and the overpaint both contained lead white and so are both present in the lead distribution map, with only a difference in density visible.

65 Oil-based retouches applied directly in the lacunae with the bare wood exposed were observed in Joos Vijd's mantle.

66 Visually, through the removal of successive layers of overpaint.

67 The discovery of the nuances in the rendering of the stone shows that these were sculptures painted in *trompe l'œil*, going beyond the concept of simple grisaille. Philippot 1990b, pp. 101–10.

68 Research continues to determine the nature of the stone used for the two sculptures.

69 Certain aspects of the drawing and particularly the wash stage might have been used deliberately during the execution of the painting to work out the modelling. Other traces of the drawing, by contrast, were definitely not intended to be seen: traces of the sketch of the trefoil arches, for instance, which reflect a preliminary phase in the *Annunciation* scene's elaboration. The more visible presence of pentimenti in the pictorial stage, such as the towel rail in the interior scene, the orientation of which was altered in the course of execution might also justify the presence of overpaint.

70 As can also be observed on the treated panel.

71 Stratigraphic analysis revealed the presence of lead white, blue granules and a discoloured red lake in the overpainting of the Erythraean Sibyl's gown.

72 The outside of Micah's mantle, which turned out to be overpainted, was interpreted prior to restoration as a change in composition desired by the artist. In the case of Elisabeth Borluut's gown too, a noteworthy difference in the construction of the folds at the bottom of the gown was visible between the X-radiograph and the painting; this was interpreted prior to restoration as part of the structure of the modelling. With hindsight, both the X-radiograph and IRR images provided us with information on the construction of the original modelling. In the lower left corner of the Archangel's drapery, lastly, which was found to be an overpainting, a difference in the construction of the draperies was visible in both the X-radiograph and IRR images, and was initially interpreted as different phases in the elaboration of the robe's modelling.

73 De Schryver, Marijnissen 1953.

74 Coxcie's copy of the *Ghent Altarpiece* was to decorate the chapel in the Royal Palace in Madrid. The copies of the panels from the exterior of the altarpiece are currently at

the Royal Museums of Fine Arts of Belgium in Brussels. The upper register shows the *Annunciation* scene, the lower register the *Four Evangelists*. The *City View* and *Interior View* are missing, which prevents a comparison of these two scenes as well as the lower register. The copies of the *Deesis* and the *Adoration of the Mystic Lamb* from the interior registers are in the Gemäldegalerie in Berlin. Kemperdick, Rößler 2014; Dubois 2017, pp. 78–93; Suykerbuyk 2017, pp. 56–69. A comparative study was already carried out by Coremans 1953, pp. 108–09, 111, 113, 117, to date the overpainting in the interior of the polyptych.

75 Exhibition at M Museum, Leuven, *Michiel Coxcie: The Flemish Raphael*, 31 October 2013–23 February 2014.

76 After Jan van Eyck (inv. KdZ 2402), Upper Rhine, final quarter of the fifteenth century (153 x 88 mm). Symposium held during the exhibition 'The Gent Altarpiece by the Brothers Van Eyck in Berlin, 1820–1920', Gemäldegalerie der Staatlichen Museen-Preußischer Kulturbesitz, 4 September 2014–29 March 2015. We are grateful to Dr Holm Bevers for allowing us to examine the original during the symposium.

77 The overpaint comprising a red lake and azurite had already been observed within a small loss.

78 We are grateful to Véronique Bücken for facilitating the infrared reflectography at the Brussels Royal Museums of Fine Arts (photographer: F. Maes).

79 These observations have been shared with Hélène Dubois, who is continuing the relevant research for her doctorate: 'The Ghent Altarpiece and its material history. A contribution to the analysis of its condition by combining technical examination with the investigation of historical sources', UGent, supervisor Prof. Maximiliaan Martens. See also contribution 1 by Dubois in this volume.

80 From a material point of view, a significant overpainting campaign can be identified across the eight panels. Traces of intervention prior to this principal campaign were found in the donors' robes, in a section from the Eritrean Sibyl's gown and a section from the Prophet Micah.

81 Flaws arising from the original technique are rare. We nevertheless detected a particular fragility on the part of the dark red lakes, which were extremely cracked and sometimes cupped. Minor losses were also noted in the lines corresponding with the liquid drawing medium, where this seems thicker and more pronounced in the IRR, as in the trefoil arch. This lack of adhesion between the drawing and the painting was noted in both registers. The presence of these losses suggests a specific weakness related to the application and composition of the original materials.

82 Pinholes were found in the paint layers of these panels. Previous generations of restorers used to make holes like this to allow adhesive to penetrate the original material. They therefore indicate that the adhesion issue was a recurring one.

83 Polyester film.

84 Philippot, Philippot 1959, pp. 5–19; Philippot, Philippot 1960, pp. 163–72.

85 Old filler was only removed at the edges of the loss when it spilled over into the paint layer.

86 This was also the case with the old filler used in the frames, which was likewise retained but mostly improved and levelled.

87 Solution of 15% damar varnish in white spirit. We are grateful to our colleague Dominique Verloo for overseeing the preparation of the varnish.

88 Von der Goltz et al. 2012, pp. 635–58.

89 Filler comprising chalk and rabbit skin glue (Totin). We are grateful to our colleague Dominique Verloo for overseeing the preparation of the filler.

90 Winsor and Newton.

91 This palette of colours was selected by Laura and Paolo Mora for reintegrating losses using watercolours with the *tratteggio* technique. *Tratteggio* was developed between 1946 and 1950 at the Istituto Centrale per il Restauro (ICR) in Rome, in response to a request from ts director, Cesare Brandi, for interventions to remain visible. Fourteen colours are sufficient to reconstitute most of the tones found in historical paintings.

92 Study and reconstitution by Griet Steyaert. The proposals were based primarily on the uncovered paint layer around the edges of the loss and on the close observation of John the Baptist's drapery, which is better preserved than that of John the Evangelist. There were no

other relatively close external sources (painting or drawing) on which the reconstruction could be based.

93 I.e. Golden PVA Conservation Paints (mix of AYA and AYAC resins and polyvinyl acetate resins diluted in ethanol), which allow varnishing by brush after retouching.

94 Since this relates to a long-term treatment with two registers still to be dealt with, we needed to be certain that the products chosen for reintegration and also permitting subsequent varnishing by brush would remain available on the market in the years ahead.

95 Van Eyck Conservation Set 1 & 2: French Ochre, Italian Gold Ochre, Raw Sienna, Venetian Red, English Red Light (iron oxide (III)), Dark Burnt Sienna, Iron Oxide Red 160M (synthetic iron oxide), Raw Umber, Raw Umber, greenish, Bohemian Green Earth, Burnt Umber, Furnace Black, Authentic Black Ivory, Titanium White, Cadmium Yellow, lemon, Cadmium Yellow, medium, Indian Yellow Imitation, Cadmium Orange No. 1, medium, Cadmium Red No. 3, dark, Synthetic Alizarine, Cadmium Red No. 1, light, Ultramarine Blue, dark, Cobalt Blue Light, Chrome Oxide Green.

96 Synthetic resin, ethyl methacrylate copolymer.

97 Lowry 2010, pp. 87–91; Podany et al. 2001, pp. 15–33; Down et al. 1996, pp. 19–44; De Witte et al. 1978, pp. 1–9.

98 Depuydt-Elbaum 2005, pp. 17–27 ; De Witte, Guislain-Wittermann, Masschelein-Kleiner 1980-1981, pp. 36–40.

99 Watercolour and Paraloid B72.

100 This choice was made primarily with a view to the work's future conservation.

101 15% varnish in aromatic white spirit. No Tunivin 292 or other antioxidant was used. Comment by L. Carlyle, Professor of Conservation, Universitade Nova de Lisboa, at the International Committee meeting on 26 October 2015: she drew our attention to certain reservations regarding the ageing of this additive.

102 Laropal A81, low molecular weight resin, urea-aldehyde, see Dunkerton 2010, pp. 92–96. Resin. http://www.gamblincolors.com/conservation-colors/technical-data-sheet/ (consulted 1/9/2017)

103 Residual varnish in the spraygun needs to be subtracted from the volume used. Spray varnishing was carried out on the two registers separately, but in two movements.

104 Brandi 1963: 'Il restauro deve mirare al ristabilimento della unità potenziale dell'opera d'arte, purché ciò sia possibile senza commettere un falso artistico o un falso storico, e senza cancellare ogni traccia del passaggio dell'opera d'arte nel tempo'. 'Restoration should aim to re-establish the potential oneness of the work of art, as long as this is possible without committing artistic or historical forgery, and without erasing every trace of the work of art's passage through time.' (This translation in Jokilehto 2009, p. 76. See also Brandi 2005, p. 50.) Since these were the original hinges, polychromed at the outset, it was deemed essential to reintegrate the losses in order to preserve the illusion of a stone facing. Visible and only slightly interventionist retouching was opted for: only the joints between the stones were reconstructed and not the stone patterns. See contribution 4b by Augustyniak and Mortiaux in this volume.

105 Hedley 1993.

4b

Conservation and Restoration Treatment
The Frames: In Search of Lost Unity

Anne-Sophie Augustyniak and Laure Mortiaux

The exterior of the *Ghent Altarpiece*'s eight wing panels have frames that are original, but which no longer possess their original format or appearance. Over time, and due to their tumultuous material history, they have undergone numerous transformations in terms of both their structure and polychromy. We know that in the work of the Flemish Primitives and especially that of the Van Eycks, frame and painted image formed an inseparable ensemble, from conception to display.[1] This unity was broken as a result of the various campaigns of restoration and transformation. Before treatment commenced in 2013,[2] no one suspected the richness of the polychromy, which was hidden at that point beneath thick overpaint that was dull and uneven, considerably diminishing the role of the frames even though this is essential to the reading of the work (fig. 4b.2a-b).

The treatment initially planned for the frames focused solely on conservation and on the basic harmonization of their visual appearance. A new approach became necessary, however, when the polychromy was studied in the light of the polyptych's material history and the discovery in the panels of overpaints concealing the Van Eyck brothers' original painting.[3] Once the decision had been taken to uncover those original paint layers,[4] the panels could hardly be reinstalled in frames which had not had their overpainting removed too.

Confirmation of the presence of a refined underlying polychromy, imitating dressed stonework on silver leaf prompted us to seek the lost unity of the altarpiece and to re-establish the relationship between frame and painting that was so important to Van Eyck.

Fig. 4b.1. (facing page) Detail of the frame of the *Interior View* before the uncovering ; detail of the frame of the *City View* after the uncovering

Fig. 4b.2a. The closed altarpiece before treatment (next page)

Fig. 4b.2b. The closed altarpiece after treatment (next page)

Hidden polychromy

From the supposed date of its completion, 6 May 1432,[5] through to our own time, the *Ghent Altarpiece* has been moved, confiscated, hidden, sold or stolen on numerous occasions, resulting in damage followed by restoration or transformation of varying significance of both the support and the polychromy.[6] Changes to the frame supports were not only prompted by wear and tear over time, but were also and primarily caused by the replacement of the hinges.[7] While the supports of the frames for the

4b.2 a

4b.2 b

eight wing panels are in a relatively good condition, the polychromy was not unaffected by all these transformations.

Not only was the polychromy covered by a significant layer of dirt and thick overpaint prior to treatment (fig. 4b.2a), but a difference in appearance between certain frames meant that the exterior of the polyptych could not be appreciated in their overall effect as an ensemble. Comparison of the frames of the *City View* and the *Interior View* with those of the other six wing panels showed that the polychromy did indeed look different. The polychromy of the frames of the six wing panels, intended to imitate dressed stonework was quite darkened and greenish, while the frames of the two views was more unified, with a brown-black appearance and gilding of the interior chamfers.

A study of the polychromy was performed on the frames as a whole. Stratigraphic examination revealed the presence of twenty layers resulting from seven interventions. To obtain a better understanding of this colour evolution and succession of layers, we need to revisit the principal interventions that occurred during the life of the altarpiece.[8]

The earliest of these – the original polychrome decoration seen in the frames of the exterior of the wing panels – is a refined polychromy composed of a ground layer, an oily orange mordant and silver leaf covered with coloured glazes, modulating from yellow to red. It mimics dressed stonework by means of joints painted in black and white, placed every 12 to 17 centimetres and a speckling of black dots heightened with a light colour (fig. 4b.3).[9] The inscriptions and the quatrain were then applied in black and red paint.[10] The modulations in the tones and intensity of the coloured glazes could no longer be evaluated with any precision, however, due to their degradation.[11]

Local intervention[12] was only detected in the right stile of *St John the Baptist*'s frame (fig. 4b.4), which displays a vertically aligned series of losses down to the wood. The wood is pitted and black in appearance, suggesting burn marks. The remnants of silver leaf covered with a yellow glaze are present in these losses. The silver leaf was applied over a grey underlayer and covers the original polychromy. This intervention shows that areas of damage were concealed by retouching, imitating the original technique (silver leaf plus glaze).

A third major intervention comprised the greenish overpainting of the entirety of the frames of the exterior. The date when this occurred is not known, but it must have occurred before the paintings were dismantled and separated, that is, prior to the beginning of the nineteenth century.[13] Photographs taken before the restoration in Berlin in 1894[14] show a monochrome coating of the frames and the fittings that can be identified as the greenish overpaint. The presence on certain frames of a bulge in the residual overpaint (barb) at the location of the hinges indicates that it was applied after the hinges were installed. These hinges were the third set to be fitted to the frames, which might have occurred when the altarpiece was remounted in the Baroque altar around 1662–63.[15] This would mean that the greenish overpaint covering the hinges postdated 1662–63 (fig. 4b.5).

Six of the eight wing panels were sold in 1816. Only those of the *City View* and *Interior View* remained in Ghent.[16] The material history of the frames of these two wing panels differs therefore from that of the other six between 1816 and 1919, when

Fig. 4b.3. Details of the original polychromy imitating dressed stonework on the frames of the *Archangel* and the *City View,* and of *St John the Evangelist* and *Elisabeth Borluut* after treatment

Fig. 4b.4. Frame of *St John the Baptist* during treatment: details of the second intervention on the right stile

4b.5

4b.6

Fig. 4b.5. Frame of the *Interior View* before treatment: local uncovering of the green overpainting (third intervention)

Fig. 4b.6 Frame of the *City View* before treatment: uncovering of the brownish layer and coat of bronze paint that constituted the fourth intervention

the panels were reunited. During that period, the frames of the six wing panels were overpainted in a dark tone on the flat parts and gilded using bronze paint on the chamfers (fig. 4b.6).

An intervention was performed in Berlin in 1823[17] on the six wing panels, which had been sold to King Frederick William III of Prussia in 1821.[18] The greenish overpaint must have been partially removed there on the order of Gustav Waagen,[19] allowing the rediscovery of the quatrain and the inscriptions on the cross-members. These inscriptions were visible through little shutters incorporated in the double-sided, gilded frames that covered the original frames in the Gemäldegalerie between 1830 and 1880.[20]

The most significant intervention performed on the frames of the six wing panels occurred in Berlin in 1894. In addition to the complete removal of the greenish overpaint, the six frames of the wing panel frames were subjected to major structural transformation, resulting in damage to and/or alteration of the polychromy. It was during this fifth intervention that the wing panels, as well as the frames, were sawn apart through their thickness.[21] All the fittings, including the hinges, whether original or not, plus later reinforcements, were removed.

Following this drastic sawing operation, the positions of the original hinges, an old latch, the bolt-holes for the metal hinges, seals and other losses in the support were plugged with lime wood inlays, then filled and retouched. Retouching in the area of these inlays consisted of an orange underlayer applied over a white ground and a layer of bronze paint, topped with black speckling, touches of colour and black-and-white joints mimicking the dressed stonework of the original polychromy (fig. 4b.7). However, this retouching covered substantial areas and spilled over significantly into the underlying polychromy, while still sparing the inscriptions, with the exception of localized reworking of certain letters.

The layer of bronze paint applied to the frames of the six wing panels in Berlin is likely to have oxidized fairly quickly. As this occurred, the bronze paint will have browned – a shift in tonality that probably no longer accorded with that of the original polychromy. A brownish layer was then applied to the entirety of the six frames, to mitigate the difference in tone between the original polychromy and the oxidized bronze paint.

The frames underwent a seventh intervention during restoration at the Laboratoire central des Musées de Belgique (the precursor of the KIK-IRPA) under Paul Coremans in 1951. This entailed impregnation with wax and the planing of the edges of certain frames, the fitting of brass reinforcing brackets, flush and screwed on the reverse, as well as the construction of a *'solide charpente métallique'* – a solid metal framework.[22] To adapt the format of the frames to this new metal display structure, two oak slats were added to the uprights on either side of the *John the Baptist* frame and another to the right stile of the *City View*. The slats were filled, given a coat of minium and then retouched in greenish brown. The only two frames to have retained their original grooved fitting[23] were dismantled on this occasion. During reassembly, some of the pegs that held the assemblies together were replaced with new wooden pegs or by large metal screws. These pegs or screws were then filled and retouched in the same way as the added slats.[24]

Fig. 4b.7
Demonstration of the interventions on the frame of *St John the Evangelist* in Berlin, 1894: the bronze paint heightened with black and coloured touches with which the wooden inserts filling the notches of the original hinges were retouched spilled onto the original polychromy, as can be seen in UV light

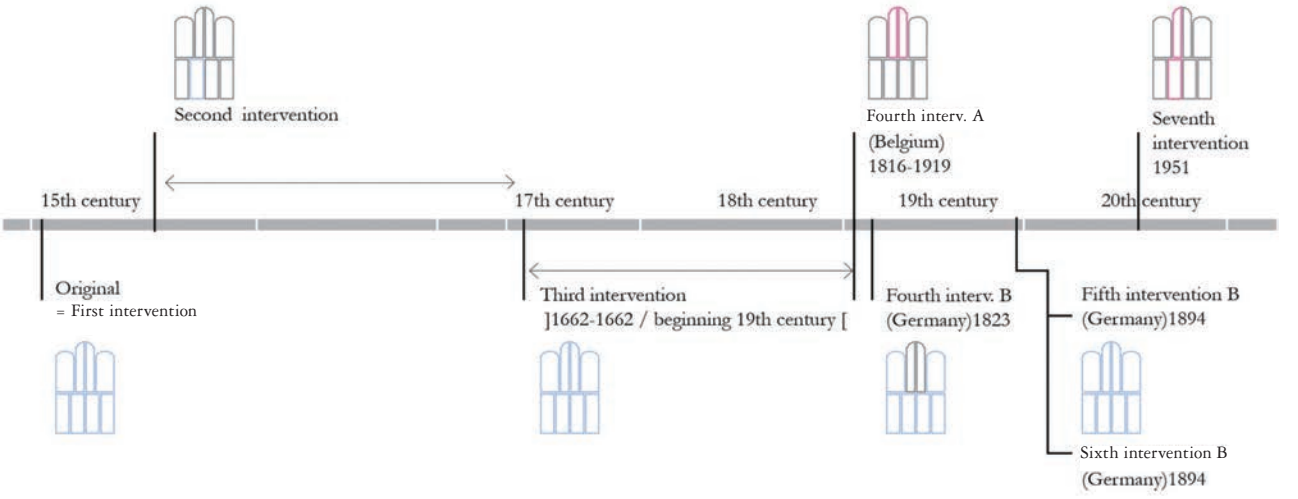


Fig. 4b.8. Timeline showing the different interventions on the frames. Diagram Jochen Ketels

This review, summarized in a timeline (fig. 4b.8), enabled us to sort out the problem of the difference in appearance between the frames that was visible at the outset of our intervention: on the one hand the group of six wing panels 'restored' in Berlin in 1894, when they were sawn through their thickness and overpainted with imitation dressed stone; and on the other the two frames of the *City View* and the *Interior View*, which had remained in Belgium and were overpainted in a greenish colour that was then hidden below a brown-black layer applied sometime between 1816 and 1919.

Necessary treatment

Despite the scale of the transformations to the frame supports and the extent of the reintegration, the uncovering of the original polychromy was justified by the difference in appearance between the frames and by the presence of very heavy layers of overpaint. The polychromy had been covered by a succession of non-original layers consisting not only of surface dirt, local retouching, a brownish layer and a coat of bronze paint, but also a thick greenish overpaint for the frames of the *City View* and the *Interior View*. However, the sequence of layers was not identical everywhere or on all the frames. Following a thorough survey of the damage observed on the frames and an evaluation of the extent of the overpainting, retouching and losses, test removals were performed – dry at first, using a scalpel under the stereo microscope, and then with solvents. A cleaning protocol was established, taking account of the issues specific to each zone to be treated: the layers covering the original one, those covering old fills at the location of the old hinges, and those covering the inscriptions – a particularly delicate area. It was also necessary to consider the solubility of each layer.

The first, swiftly performed cleaning tests revealed that the layer of surface dirt could be removed at the same time as the brownish layer, which thus avoided the need for prior surface cleaning. The results of dry removal, by contrast, proved inconclusive.

To select the most appropriate solvents with which to dissolve the dirt and the brownish layer, different mixtures of high-quality organic solvents were tested, specifically two large families of blends – a ketone with an aliphatic hydrocarbon and an alcohol with an aliphatic hydrocarbon in different proportions, according to a method drawn up by Paolo Cremonesi.[25]

The selection was based on several factors, including the capacity to solubilize the existing layers, miscibility to obtain homogeneous mixtures of different polarities, low retention in the paint layer, variable evaporation rate to avoid mixtures that could damage the remains of original glazes and/or the silver leaf, and minimal toxicity in the context of the work to be performed.

The removal of successive layers of dirt and overpaint was thus carried out in several stages:

— using a solvent gel comprising an alcohol and an aliphatic hydrocarbon, according to the formulation proposed by Richard Wolbers[26] to eliminate the brownish layer present on the six frames restored in Berlin in 1894. Gelling allowed the effective solubilization of the non-original layers and a homogeneous result, while preventing excessive diffusion of the solvent within the layers and reducing friction on a fragile surface (fig. 4b.9).

— using a solvent gel comprising a ketone and an alcohol to eliminate the greenish overpaint present primarily on the frames of the *City View* and the *Interior View* and as residues on the other frames. This solvent mixture proved more effective in compresses when removing the bronze paint from the expanses of filling applied in Berlin in 1894 at the location of the old hinges, that is, where there was no original polychromy. It was possible in this way to remove the bronze paint while retaining the orange underlayer, which seemed at first to provide a useful base for future retouching.

Fig. 4b.9. Removal of the brownish layer obscuring the original polychromy of the frame of the *Archangel* by means of a solvent gel. The gel is applied in a thick layer using a cotton swab. Excessive gel is removed when dry and the uncovered area washed with solvent in order to eliminate any residual material.

— combining the action of the solvents and the scalpel, monitored under the stereo microscope, to eliminate the residual overpaint around the inscriptions, given the fragility and importance of these zones.

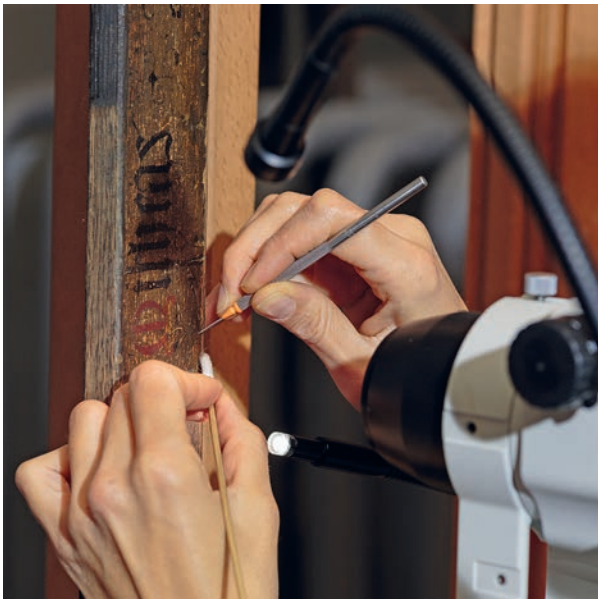
For most of the time, therefore, the action of the solvents was combined with use of the scalpel. In particularly fragile zones, however, such as the inscriptions, mechanical removal under the stereo microscope proved indispensable (fig. 4b.10).

This prolonged and painstaking removal work revealed an original polychromy of high quality but in an altered and abraded condition with numerous losses (fig. 4b.11). Having been uncovered, therefore, the polychromy displayed not only alterations reflecting its material history, such as the presence of expanses of filler, wood inlays and numerous losses, but also specific alterations inherent to its structure, such as the degradation of the silver leaf or the original glazes.

The propensity of silver leaf to degrade was well known to artists in the Middle Ages, as evidenced by the warnings set out in guild rules or in early treatises,[27] notably Cennino Cennini's: '*Note above all: do it with as much silver as possible, because it does not last and turns black on walls, on woods, but it fails more immediately on walls*';[28] (although Cennini fails to recommend the application of a specific protective layer to delay this alteration[29]). Artists were in the habit of placing coloured glazes over silver leaf, a practice that played a significant role in the latter's preservation.[30] These protective layers too degrade over time, exposing the silver leaf to contamination. Depending on the environment, a variety of corrosion products form on it, the ones detected most commonly being silver chlorides, AgCl (white) and silver sulphides, Ag_2S (black).[31] Samples were therefore taken from two locations on the frame of the *Interior View*, at the position of one of the first micro-windows, to measure the oxidation and its possible evolution. The two compounds (AgCl and Ag_2S) were detected in the samples by SEM-EDX and TOF-SIMS. Macroscopic observation did not reveal any blackening during the uncovering of the frames. The distribution of chlorine in the micro-samples containing fragments of silver leaf was determined using SEM-EDX. Chlorine was detected alongside silver at all the analysed points of all the samples, even those presenting a metallic character. In some cases, the chlorides seem to have developed where the silver leaf meets the mordant layer rather than the glaze layers protecting the leaf, suggesting that one of the sources of the chlorine might be the adhesive layer.

Before proceeding with the treatment, it was therefore essential to protect the exposed silver leaf from oxidation. The different ways of achieving this were considered alongside a series of tests performed by the paintings workshop at KIK-IRPA[32] and in collaboration with Ghent University. Bearing in mind that most of the studies carried out in this regard related more to the protection of solid silver objects than that of silver leaf incorporated in polychromy,[33] the research performed at Ghent University by Anastasia Rousaki and Peter Vandenabeele in collaboration with Hélène Dubois[34] focused on the effectiveness with which silver leaf was protected against exposure to high concentrations of corrosive gases. The synthetic resins to be tested were chosen from among the ones most frequently used in conservation and restoration.[35]

A purely visual evaluation of the corrosion was made by Anastasia Rousaki, following which Laropal A81 and Regalrez 1094 were selected as the most effective protective coatings. Paraloid B72 proved less convincing in the context of this



4b.10

4b.11

Fig. 4b.10. Mechanical removal of green overpaint, under the microscope: inscription on the frame of the *Virgin Annunciate* and on the quatrain, frame of *St John the Baptist*

Fig. 4b.11. Frames of the *Archangel* before and the *Virgin Annunciate* during the uncovering

experiment,[36] although research by Lyndsie Selwyn into the protection of silver and copper gilt[37] does not exclude this resin. At the same time, test-samples reconstructing the original polychromy and topped with the different varnishes were produced at the KIK-IRPA paintings studio and subjected to ageing in natural and UV light, or by adding a coating of Cosmoloid 80H wax. Visual evaluation of these results[38] showed that the combination of Paraloid B72 and Cosmoloid 80H wax offered the best protection to the silver and the polychromy; Laropal A81 and Regalrez 1094 also delivered good results. Given the results of the tests performed by KIK-IRPA and Ghent University, but also taking account of compatibility with the retouching materials, their solubility in the varnishes used and control of the desired degree of gloss in the final appearance, we opted for three-stage protection.

Following the uncovering of the original polychromy, a layer of Paraloid B72 varnish (dissolved 10% in xylene) was applied with a thin varnish brush. Next, following retouching, the frames were sprayed with a thin coating of Paraloid B72 varnish with three vertical and horizontal passes, to isolate the retouching while simultaneously reinforcing the protection of the silver leaf. Lastly, the application by brush of a layer of microcrystalline wax completed the protection of the polychromy and the silver leaf.

The first stage in the treatment of the frames therefore enabled the original polychromy to be revealed by removing the various layers of overpaint (fig. 4b.12) and other interventions that had concealed it (compare figs 4b.12 and 13).[39] The retouching done in Berlin was removed, for instance, revealing the orange underlayer covering the filling applied to the wooden inlays. We initially considered using this as the base for retouching, but realized that it would be preferable to remove it to allow correction of the filling, which spilled over into the original layers and was not level. These fills with conspicuous outlines and rectangular forms situated at the position of the hinges and the other fittings were very significant, especially in the arched frames of the *Archangel* and the *Virgin Annunciate*. The orange layer as well as the filling overspill were therefore removed. In most cases, the old filling was preserved and levelled by applying a new, finely sanded chalk and glue-based filling. The fillings covering smaller losses were also preserved and reworked with a slight texture to integrate them more effectively with the remains of the polychromy. Not all the losses had been filled, however. In addition, certain historical traces concealed during earlier restoration treatments were uncovered. This was the case of the historical burn marks in the wood of the frame of *John the Baptist*[40] and of the two wooden slats added to the lateral edges in 1951. Depending on the condition of the polychromy and the extent of the losses to be filled (fig. 4b.12), each frame therefore required an individual, staged approach, which was then set against an overall view of the ensemble.

At this stage of treatment, the frames presented numerous expanses of fillings, which had to be reintegrated (fig. 4b.14). It was important to keep in mind, however, that these were not losses in the strict sense, but traces of the lost hinges. Van Eyck himself originally disguised the hinges by painting them, as may still be seen on the frames of the *City View* and the *Interior View* (see fig. 4b.1). How then to re-establish the lost unity and aesthetic value of the ensemble, while simultaneously respecting this eventful history? How might these large rectangular zones be integrated without eradicating the material traces, but actually highlighting them?

Fig. 4b.12. Frames of the lower register after the uncovering of the polychromy. (1) position of the original hinges; (2) position of the notch for the pin of the second hinge; (3) position of an old latch; (4) screwholes of the metal hinges; (5) position of seals and lacunae

The status of these frames and the intrinsic nature of the polychromy necessitated further reflection, from both an ethical and a technical point of view.[41] The frames form a unified ensemble with the painted panels and contribute fully to the coherence of the polyptych; what's more, the highly distinctive *trompe l'œil* stone also provided the physical link with the original architectural setting of the Vijd Chapel. Consequently, these *lacunae* should not just be approached in the same manner as losses in the paint layer, but care should be taken to re-establish unity and balance on several levels.

The reintegration of losses in a metal leaf is not straightforward, due in part to its colour, but above all to its sheen and the light it reflects.[42] Even if the original silver leaf and glazes were oxidized and had lost their gleam and intensity over time, the question of restoring the lost lustre and the illusion of the stone facing was crucial.[43] Several treatment approaches were therefore possible, ranging from minimally interventionist retouching to illusionistic retouching.[44] However, since the aim of the retouching was to serve the *trompe l'œil* intended by Van Eyck and to achieve a complete vision of the altarpiece, it was necessary to avoid any confusion between the original parts and the retouches. In order to respect the authenticity of the work it was therefore decided to privilege a 'suggestive differentiated retouching',[45] which would evoke the loss through variations in colour and form, but without recreating details and while remaining perceptible from a certain distance. Further-reaching retouching of the illusionistic type would have meant inventing the location of irregularities in the

Fig. 4b.13. Wings of the lower register before the 1894 restoration

stones and coloured highlights and hence a risk of returning to the appearance of the removed overpainting. With this in mind, only the black lines were replaced so as not to lose the rhythm of the dressed stone.

Retouching – like the filling – was carried out in stages. To allow the potential of each frame to be evaluated, it was vital to start the retouching process with the areas of abrasion in the polychromy before commencing on the expanses of filler. Watercolours would not deliver satisfactory results because of the impermeable surface of the polychromy's protective coating,[46] and so the abrasions were retouched using industrially ground pigments in Paraloid B72[47] – a set created at our request especially for this project by the Kremer company.[48]

The visibility requirement was particularly necessary in the area of the inscriptions and the quatrain. Special attention was therefore paid to these zones: only the abrasions around the letters were retouched and not the letters themselves, to avoid interfering with the interpretation of the quatrain, which has been the subject of so much debate (fig. 4b.16).[49]

Once the abrasions had been retouched, a start could be made on reintegrating the fillings. Use of watercolour as a base tone (fig. 4b.17a) allowed light and thin retouching. A fairly fluid base tone was applied by paintbrush (fig. 4b.17b); retouching then occurred progressively, using fine vertical and parallel lines, modulating the tone while taking care to preserve transparency (figs 4b.17c-d). The frames were not all in the same condition, so re-establishing the balance of the ensemble had to undergo several stages: a first stage of retouching with watercolour allowed the original

4b.14

Fig. 4b.14. Frame of the *Archangel*: the fillings are large and geometric in shape, in particular those covering the notches of the old hinges.

Fig. 4b.15. Detail of the reintegration on the frame of the *Archangel*: (a) filling, (b) retouching

4b.15 a

4b.15 b

4b.16 a

4b.16 b

Fig. 4b.16. Example of the reintegration of losses around the inscriptions on the frame of *Joos Vijd*: filling (a) and retouching (b) of abrasions and losses

polychromy of each frame to be highlighted in isolation, before then being compared with its immediate neighbour and lastly with all the frames placed side by side. Following this overall view, a second stage of retouching was carried out using ground pigments in Paraloid B72.[50]

The temporary reframing of the paintings was essential for the finalization of the retouching and for harmonizing the ensemble. The final wax-based protection allowed certain remaining matte/gloss issues to be dealt with while lending a satin and homogeneous appearance to the frames, contrasting with the appearance of the varnished painted panels. In this way, the connection between the painting and its frame, as well as the relationship that each frame maintains with its neighbouring frame within the overall exterior of the polyptych, has been restored within the limits determined by their specific condition and their material history.

Conclusion

Prior to the conservation and restoration treatment, the frames had been entirely overpainted: six of them had been polychromed in imitation stone, brownish and dull; two others, the *City View* and the *Interior View*, were painted black. This difference in appearance, reflecting their respective material histories, as well as the numerous overpaints, made it difficult to view the closed polyptych as an ensemble.

Uncovering the frames was not initially planned. However, the study carried out in parallel with that of the painted panels resulted in a proposal to fully conserve and restore them (fig. 4b.19), which would allow the original polychromy to be rediscovered. The latter consists of a refined imitation of dressed stonework, rendered using silver leaf covered with coloured glazes (now substantially darkened), ranging from yellow to red and heightened with small touches of colour and articulated by joints painted in black and white.

4b.17 a

4b.17 b

4b.17 c

Fig. 4b.17. Successive stages of retouching: (a) retouching small losses using watercolour; (b) progressive retouching of large fillings through the application of a fluid base tone using a medium-sized paintbrush first, then thin parallel strokes

4b.18

Fig. 4b.18. Frames, during the final retouching.

Once the additions and numerous overpaints had been removed, the polychromy displayed a considerable degree of alteration, abrasion and losses. The meticulous and phased process of filling and retouching was intended to serve the illusion created by Van Eyck's *trompe l'œil*, while refraining from an overly interventionist reintegration. Reconditioning the imitation dressed stone in this way has re-established the connection between the paintings and their frames which, despite its vital importance in Van Eyck's work, has been hidden for so many years. The scenes are more spatially coherent as a result, while the shadow cast by the frames on the tiled floor of the scene in the upper registers now takes on its full meaning. The uncovering of the original polychromy has also contributed to a rereading of the quatrain and the inscriptions (fig. 4b.2b).[51]

The irreversible degradation of the glazes prevents a full appreciation today of the original appearance of the polychromy and the brilliance it once possessed. Be that as it may, thanks to some well-preserved zones we can understand the sophistication of the polychromy and the attention that Van Eyck bestowed on this element of the work. Revealing the original polychromy of the frames, even in its darkened state, means that the closed polyptych can now be appreciated in a condition that, while altered, is nevertheless closer to the original, and which had not been visible for several centuries.

Fig. 4b.19. Successive stages in the restoration treatment of the frames illustrated from the *Archangel* and *Joos Vijd* (next page)

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Notes

1 See the many publications on this subject by Verougstraete, Van Schoute 1987, 1989, 2000.

2 Treatment of the frames began in May 2013, while that of the painted panels had begun in 2012.

3 The research and restoration treatment was headed by Livia Depuydt-Elbaum. We are grateful to everyone who contributed to this work from both near and afar.

4 See contribution 4a by Depuydt, Rosier, Devolder and Laquière in this volume.

5 The 1432 date is mentioned in the quatrain painted on the frames of the lower register. See contribution 6 by Jones, Augustyniak and Dubois in this volume.

6 For the material history of the altarpiece, see contribution 1 by Dubois and contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

7 The five interventions to replace hinges resulted in the damage described in the contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

8 See contribution 1 by Dubois in this volume.

9 See contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

10 For the inscriptions, see contribution 6 by Jones, Augustyniak and Dubois in this volume.

11 For the exhibition *Van boomstam tot altaarstuk* at the Provinciaal Cultuurcentrum Caermersklooster in Ghent, Marie Postec reconstructed the original polychromy of the frames. She did so by reproducing the technique and materials used by Van Eyck as faithfully as possible. The difference in appearance between this luminous reconstruction and the polychromy that is sufficiently visible at present is striking. However, the reconstructions altered in appearance, dulling considerably, within just three months. Comparing this appearance with laboratory analysis alerted us to the fact that the alteration of the original polychromy might also have resulted from the glazes covering the silver leaf. Augustyniak, Postec, Sanyova 2015, pp. 111–13.

12 Viewed as the second intervention.

13 In 1816, six of the eight wing panels were sold to the art dealer L.J. Nieuwenhuys, who sold them in turn to the British collector Edward Solly; the Adam and Eve panels remained in Ghent; Kemperdick 2014, p. 63.

14 See contribution 2 by Ketels, Glatigny and Augustyniak and contribution 1 by Dubois in this volume.

15 For the Baroque altar, see Dhanens 1976, pp. 33–36; Kemperdick 2014, p. 60.

16 Kemperdick 2014, p. 63.

17 Waagen 1824a; 1830; Waagen, Rassman, De Bast 1825.

18 Prussia legally acquired the six wing panels of the *Ghent Altarpiece* from Edward Solly in 1821; Kemperdick, Rößler 2014, pp. 70–99.

19 Waagen, Rassmann, De Bast 1825.

20 These frames were created by Karl Friedrich Schinkel. See Von Roenne 2017; Stehr, Dubois 2014.

21 In 1894, Wilhelm von Bode, the director of the Gemäldegalerie where the paintings were kept, wanted to be able to present the paintings side by side, which prompted him to order the splitting of the panels and the frames. The grooved frame assemblies were dismantled so that each element could be cut in half through its thickness. Following the splitting of the frames, softwood pieces were glued to the reverse to create deep members that had been sufficiently enlarged to receive the cradled panel (thickness 2.2 cm); Coremans 1953, pp. 59–60 and 86–87; Glatigny et al. 2010, pp. 253–57; 276–78; 288–89; 299–300; 311–13; 325–27; 332–34; Stehr, Dubois 2014. See also contribution 2 by Ketels, Glatigny and Augustyniak and contribution 1 by Dubois in this volume.

22 Coremans 1953, p. 93.

23 The *City View* and the *Interior View.*

24 I.e. white filler, orange underlayer, ochre-khaki layer, brown layer.

25 Cremonesi 1997; 2004; Cremonesi, Signorini 2004.

26 The solvent mixture was thickened using a polyacrylic acid and a weak base. Use of gel necessitated dry cleaning to remove the excess and rinsing by application of a blend of solvents of weaker polarity; Wolbers 1992; Phenix, Wolbers 2012.

27 Historical treatises contain numerous recipes and application techniques for

solid silver objects and/or metal leaf, with a preponderance of gold leaf, but also silver and tin leaf, which were used in illuminations, in decorative techniques for polychrome sculptures and in paintings. The texts often mention its use to mimic gold by covering it with yellow glazes. The principal historical texts referring to gilding and silvering techniques are: *Mappae Clavicula* (9th–10th century): Smith, Hawthorne 1974; *Schedula diversatum artium* [On Diverse Arts] by Theophilus Presbyter (twelfth century), see Hawthorne, Smith 1979, particularly Book 3: *The Art of the Metalworker*; *Il libro dell'Arte* by Cennino Cennini (1390–1435): see Broecke 2015; *Manuscript of Strasbourg* (1400–1570): see Neven 2016; *Experimenta de coloribus, Manuscripts of Jehan Le Begue* (1431) and *De coloribus et artibus romanorum*, Heraclius, Eraclius (XIII): see Merrifield 1999. For more details, see contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

28 Chapter 95: 'The way to decorate walls with gold or with tin', Broecke 2015, p. 130.

29 There is little reference in the literature to coatings used by artists to protect silver, which does not necessarily mean they did not exist. Protein coatings, based on albumen are often mentioned in the Middle Ages, but so too are animal glues, oils and resins; see Bergeon-Langle, Curie 2009, II, p. 1058. For the purposes of this study, the ageing of test-samples reconstructing the stratigraphy of the frames showed that those in which the silver leaf was covered with a coating of albumen displayed less oxidation on the part of the silver leaf and the coloured glazes than the test-samples that were not coated with protein. See *Tests de vieillissement de plaquettes-test en vue d'étudier l'altération des glacis des cadres de l'Agneau Mystique et l'efficacité de divers vernis protecteurs de la feuille d'argent*; study performed by Charlotte Sevrin, Marie Postec and Alexandra Louis in collaboration with Jana Sanyova and Hélène Dubois, KIK-IRPA, April 2014 – September 2016; unpublished.

30 Martin, Eveno, Ressort 1998, p. 106.

31 Martin, Eveno 1994; Salvado et al. 2011.

32 *Les couches protectrices pour les feuilles d'argent: cadres de l'Agneau Mystique*; study performed by Charlotte Sevrin, Marie Postec and Alexandra Louis in collaboration with Hélène Dubois and Marie Postec; KIK-IRPA, July 2015; unpublished.

33 Including notably the recent study: Grissom et al. 2013.

34 Hélène Dubois provided the selection of varnishes based on the conservation literature.

35 Namely Regalrez 1094, Laropal A81, Paraloid B72, PVA 20 Kremer and PVA 30 Kremer.

36 Rousaki et al. 2016a; Rousaki et al. 2016b.

37 Selwyn 2000.

38 Evaluation by Charlotte Sevrin and Alexandra Louis, report dd. 12 April 2016, KIK-IRPA, unpublished.

39 The work to uncover the entirety of the frames was performed between 24 March 2014 and 22 January 2016.

40 At the time of the 1894 intervention in Berlin.

41 Brandi 1963; Philippot 1959; Philippot 1990.

42 The problem of reintegrating metal leaf arises most frequently with respect to gilding and particularly to the retouching of the gilded backgrounds of early Italian or Spanish paintings, in icons, or on frames. Various reintegration techniques have been developed to deal as effectively as possible with gilded backgrounds. They include the *tratteggio* technique (by Paolo and Laura Mora) and selective retouching and chromatic abstraction (by Umberto Baldini). These interventions, even when executed brilliantly, often remain perceptible. No retouching, no matter how illusionistic, can capture the highly distinctive gleam of gold leaf. Tests have also been carried out using gold leaf or powder, which give a better result in terms of sheen. There are few examples, by contrast, of the reintegration of silver leaf. See in particular the articles on this subject by Dunkerton 2001 and Klaar Walker 2011.

43 Rolland-Villemot 2014.

44 Nadolny 2012; Muir 2011.

45 'Suggestive differentiated retouching = an approach in which the retouching provides a general indication of lost form using variation in either or both colour and shape, but no detail. The goal is to provide as coherent an image as possible for the viewer by completing forms without resorting to speculation. The retouching is perceptible at all viewing

distances. It may be built up with a different manner of paint application from the original – often a series of fine lines, tiny dots, etc.'; in Nadolny, 2012, p. 576.

46 To recapitulate, after the polychromy had been uncovered, the frames were given a protective coating composed of Paraloid B72 dissolved 10% in xylene, applied by brush.

47 Lowry, 2010.

48 The Van Eyck set supplied by the Kremer company consisted of twenty-four colours and the solvent used for dilution was 1-Methoxy-2-propanol.

49 See in this regard Van der Velden 2011b and contribution 6 by Jones, Augustyniak and Dubois in this volume.

50 Kremer set.

51 See the contribution 6 by Jones, Augustyniak and Dubois in this volume.

5a
The Van Eycks' Creative Process
The Paintings: from (Under)drawing to the Final Touch in Paint

Marie Postec and Griet Steyaert

The painting technique employed in the *Ghent Altarpiece*, and in this case on the exterior panels, has already been the focus of several publications, among them *L'Agneau Mystique au laboratoire*,[1] which appeared in 1953 following the polyptych's previous conservation treatment. In the 1980s the KIK-IRPA resumed its analyses of cross-sections taken during this earlier restoration campaign.[2] A major study on the underdrawing had meanwhile been published in 1979,[3] and the *Ghent Altarpiece* had also been discussed within the context of some broader technical studies.[4] All of these investigations were thus conducted when the work was still covered by very old overpaints, which have today been removed from the exterior panels but which went undetected in previous research initiatives and have never even been mentioned by experts to date. For the first time in many centuries, therefore, we can now truly admire Van Eyck's original technique on the exterior panels. The present article brings together the observations made during the treatment by the entire team of restorers, who continuously shared their findings with each other, and in dialogue with the KIK-IRPA laboratory.[5] The universities of Ghent and Antwerp have likewise contributed to this research.[6]

While the *Ghent Altarpiece* is the largest composition in Jan van Eyck's known oeuvre,[7] the technique in which it is executed conforms relatively closely to that described in detail in the numerous publications relating to other, much smaller paintings by the Bruges master.[8] Just as in his small-format works, Van Eyck paints with dazzling facility, great assurance and with an amazing rapidity of execution, demonstrating a keen sense of observation. The lengthy work of restoration carried out between 2012 and 2016 on the exterior panels of the *Ghent Altarpiece* allowed us to study these constants of Van Eyck's painting technique close-up and at the same time to identify numerous distinctive features.[9]

Our understanding of painting technique is today greatly influenced by our reading of stratigraphic cross-sections and by scientific imaging. Since the first half of the twentieth century, these continuously advancing technologies have been delivering insights into the construction of a painting and the role of each constituent layer. But this approach has also led us to analyse paintings in terms of successive and distinct phases, with each stage looked at in isolation. It seems, however, that the physical

Fig. 5a.1. (facing page) *Interior View* (IRR): detail

completion of a painting by Van Eyck involves a dynamic approach in which successive steps can be interwoven without each being masked by the next.

Each application plays a part in the final result, whether indirectly through the visual impact it achieves on behalf of the layers on top of it, but also directly, since even the bottom layers may remain visible in the final picture.

Ground

The ground, consisting of chalk and a protein glue such as an animal glue, has been applied on the eight panels already in their frames and therefore also on the frame mouldings. Consequently, there is no ground on the parts of the panels covered by the mouldings and by the crossbars separating the figures of the prophets and sibyls from the *Annunciation* scene below. The presence of unpainted edges and barbs on each panel testifies to this practice, which was common at that time.

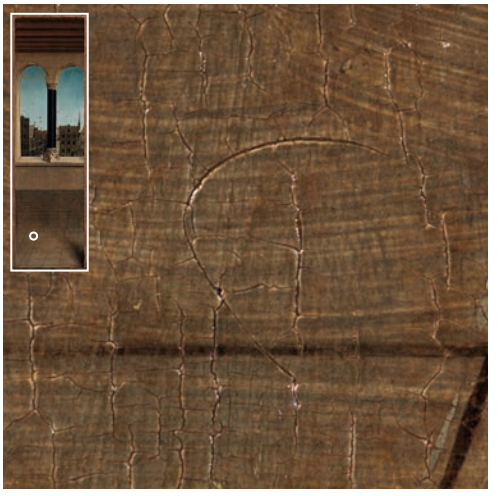
This ground was built up in three layers.[10] Its method of application can be deduced from several traces of artist's utensils found on the paintings. Bristles trapped in the ground attest to the use of brushes to apply the initial coats, while a series of parallel grooves are evidence that a spatula was used to spread the top layer or layers of the ground and at the same time ensure a level surface.

Paintbrush hairs

A great many paintbrush hairs have been found in the eight paintings on the exterior panels. Many of them are still physically preserved (fig. 5a.2), while others have just left their mark, namely as a curved imprint.[11] These bristles, or their imprints, are particularly numerous and in some cases total as many as 30 and even 50 within a single painting.[12] All those that remain are buried deep within the paint layer, very often in the ground, implying that it was primarily the brushes used to apply the ground that lost their bristles – something that also ties in with observations concerning the preparation of the frames.[13] The hairs themselves are translucent and brownish yellow in colour. The longest are curved, proving their relative suppleness. Roughly two sizes can be distinguished: hairs of around 3 cm in length, and shorter ones of roughly 1 cm.

Some of the earliest descriptions of the brushes used by European painters in the Middle Ages are found in the Montpellier *Liber diversarum arcium*,[14] dating from the thirteenth century, and in the fifteenth-century *Il Libro del Arte*[15] by Cennino Cennini. According to these sources, brushes were made from hairs of animal origin, either squirrel or pig bristle, secured and fastened by a 'thread or some waxed silk' inside the shaft of a bird's feather. This in turn was attached to the brush handle, which consisted of a tapered wooden stick.[16]

This type of brush can be clearly recognized in fifteenth- and sixteenth-century representations of painters at work (fig. 5a.3).[17] The paintbrushes in these illustrations seem to be mainly of the round type, tapering to a point at their tip, with flat brushes appearing more rarely (fig. 5a.4).[18] These latter were nevertheless evidently in use: they



5a.2 a

5a.2 b

5a.2 c

Fig. 5a.2. Paintbrush hairs trapped in the paint layer or ground in *City View* (a) and the *Angel Annunciate* (b and c)

Fig. 5a.3. Selection of paintbrushes in a miniature from Giovanni Boccaccio, *De mulieribus claris* / *Le livre de femmes nobles et renomées*, anonymous French translation, 1402, Bibliothèque nationale de Paris, MS Français 12420, fol. 86 (detail)

are mentioned by Cennino Cennini,[19] and the marks they leave in the paint – of the kind visible in the floor in the Interior View and in certain details of the infrared reflectograms (fig. 5a.23 and 24) – confirm that blunt-ended brushes were employed here too.

Bristles are trapped not solely in the ground but also in the paint layers. One such – a shorter hair about 1 cm long – was found in Joos Vijd's red gown, for example.[20]

While the discovery of bristles of two different lengths might suggest that we are dealing with two different types of paintbrush, we could equally well be in the presence of brushes of varying quality and better or worse states of wear. In fact the 1 cm hairs more likely represent sections of bristle that have broken off, for if we take into consideration the section inside the shaft of the feather, bristles must have measured more than 1 cm in total.

Fig. 5a.4. Flat brush in a miniature from: Giovanni Boccaccio, *Des cleres et nobles femmes*, anonymous French translation, 15th century (1488–1496), Bibliothèque nationale de France, Ms. fr. 599, fol. 50r

The presence of paintbrush hairs trapped in the paint layer is not uncommon, but is rarely mentioned in the literature.[21] Even so, as far as we know the concentration in which they are found here is exceptional. Just like modern brushes, medieval brushes no doubt lost bristles fairly often in the course of use. It would seem, however, that the brushes employed here were very fragile, of poor quality or already badly worn, given the substantial number of lost or broken bristles. This poor quality may seem surprising in the case of a painter like Van Eyck, who appears to choose his materials with care – unless he deliberately wanted to use well-worn brushes.[22] Cennino Cennini, for example, repeatedly recommends employing a used brush for its greater suppleness.[23] In the floor of the City View, the brush even seems to have disintegrated at one point, losing several hairs at a particular spot.

Use of a spatula

It would appear that the final layer of the ground was applied not with the aid of a brush but with a spatula, leaving behind some parallel grooves characteristic of the use of this utensil (fig. 5a.5). Contrary to what was for a long time thought,[24] such grooves were not made by a serrated scraper but by a smooth spatula, which sometimes started to vibrate when it was pulled over a not completely dry layer. Grooves of this kind are frequently found in paintings on wood[25] and can be seen on some of the exterior panels.[26] This does not rule out the possibility that a spatula was used to apply the ground on every panel, but simply without leaving a mark.

The grooves appear as series of fine, distinct and perfectly parallel striations. They are not to be confused with another type of incision also present in the ground, which seems more likely to correspond to scratches. These, too, appear to have been generated during the application of the ground with a spatula, but they are less straight, less finely incised into the ground, and a great deal longer. It seems more likely that they were created by certain granules of a harder consistency present in the fresh coating,

5a.5

Fig. 5a.5. *Angel Annunciate* (detail): parallel grooves in the ground

5a.6

Fig. 5a.6. *John the Baptist* (IRR detail): scratches in the ground

which were dragged across the ground with the spatula, thereby causing occasional scratches (fig. 5a.6).

The use of a spatula to spread the ground demonstrates the desire to obtain a flat and even surface on which to execute the underdrawing and apply the paint layers.[27] It was important that the ground should be perfectly smooth, as historical treatises clearly stress.[28] We were able to confirm the smoothness of the ground on the exterior panels of the *Ghent Altarpiece*, moreover, from our own observations during the course of restoration: in those places where losses in the paint layer revealed the ground underneath, no unevennesses were visible, the smooth surface being ready to receive the drawing laying out the composition.

A non-pigmented isolation layer is present beneath the underdrawing. Another layer – in this case, pigmented – is present on top of the drawing (we shall be calling this layer the *imprimatura*). These two strata remain difficult to distinguish and they will therefore be discussed in detail later on, since the imprimatura seems to belong more to the paint layers.[29]

(Under)drawing

The new infrared reflectograms[30] of the *Ghent Altarpiece* made by the KIK-IRPA in 2010 prior to cleaning, and subsequently again in 2016 following the removal of the overpaints on the exterior panels, have enabled us to distinguish different phases in the working up of the drawing. This is something that had rarely been evidenced clearly in Jan van Eyck's work, even if certain authors have occasionally mentioned the possibility of some reworking of the drawing.[31] These findings were substantiated by the restorers in direct contact with the painting and on the basis of scientific imaging and laboratory analyses.

In addition to the contour lines and the hatching to indicate modelling, distributed in a more or less dense network and commonly found in the artist's works,[32] other types of lines as well as washes are found at earlier and later stages. Some of the lines of the drawing rather seem to belong to a first sketch. Once the principal elements have been positioned in the available space, the outlines of forms can be refined and their volumes clarified by means not only of hatching but also of washes, which prefigure the distribution of shadows and lights.

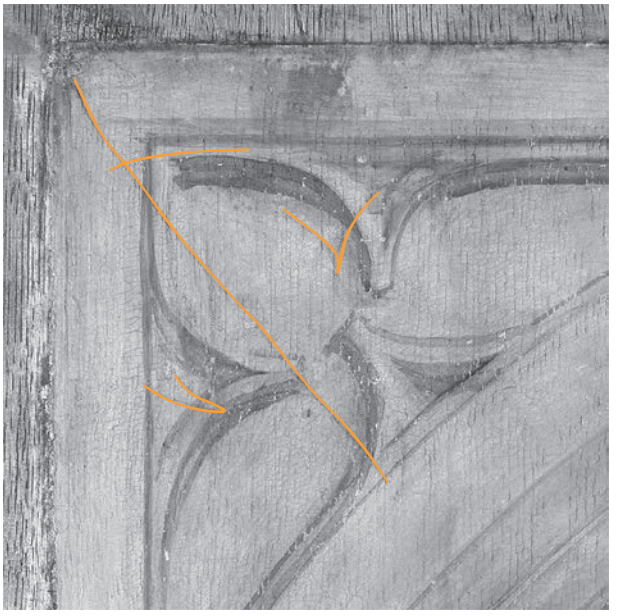
By 'wash'[33] we usually understand a painting technique employed on paper, and which consists of the use of watercolour or India ink (water-based binder), which is more or less diluted so as to obtain different tones. Here, therefore, the underdrawing is not purely linear but already partly painted: with no clear transition, it progressively approaches the stage of painting which introduces colour in the proper sense. From the laying out of the composition onwards, the artist is aiming to visualize the scenes in terms of tonality and to evaluate the gradations of zones of light and shade independently of colour, in order to create relief and modelling.[34] Rather than being masked by the paint layers, these tonal values will be continually enhanced and exploited while the painting is being worked up. They are sometimes covered over, but on other occasions they participate directly in the final rendering of the modelling.

These observations oblige us to somewhat rethink our reading of the different strata. Lines of underdrawing and first layers of more or less coloured paint can coexist at a very early stage in the working-up of a painting.

The underdrawing is generally[35] described in the case of Van Eyck as being executed in a liquid, probably aqueous medium, either a paint or an ink,[36] applied with the aid of a brush.[37] On the external panels of the *Ghent Altarpiece* we also believe we can see the use of dry media in an initial stage of the underdrawing, preceding the work with the brush.[38] Finally, the direct study of the works has similarly allowed us to detect scored lines in the ground and in the fresh paint layer, as well as traces of the use of a compass, all of them playing a role in the genesis of the work.

First sketch and construction lines in a dry medium

Among the very first lines drawn on the ground are certain strokes plainly executed very rapidly in freehand, probably in a dry medium, which appear to belong to a first sketch. This latter is hard to see in the infrared reflectogram, probably because it was worked up and thus covered over or even erased at a subsequent stage.



5a.7

5a.8

Fig. 5a.7. *John the Baptist*, IRR detail of the top left-hand spandrel of the arch: first sketch and construction lines, probably in a dry medium at the level of the volutes here indicated in orange, compare with IRR on *Closer to Van Eyck*

Fig. 5a.8. First sketch, probably in a dry medium in Joos Vijd's draperies (IRR detail) here indicated in orange, compare with IRR on *Closer to Van Eyck*

Curved lines can be detected in particular in the area of the capitals in both registers[39] (figs 5a.10a and 10b), in the motifs of the spandrels in the arches of the lower register (fig. 5a.7), and in some of the figures, for example in the draperies of Joos Vijd (fig. 5a.8) and of Elisabeth Borluut, and in the figure of John the Baptist (fig. 5a.9).[40] Other lines, which do not correspond to any forms in the final painting,[41] also seem to belong to this first draft; examples include the oblique lines present in the spandrels of the arches in the lower register (fig. 5a.7). These latter are not perfectly straight and hence do not seem to have been drawn with great care, but rather as if laying down a first point of orientation within the picture plane.

These sketchy lines are visible above all in those places where changes have been made during the finalization of the underdrawing and the composition no longer followed it. The purpose of this first draft was probably to indicate and position in relatively summary fashion the principal forms that were to fill the pictorial space.

These first lines differ from the majority of the underdrawing visible in the infrared reflectogram, which seems to belong to a later phase and to be executed in a liquid medium. They appear finer and paler and exhibit a certain irregularity, even granularity in their course, suggesting the use of a dry medium. This sketch might have been erased or has disappeared beneath the lines of the more finished underdrawing. In the arch initially envisaged for the Archangel, at the left-hand capital (fig. 5a.10c), we can clearly make out these different phases: on the one hand very fine lines in a succession of fine particles,[42] whose course is not rectilinear but interrupted and which belong to this first sketch, and on the other hand broader lines with a more fluid course corresponding to a later stage in the working-up of the capital, which were executed with a brush.

Dry media present several advantages over liquid techniques, the first being the fact that they can be easily erased (in particular charcoal and leadpoint – a useful

Fig. 5a.9. *John the Baptist* (IRR detail): back wall of the niche as actually painted and first sketch of the left-hand capital here indicated in orange, compare with IRR on *Closer to Van Eyck*

property when making a first draft, which by definition is often liable to later modification. Indeed, Cennino Cennini recommends painters to draw in the first instance in charcoal,[43] since this is easy to rub out should corrections be necessary, and only then to lay down the drawing definitively with the brush. Furthermore, the dry medium chosen in this case produced fine and relatively discreet lines which were not to interfere with the later development of the composition in the event of corrections. Another not insignificant advantage of a dry medium versus a brush is that it allows the artist to work without stopping, unlike a brush which has to be re-loaded with ink or paint all the time.

If this first underdrawing is indeed executed in a dry medium, it seems probable that the artist used metalpoint rather than charcoal, given that none of the subsequent layers, whether aqueous or oil-based (wash, imprimatura or paint layer), have altered the line. This would not have been the case with a line drawn in charcoal or black chalk, whose fine particles, not bound to each other, would have dispersed. A line drawn with a leadpoint is easily erased, allowing reworkings and corrections, contrary to a silverpoint drawing; furthermore, this latter preserves its physical characteristics even after the paint layers have been applied.[44]

The study of these works also clearly shows the use of a compass to draw circles. The hole left by its spike can still be seen today at certain points, including where the

5a.10 a

5a.10 b

5a.10 c

Fig. 5a.10. *John the Baptist*, IRR detail of the left-hand capital (a); *John the Evangelist*, IRR detail of the left-hand capital (b); *Archangel Annunciate*, IRR detail of the left-hand capital (c)

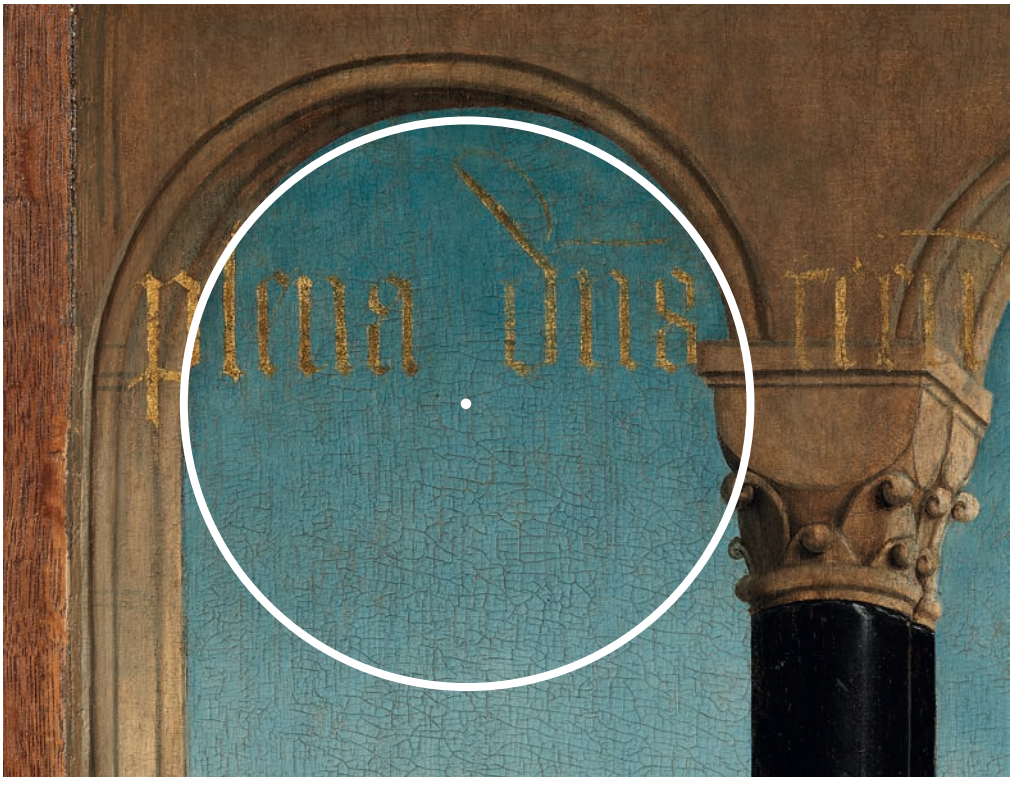
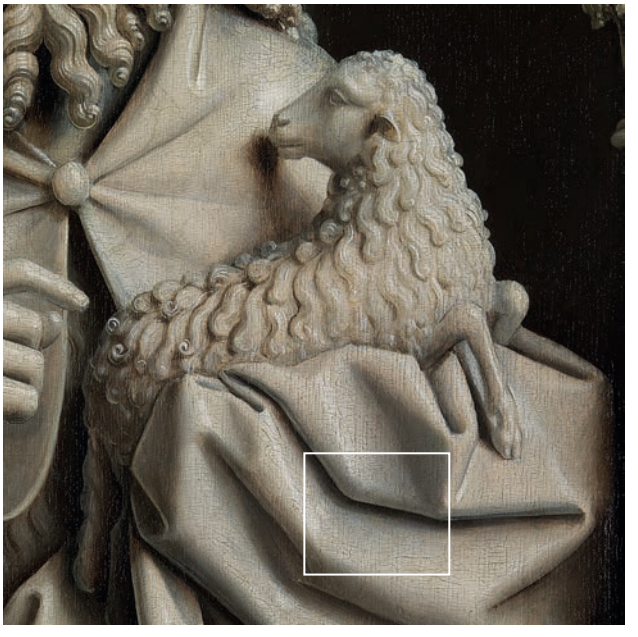
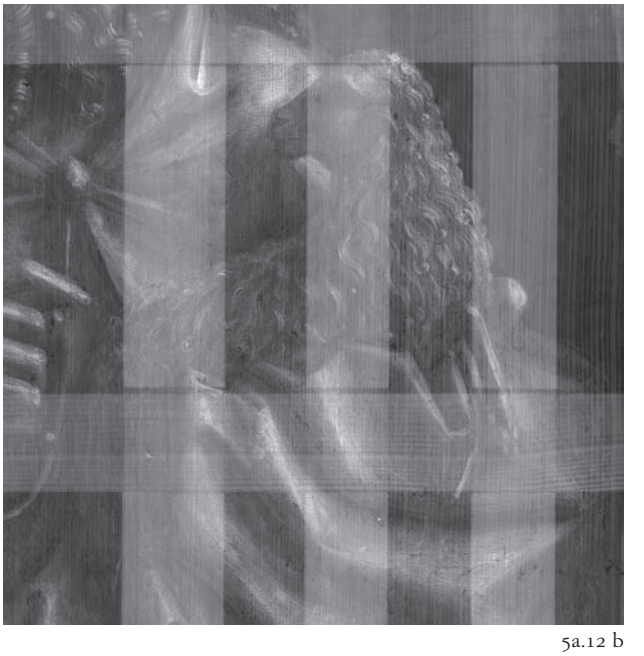


Fig. 5a11. Use of a compass in *City View* here indicated in white, compare with IRR on *Closer to Van Eyck*



5a.12 a



5a.12 b

5a.12 c

5a.12 d

Fig. 5a.12 (a-d). *John the Baptist* (detail) ; *John the Baptist* (X-ray, detail) ; *John the Baptist* (IRR, detail): circle approx. 3.5 cm in diameter drawn with a compass ; *John the Baptist* (X-ray, detail): circle drawn with a compass

compass was used to trace the arches on the two registers (fig. 5a.11). In the upper register, these marks can be detected in conjunction with the drawn but not painted trefoil arches, as well as in conjunction with forms present in the final painting, such as the stained-glass window inscribed in a circle in the *Interior View* and the two window arches in the *City View*. This compass drawing probably belongs to the construction lines organizing pictorial space from a very early stage. The presence of another compass hole, on the other hand, cannot be explained so easily: it is situated beneath the Lamb held by John the Baptist (fig. 5a.12a). The hole left by the spike and part of the traced circle[45] can be seen in raking light as well as in the X-radiograph

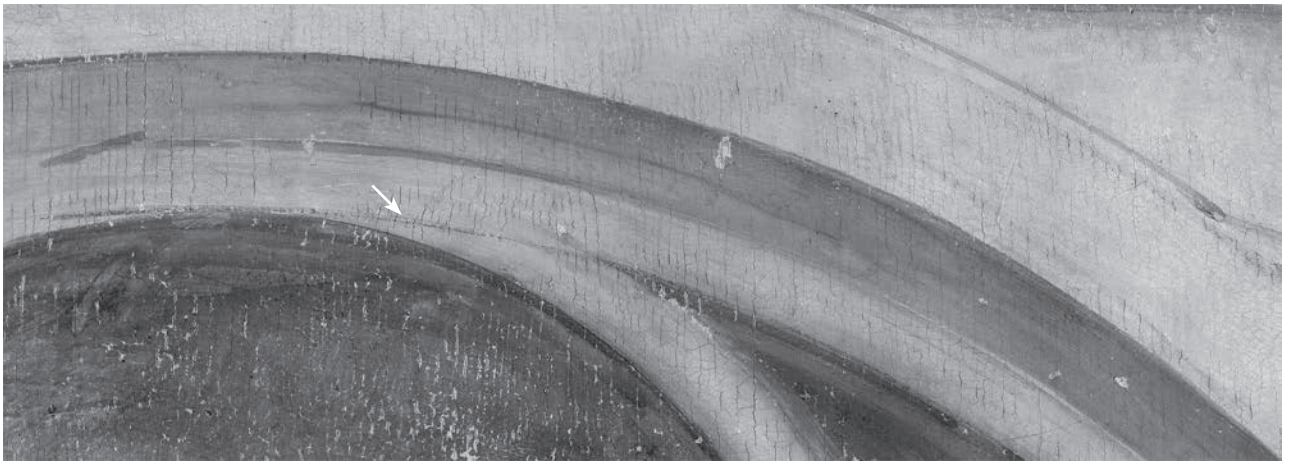


Fig. 5a.13. *John the Baptist* (IRR, detail): top right-hand side of the arch above the saint (line belonging to the first sketch, drawn with a compass using a dry medium)

and the infrared reflectogram (figs 5a.12c and 12d). It is thus clear that the line is also indented, probably scored into the ground, since it has been filled with radio-opaque paint (the whitish grey of the paint layer). But what is a circle doing in this spot? Was it to test the compass? Was it to put down an element initially envisaged but not painted or even drawn? In several pre-Eyckian representations of John the Baptist, the saint carries a book with the lamb resting on top and holds a lantern hanging from a handle.[46] Might it be possible that the traced circle corresponds to the handle of a lantern abandoned during the execution of the painting?

A dry medium also seems more appropriate for use with a compass.[47] In the circle beneath the Baptist's lamb, the incision suggests the use of a hard point, such as a metalpoint that has incidentally incised the chalk ground, rather than the supple tip of a brush. The lines plainly traced in order to position the arc segments seem in many cases very fine, effectively supporting the hypothesis of the use of a dry medium, perhaps here, too, a metalpoint (figs 5a.12c and 13).[48]

Apart from this circle drawn with a compass below the lamb, the presence of scored lines in the ground seems relatively rare on the exterior panels of the *Ghent Altarpiece*. They are found in John the Baptist's pedestal[49] (figs 5a.14) and apparently in the tiled floor below the donors (figs 5a.15).[50] There seems to be no reason why these lines are incised, which argues in favour of the use of a (metal?) point which would have accidentally scratched the ground, making an incision which was not intended.[51]

The fact that such incisions are not detectable elsewhere does not mean that they are absent: they may have been masked by the application of the paint layer. A great many incisions have been identified in Van Eyck's *St Barbara* in the Koninklijk Museum voor Schone Kunsten in Antwerp.[52] Although the *St Barbara* is a great deal smaller than the *Ghent Altarpiece*, there is an interesting parallel between the two works, in particular in the progression of the underdrawing. The incisions in the *St Barbara* are so slight that they are only visible with a powerful microscope, and the application of a paint layer would most certainly have hidden them from our view.

5a.14 a

5a.14 b

Fig. 5a.14 (a and b). *John the Baptist* (IRR, detail): diagonal line crossing the pedestal, perhaps a construction line; *John the Baptist* (detail): diagonal line crossing the pedestal

We can also make out, and more clearly, lines scored into the fresh paint on the exterior panels of the *Ghent Altarpiece*. These were made at a later stage in the creative process and will be discussed further on, even if in some cases they concern a correction to the underdrawing.

The extent of this first sketch remains difficult to determine, since it was obscured by the liquid underdrawing at a later stage.

Fig. 5a.15. *Elisabeth Borluut* (detail): scored line running across the tiled floor

Elaborating the underdrawing and volumes with a liquid medium: contour lines, hatching and wash

The major part of the underdrawing visible in the infrared reflectograms consists of strokes that are much broader than this small number of sketched lines. It is a more finished drawing, comprising contour lines and hatching and executed with a brush in a liquid medium. In parallel, the washes observed here and there in other works by Van Eyck[53] also appear clearly and seem to belong to this more advanced stage of the development of the composition. We are no longer dealing with drawn lines but with larger areas of flat colour, very probably obtained with the same type of medium as employed for the fluid lines of the linear underdrawing, but more diluted. The colour seems to differ: black for the linear underdrawing, brown for the washes. This chromatic difference may simply be a question of dilution: densely pigmented, the mix appears black (fig. 5a.16), whereas when diluted it is more brownish in colour.[54]

The contours and modelling of the architecture and figures are worked out with lines of varying density (more or less fine, more or less dark), in order to lay the foundations of the play of tonal values which will give the final painting its exceptional three-dimensional qualities. Some of the areas of half-shadow on the garments are indicated by fairly fine hatching, while the deepest shadows and certain contours of the main elements are accentuated by more heavily emphasized lines (fig. 5a.18).

The lines sometimes present drips at their extremities (fig. 5a.19a), clearly testifying to the liquid, if not aqueous, character of their medium.[55] Some of the broader lines likewise exhibit accumulations of pigment along their outer edges – a sign of the tendency of fine particles of pigment in suspension in water to migrate to the perimeter during drying (fig. 5a.19b). The liquid, even aqueous, character of these strokes seems fairly clear.

The use of a liquid medium can also be deduced from the observation of certain shadows clearly executed using a broad brush, whose bristles have left behind a network of dense parallel lines (fig. 5a.18). The long and fluid brushstrokes which overlap, if not fuse, produce a shaded surface close to a wash clearly illustrating the fine border between linear underdrawing and wash.

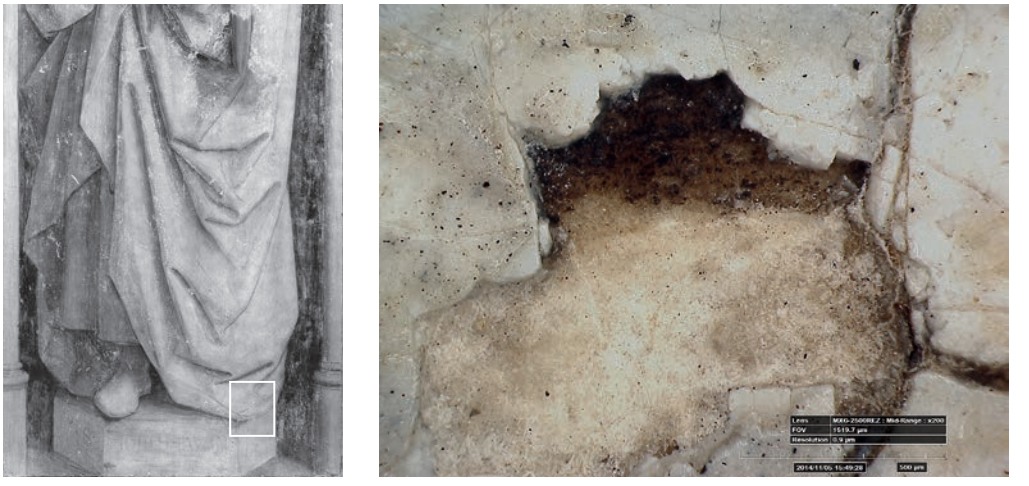
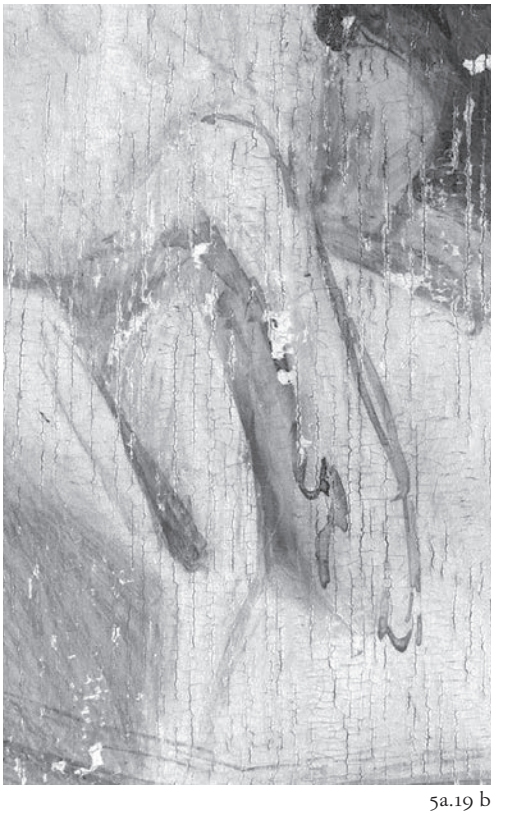


Fig. 5a.16 *John the Evangelist* (IRR and micro-photograph): blacker wash visible in a lacuna in the draperies of the painted statue

Fig. 5a.17. *John the Baptist* (detail)

Fig. 5a.18. *John the Baptist* (IRR, detail): in some shadows the bristles of a broad brush have left behind parallel lines

5a.19 a



5a.19 b

Fig. 5a.19. *Elisabeth Borluut* (IRR, detail): drip marks left by a liquid medium, serving as a sort of wash reinforcing the shadows (a); *John the Baptist* (IRR, detail): lines of the underdrawing in the lamb's foot, clearly executed with a liquid medium (b)

Certain lines of this liquid underdrawing are very thick. They are sometimes visible in lacunae (fig. 5a.20) or can be made out with ease in raking light thanks to the relief they create beneath the paint layer.[56] This is notably the case in the scenes making up the *Annunciation*, in the area where arches were drawn but not painted. It should be noted that the drawing of these arches differs from one panel to the next: it is more strongly pronounced – darker in the infrared reflectogram and, above all, in higher relief – in the *Interior View* and the *City View* than in the *Archangel* and the *Virgin Annunciate*. No reason has yet been found to explain this difference. A similar relief can be seen in the panel of *John the Baptist*, where the liquid medium of the underdrawing has also created relief in the form of drips, situated in an area of drawing and washes (figs 5a.21). Their relief and their shape are clearly visible in raking light and also in the x-radiograph – the latter because there is an accumulation of greyish white paint layer around these reliefs, which in turn proofs that the drops were already dry when the paint was applied.

The thickness and cleanness of the liquid underdrawing raise questions. Whereas a liquid underdrawing of an aqueous nature (glue, gum) ought to be largely absorbed by the ground, the lines of the drawing visible here seem very thick and appear to have run very little. The fact that the drawing was executed on top of an isolation layer might be one explanation. But we may equally wonder about the exact nature of the binder used in the drawing, which perhaps also contains additives that give it a certain body.

Fig. 5a.20 *Elisabeth Borluut* (during restoration and micro-photograph): damage in the paint layer showing a line of the liquid underdrawing in the left sleeve

Fig. 5a.21. *John the Baptist* (IRR and photo, detail): relief created by drips formed by the liquid medium of the underdrawing

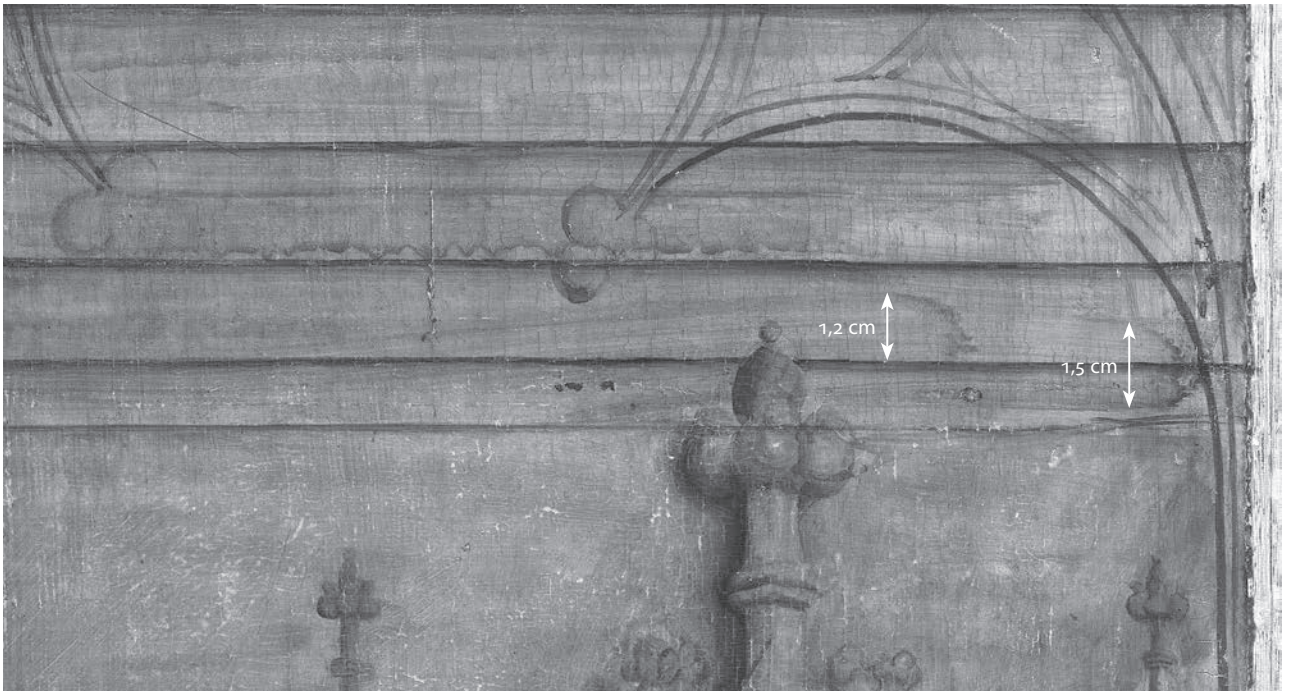


Fig. 5a.22. *Interior View* (IRR, detail)

Fig. 5a.23. Cumaean Sibyl (IRR, detail): drapery folds executed in wash with a square brush

In conjunction with this linear drawing, the use of wash can be detected in all the exterior panels, most significantly in the infrared reflectogram of the ceiling of *Interior View* (fig. 5a.22). With brushstrokes approx. 1.5 cm wide the ceiling was rapidly brushed in a horizontal direction with a very fluid material, which has run down to form a wavy line resembling a festoon.[57] This seems to confirm that the medium was used in a very dilute state.[58] This fluid and dilute character can also be seen in the laying out of certain drapery folds, such as those of the Cumaean Sibyl's dress, executed with a square brush (fig. 5a.23), and in a shadow whose end presents the splayed aspect of a fairly wide brush in a fold in John the Baptist's robes (fig. 5a.24).

In certain zones not covered by the paint layer, this brown layer can be seen with the naked eye, as in a fold in John the Baptist's cloak (fig. 5a.34), where the artist deliberately took advantage of this layer in the completed painting. It also appeared clearly in the course of removing the overpaints from a somewhat larger lacuna in a shadow on Elisabeth Borluut's green sleeve. The cross-section of a sample taken from this point in the sleeve (fig. 5a.25) reveals a transparent brownish layer between the ground and the layers of green paint, which might correspond to this wash. Its strong fluorescence under ultraviolet indicates that this layer is rich in binder, which tallies with the observations at the macroscopic level.[59]

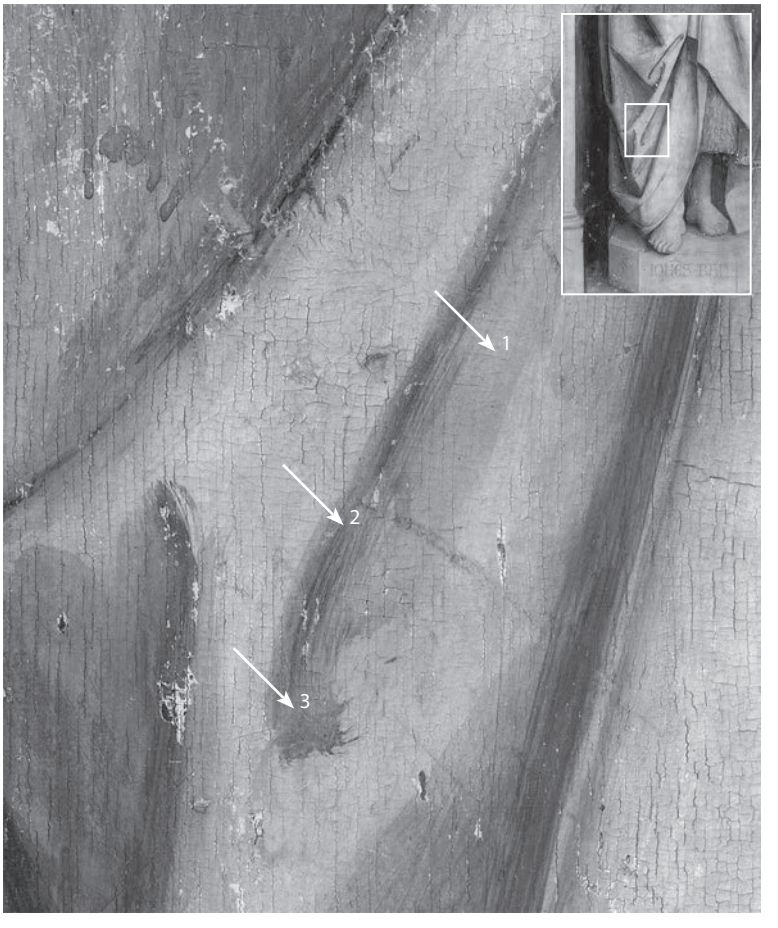
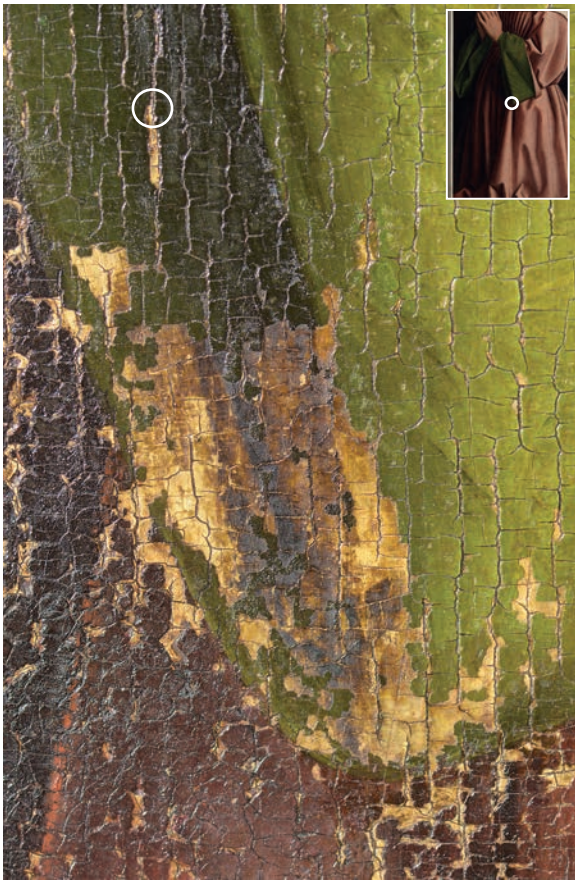
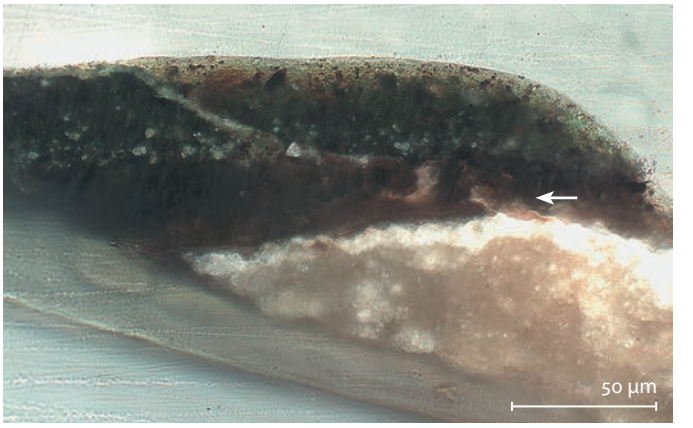


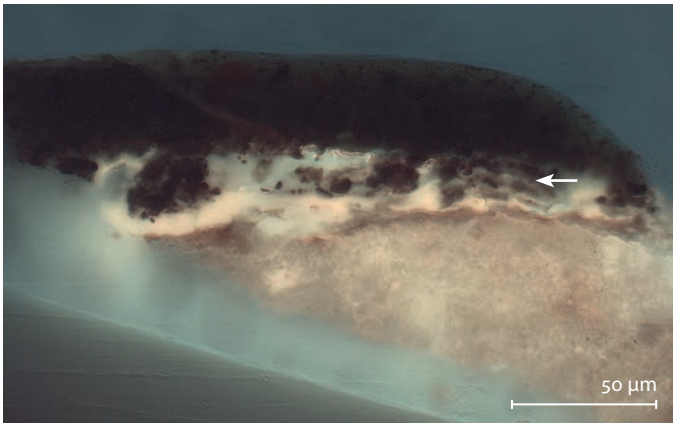
Fig. 5a.24 *John the Baptist* (IRR, detail): use of a brush that has left behind marks of: a very fluid material (wash) (1); a more viscous material, with lines left by the bristles of the brush (2); the end of the brushstroke (3)



5a.25 a



5a.25 b



5a.25 c

Fig. 5a.25 (a-c). *Elisabeth Borluut* (during restoration): detail (a); cross-section C093.111 (sample no. 42) from the area of a wash in a shadow beneath the paint layer of the sleeve, seen under polarised visible light (b) and ultraviolet light (c), magnification x500

Such washes are present in the eight paintings of the exterior panels, even if they are not always visible in the infrared reflectograms.[60] The painstaking task of restoration has provided frequent opportunities to see this layer, with its fairly warm tonality, in small losses in the paint layer or in larger cracks (fig. 5a.16).

It is clear that all these practices, whether they are closer to drawing or to painting, are found in combination and side by side. Rather than seeing in them the use of a linear underdrawing followed by a more painterly phase composed of wash, it seems more probable that Van Eyck employed these various procedures jointly, depending on the effects he wished to obtain. The lighting effects found in the final painting are already suggested at underdrawing stage.[61]

The infrared reflectogram of the *John the Baptist* panel (fig. 5a.26a) provides a good idea of the character of the washes. We are talking about a rapidly executed stage, with brushstrokes, hatching and shadows placed accurately and at the same time with great spontaneity. [62]

Certain unfinished works by later artists, such as Leonardo da Vinci and Rubens, can help us visualize the washes already found in Van Eyck. It is indeed known that Leonardo used such monochrome washes[63] as a means of further developing the composition after sketching the initial linear underdrawing. This is evidenced by

Fig. 5a.26. Comparison of a detail of the infrared reflectogram of *John the Baptist* (a) and Rubens's *The Battle of Ivry* (b) (1628–1631, Rubenshuis, Antwerp)

5a.26 a

5a.26 b

some of his unfinished paintings, such as the A*doration of the Magi* (c. 1485: Uffizi, Florence) and *St Jerome* (c. 1482; Vatican Museums, Rome).[64] Leonardo likewise seems to lay down his composition in several phases, mixing linear underdrawing and an underdrawing that comes closer to painting.[65] In Rubens's unfinished canvas of *The Battle of Ivry* (1628–31; Rubenshuis, Antwerp), too, we can admire a powerful sketch executed in different shades of brown, even if the medium used by Rubens is probably not the same as that employed in the *Ghent Altarpiece*. The comparison is interesting because it gives a better idea of a state existing at a given moment in the creation of the *Ghent Altarpiece*. In *The Battle of Ivry*, areas of flat colour have already been applied and it is difficult to draw a boundary between the underdrawing (wash) and the paint layers (base colours), because the two fuse, as it were (fig. 5a.26b). In the historical vocabulary of painting, these underlayers were called *doodverf* ('dead colour').[66] The term was employed by Karel van Mander, himself a painter as well as a writer, in conjunction with the work of Van Eyck. He writes that Van Eyck's *doodverf* is clearer and sharper than that of other masters[67] and he describes *St Barbara* (Royal Museum of Fine Arts, Antwerp) as being a small painting only carried as far as the *doodverf* stage.[68]

Visible corrections to the drawing – Pentimenti

At this stage the composition is already substantially laid out, not only as regards the positioning of the forms to be painted, but also the play of light and shadow. This does not rule out later corrections, however.

Many changes have already been examined in *L'Agneau Mystique au laboratoire* and by Van Asperen de Boer in 1979, the most important being the replacement of the drawn but not painted trefoil arches by a wood ceiling in the four paintings making up the *Annunciation* scene, and the location of the towel, rail and washing basin in the Interior View. The space around the figures of the two St Johns has also been modified, the top of the niches initially being placed higher, which probably led to a modification at the pedestals.

The other changes are minimal and are made solely in order to slightly modify the positioning of the principal forms.

One drawn but not painted motif has been detected for the first time during this examination and restoration campaign, however, namely a small bearded head in the sky of the urban landscape in the background of the City View (fig. 5a.27). This drawing was clearly executed in a dry medium and therefore at a fairly early stage of the proceedings. Are we looking at the remnant of a first composition for the background that was completely different from the final City View,[69] or at a head of God the Father appearing in the upper part of the sky, as seen in certain other representations of the Annunciation from this epoch? This iconography is found, for example, in the Annunciation scene painted by Van Eyck himself in the rood screen of the Berlin *Madonna in the Church*,[70] and also in the *Aix Annunciation Triptych*,[71] a work by Barthélemy d'Eyck dated to 1443–45.[72] This latter hypothesis seems highly plausible, except that the drawn head in City View in the *Ghent Altarpiece* is turned towards the angel and not towards the Virgin, as otherwise seems to be the case in this iconography.

Fig. 5a.27. *City View* (IRR, detail): small bearded head in the sky

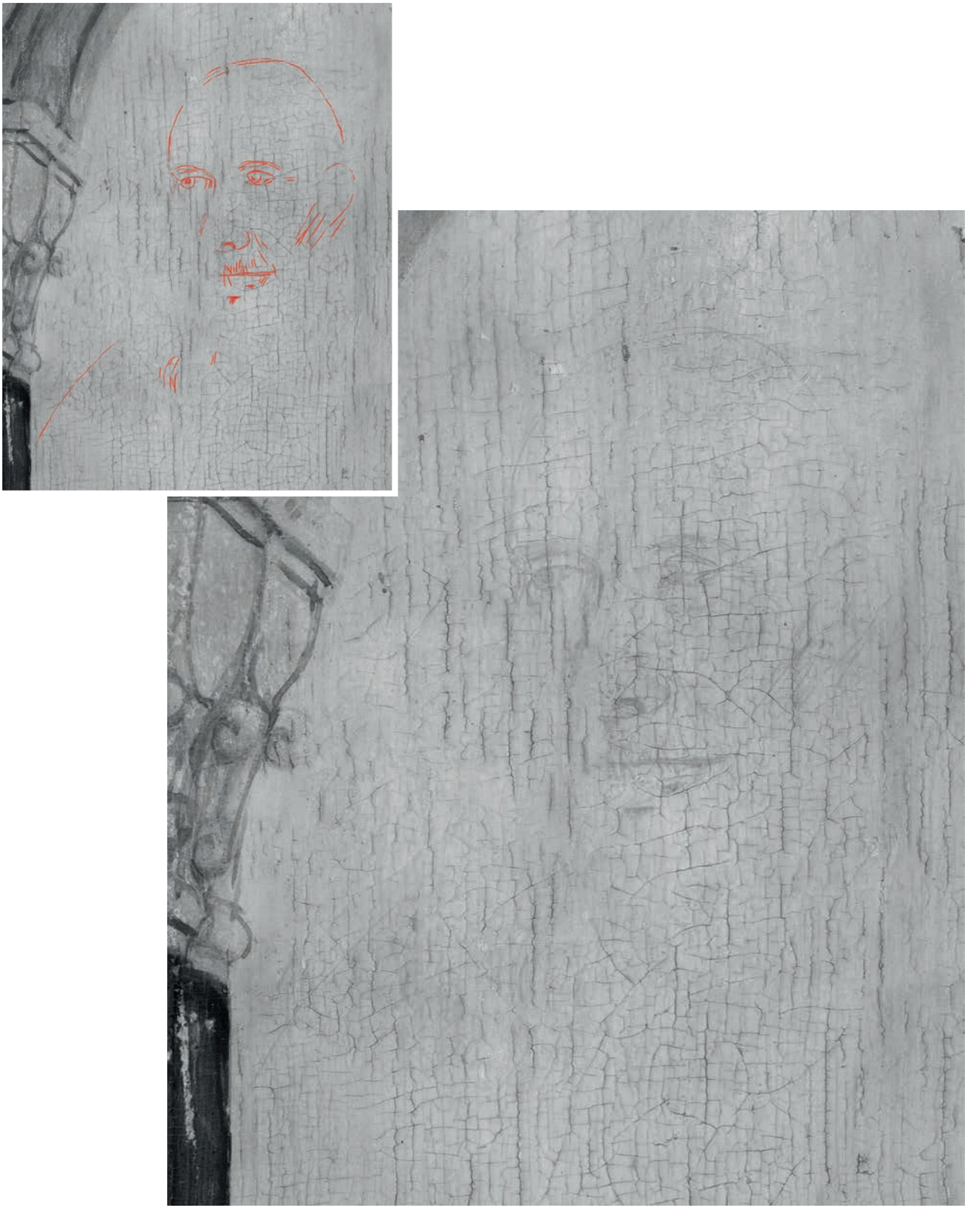
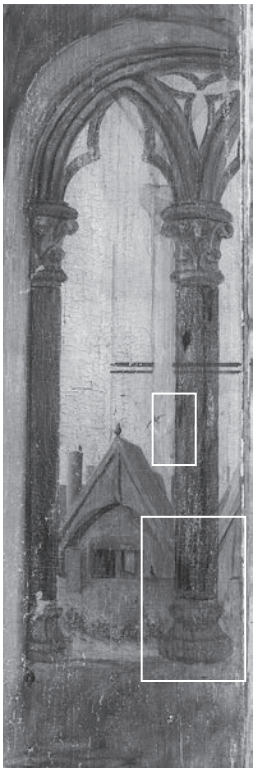


Fig. 5a.28. *John the Baptist* (IRR, detail): in green: initial design at the underdrawing stage; in orange: back wall of the niche as actually painted

Compositional changes are not confined to the first layers. Certain lines scored into the fresh paint can be related to the process of composition and correspond to revisions to the underdrawing after painting had already begun. The back of the niche behind the figure of John the Baptist seems to have been modified at a relatively advanced stage of painting. The line indicating the upper limit of the back wall of the niche as it was actually painted can be seen in the x-radiograph as well as in the infrared reflectogram (figs 5a.28). It seems to have been traced in a layer that was not yet dry, as clearly evidenced by the ridges that have formed on either side of the line, and hence probably at the same time as the application of a first layer of paint. The sheer possibility of scoring a line into the fresh paint in this way points to the use of a binder that takes a certain time to dry, and hence probably oil. Unlike oil, a protein binder dries immediately after application, making it impossible to rework a line even after a very short lapse of time. Similarly, the position of the column of the window in the Archangel panel, initially envisaged further left, has been redrawn by means of a line scored into the fresh blue paint layer of the sky (fig. 5a.29); although partly covered by the black of the pillar, this line is still visible in places (fig. 5a.29c).



5a.29 a

5a.29 b

5a.29 c

Fig. 5a.29 (a-c). *Angel Annunciate* (detail IRR and normal light): the position of the column scene, initially envisaged further left, has been redrawn by means of a line scored into the fresh blue paint layer of the sky

Isolation layer, imprimatura

In the general study, published in 1997 by the National Gallery in London, on the methods and materials employed in the early Netherlandish paintings in its collection, two types of isolation layer were identified on top of the ground: the first a proteinaceous size and the second an oil-based[73] or possibly also proteinaceous, more or less pigmented priming. According to the authors of the study, this priming might correspond, to the *'primuersel'* discussed by Van Mander: 'It is tempting to identify the priming layer with the *primuersel* Karel Van Mander describes the painters of an earlier generation as applying over the underdrawing. It is described as thin, translucent (the underdrawing was visible through it), oil-based and flesh-coloured.'[74]

In *L'Agneau Mystique au laboratoire*, two applications of a drying oil are described: a first application which has impregnated the ground, and a second characterized as an isolation layer.[75] Analyses carried out in the 1980s at KIK-IRPA[76] sought to shed more light on this finding. The authors of the resulting publication conclude that there is in fact just one layer, which has impregnated the ground while preserving a fine film on the surface. They suggest that the medium employed is an oil heated with lead, the only material in their view capable of being sufficiently absorbed by the ground while remaining as a thin layer on the surface.[77]

The same researchers also attempt to localize this isolation layer in relation to the underdrawing, and they seem to come across several cases sometimes beneath the

underdrawing and sometimes on top of it. They are unable to establish with certainty whether some of the dark layers detected belong to the underdrawing or to a first paint layer, the so-called base layer. This situation tends to confirm the presence of several phases in the laying down of the composition at the drawing stage.

The latest examination of the stratigraphic cross-sections helps to clarify the situation, even if many questions still remain. Two different layers have by now been distinguished: a non-pigmented layer beneath the drawing and a pigmented layer on top of the drawing.

A first layer indeed lies on top of the ground, but plainly beneath the underdrawing. It is not possible to confirm, however, whether it was already in place prior to the execution of the first sketch (dry medium) or was applied later during the working-up of the underdrawing (liquid medium). In several cross-sections of the samples taken, a thin fluorescent layer is visible under ultraviolet between the ground and a fine black layer, the latter probably corresponding to the underdrawing (see contribution 3 by Sanyova et al. in the present volume).

Finally, another layer, which we shall call *imprimatura* because it is pigmented, is present on top of the liquid underdrawing. This layer contains bone white, lead white and sometimes a few particles of carbon black or vermilion. It is a fairly transparent layer which reaches a certain thickness in places. It is interesting to note that the imprimatura differs from one register to another in the exterior panels of the *Ghent Altarpiece*: barely pigmented in the lower register, in the upper register it is considerably more pigmented and hence also thicker, both in the four panels of the *Annunciation* and beneath the figures of the prophets and sibyls. It can be seen in a paint loss in the prophet Zechariah, where it appears as a slightly pinkish layer (fig. 5a.30). This

Fig. 5a.30 Prophet Zechariah (detail): imprimatura visible in a lacuna

difference in the composition of the imprimatura between the two registers goes hand in hand with a difference in the paint layer. The coloured layers applied over the more pigmented imprimatura are thinner and more transparent. The paint layer in the lower register is thicker.[78]

What is the explanation for this notable difference between the two registers? Are we looking at two different ways of working, perhaps suggesting the involvement of two painters? We shall return to this question further on, but we have found no evidence of the participation of several artists on the execution of the exterior panels of the *Ghent Altarpiece*. It is more likely that the painter was aiming at a chromatic distinction between the two registers. Thus the presence of the more pigmented imprimatura gives a warmer tone, which seems logical for the paintings of the upper register with their softer hues (perhaps on account of their more idealized character vis-à-vis the figures of the lower register).

These stratigraphic layers require further study in the future, over the course of the following phases of the restoration. Comparisons between the different panels making up the polyptych will probably help us clarify the role of each of these layers.

Paint layer

Jan van Eyck's painting technique has aroused admiration and questions all through the centuries. Ever since Bartolomeo Fazio and especially Giorgio Vasari,[79] authors have wondered about the nature of Van Eyck's paint medium,[80] hoping to explain his technical prowess solely in terms of his materials. It seems more and more apparent today that the artist's genius lay in his keen understanding of the optical qualities of light and his ability to translate these into paint.[81] His perfection of the oil-painting technique no doubt greatly helped him to translate the effects he observed. Another material factor that is mentioned less frequently, but which nevertheless plays a key role and is today beginning to be more widely appreciated, is the quality of Van Eyck's pigments and, among other things, their fineness.[82] The choice of very finely ground pigments for certain layers undoubtedly imparts a unique aspect to the painting technique of which Van Eyck acquired supreme mastery.

Build-up of the modelling, assurance of the artist's hand and rapidity of execution

Technical studies of the *Ghent Altarpiece* up till now have taken the top paint layers to be original and have consequently included overpaints in their analyses. This has entangled the interpretation of the stratigraphy of the paint layers, which in reality turns out to be less complex.[83] In the present case, too, the necessarily limited number of samples is not representative of the material reality of such a large ensemble. Furthermore, the choice of where to take the samples is dictated by the desire to answer a maximum of questions asked by the conservator, the chemist and the art historian. It is therefore usually done at a place where the layers are the most numerous, prompting us to extrapolate a stratigraphic principle which does not apply everywhere,

however. The number of paint layers can vary greatly from one zone of the painting to another.

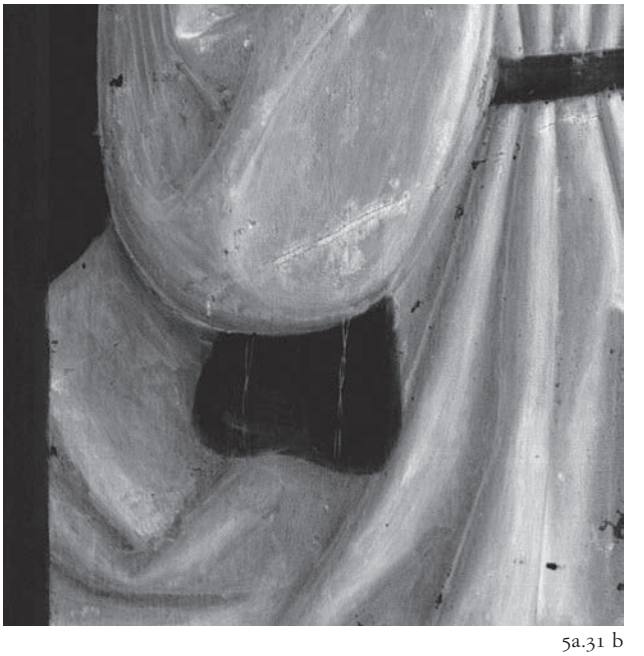
The introduction of colour in the true sense begins after the application of the washes and starts with the laying down of base tones. The backgrounds and the main figures in the *Annunciation* scene, the donors and the two St Johns contain this first base tone. In the large areas of flat colour in the donors, the semi-transparent red and pink base tone completely covers the underdrawing and washes, which nevertheless remain visible through it. It is clear that this first layer does not yet completely mask the underdrawing and the washes, which will continue to provide the artist with points of reference in the future build-up of the volumes.[84] In the figures of the two St Johns, however, the light grey base tone does not cover the washes in the darkest shadows, where a light-coloured layer would make it impossible to achieve the saturation of dark tones so important in the rendering of the volumes.

This first layer is sometimes applied in broad brushstrokes and seems to be given relatively little modelling at this stage. The painter is interested first of all in the distribution of the colour masses, before perfecting the volumes and the details. This base tone remains visible – because it has not subsequently been covered – in numerous places, in particular in the architecture, floors, walls and arches. In the upper register, traces of the application of this base tone can easily be seen in the floors and walls. A layer of more or less dark grey paint, striated by the passage of the brush, reveals glimpses of an undercoat in a warm tone – the more strongly pigmented imprimatura of the upper register. The artist has applied this grey in a few brushstrokes whose marks he has not attempted to conceal. The edges of the floor tiles are then picked out in black lines, heightened with pale grey lines in the vertical direction.

From the MA-XRF scan mapping the distribution of mercury (fig. 5a.31), we can also deduce that the first layer of Joos Vijd's garment was applied with a certain rapidity.[85]

Fig. 5a.31 (a-b). *Joos Vijd* (detail): normal light and MA-XRF of Joos Vijd's red gown (after removal of the overpaints): mapping of the mercury (Hg) – University of Antwerp

5a.31 a



5a.31 b

5a.32 a

5a.32 b

Fig. 5a.32 (a-b) *Portrait of Margaret van Eyck*, 1439, oil on panel, 32.6 x 25.8 cm, Bruges, Groeninge Museum. Normal light and MA-XRF of Margaret van Eyck's red gown: mapping of the mercury (Hg) – University of Antwerp

We were also able to visualize these underlayers, whose colour varies relatively little in the first stratum, in our close-up examination of the panels during restoration. This rapidity of execution has already been observed in other works by Van Eyck, even if the paintings in question are much smaller in format. Thus the infrared reflectograms of *Portrait of a Man (Self Portrait?)* at the National Gallery in London,[86] like the MA-XRF scan of the mercury (vermilion) in the Bruges *Portrait of Margaret van Eyck*[87] (fig. 5a.32),[88] allow us to see how the underlayer has been rapidly applied in the area of the clothing, without modelling and brushed on in every direction.[89]

On top of these base colours establishing the overall tonality of the painted forms, the hues and the volume of the forms and the areas of modelling are progressively clarified with the aid of flat colour, lines and variously light or dark accents. As part of this process, the painter does not always cover the base tone but exploits it in certain places in the final result. The areas of flat colour, lines and accents may be transparent, like glazes, or more opaque, as in the case of local dabs of paint, and range through all possible gradations determined by both the medium-to-pigment ratio and the way the paint is applied.

The glazes are applied more or less thickly so as to give the colour the desired depth, or may have dark pigments added to them in order to achieve a greater saturation, as in the case of the red glazes mixed with black. In the more opaque media, thickness likewise plays a significant role in the final effect. Scumbles, for

Fig. 5a.33 *John the Baptist* (detail)

example, are created with brushstrokes that leave the base tone visible, while luminous highlights can reach a substantial thickness and in so doing rather conceal the underlying paint. The 'artist's hand', sweeping or precise, plays a major role (fig. 5a.33).

Sometimes this base tone is not present and the glazes are applied directly on top of the imprimatura, as in the case of the Prophet Micah's pink cloak (see contribution 3 by Sanyova et al. in the present volume) and the Archangel's right wing (fig. 5a.37). In this latter, the strokes of the drawing and the wash remain very visible, in particular in the lower part of the wing, owing to the transparency of the glazes. It seems fairly clear that the effect produced by these dark strokes was deliberately intended by the artist.

The technique is highly economical and exhibits great mastery in its execution: the artist knows precisely what result he wishes to obtain and paints spontaneously and with no sign of hesitation.

While the washes seem to have been largely covered in the draperies of the two donors and in the figures of the Archangel and the Virgin Annunciate, in other places they are exploited in the final result, notably in the painted statues of the two St Johns. In places, the wash is not covered and can be seen with the naked eye, as in *John the Baptist* (fig. 5a.34). In the halftones of the light shadows, the artist covers this brown layer with a semi-transparent white which, through opalescence, gives a colder white, transforming it into a light grey (fig. 5a.35). Lastly, the brightly lit zones are covered with a thicker and hence more opaque white, in the form of more or less broad, subtly modulated areas of flat colour or local dabs of paint. These latter are executed at the end of the painting process in order to place highlights and can exhibit a certain relief (fig. IV.1.8). Parallel to these highlights, the artist lays down deep shadows with the aid of a brush laden with dark pigments. As elsewhere, the speed of execution can be read in the mark left by the brush in the fresh paint. The dark line emphasizing a fold in the draperies beneath John the Baptist's beard seems to have been executed

Fig. 5a.34 *John the Baptist* (detail): wash visible to the naked eye

Fig. 5a.35 *John the Baptist* (detail)

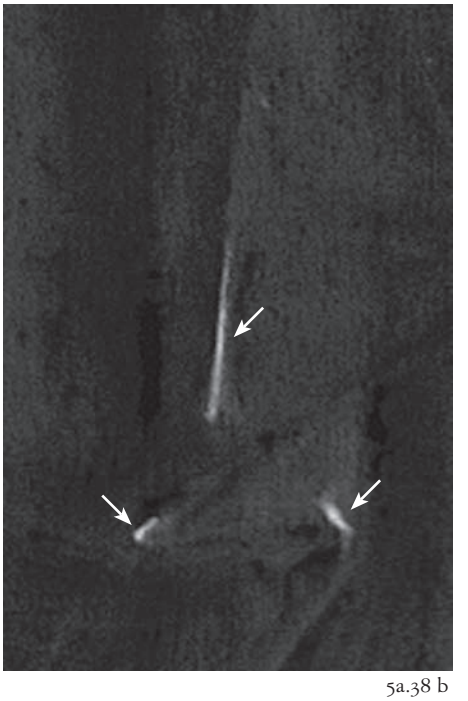
with a fine brush in just two rapid strokes, the artist having recharged his brush midway through the line (fig. 5a.36). By exerting a certain pressure on his brush, he divides the line in two so as to suggest the depth of the fold with just one stroke. At the point where he resumes the line with his freshly laden brush, he introduces a variation in the shadow.

The translucency of the first paint layers sometimes also leaves the underdrawing visible. It is difficult today to gauge the role played here by ageing, which has caused the paint to become more transparent with time, but it is not impossible that Van

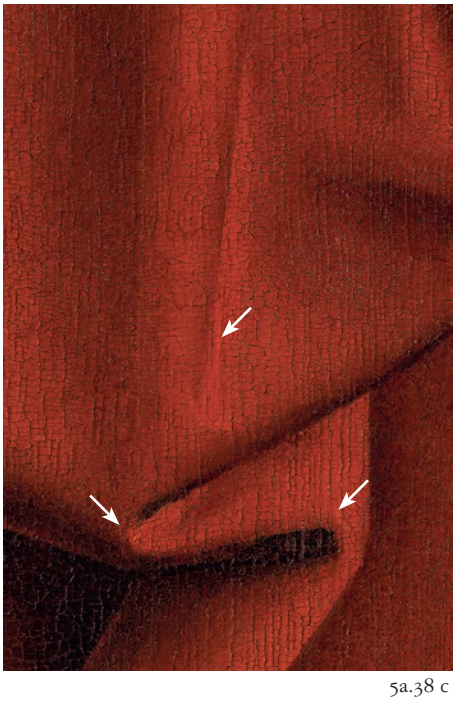
Fig. 5a.36 *John the Baptist* (detail)

Fig. 5a.37 *Angel Annunciate*: detail of the right wing

5a.38 a



5a.38 b



5a.38 c

Fig. 5a.38 (a-c) MA-XRF of *Joos Vijd* (after removal of the overpaints): mapping of the lead (Pb) – University of Antwerp ; detail in MA-XRF revealing accents of lead white ; detail in normal light

Eyck has integrated some of the effects created by the visibility of the underdrawing into his final image. The translucency of the light paint layers in the two St Johns allows the black lines of the drawing to be glimpsed in numerous places. By his apposition of a transparent light layer, the artist here and there attenuates the dark lines, playing on the contrasts between the warm colours of his more opaque strokes of paint and the cool colours obtained by leaving the drawing visible.

Elsewhere, final touches of light-coloured paint suggest the reflections of light that bring forms to life. These touches serve to reinforce the luminous zones on the surface, but are also found at a deeper level of the stratigraphy. Indeed, a practice rarely mentioned in the literature to date can be observed in Joos Vijd's red gown. On top of the red ground probably with little modelling at this stage, the artist places a few accents of pure lead white (fig. 5a.38), which are then covered again by a new layer of vermilion.[90] In this way the artist obtains a small number of very luminous red accents which he would not have been able to create with pure vermilion applied as a final touch on top of the base tone. Similar accents of white have also been detected in the Washington *Annunciation*[91] and have been likened to accentuations of the drawing, just like the local white accents observed on the drawing of the Antwerp *St Barbara*.[92]

Accents of light are not reserved for the brightest parts of the composition: in the course of the restoration campaign, their presence was also discovered in areas of shadow. This subtle use of highlights as a way of revealing the shadows even more had not been taken up in the overpaints. Yet it plays a masterly role in the working up of volumes, as in the case of Joos Vijd's right sleeve (figs 5a.31 and 38). This distinctive feature is the result, once again, of a keen eye for the play of light.

The construction of the flesh tones is no different. Over a base tone serving as the mid-tone, highlights and glazes are laid down in order to enhance the volume

Fig. 5a.39 Portrait of the donor Joos Vijd (detail)

(fig. 5a.39). Next the artist adds extremely realistic details, in particular in the portraits of the donors, such as the red blotches and beard stubble in Vijd's face.

At this stage of painting, the ground covers the moulding of the frames. From our observation of the zones of contact between the painting and the polychromye decoration of the frames, it appears that the painted compositions were executed before the polychromy of the frames, which thus represented the final stage in the completion of the altarpiece.

Distinctive technical features

As in most of his paintings, Jan van Eyck does not work solely with a brush, but also uses his fingers, the brush handle or a stylus to scrape the fresh paint medium.

As we have already seen, only a few incised lines have been detected in the ground. The majority of scored lines observable today were executed in the fresh paint layer. Some were made on the surface for aesthetic purposes, in order to convey a particular effect, as in the pages of the Prophet Micah's book. Others are marking lines in the base tones. We have already mentioned some of these in the context of revisions made to the drawing after painting had already begun. Still others act as technical guidelines for the artist. Strokes giving the alignment of the painted letters on the sibyls' banderoles and on the two St Johns' pedestals thus serve as guidelines,[93] which the artist can use to good advantage at the painting stage. They permit him to arrange certain elements with confidence and to concentrate on the form and colour rather than on the correct positioning of the letters.[94] Straight lines ensure that the letters are correctly aligned, while short diagonals ensure that they are regularly spaced (fig. 5a.40). Sometimes these lines remain visible, sometimes they are covered over or blurred in the course of subsequent phases of painting. This probably explains why they remain very visible on the pedestal of John the Baptist, but much less so on that of John the Evangelist.

Some of the lines scored into the fresh paint, on the other hand, are there not for technical but for aesthetic reasons. The pages of the Prophet Micah's book (fig. 5a.51b) clearly testify to an artist working at speed and with a confident hand. On top of an area of flat brown, the painter has rapidly brushed on – probably with a square brush – a first light-coloured layer, into which he has immediately scored parallel lines suggesting the thick and slightly undulated pages of the book. The accumulation of paint along the periphery of these lines is clear evidence that they were worked in the fresh medium. Through this play of lines created either as depressions or in relief by the accumulation of the displaced paint, the artist also plays upon the warmth of the tones, depending on the thickness of the paint and the chromatic influence of the brown layer underneath. All these variations contribute towards creating a dynamic momentum with relatively simple pictorial means.

Fig. 5a.40 *John the Baptist* (detail): painted letters on the pedestal, with guidelines scored into the fresh paint

Fig. 5a.41 *Virgin Annunciate* (detail): beading of the paint on the gable

The artist obtains other visual effects by playing with the paint. This is the case with certain final touches executed in a fluid medium that does not adhere well to the surface of the painting, which latter was probably already dry to the touch. As a consequence, these final touches form droplets on the surface. This technique can be seen in the reflection of light present on the gable of the house behind the Virgin Annunciate (fig. 5a. 41).[95] In this way, the artist creates a certain surface animation with just one application of paint. This beading effect had already been noted in *L'Agneau Mystique au laboratoire* in the case of the hairs on Adam's legs, where it is described as 'indicating an excess of fatty matter in the binder'.[96] It is not a technical flaw, however, but a deliberate effect, and seems to illustrate the placing of a lean over a fat layer or simply an oily layer applied on top of a coat already too dry to allow this final touch to adhere properly. This phenomenon can be observed elsewhere, and more frequently, on the interior of the altarpiece.

The artist also dabbed his fingers in the fresh paint, in order to blend different colours. This is clearly evidenced by the marks left by his fingerprints (fig. 5a.42), which have likewise been found in other works by Van Eyck.[97]

The binder

The binder analysed to date in the works of Jan van Eyck consists of linseed oil, boiled or not, sometimes mixed with resin.[98]

It has long been attempted to explain the artist's virtuosity in terms of the nature of his materials alone. A large part of his technical prowess is undoubtedly due above all to his unrivalled dexterity and his powers of observation. The quality of the materials chosen by Van Eyck – binders, pigments and possible additives – is nonetheless crucial to the results he achieved with his pictorial material, which

Fig. 5a.42 The prophet Zechariah: Traces of fingerprints in the fresh paint made while dabbing to blend different colours between the green drapery and the prophet's beard

combine with his genius to create works that have aroused our admiration since the fifteenth century.

Vasari has often been accused of having spread the idea – today considered totally unfounded – that Jan van Eyck was responsible for the invention of oil painting. In his *Vite de' piu eccellenti pittori, scultori e architettori*, of which the first edition was published in 1550 in Florence, Vasari describes his admiration for the Bruges master's technique. He opens the chapter devoted to the life of Antonello da Messina by acknowledging that many painters – Italian, French, Spanish and German – had long tried in vain to improve tempera, the technique in which they had traditionally worked but that did not allow them to blend colours together.[99] It would be 'Giovanni da Bruggia' (John of Bruges), identified with Jan van Eyck, who after many experiments succeeded in creating the binder so coveted by all, positively made of oil. Even if we now know that oil was being employed in painting well before Van Eyck, it nevertheless appears that the technical improvements that enabled artists to choose oil painting as their primary, if not exclusive medium from the fifteenth to the twentieth century, were made in Flanders at the start of the 1400s. In this sense we can credit the authorship of this technique to the Flemish masters of the fifteenth century, if not to Jan van Eyck himself.

Oil-based binders thus alleviate what Vasari describes as tempera's want of *morbidezza*, that is to say, softness in the transitions between colours and depth in the tones. Artists had long avoided using binders made of oil as they were so slow to dry – a disadvantage lamented by the monk Theophilus, among others.[100] It would therefore seem that one of the innovations of this epoch was an improvement in the drying time of the oil. Linseed oil, as naturally the most siccative oil and one whose drying process could be accelerated if the oil was boiled before use, progressively became the binder of choice for painters, since it dried within a few hours and thus allowed layers of oil paint to be easily built up.

Jan van Eyck explored a wide range of technical possibilities offered by the oil binder, from the ingenious overlaying of often pure or only slightly mixed colours, playing on the impact of the tones underneath on the more or less transparent layers or impasto accents on top, to extremely subtle transitions between light and dark tones and working wet-in-wet. The exceptional quality of his paint mix nevertheless owes a great deal, too, to his choice of pigments, which – thanks to their very fine grain size – lend his paint not only its colour but in some cases a certain creamy smoothness as well.[101] The resulting paint mix is easier to spread and more suitable for rendering the finest details. Van Eyck creates fine luminous accents with a velvety appearance by means of touches of light impasto which marry perfectly with the underlying layers. These luminous accents very convincingly serve to underline the effects of volume.

One painter – or several?

One of the major questions that has long preoccupied art historians with regard to the *Ghent Altarpiece* concerns the respective contributions of the Van Eyck brothers, and the possible involvement of assistants. To what extent do stylistic or technical

differences allow us to distinguish the involvement of different hands? The quatrain, whose authenticity has now been proven, tells us that the work was begun by the painter Hubert van Eyck – 'the greatest who was ever found' – and that the weighty task was finished by his brother Jan van Eyck, 'second in art'.[102] It is known that Hubert[103] and Jan employed assistants. On the basis of archival evidence, we know that Jan had one assistant in 1422, two in 1424 and an unspecified number in 1432 and 1433, perhaps as many as five.[104]

The authors who have tried to distinguish between the hands of different painters in the execution of the *Ghent Altarpiece*, and in particular between those of Hubert and Jan, have chiefly concentrated up till now on the interior of the altarpiece.[105] Some art historians think that Jan assembled the altarpiece on the basis of existing paintings already painted by Hubert. With regard to the exterior panels, these specialists tend to attribute the whole of the work to Jan.[106] According to Baldass, the spatial setting of the *Annunciation* was conceived by Hubert, who also executed part of the Archangel, and Jan then finished the work.[107]

In his in-depth study of the polyptych's underdrawing, Van Asperen de Boer[108] notes similarities with the underdrawing in autograph works by Jan van Eyck. On the exterior of the altarpiece, he identifies a number of very specific details in the figures of the Prophet Micah and the sibyls which are found nowhere else, namely convex hatching in the prophet's draperies, and broader lines, some of them ending in a hook, forming the deepest folds in the garments of the sibyls. These details are located at the top of the exterior panels where, according to the author, it is possible that the underdrawing has been reworked. He believes, albeit without stating his reasons, that if assistants were involved, it makes sense that they are more likely to have worked on the upper register.[109] However, Van Asperen de Boer concludes that there is insufficient evidence to make a clear distinction between the underdrawing of the different panels: 'The same phenomenon described by Friedländer for the surface of the painting occurs at the level of the underdrawing as well: the longer one looks at the underdrawings the more they seem to flow together.'[110]

Kemperdick observes for his part that Jan can only have embarked on the figure of the Cumaean Sibyl after 1430, following his return from Portugal, since her outfit takes up that of the portrait of Princess Isabella which Jan painted in January 1429 at Aviz.[111] Kemperdick enumerates different possible options for the altarpiece as a whole: Hubert may have planned the entire ensemble and painted a large part of it; Hubert may have planned the entire ensemble and Jan painted it all; Jan may have painted on top of what his brother had already started; or he may have been responsible for both the conception of the altarpiece and its execution.

Contrary to most other authors, Périer-D'Ieteren[112] thinks that it is possible to make out different hands, both in the underdrawing and in the paint layer. She considers that the drawn but not painted arches, visible in the infrared reflectogram in the *Annunciation*, belong to the original design by Hubert; the more innovative Jan replaced these arches with a wooden ceiling in order to locate the *Annunciation* in a non-religious setting. Again according to Périer-D'Ieteren, assistants were responsible both for the underdrawing and for the painting of the two Saint John statues. The Archangel was drawn and also partly painted by an assistant, while the Virgin can be attributed to Jan. In the underdrawing of the upper register, she sees the participation

of several assistants; only the Prophet Micah was drawn by Jan. Périer-D'Ieteren concludes that Van Eyck 'ultimately appears to us in a new light as the head of a workshop, producing drawings serving as models and touching up the designs made by his assistants, as Rubens would do later."[113]

Today, after the present restoration, the original paint layer – hidden for centuries beneath extensive overpainting – can at last be examined for the first time. The question of whether it is possible to distinguish between different hands consequently presents itself anew.[114]

In order to make stylistic comparisons, it is important to take into account the iconographical status, the scale and the state of conservation of the details compared. The figures present on the exterior panels of the altarpiece differ in terms of their size and their status. Joos Vijd and Elisabeth Borluut, the two kneeling donors, constitute realistic portraits of a couple of mature age, complete with unflattering details such as wrinkles and watery eyes. They are represented slightly smaller than life size. John the Baptist and John the Evangelist are representations of white marble or alabaster sculptures (and not grisailles, as was often stated before the restoration). These statues of saints on pedestals are slightly smaller than the donors. The Archangel and the Virgin Annunciate in the upper register are given the idealized features of young people and are portrayed on a scale smaller again than the sculptures of the two St Johns. Lastly, the prophets and sibyls at the top are half the size of the figures of the *Annunciation*. The state of conservation also differs from one panel to the next. While *John the Baptist* is in very good condition, with just a few minor losses and a few abraded areas, *John the Evangelist* has greatly suffered as a result of a heavy-handed previous restoration and exhibits substantial abrasion and a large lacuna, even if the face and hands are better preserved. Although today retouched, this panel remains in a state of generalized wear.

When we place comparable details side by side, taking account of their respective scale, differences are clearly visible. But does this necessarily mean we are looking at the involvement of several painters? The challenge is all the greater when we know that Jan van Eyck never works in a systematic fashion, but constantly varies his forms and their treatment, for example when he creates cascades of drapery folds. Bearing all these factors in mind, it must be said that it is difficult to see any obvious stylistic differences or differences in quality in the exterior panels of the *Ghent Altarpiece*, whether in the underdrawing or in the paint layer.

Let us compare, for example, some of the female hands (fig. 5a.43). The differences between them can essentially be attributed to those existing between young and idealized hands, such as those of the sibyl and the Virgin, and the more realistic hands of a middle-aged lady, such as those of the female donor. Thus the fingers of the first two women are paler and more slender, and the highlights on their nails whiter. These differences aside, however, the hands also exhibit clear stylistic and technical similarities. Each brushstroke is performed with the same rapidity of execution and nonetheless impressive precision. In laying down planes of shadow along the sides of the fingers, in several places the painter contrasts these with a fine highlight. The folds of skin at the base of the fingers are represented by small graphic lines, sometimes in different colours. At no point does the painter work according to a method; each highlight falling on a nail is different, for example. The edges of the nails are not

5a.43 a

5a.43 b

5a.43 c

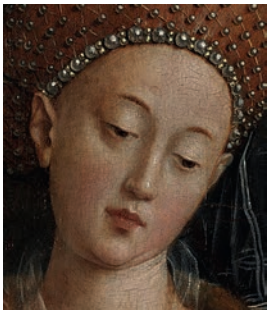
Fig. 5a.43 (a-c): Comparison of hands (scaled up): Right hand of the Cumaean Sibyl (a); Right hand of the Virgin Annunciate (b); Hands of Elisabeth Borluut (c)

indicated by a line, but are suggested by rapidly placed zones of shadow and accents of light in different nuances. As always with Van Eyck, the form is never bounded by a contour: everything is revealed by the light.

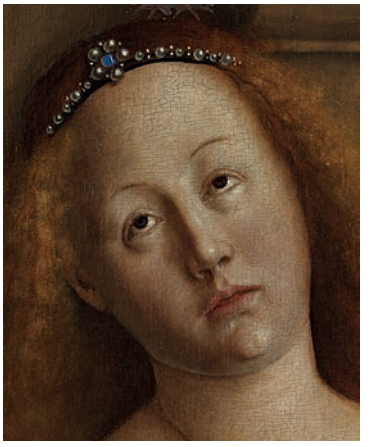
By the same token, if we compare the details of some of the female faces from both registers (fig. 5a.44), a difference emerges between the pale, young and idealized figures and the living, realistic portrait of Elisabeth Borluut. The eyes, in particular, are different: youthful in the first, and with wrinkles and rings in the second (fig. 5a.45). But here, again, stylistic and technical similarities are also clearly apparent. In every case, we find the same subtle lights and shadows around the eye sockets, mouth and nose, placed with precision but also with economy. No two details are the same: each eyebrow, for example, is different, but painted with the same virtuosity.

No system appears in the draperies, either, where no two folds are the same. Everywhere, however, we find the same efficiency of execution, with the same accurate and bold brushstrokes lending shape to the clothing.

In the architectural elements of the lower register, subtle differences in form could give the impression that two artists have been at work here. To us, however, this does not seem to be the case. In the panels of *Joos Vijd* and *John the Evangelist*, the mouldings of the column bases (fig. 5a.46) are slightly more complex than those of the two other panels. By contrast, the capitals (fig. 5a.47) in *John the Baptist* and *Elisabeth Borluut* are



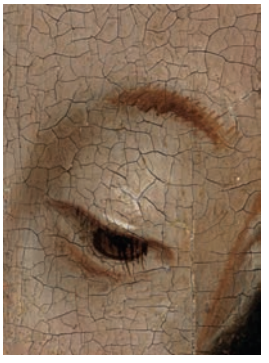
5a.44 a



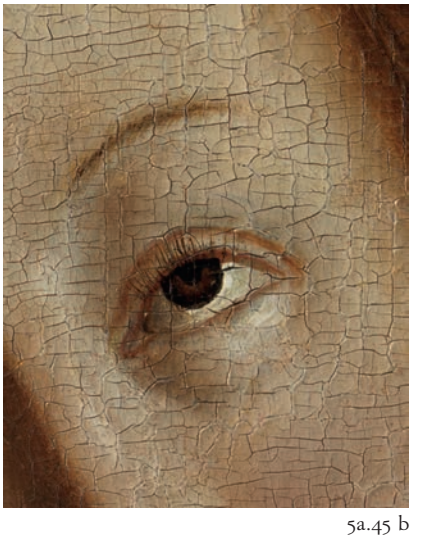
5a.44 b

5a.44 c

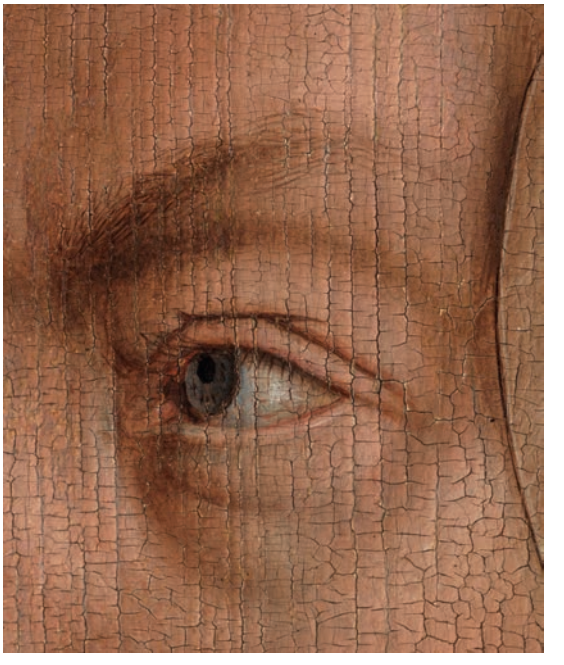
Fig. 5a.44 (a-c): Comparison of faces (scaled up): Cumaean Sibyl (a); Virgin Annunciate (b); Elisabeth Borluut (c)



5a.45 a



5a.45 b



5a.45 c

Fig. 5a.45 Comparison of eyes (scaled up): Cumaean Sibyl (a); Virgin Annunciate (b); Elisabeth Borluut (c)

5a.46 a 5a.46 b 5a.46 c 5a.46 d

Fig. 5a.46 (a-d). Bases of the columns in the lower register: *Joos Vijd* (detail) (a) ; *John the Baptist* (detail) (b); *John the Evangelist* (detail) (c); *Elisabeth Borluut* (detail) (d)

decorated more richly than in the two other panels. These formal differences establish a certain rhythm between the four arches. On closer inspection we can see that the artist started out by painting the same capitals and column bases in a simple fashion everywhere, and then added a few rapidly executed touches – a fine moulding above the tori at the base of the columns, florets in the capitals – in order to introduce variation into the ensemble. The aim is to break up the monotony of repetition and liven up the whole with small touches and chromatic variants, but the basic principle hardly changes.

If we also compare the tracery arches (fig. 5a.48), the representation of the trefoil decoration seems more sophisticated in *John the Baptist* than in *Elisabeth Borluut*. Looking more closely, however, it is clear that the differences in this case are linked with the perspective, in other words with the fall of the light on these ornamental apertures, and ultimately to the way in which the openwork tracery stands out against


5a.47 a


5a.47 b


5a.47 c


5a.47 d

Fig. 5a.47 (a-d). Capitals of the columns in the lower register: *Joos Vijd* (detail) (a); *John the Baptist* (detail) (b); *John the Evangelist* (detail) (c); *Elisabeth Borluut* (d)

the more or less deep shadows of the niches behind. In the case of the lobe detaching itself on the left in the *John the Baptist* panel, its left-hand inner faces are visible and there is a subtle contrast between their surfaces, which catch the light, and the rear wall of the niche. In the panel of *Elisabeth Borluut*, we see more of the right-hand interior of the lobes, whose faces catch less light, generating fewer contrasts with the dark wall of the niche behind. The restoration has revealed the exact shape of the niches behind the arches, which are not all the same. The sculptures of the two St Johns each stand in a shallow stone niche with a flat rear wall and an arched ceiling. The donors are kneeling on a tiled floor, in a space that is considerably deeper and which appears higher, since we do not see the ceiling, and featuring a corner hung with spider's webs. The fact that these zones are deeper and higher explains why they are also darker than the niches occupied by the saints.[115] It is interesting to note that Van Eyck has introduced a perspective effect in the open tracery, but has not done so in the blind tracery above.

The differences between the two St Johns are due to their respective state of conservation and also to the variations, deliberately introduced by the painter, in the way the statues are lit. The worn condition of the paint in *John the Evangelist* largely explains why the veins in the marble or alabaster are barely visible (fig. 5a.49).[116] But although less numerous than the veins in the painted stone sculpture of John the Baptist, they are nonetheless present. Quite simply, Van Eyck underlined the fact that no two blocks of marble or alabaster are ever identical. In the lettering on the two pedestals (fig. 5a.50), Jan van Eyck also varied the lighting in order to heighten the illusion of real stone sculptures. A ray of natural light seems to fall in an attenuated fashion onto the Evangelist's pedestal. The method is here similar to the variation introduced into the capitals via the addition of ornamental details. On both pedestals, the engraved letters have been executed first of all in the same ochre base tone.

5a.48 a

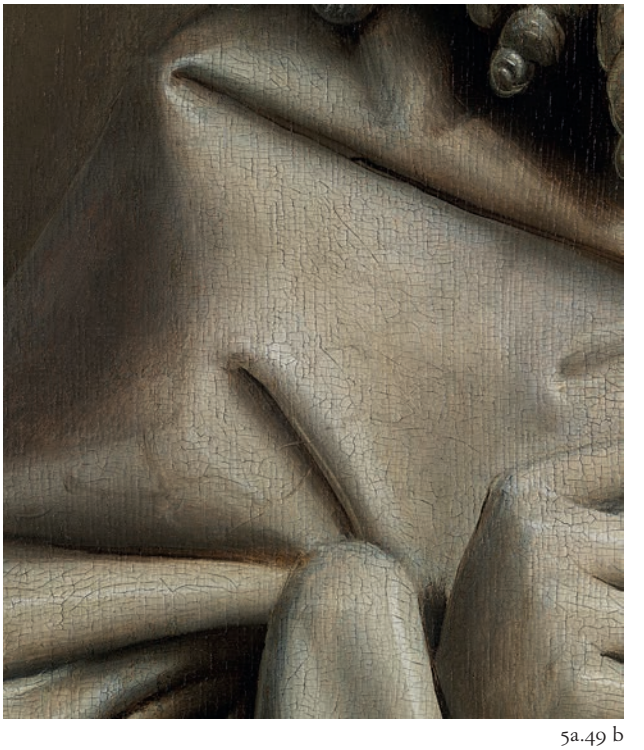
5a.48 b

5a.48 c

5a.48 d

Fig. 5a.48 (a-d). Tracery arches in the lower register: *Joos Vijd* (detail) (a); *John the Baptist* (detail) (b); *John the Evangelist* (detail) (c); *Elisabeth Borluut* (d)

5a.49 a



5a.49 b

Highlights of white paint have then been added, followed – but only on the Baptist – by further nuances of dark grey.[117]

Lastly, there is a significant difference at first sight between the two books that seem to project out of the frame near the prophets. But here, too, nothing points to the involvement of two artists. Van Eyck has painted two types of bound book (fig. 5a.51), one with gilt edges and the other, less luxurious, with the irregular edges of parchment pages. A different treatment for a different sort of book.

Everywhere we look, it is the same treatment of light and shadow that brings out the material properties of each element. Unless Hubert or an assistant was able to equal Jan in the art of underdrawing and in the spontaneity of pictorial execution, everything seems to indicate that these paintings were completed entirely by Jan van Eyck himself, from the laying down of the composition to the finishing touches.

Fig. 5a.49 (a-b). Veins in the stone: *John the Evangelist* (detail) (a); *John the Baptist* (detail) (b). The abraded condition of John the Evangelist is largely the reason why the veins in the painted stone are less visible than in John the Baptist, but they are nonetheless also present.

5a.50 a

5a.50 b

Fig. 5a.50 (a-b) Pedestals of the painted sculptures: *John the Baptist* (detail) (a); *John the Evangelist* (detail) (b)

Conclusion

Among the practices identified in the exterior panels of the *Ghent Altarpiece*, what is most striking is the great mastery of the artist at every stage of the painting process, especially since this mastery is accompanied by a keen sense of observation. His hand serves the exceptional sharpness of his eye. Not only does the painter capture the distinguishing features of each element he observes, whether fabric, stone or human flesh, but he succeeds in transposing this three-dimensional world onto a flat surface in superb fashion.

He wields his pictorial skills with ease. Touches and brushstrokes are applied in a direct and forceful fashion, without reworking. The painter never hesitates; he applies his paint in a few brushstrokes, never repeating the same effect or the same touch twice.

The final rendering takes shape from the foundations of the composition onwards and is the result of a steady progression right up to the final touches of paint. The economical artist develops the composition not by accumulating layers but by exploiting the underdrawing, the imprimatura or the base tone alternately. The same freedom, variety, speed and precision can be seen in the execution everywhere. At no

5a.51 a

5a.51 b

Fig. 5a.51 (a-b) Books of the two prophets in the upper register: The Prophet Zechariah (detail) (a); The Prophet Micah (detail) (b). Lines scored into the fresh paint as part of the representation of the pages of the book

point can we make out the involvement of more than one painter. Jan van Eyck does indeed seem to be the master of the closed altarpiece, the person responsible for working out and executing the paintings.

Notes

1 Coremans 1953.

2 Brinkman et al. 1984–85 and Brinkman et al. 1988–89.

3 Van Asperen de Boer 1979.

4 Without attempting to be exhaustive, we shall return to these published articles and papers in the footnotes that follow.

5 Each restorer was responsible for the treatment and documentation of one panel: *Archangel,* Bart Devolder; *City View,* Nathalie Laquière; *Interior View,* Françoise Rosier; *Virgin Annunciate*, Livia Depuydt; *Joos Vijd*, Hélène Dubois; *John the Baptist*, Griet Steyaert; *John the Evangelist*, Claire Mehagnoul and Griet Steyaert; *Elisabeth Borluut*, Marie Postec.

6 See on this subject the contribution 3 by Sanyova et al. in this volume, even though the article is essentially devoted to a study of the overpainting.

7 Jan van Eyck's painting technique has been the focus of numerous studies on the basis of his autograph works, unlike that of Hubert van Eyck, by whom no work is known with certainty. We therefore base ourselves on the technique of Jan. The question of the participation of more than one artist on the *Ghent Altarpiece* is discussed in the final section of this article.

8 Kockaert, Verrier 1978–79; Brinkman et al. 1984–85; Périer-D'Ieteren 1985a and 1985b; Brinkman, Kockaert, Maes et al. 1988–89; Van Asperen de Boer, Faries 1990; Van Asperen de Boer 1992; Bosshard 1992; Brinkman 1993; Gifford 1995, 1999, 2000; Van Asperen de Boer 1995; Billinge 2000; Neidhart, Scholzel 2000; Roy, White 2000; Effman 2006; Kirby 2012; Gifford, Metzger, Delaney 2013; Périer-D'Ieteren 2016; Postec, Sanyova (forthcoming); Spring, Morrison 2017; Dunkerton, Morrison, Roy 2016; Spring, Morrison 2017.

9 The present article discusses the painting technique on the exterior panels of the *Ghent Altarpiece* from the point of view of the restorer/art historian, even if regular dialogue was maintained with the laboratory. The results of the chemical analyses, with a more specific characterization of the work's constituent materials, will be the subject of a separate article at a later date, when the processed data can be examined side by side with the results obtained from the study of the polyptych's interior. The restorers' intimate contact with the pictorial materials over the course of several years makes it possible to adopt an approach that is less localized and microscopic, but which proposes a broader understanding of the act of painting. This is the analysis offered in this essay.

10 The KIK-IRPA laboratory observed three layers on average as part of its examination of the stratigraphic cross-sections.

11 These hairs are clearly visible in infrared images.

12 Around 25 paintbrush hairs have been counted in the *Archangel*, 30 in the *City View*, 4 in the *Interior View*, 13 in the panel of the *Virgin Annunciate*, 15 in the portrait of *Joos Vijd*, 50 in *John the Baptist*, 15 in *John the Evangelist*, and 20 in the portrait of *Elisabeth Borluut*. This count does not claim to be exhaustive; it was not always easy to distinguish lines left by paintbrush hairs from cracks. These totals therefore only take account of those instances where we were confident that we were dealing with paintbrush hairs or the marks left by hairs that were formerly trapped.

13 See contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

14 Clarke 2011, p. 128.

15 Cennino Cennini, ch. 64, 'The way to make vair brushes' (Broecke 2015, p. 95).

16 The *Liber diversarum arcium* even provides an illustration: Clarke 2011, p. 128. See also the chapters on preparing the ground and on brushes in Currie 2009, pp. 33–34 and 45–47.

17 E.g. in Giovanni Boccaccio, *De mulieribus claris* / *Le livre de femmes nobles et renomées*, anonymous French translation, 1402. Bibliothèque nationale de France, Paris, Ms. fr. 12420, fol. 86.

18 E.g. in Giovanni Boccaccio, *Des cleres et nobles femmes*, anonymous French translation, 15th century (1488–1496), Bibliothèque nationale de France, Paris, Ms. fr. 599, fol. 50r. See also http://gallica.bnf.fr/ark:/12148/btv1b10515437z/f103.image; Niklaus Manuel, *St Luke Painting the Virgin*, 1515, Kunstmuseum Bern.

19 Cennino Cennini, ch. 65, 'How and in what way you should make bristle brushes' (Broecke 2015, p. 96). Cennino Cennini

mentions three types of brush: the 'pointed bristle brush, blunt bristle brush and pointed vair brush' (Broecke 2015, p. 105, note 37).

20 This hair has been removed and sent to the laboratory. It is scheduled for analysis by the KIK-IRPA Laboratory for Polychrome Artefacts.

21 Steyaert 2012, p. 123.

22 We know little about who performed what tasks in a fifteenth-century workshop, in particular when it comes to the application of the ground. It would seem, however, that this was done in the painter's workshop; pre-prepared panels only start to appear on the market towards the end of the sixteenth century (Wadum 1998, p. 165). Whatever the case, even if the ground was applied in the painter's workshop, this preparation could have been done by an apprentice.

23 Cennino Cennini, ch. 65, 67, 68, 72, 90, 122, 157, 178, 183 and 211 (Broecke 2015, pp. 96, 102, 107, 113, 126, 158, 187, 210, 215 and 234).

24 Postec 2012, pp. 148–49.

25 Some examples are listed in Steyaert 2012, p. 133.

26 On *City View*, *Interior View* and the *Archangel*.

27 The traces of brushstrokes spotted by Brinkman et al. in 1984, proving for these authors that the ground had been applied with a brush and not rubbed down, are not located in the ground, nor even in the paint layer, but are the result of restoration. Their hypothesis is based on a photograph of the restoration carried out in 1950–51 (photo KIK-IRPA L2988B of panel XVI), which in reality shows traces of a coat of wax applied on the surface during the fixing of the 1950–51 treatment: Brinkman et al. 1984–85, p. 146.

28 Clarke 2011, p. 138; Theophilus 2011, ch. 19, p. 30; Cennino Cennini, ch. 121, 'How the *gesso sottile* should be scraped on the flats' (Broecke 2015, p. 157). See also the possible use of abrasives in Currie 2009, pp. 33–34.

29 See Section III, Isolation layer, imprimatura.

30 The entire altarpiece was documented in 2010 with a KIK-IRPA Inframetrics IRR camera outfitted with a platinum silicide detector: http://closertovaneyck.kikirpa.be/#home/sub=methods (14/06/2017). After cleaning, the altarpiece was documented a second time with a different camera: http://www.kikirpa.be/EN/122/343/Examen+infrarouge.htm?

31 Van Asperen de Boer 1979, pp. 147, 149; Rachel Billinge also wonders about the existence of a first underdrawing for the chandelier in the *Arnolfini Double Portrait*: Billinge 2000, p. 92; Gifford, Metzger, Delaney 2013, pp. 128–53; Postec, Sanyova 2016; Périer-D'Ieteren 2016, pp. 120–35.

32 Desneux 1958; Van Asperen de Boer 1979; Van Asperen de Boer and Faries 1990; Van Asperen de Boer 1995; Faries 1999; Billinge 2000; Billinge, Verougstraete and Van Schoute 2000; Gifford, Metzger and Delaney 2013; Périer-d'Ieteren 2016; Postec, Sanyova 2016.

33 We prefer the term 'wash' (*lavis*) to 'preliminary sketch' (*ébauche*), since the latter implies the introduction of the binder used for the paint layers, in this case the oil binder, which does not seem to us to be the case. Certain characteristics discussed here lead us to think that we are dealing rather with an aqueous layer, even if no scientific analysis has yet been able to prove this hypothesis. The term *lavis* is employed by Périer-D'Ieteren in 1985 (Périer-D'Ieteren 1985a, p. 23) and taken up in the literature as wash/washes/*lavis* (Billinge 2000, p. 84; Van Asperen de Boer, Faries 1990, p. 47).

34 This gradual process of building up areas of modelling is today visible, in our view, in Van Eyck's *St Barbara* in the Koninklijk Museum voor Schone Kunsten, Antwerp: Postec, Sanyova 2016.

35 Some authors occasionally mention the possible use of other media: Neidhart, Scholzel 2000, pp. 29–30.

36 Bosshard 1992, pp. 4–11, esp. p. 9.

37 Or with several different types of brush (Billinge 2000, pp. 83–96, esp. p. 94), probably extremely fine (Faries 1999, pp. 221–30, esp. p. 229), or even with a 'writing-quill and a thin, black paint or ink' (Bosshard 1992, p. 9).

38 Although it is difficult to give a firm opinion on the nature of the media used for the majority of the lines in the underdrawing, we shall nevertheless attempt – with the greatest caution – to identify some of their material characteristics.

39 In the upper register, this first sketch can be seen in the capital that is drawn but

not painted on the left-hand side of the *Annunciation* scene. Although it does not appear in the *Elisabeth Borluut* panel, this does not mean that the capitals in the lower register were not worked in the same way at an initial stage. The positioning of the capitals in the lower register was originally envisaged a little higher on all the panels, unless the capitals were intended to be larger.

40 We must be cautious in identifying these lines, however, since some of them may also correspond to the scratches observed in the ground (see section I.2).

41 Possibly including those in the floor of *Interior View* and *City View* and in the pedestal of the painted statue of John the Baptist. The straight line crossing John the Baptist's pedestal is, moreover, a line scored into the ground. It is one of the few lines that were incised into the ground that are visible today in the eight paintings of the exterior panels.

42 Not to be confused with pouncing.

43 Cennino Cennini, ch. 122, 'How, to start with, to draw on panel with charcoal and reinforce with ink' (Broecke 2015, p. 158).

44 Postec 2014 and 2015.

45 This circle measures approx. 3.5 cm in diameter.

46 See e.g. Deneffe et al. 2009, pp. 177–78. The lantern as an attribute of St John the Baptist seems to have its origins in Bruges.

47 Klaassen, Postec, Van der Snickt (forthcoming); Postec, Sanyova 2018.

48 The shape of these circles is then clarified in more detail at the stage of the liquid underdrawing, where we can see drips that prove the use of a liquid medium. Their outlines may have been executed with the aid of a compass, but equally well in freehand.

49 In this case, too, we cannot rule out the hypothesis of an accidental scratch (see note 38 and section I.2).

50 It is also possible that some of the straight lines in the region of the beams in the scenes making up the *Annunciation* have been scored at a very early stage of execution.

51 Incised lines have already been identified in the *Ghent Altarpiece*, between the floor tiles and the large figures of the *Deity Enthroned*, and in the rays of the dove in the *Adoration of the Lamb* (Van Asperen de Boer 1979, p. 175). Incised lines are common in fifteenth-century Flemish painting, but it is important to distinguish lines scored in the ground from those incised into the fresh paint.

52 Till-Holger Borchert (in Albert, Lammertse 2016, p. 149 n. 29) comments that 'Marie Postec suggested in 2013 [Postec and Sanyova 2016] that Van Eyck's *St Barbara* was also partly drawn in silverpoint. The lines she believes to be executed with a stylus were surprisingly crudely executed and did not correspond at all with Van Eyck's skills as a draughtsman'. Let us clarify, however, that the incised lines are so fine that they are not visible to the naked eye. Furthermore, these incisions are intimately bound up with the lines of the underdrawing and are original, in other words Eyckian, whatever their purpose – or their chance nature – and the tool that produced them.

53 This type of underdrawing, with its anticipation of the modelling of volumes, does not appear to be common for its day (Billinge 2000, p. 95), but can be observed in several works by Jan van Eyck: the *Virgin and Child with Canon van der Paele* (Périer-D'Ieteren 1985b, p. 65), the *Madonna of Chancellor Rolin* (Van Asperen de Boer, Faries 1990, pp. 37–49), the Washington *Annunciation* (washes can be detected in the architecture: Gifford 1999, p. 111 and note 15), the *Arnolfini Double Portrait* and the *Portrait of a Man ('Léal Souvenir')* (Billinge 2000, p. 84); 'more watery-looking strokes' have also be identified in the *Dresden Triptych* (Faries 1999, p. 223) and more recently in the *Ghent Altarpiece* (Périer-D'Ieteren 2016). See also Périer-D'Ieteren 1985a, p. 23.

54 These materials have not yet been analysed by the laboratory.

55 Billinge 2000, p. 94.

56 Depuydt et al. 2014 (unpublished).

57 These brushstrokes belong definitely to the underdrawing stage and not to the application of the paint layer.

58 This fact indicates that painting was carried out with the panel in a vertical position, as confirmed by contemporary representations of artists in their workshops. This upright position is the most logical, since it allows the artist to step back and view the work from a distance and to see more clearly whether the masses are evenly distributed. Painters

are portrayed standing or seated in front of their work.

59 Its composition has not been analysed by the laboratory, however.

60 Perhaps owing to their colour, which sometimes tends more towards brown and so has difficulty absorbing infrared.

61 Taubert 1975; Périer-D'Ieteren 1985a, p. 23.

62 Caspers, Van Grevenstein-Kruse 2014, p. 105. The 'historical re-enactment' proposed here is interesting, even if we do not find the spontaneity and confidence of Van Eyck's hand.

63 Schmidt et al. 2014, pp. 45–47; Jill Dunkerton recognizes these washes in Verrocchio: Dunkerton 2011, pp. 12–13.

64 Schmidt et al. 2014, p. 45.

65 Walmsley 2014, pp. 60–64.

66 Van Hout 1998, pp. 199–225; Van Hout 2005, p. 25; Van Hout, Balis 2010, pp. 62–63. The term 'doodverf' appears *inter alia* in a legal document of 1519, in the context of a dispute between Ambrosius Benson and Gerard David. The document speaks of a Magdalene begun in 'doodverf' ('een machdaleene van doodverwe begonnen'). Van Miegroet 1989, p. 344, doc. 44. Van Hout (2005, p. 36) also describes the zones left unfinished in Dirk Bouts's *The Justice of Emperor Otto* (KMSKB-MRBAB, Brussels) as having been abandoned at the 'doodverf' stage.

67 Van Mander 1604, fol. 202r: 'Sijn dootverwe was veel suyverder en scherper gedaen, als ander Meesters'.

68 Van Mander 1604, fol. 202v: 'een cleen conterfeytselken van een Vrouw-mensch van hem hebbe ghesien, met een Landtschapken achter, dat maer gedootverwet was, en nochtans seer uytnemende net, en glat'.

69 Depuydt et al. 2014 (unpublished).

70 For a detail see: Dhanens 1980, p. 321, fig. 199.

71 The Aix triptych was formerly housed in the cathedral of Saint-Sauveur in Aix-en-Provence, but is today broken up into six panels dispersed between three museums (Museum Boijmans Van Beuningen, Rotterdam; Royal Museums of Fine Arts of Belgium, Brussels; Rijksmuseum, Amsterdam) and a church (Église de la Madeleine in Aix-en-Provence, which normally houses the central panel; currently, however, this panel is on display at the Musée du Vieil-Aix).

72 Dhanens 1980, p. 66, fig. 39. Some pre-Eyckian examples are found in the *Annunciation* in the painted wings by Broederlam belonging to the *Crucifixion Altarpiece* (Musée des Beaux-Arts, Dijon; Currie 2009, p. 24), the *Annunciation* in the Walcourt panels (Musée provincial des Arts anciens Namurois, Namur) and in the *Reliquary of the Virgin's Veil* (Basilica of the Nativity of Our Lady, Tongeren). On the two latter, see Deneffe et al. 2009, pp. 310–46, 421–42; for details see p. 336, figs 44 and 45.

73 Campbell, Foister, Roy (eds.) 1997, pp. 22–23.

74 Ibid., p. 24.

75 Coremans 1953, p. 75.

76 Brinkman et al. 1984–85, pp. 147–57; Brinkman 1993, pp. 213–18. These authors use the single term *'isolatielaag'* (isolation layer), whether they are talking about heavy layers or not.

77 Ibid., p. 151.

78 We should not rush to any conclusions, however, since the number of samples taken from the lower register was significantly fewer. In the case of the paintings of the donors, samples were taken only from the figures, not from the backgrounds or architecture.

79 Vasari 1996, vol. I, pp. 424–29.

80 Effman 2006.

81 Roy, White 2000.

82 Kirby 2012, pp. 255–78; Spring 2012b, pp. 93–105.

83 For example, the presence of azurite in Elisabeth Borluut's violet-red dress on top of a layer of madder (Coremans 1953, p. 74) is a misinterpretation of the cross-section. Similarly, the technique used to apply the glazes, as described in the case of Elisabeth Borluut's dress, namely by patting the glaze with a fine cloth or even with the palm of the hand (Vandivere 2016), concerned the overpaint and not the original paint layer.

84 Numerous reconstructions and technical experiments over several years allow us to confirm that a first paint layer applied as flat colour preserves, through its transparency, the visibility of the underdrawing and its modelling, which may be substantially worked up.

85 When analysing the painting technique, it is important to refer to scans made after the removal of the overpaints. See Van der

Snickt et al. 2017; See contribution 3 by Sanyova et al. in this volume.

86 Campbell 1998, p. 215.

87 Van der Snickt, Spring, 'New insights in the painting technique of Jan van Eyck's portrait of Margaret by combined micro and macro chemical imaging' (forthcoming).

88 University of Antwerp, AXES Research Group, Prof. Koen Janssens and collaborators.

89 Dunkerton, Morrison, Roy 2016, p. 272.

90 Some of these white accents were seen by the conservators during restoration.

91 Gifford, Metzger, Delaney 2013, p. 137.

92 Billinge, Verougstraete, Van Schoute 2000, pp. 42–43; Postec, Sanyova 2016, p. 27.

93 Metzger, Steyaert 2009, p. 173.

94 A similar method was used to position the lettering on the frames; see contribution 4b by Augustyniak and Mortiaux in this volume.

95 The same type of effect can be seen in the outermost rays around the head of the dove above the Virgin.

96 Coremans 1953, p. 80.

97 Campbell 1998, p. 184.

98 For a summary of the hypotheses and analyses concerning the binder, see Effman 2006 and Spring, Morrison 2017.

99 On the limitations of tempera, see Kirby 2012, pp. 255–78.

100 Theophilus 2011, ch. 27, p. 39.

101 Kirby 2012, p. 272; Spring, Morrison 2017, p. 208.

102 See contribution 6 by Jones, Augustyniak and Dubois in the present volume.

103 Weale 1908b, p. XXIX.

104 Ibid., pp. XXVII, XXXVIII, XXXIX.

105 De Bast 1823, p. 264; Dvořák 1904; Beenken 1933.

106 Panofsky 1953, pp. 207–22. In note 208/3 Panofsky refers to earlier authors, including Beenken, who regarded the *Ghent Altarpiece* as an assembly of miscellaneous panels. Van der Velden 2011a, pp. 140–41.

107 Baldass 1952, pp. 36–37. Dhanens also argues that Hubert may perhaps have done the underdrawing for the *Annunciation*: Dhanens 1965, pp. 74–82.

108 Van Asperen de Boer 1979, pp. 208, 210–11.

109 Ibid., p. 150.

110 Ibid., p. 211.

111 Kemperdick, Rössler 2014, p. 21; Kemperdick 2016, p. 312.

112 Périer-D'Ieteren 2016, pp. 133–34.

113 Ibid., p. 134.

114 After the restoration of the interior panels, it will be possible to examine this question in the broader context of the altarpiece as a whole.

115 It is interesting to note that a similar distinction exists between the niches in Rogier van der Weyden's *Last Judgement* in Beaune, where the donors are also placed in niches considerably deeper than those of the painted stone sculptures. Other elements of the *Last Judgement* likewise testify to the influence of the *Ghent Altarpiece*. De Vos 1999, pp. 252, 259.

116 During the restoration, it was preferred not to overdo the retouching of this more damaged panel. More substantial retouching would have allowed some of the original veins to emerge more clearly, but also carried the risk of overburdening the whole and of the retouching becoming too conspicuous.

117 This also explains why the letters are more visible in the infrared reflectogram of the Baptist than in the one of the Evangelist.

5b
The Van Eycks' Creative Process
The Frames: an Exceptional Polychromy

Anne-Sophie Augustyniak, Laure Mortiaux and Jana Sanyova

As Leon Battista Alberti explains in his treatise *De Pictura* (1435),[1] the painted image is the window and the frame is the border that signals to the viewer the boundary with the real world. The polychrome decoration on the frame plays a crucial role in this, marking the transition between depicted space and real space.[2] Fifteenth-century artists, Van Eyck in particular, knew this and often took as much care with the frame as they did with the painting.[3] When painted in *trompe l'œil*, when imitating dressed stonework or marble, or when the painted image extends onto the frame, the polychromy serves to transgress the border created by the frame. Likewise, in order to challenge the spectator's impression of what he is looking at, the frame can be extended into the painted image.

If we study Van Eyck's works in their original state, the importance accorded to the frames is abundantly clear, and so is the subtlety with which the polychromy is handled. However, this delicate decoration had become imperceptible on the exterior panels of the *Ghent Altarpiece* before its restoration. Although original, the darkened frames created vertical breaks between the scenes, and since the frames' original polychromy was masked by overpainting – as were the letters constituting the famous quatrain – it was no longer possible to view the painted image and the frames as an ensemble.

The conservation and restoration treatment of the frames (fig. 5b.1) carried out in parallel with the work on the paintings, has revealed the relationship, so important in Van Eyck's works, between the frame and the painting.[4] Today, this rediscovery has made it possible not only to appreciate the original polychromy on the frames of the exterior panels, but also to gain a better understanding of the creative process. While the frames of the open polyptych are gilded, the imitation stonework of the exterior consists of silver leaf covered in coloured glazes, in tones modulating from yellow to red and heightened by touches of colour. The choice of silver leaf as a base for the simulated dressed stonework has raised a number of questions, about both the technique, and the symbolic significance of this choice.

Fig. 5b.1. (facing page) The original polychromy of the frames imitating dressed stonework (after treatment)

Frames and polychromy

The frames of early Netherlandish paintings have been consistently disregarded or relegated to the background; most have disappeared by now, or have survived in an altered state, a shadow of their former appearance. Nevertheless, a number of works by Van Eyck, including the *Annunciation Diptych* (1433–1435),[5] *Saint Barbara* (1437; fig. 5b.2),[6] the *Portrait of Margaret van Eyck* (1439; fig. 5b.3)[7] and the *Virgin and Child at the Fountain*[8] (1439; fig. 5b.4) have come down to us in their entirety. These examples demonstrate the concern for realism shown by Van Eyck in his representation of the stonework, and the degree to which the subtle link between the frame and the painting gives a characteristic dimension to the work. It is relatively easy to identify the stone varieties that inspired Van Eyck. Often, they are jasper or porphyry, or different types of marble.[9] In the latest edition of her technical study of Southern Netherlandish panel painting of the fifteenth and sixteenth centuries, Hélène Verougstraete devotes a long chapter to this subject.[10] It is the skilful handling of the brush and the subtle use of glazes that breathe life into these illusory materials. And so, likewise, the question arises as to the status of the frames of the *Ghent Altarpiece*'s exterior panels.

Fig. 5b.2. Jan van Eyck, *St Barbara*, 1437 (Koninklijk Museum voor Schone Kunsten, Antwerp). Detail of the painted frame imitating jaspis or porphyry (?)

Fig. 5b.3. Jan van Eyck, *Portrait of Margaret van Eyck*, 1439 (Groeninge Museum, Bruges). Detail of the painted frame imitating marble or jaspis (?)

The original polychromy on the exterior panels imitates a dressed masonry construction with black joints added every 12 to 17 centimetres. The illusion of stonework is created by a succession of stone blocks in colours that differ slightly thanks to subtly varying glazes of yellow, green and pink. The stone is speckled with black flecks heightened in a lighter colour (also varying between yellow, green and pink) which gives each stone its individual rough quality (fig. 5b.1). Today the colours have altered and darkened: the appearance and colour of the polychromy currently make the stonework appear more aged and patinated. Our aim in this article is to keep in mind the impact that this *trompe l'œil*, with its dazzling reflections given off by the silver leaf and coloured glazes, must have had at the time.

Imitation stonework was frequently used by Van Eyck and his contemporaries to decorate the frames[11] of both small paintings and large polyptychs. One example is to be found on the exterior wings of the carved *Passion Altarpiece* in Ambierle, painted in 1466 by a follower of Van der Weyden.[12] Although this type of decoration is usually painted, the technique used on the exterior panels of the *Ghent Altarpiece* is not as straightforward and has, as a result, caused some scholars to doubt its authenticity.[13] A detailed study thus had become indispensable; it was carried out in two phases: with the binocular microscope at the beginning of the treatment, and then, after the cleaning, in greater depth, in close collaboration with the laboratories of the KIK-IRPA.[14]

Fig. 5b.4. Jan van Eyck, *The Virgin and Child at the Fountain*, 1439 (Koninklijk Museum voor Schone Kunsten, Antwerp). Detail of the painted frame imitating marble

The preparatory layers

As was customary at the time, the preparatory layers were applied with the panels already in their frames.[15] A layer of glue was applied to the wood (layer 1) before the ground made of chalk and animal glue (layer 2). In this case, the layer was relatively thin, varying in thickness between 100 and 200 microns. Some samples reveal a pigmented layer which impregnates and seals the upper part of the ground (layer 3) (fig. 5b.8).

5b.2

5b.3

5b.4

5b.5 a

5b.5 b

Fig. 5b.5 (a and b). Stereo photomicrographs demonstrating the presence of hairs in the ground of the frame of *Joos Vijd*

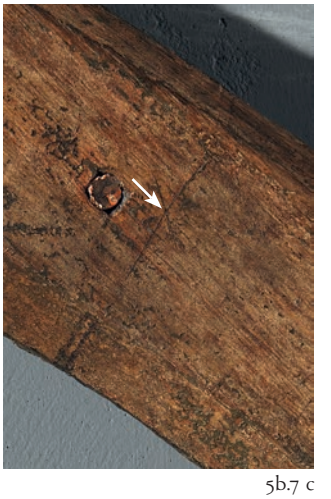
5b.6 a

5b.6 b

Fig. 5b.6 (a and b). Incised line marking the position of a joint on the left stile of frame of the *Archangel Annunciate*

5b.7 a

5b.7 b



5b.7 c

Fig. 5b.7. Incised lines and cross marking the position of joints in the arched top of frame of the *Interior View*

The preparatory layers were probably applied with a spatula as well as a brush, the latter evidenced by the numerous bristles embedded in the material (fig. 5b.5).[16] Where the fake joints occur, the preparatory layer presents horizontal incisions across the width of the frame to mark their location (fig. 5b.6). However, in the arched part of the frame of the *Interior View*, as well as incised lines, crosses have been cut into the ground, which could be the traces of reference points for a compass (fig. 5b.7).

Silver leaf on mordant

The technique of applying an oily mordant to the ground as a base for the silver leaf is often described as matt gilding/silvering, to differentiate it from the polished look of gilding/silvering applied to an aqueous ground layer – the bolus. Only metal leaf applied on an aqueous underlayer could be burnished to great sheen with the aid of an animal's tooth or an agate. However, in the case of the exterior panels of the *Ghent Altarpiece*, the effect sought by the polychromers was not a matt appearance, but more likely the light lustre of a satin finish.[17] This surface could be obtained by sanding the ground extremely finely, or by polishing it and applying glazes on the metal leaf. The silver leaf could also be smoothed delicately with cotton – a process mentioned in medieval recipes,[18] notably by Cennini[19] – before the glazes were applied.

The oily layer onto which the silver foil was applied is today called *mixtion* in French and *mordant* in English. The French term derives from the fact that this layer contains a mixture of pigments and ingredients intended to create a special colour, whereas the English term refers to its adhesive function and corrosive effect. This layer is designed to enable the metallic foil to stick and to lend it the tone required by the artist. Artists were conscious of the influence the background tone had on the colour to be perceived after the foil had been applied. The chromatic function of the mordant is clear, and in medieval technical treatises the terms used to define this layer are often connected with colour: *couleur d'or* (French), *goutverwe* (Dutch) and *goltvarwe* (German). As a matter of fact, the polychromers could vary the colour (from white, beige, yellow to orange, red and, less frequently, brown), its intensity (from transparent to opaque) as well as its thickness.[20] Ideally the pigments and other ingredients recommended for these layers should have siccative properties,[21] and the binder was nearly always oil-based, sometimes with the addition of resin in a fairly high concentration.[22]

The mordant revealed here was applied in two oily layers (see fig. 5b.8): the first layer applied on the ground is orange in colour and contains a mixture of minium, calcium carbonate and a little ochre. The frames in the lower register sometimes contain other ingredients in minute quantities, including white lead, lead-tin yellow, or powdered glass (layer 4). The second layer (layer 5) is lighter; it contains more binding medium and is therefore more transparent. This layer contains the same ingredients but with the addition of white lead. It is quite thick in some places (30–40 microns), in others so fine as to be almost invisible. The role of the first layer is to give colour, but it also acts as an isolation layer, rendering the ground impermeable. The second layer, on the other hand, appears to have an adhesive function. It could also have been used to modify the colour of the first layer if this were judged to be too intense. The chemical composition of the two layers is very similar, except for the

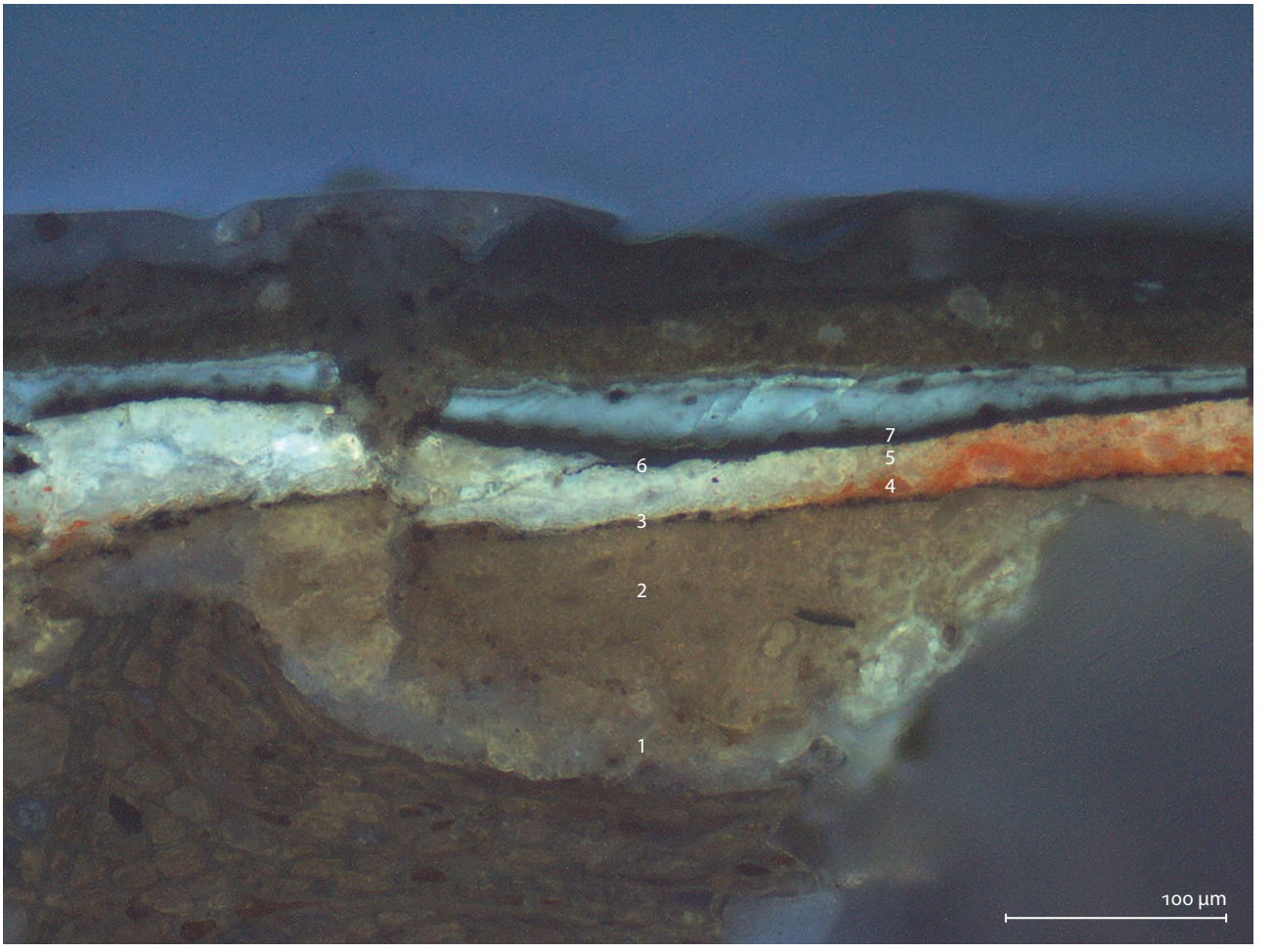


Fig. 5b.8. Cross section (sample from frame of the *City View*) showing the irregular thickness of the mordant layer

Fig. 5b.9. Diagram of the stratification of the original polychromy: 8. Black and coloured accents; 7. Glaze; 6. Silver leaf; 5. Mordant; 4. Red lead-based layer; 3. Ground layer; 2. Glue layer; 1. Wooden support in oak

proportion of the binder which is higher in the upper layer. Minium and white lead provide colour as well as being siccatives.

In this connection, it is worth bearing in mind that it was this *mixtion* in two layers that in 1951 made Paul Coremans suspicious about the authenticity of the polychromy on the frames and, as a consequence, of the authenticity of the quatrain.[23] He saw the two base layers –'*deux assiettes*'[24] – as evidence of two different interventions. Astonished not to find any remnants of gilding, as existed on the frames of the open polyptych, he advanced the hypothesis that the first application might be the base layer of an earlier gilding process, eliminated by sanding during a previous cleaning, and that the second layer could have functioned as a base for the silver leaf during a later intervention, and thus was not original. During the current investigation, however, no traces of earlier gilding or polychromy have been found. Therefore, this double layer with its triple function – chromatic, isolating and adhesive – understandable enough from a technical point of view, can be regarded as a single intervention. If we consider other works of art of the same period, this stratigraphy in several layers – oily mordant on an intermediary pigmented layer – does not seem so unusual.[25] It can be found under the original gold leaf on the frames of the wings of the open polyptych.[26] In addition, images representing painters in their studios also provide an explanation for the double coloured layer: although it is generally agreed that the painter executed his painting on a framed panel covered in a white ground, as can be seen for example in the background of the *St Luke Drawing the Virgin and Child* attributed to the workshop of Bouts and now in the Bowes Museum,[27] a painting of the same subject by Derick Baegert, dated 1480–85, now in the LWL – Museum für Kunst und Kultur in Münster, also demands our attention.[28] St Luke is seen painting the Madonna on a panel whose integrated frame is painted red. If we discount the idea of a finished red frame, quite common in Germany at that time, it could be deduced that the painter had applied a layer of colour to the frame during the painting process; the frame would then receive a second layer of mordant for the adherence of the metal foil and to complete the polychromy.[29] The suggestion that the mordant layer was applied in two stages – the coloured underlayer during the painting process and the coloured mordant after its completion – could account for the double layer on the stratigraphic sections in the *Ghent Altarpiece*. On the other hand, there is little doubt that at least one of the orange underlayers as well as the silver leaf were applied after completion of the paintings or during the finishing process. Evidence of this can be found in the many fragments of silver leaf found on the surface of the painted arches and columns in the lower register, the traces of the orange substrate on the paint layers at the edges of the panels, and finally, the overflows of original paint on the white preparatory layer of the frames, covered by the polychromy.

The coloured glazes

On top of the fine silver leaf, which is of a consistent thickness of about 1 micron,[30] the *trompe l'œil* imitation of the varied tones of the ashlar masonry is rendered using coloured glazes modulating from yellow to red (fig. 5b.9). In addition to their aesthetic value, these coloured glazes certainly played a part in preventing the silver leaf from

oxidizing or tarnishing. No other protective layer has been detected between the layer of silver and the coloured glaze. Although they are visible under the microscope, the modulations in the tonality and the intensity of these glazes cannot be accurately evaluated today because of material degradation.[31] Examination of a few samples has nevertheless allowed some of the components of the glazes to be identified. Regularly found is calcium carbonate combined with red lake, carbon black and ochres. A sample of the pink highlights from the frame of the *Virgin Annunciate* has revealed the presence of a red lake prepared from the waste of dyed wool. This coarse-grained lake, on a protein-containing substrate, was frequently used by painters in the fifteenth and sixteenth centuries.[32] It has also been detected in two other paintings by Van Eyck, the *Portrait of Margaret van Eyck,* now in the Groeninge Museum in Bruges and treated at the National Gallery, London, and the Washington *Annunciation*.[33] Infra-red spectroscopy has revealed the presence of a large quantity of calcium oxalate, a degradation product which substantiates the degraded appearance of the glazes.

Opaque highlights and inscriptions

Opaque highlights were added to the coloured glazes to complete the imitation stonework. Joints, consisting of three lines – a black line with a white line on top, and a pink, yellow or green line below according to the colour of the glaze – were placed at fairly regular intervals, every 12 to 17 centimetres on the flat faces and bevelled edges. Generally speaking, on the rails (horizontal members) the coloured highlight is placed to the left of the black joints; on the stiles (vertical members) the highlight is placed just below the black line (figs 5b.10 and 11). A scattering of irregular black flecks heightened with a light colour – yellow, pink or green – plus some very fine veining here and there suggest the rough surface of the stone. The rhythm is ensured by the alternating glazes and coloured highlights. The pigments employed are the same as the pigments identified in the paintings, which is to say lead white, lead-tin yellow, carbon black, earth pigments and calcium carbonate. It was during this stage that the quatrain and the inscriptions, of which the examination is described elsewhere in this volume,[34] were painted.

Although the appearance of the imitation stone, obtained by the use of small black flecks heightened with light colours, has altered today, the rendering of the stone seems nevertheless to differ slightly between the lower and upper registers (fig. 5b.10). In fact, in the lower register the black flecks are small and more numerous and are accompanied by coloured highlights in green, yellow or pink varying from one stone to the next. The black joints with a white line on top are also underlined by the same type of coloured highlights as the green, yellow and pink dots (see figs 5b.12 and 13). On the stiles the alternation of 'green-yellow and pink' highlights is not always repeated consistently. On the other hand, we have identified a similarity between adjacent members of the frames. For example, the right stile of the frame of *Joos Vijd* and the left stile of the frame of *St John the Baptist* present exactly the same pattern of coloured highlights. The same goes for the right stile of the frame of *St John the Evangelist* and the left stile of the frame of *Elisabeth Borluut* (fig. 5b.11). This similarity between the stiles and the scattered flecks completes the illusion of a succession of the

Fig. 5b.10. Details of the imitation stonework using small black touches heightened with bright colours show a subtle difference between the upper and lower registers after treatment

same blocks of stone from one frame to the next. There can be no doubt that the frames of *Joos Vijd* and *St John the Baptist* and those of *St John the Evangelist* and *Elisabeth Borluut* were painted side by side and treated in pairs. Like the joints, some of the veining is carried over from one frame to the next, and all of it is executed with the same firm confidence.

With regard to the upper register, the dots are broader and form more widely-spaced flecking. The black specks are heightened with broad strokes of yellow or pink, occasionally white. By contrast, no coloured highlights can be detected along the joints. The arched parts of the frames in the upper register are handled slightly differently, in a manner akin to that of the polychromy in the lower register. Here again we find flecks and joints accompanied by coloured highlights – green, yellow or pink, varying from one stone block to the next to provide the same repetitive rhythm. Worth noting is that the alternating coloured highlights can be found right along the left stile of the frame of the *Archangel Annunciate* and across the upper rail, whereas they are not present on the stiles and rails of the other frames. The distribution of coloured highlights on the frames in the upper register is summarized in the diagram (fig. 5b.12). Certain areas are marked with a question mark – these areas show paint losses and no longer provide sufficient information about the colour of the highlights. Some of the stone blocks bear no coloured highlights and present solely black flecks. It is difficult to be certain whether these highlights have disappeared or whether they were absent from the start; the hypothesis could be advanced that the flecking and speckles on the frames in the upper register, designed to be placed higher up, might have been deliberately accentuated in order to be distinguished with the same intensity as those in the lower register.

Interpretation

At the end of this study and of our examination of the successive layers on the bevelled edges, we can conclude that the polychromy, which covers the whole of the frames including the edges and the hinges,[35] was applied after the panels were painted, as was the usual practice at the time.[36] Indeed, the diagram (fig. 5b.14a) shows that, to begin with, the ground (layer 1) was applied to the panel in its frame. Next, the painting (layer 2) of the panel was executed. Once the painting was finished, the polychromy (layer 3) was applied to the frames:[37] orange underlayer, mordant, silver leaf, coloured glazes, opaque highlights and inscriptions. Examination of the quatrain and the inscriptions led us to deduce that the letters were contemporaneous with the rest of the creative process.

Why was silver leaf chosen as the base for the imitation of stone?

The use of silver rather than gold leaf for the polychromy on the frames of the closed polyptych – gold was nobler and more expensive – has given rise to some queries and continues to do so, not only with regard to its authenticity but also from a technical and aesthetic point of view, as the basis of imitation masonry.

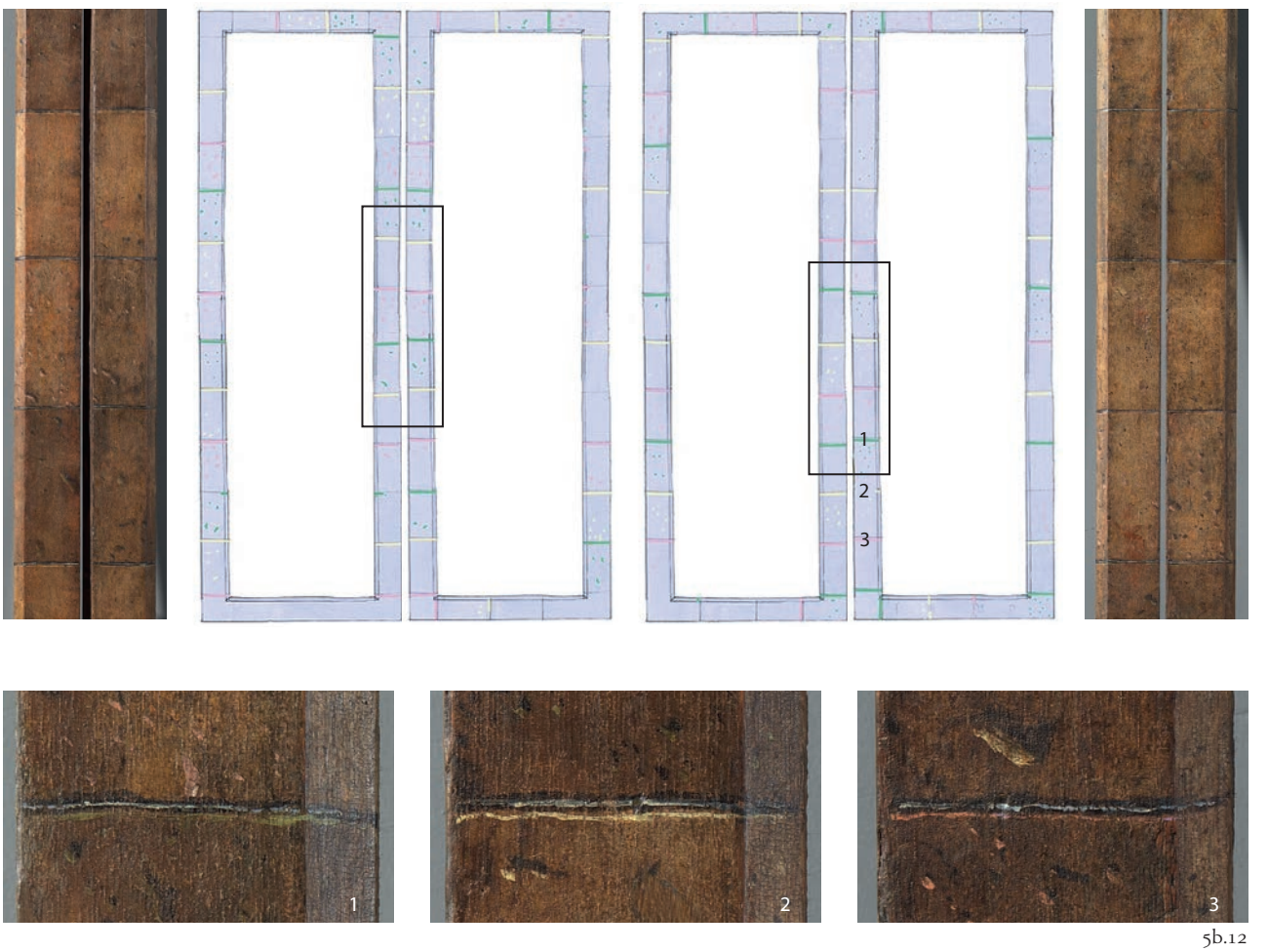
Worth remembering is that silver leaf was widely used in Europe well before the period of Van Eyck. In fact, early treatises[38] mention the use of silver for inscriptions and illuminations, for the decoration of sculpture in altarpieces,[39] for the representation of the reflections of metal objects or opulent fabrics in painting,[40] or as a technique for imitating gold, in which case the foil is covered with yellow glazes. The technique of using a less costly material as a substitute for gold leaf – whereby silver or tin foil was polished and then coloured with pigments ground in oil to obtain a golden sheen – is mentioned in the *Leyden Papyrus* as early as the third century[41] and was revived by Theophilus,[42] Heraclius and Cennini. Unn Plahter also mentions, for example, that in thirteenth-century Norway, silver foil covered with yellow glazes was used more frequently to imitate gold than gold itself.[43] Interestingly, the rules laid down by the guilds were very strict with regard to these 'fraudulent' practices and forbade the use, for example, of saffron or other colourants to imitate gold – the perpetrator risked prosecution.[44] Cennini suggests using silver leaf for practising gilding rather than gold 'because it is less of a loss'.[45]

Leaving aside the economic aspect, there is evidence that the techniques of silvering on bolus or mordant, whether or not polished and/or glazed, were widespread throughout Europe, not only in Italy[46] or Spain,[47] but also in the Low Countries on carved altarpieces[48] and, particularly in Germany and Scandinavia, on paintings and polychrome sculpture.[49] Although aqueous techniques are most often described, the use of silver leaf on mordant in combination with glazes as described by Cennini[50] was particularly popular in Italy in the second half of the thirteenth century.[51] A rigorous technical examination of works of art from Cologne, accompanied by a catalogue of painted works dating from between 1400 and 1450 published in *Let the Material Talk* (2014),[52] demonstrates that the same popularity pertained in Northern Europe, where silver leaf was used in the same way as gold, or the two were combined in a technique known as *or parti* or *zwischgold.*[53] Innumerable examples bear witness to its local application on an oil-based mordant to imitate the reflection of metallic objects in details such as arms and armour,[54] keys, the tips of lances, saucepans and plates,[55] inscriptions and armorial bearings,[56] or sometimes floor tiles – as can be clearly seen in the upper register of the *Ghent Altarpiece* in the open position.[57]

Nevertheless, the tendency of silver to tarnish rapidly and grow dull, well-recognised by painters and artisans of the period,[58] its less noble reputation and restrictions on its use laid down by the guilds must certainly have played their part in its relinquishment in favour of gold.

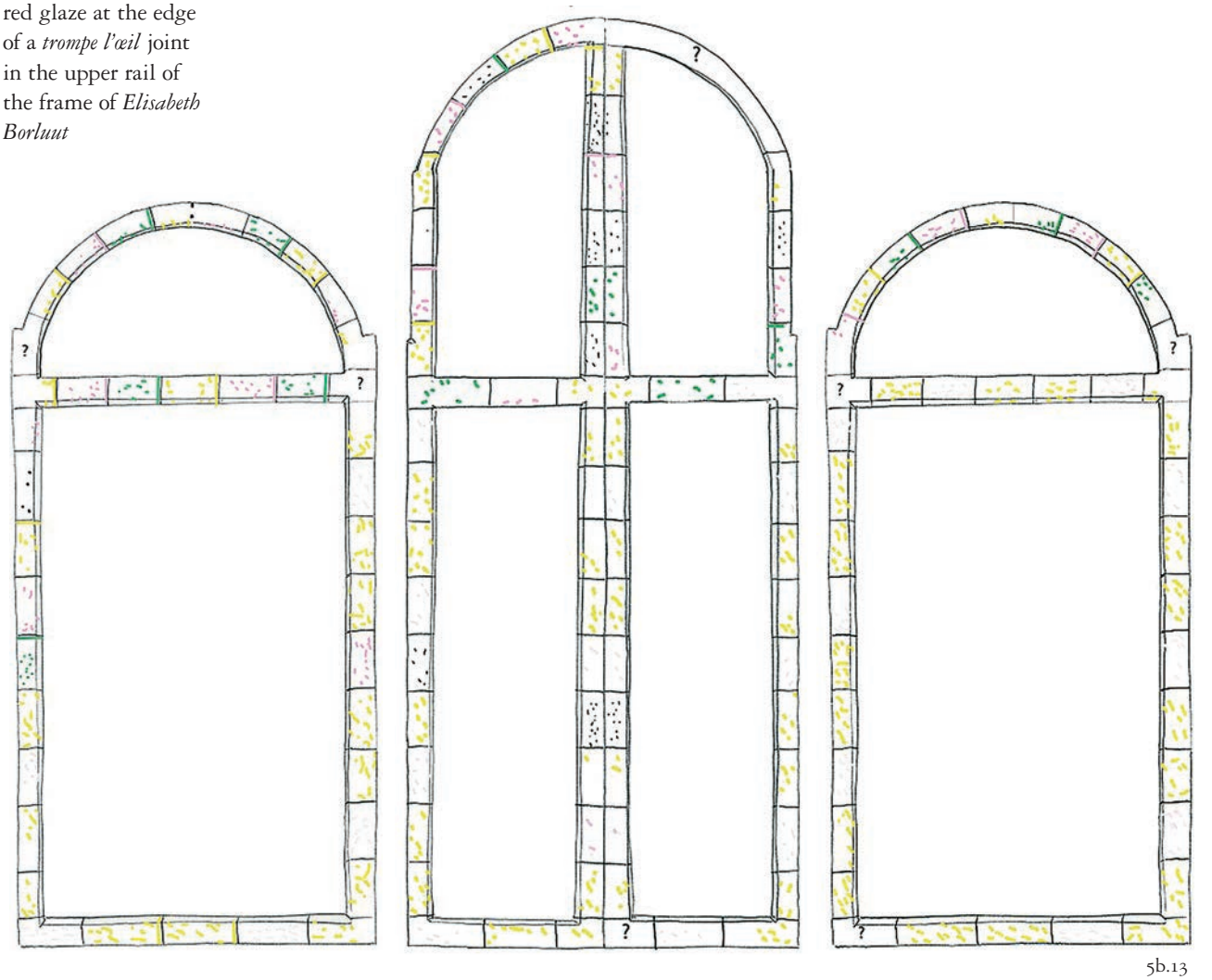
After this brief overview of the context, it is not so surprising that Van Eyck should have chosen silver leaf for the reverse sides of the frames of the wing panels. However, the argument put forward by a number of people that silver leaf was used instead of gold to reduce expense seems implausible in the case of such a major and prestigious commission as the *Ghent Altarpiece*. In our opinion, it is more likely that the choice was dictated by the desire to obtain a particular effect and gleam. Silver, used as a background for mirrors, is a highly lustrous metal, reflecting almost all the wavelengths of the visible spectrum. Although the use of silver to suggest metal in the painted representations cited above is quite comprehensible, its use as the basis for creating *trompe l'œil* stone blocks is certainly unexpected, indeed virtually unique. This makes the exceptional nature of this work of art even more extraordinary.

5b.11



5b.12

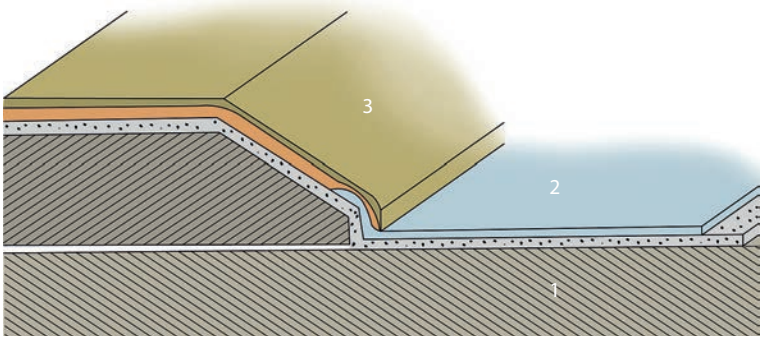
Fig. 5b.11. The intensity of some of the glazes is still visible under a binocular microscope: remaining traces of red glaze at the edge of a *trompe l'œil* joint in the upper rail of the frame of *Elisabeth Borluut*



5b.13

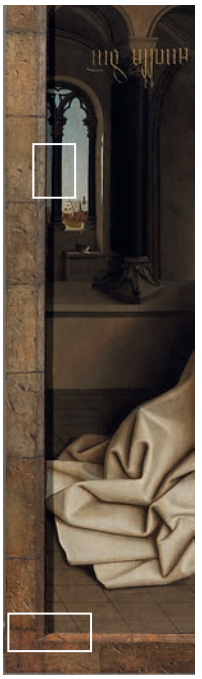
Fig. 5b.12. Diagram of alternately coloured highlights in the frames of the lower register; alternating 'green (1)–yellow (2)–pink (3)' highlights below the black joints of the left stile of the frame of *John the Evangelist*

Fig. 5b.13. Diagram of coloured highlights in the frames of the upper register.



5b.14 a

Fig. 5b.14a. Diagram showing that the blue paint is covered by the orange base layer of the frame's polychromy
Fig. 5b.14b. In the *Virgin Annunciate*, the blue sky spills on the chamfer of the left stile of the frame. The blue paint is covered by the orange base layer of the frame's polychromy (1-3). The orange underlayer is visible at the lower left corner of the frame and on the surface of the panel (4).



1.

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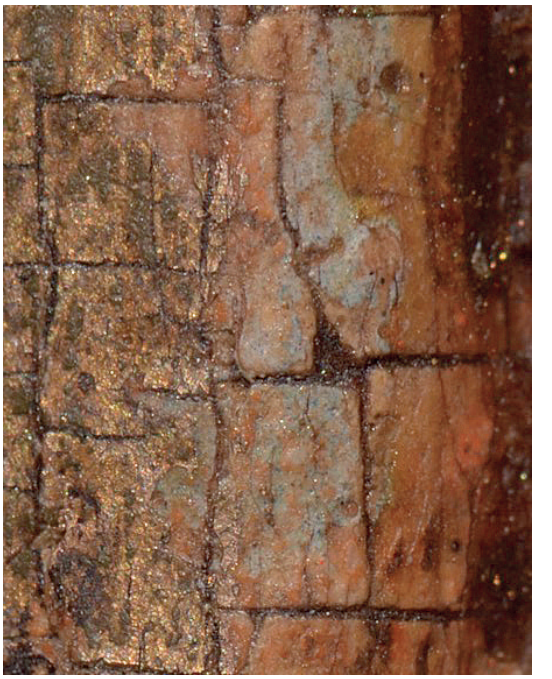


3.

4.

5b.14 b

In the absence of examples of this technique on other frames,[59] we need to consider the choice of silver for its intrinsic aesthetic qualities in two other paintings: Bernardo Daddi's *Coronation of the Virgin* of about 1340, in which the lining of the Virgin's mantle and that of Christ are painted using a green glaze on silver leaf, laid on an oily mordant;[60] and the fascinating *Portrait of Philippe de Croy*, painted by Rogier van der Weyden in 1464, where the entire background consists of silver leaf covered with a green glaze.[61] As on the frames of the *Ghent Altarpiece*, Van der Weyden does not seem to be imitating the metallic reflection of any object or material; he uses the reflection of light on the silver leaf to obtain a particular pictorial and visual effect. Although these green backgrounds, in Daddi's painting as well as in that of Van der Weyden, have darkened and no longer glow as they used to, the effect they must have produced on their contemporaries when they were first painted may well have been comparable to that produced by the dazzling polychromy on Van Eyck's frames. Polychromy on silvering, bright and luminous in tone, will surely have increased the impression of the frames projecting in front of the painted surface, and thus also must have given the impression of a window onto another spatial dimension, luminous and spiritual.

It is clear therefore that, whatever Coremans may have thought,[62] the coloured glazes modulating from yellow to red and lending a warm tone to the silver leaf, were not intended to imitate gilding. Why, anyway, would Van Eyck have chosen to imitate gilding when he had the means to use genuine gold leaf? Similarly, why would he have gone through the trouble of using metallic foil and the subtle interplay of coloured glazes when he could have managed with a straightforward painted imitation of stone? We should certainly interpret this as the desire for a particular effect: it allowed him to establish a common basis with the gilded frames of the open altarpiece and thus to establish a hierarchical link between the exterior and the interior, a means of dissociating real space from the painted space on the inside of the wings.

The stone represented: sublimated reality?

Meanwhile, in addition to the symbolic dimension of the metal foil, we know that Van Eyck excelled in the art of *trompe l'œil*, and of reproducing different materials. Although some are of the opinion that no attempt should be made to identify the varieties of painted stone in fifteenth-century frames – and that we should simply assess their decorative effect[63] – the question of the nature of the stones represented here has inevitably arisen.[64] Our early attempts led us to make comparisons with travertine, a sedimentary calcareous rock, white in colour but sometimes veering towards grey, yellowish, reddish or brown, according to the impurities present within it, and characterized by small vacuoles dispersed irregularly through it. The dark spots with coloured highlights of the polychromy could be imitating the vacuoles in travertine.

However, a number of specialists in stone, including Marleen De Ceukelaire[65] and Francis Tourneur[66] have excluded this hypothesis in favour of Lede stone, also known as Balegem stone[67] (fig. 5b.15). Lede stone is a calcareous sandstone, varying from grey to light brown in colour, homogeneous in structure and with a very characteristic yellow patina. In olden times, it was quarried over a huge area stretching from Ghent

5b.15 a

5b.15 b

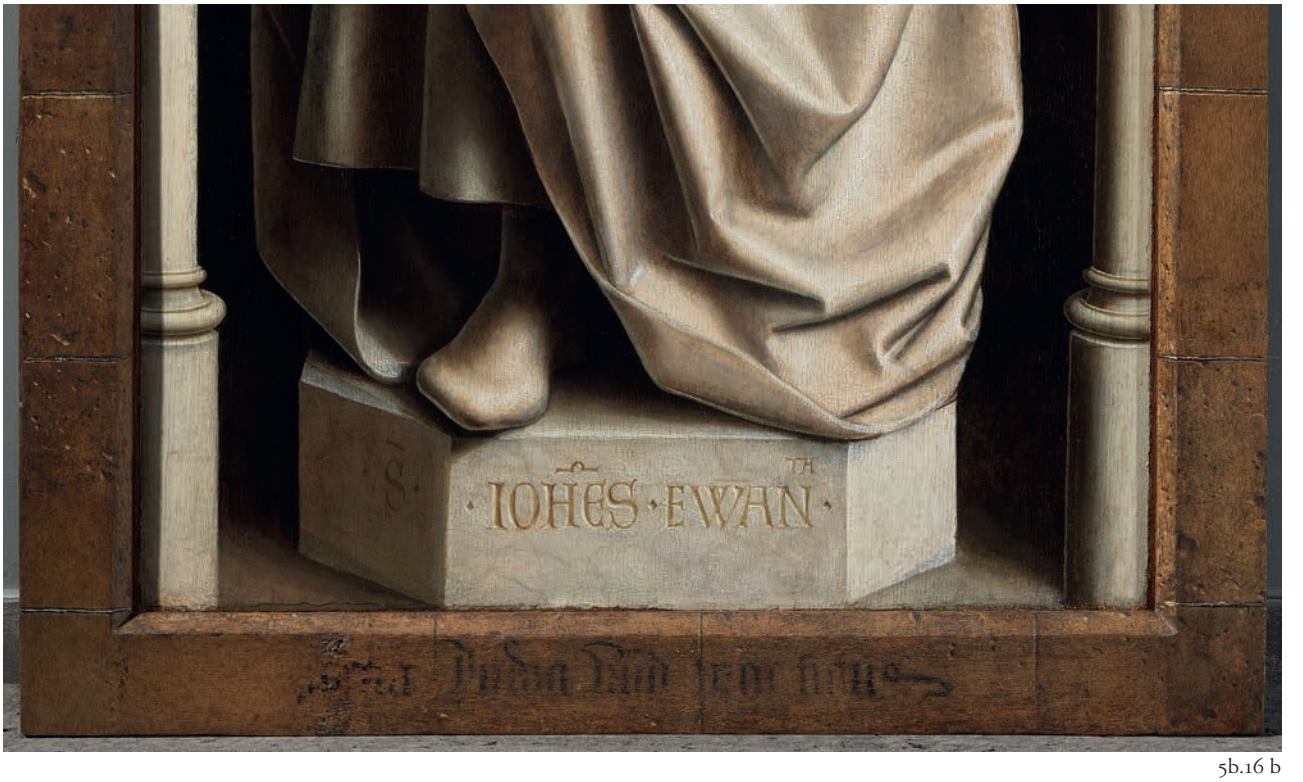
Fig. 5b. 15 (a–b). Visual comparison between the imitation stonework of the frames and the Lede stone of the steps of Sts Michael and Gudula Cathedral, Brussels

to Leuven. From the High Gothic period onwards, Lede stone was the most popular building material and used for any number of buildings,[68] including notably St Bavo's Cathedral. Camille De Clercq[69] is of the opinion that besides the stone's appearance we should also take account of the masonry construction per se. This broader view permits further comparisons with, for example, ferruginous sandstone (*ijzerzandsteen*), another stone much used in the Low Countries and to be found in many fifteenth-century buildings. This approach invites us also to bring the stone imitations in the paintings in the lower register into the discussion. The St John sculptures seem to imitate polished marble, whereas the trefoil arches could be made of Avesnes or Lede stone. How can we account for such a difference in pictorial treatment between the painted architecture and the frames if the latter also imitate a variety of calcareous stone (fig. 5b.16)? Worth noting is that neither Lede stone nor ferruginous sandstone can be polished on account of their porous nature and friable structure. This would seem to be in total conflict with the use of silver leaf covered with coloured glazes to evoke the brilliance and lustrous appearance of polished stone. Even if the stone represented has no basis in reality, the *trompe l'œil* of the frames visually echoes the stones represented in the paintings. The handling is similar, and the roughness of the stone is rendered with the same precision as in, for example, the paving in the panel of *Joos Vijd* (fig. 5b.18), the border of the niche in the *Interior View* (fig. 5b.17) or the wall in the background of the *Virgin Annunciate* (fig. 5b.19) .

The illusion of painted stone must surely also have had some connection with the immediate context of the Vijd chapel and the cathedral, both of which comprised elements made of the same type of stone. The use of silver leaf on the frames of the

Fig. 5b.16 (a–b). Lower register after restoration: a. overall view; b. detail

5b.16 a



5b.16 b

5b.17

5b.18

5b.19

Fig. 5b.17. The border of the niche in the *Interior View*

Fig. 5b.18. The paving in the panel of *Joos Vijd*

Fig. 5b.19. The wall in the background of the *Virgin Annunciate*

exterior panels to give a particular quality of reflection could also be interpreted as a progression from the real space of the cathedral towards the sacred space of the altarpiece, culminating in the interior scenes, whose frames were covered with gold leaf. The use of metallic foils inside and outside the polyptych (whose reflective qualities must have been intensified by candlelight) ensures a visual link between the two levels of the altarpiece, reinforcing their symbolic significance.

In the absence of any conclusive answers following our research into the types of stone represented, other hypotheses could be entertained – for example, Hélène Verougstraete's suggestion about the possible influence of marbled paper from the Middle East, which was used for books and miniatures and made a strong impression on the painters and polychromers of the day.[70] After all it is not unlikely that instead of rigorously imitating reality, Van Eyck took his inspiration from the fictive marbles and stylized motifs featured on marbled papers. Whatever the truth of the matter, Van Eyck probably wished to sublimate reality, producing a very unusual effect as he did in many of his works.

Conclusion

The comprehensive study and treatment of the frames proves once again that restoration, supported by laboratory analysis, provides a privileged insight into early techniques, particularly those of the frames, which are far too often ignored.

Interdisciplinary study and the conservation and restoration work carried out allowed us to (re)discover and reinterpret this exceptional polychromy – which has nevertheless not ceased to challenge many of us. It is exceptional in more than one respect, not only because the choice of silver leaf covered with glazes to suggest stone is unusual in itself, but also because it appears to be unique in the work of Van Eyck and contemporary artists.

If there are those, including Paul Coremans in 1951, who have doubted the authenticity of the polychromy on the frames of the closed polyptych and therefore the authenticity of the quatrain, other elements such as the absence of traces of any earlier polychromy, the evidence of double-layered mordant under the silver leaf – interpreted today as a single application – the similarity of the composition of the pigments of the glazes and the opaque highlights to those of the paintings, as well as the context of the widespread use of silver leaf well before Van Eyck's day all plead in favour of authenticity. And even if the use of silver leaf as the base for the illusionistic rendering of stone in painting seems atypical and raises questions, it is definitely not without importance: here Van Eyck is not satisfied with copying reality, he transcends it. In fact, the stone depicted in *trompe l'oeil* does not seem to be directly inspired by reality: Van Eyck uses the glow and the reflection of the light on the silver leaf to create an unexpected pictorial effect, and to give the closed polyptych a special dimension and symbolism.

Notes

1 Alberti 1992.

2 The concept of frame-painting is explored in a number of books and essays by various authors, including Arasse 2002; Beyer 2006; Bjerre 2008; Paris 1990; Mitchell, Roberts, 1996; Penny 2011.

3 Verougstraete 2015; Billinge et al. 1997.

4 With regard to the restoration treatment of the frames of the exterior panels, see contribution 4b by Augustyniak and Mortiaux in this volume.

5 *Annunciation Diptych,* 1433–1435, oil on panel, left wing: 38.8 x 23.2 cm/right wing: 39 x 24 cm, Museo Nacional Thyssen-Bornemisza, Madrid, inv. 137.b.

6 *Saint Barbara*, 1437, oil on panel, 31 x 18 cm, Koninklijk Museum voor Schone Kunsten, Antwerp, inv. 410.

7 *Portrait of Margaret van Eyck*, 1439, oil on panel, 32.6 x 25.8cm, Groeninge Museum, Bruges, inv. 000.GRO 1621.

8 *Madonna at the Fountain*, 1439, oil on panel, 19 x 12cm, Koninklijk Museum voor Schone Kunsten, Antwerp, inv. 411.

9 Verougstraete prefers the term 'jasper' to 'porphyry', see Verougstraete 2000, pp. 110–111 nn. 13 and 14.

10 Verougstraete 2015, Chapter IV, 'Carved and painted decoration', pp. 83–102.

11 On the frames as well as on the painted exterior wings.

12 The Ambierle *Passion Altarpiece,* follower of Van der Weyden, 1466, Eglise Saint-Martin, Ambierle. In Coekelberghs 1970; Bücken, Steyaert 2013, pp. 114–117. The photograph of the closed altarpiece on p. 116 clearly shows decoration of *trompe l'œil* stonework and Griet Steyaert has given us oral confirmation of the originality of the polychrome painting, in spite of a number of restorations.

13 Including Paul Coremans who nevertheless admitted that a more thorough investigation of the polychromy on the frames was needed. Coremans 1953, p. 122. The problem of the authenticity of the polychromy will be examined under the heading *Silver leaf on mordant.*

14 We would like here to extend our warmest gratitude to the restoration team, and to Cécile Glaude, Caroline Boulord (in the context of the research project financed by Belspo, Action 1-MO/39/011, 'The Mystic Lamb in the laboratory 60 years after Paul Coremans. The contribution of new analytical techniques'), and also to Alexia Coudray (in the context of the project financed by the Gieskes-Strijbis Fund).

15 Verougstraete 1989; 2000; 2015; Billinge et al. 1997, pp. 18–20. Large numbers of pictures depicting painters' workshops illustrate this practice. On the subject of the production of the supports and frames of the *Ghent Altarpiece*, see contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

16 See contribution 5a by Postec and Steyaert in this volume.

17 Nadolny 2006, pp. 148–62.

18 Nadolny 2001.

19 CXLIII – Chapter 150, in Broecke 2015, p. 182.

20 Walcher, Stege, Von Baum 2014, pp. 93–94.

21 'The pigmentation consists of a mixture of ochre and lead pigments (lead white, minium, occasionally also lead-tin yellow) in varying proportions. Frequently small amounts of black, cinnabar, azurite, red lakes and chalk were added', in Walcher, Stege, Von Baum 2014, p. 93; see also Billinge et al, 1997, pp. 31–32.

22 Nadolny, 2001.

23 Coremans 1953, p. 122.

24 In French the term *assiette* is used for water gilding and usually describes bolus.

25 Walcher, Stege, Von Baum 2014, p. 94.

26 Samples lifted from the frames of the Cavaliers and Adam wings clearly display the presence of these two layers of mordants. They will be analysed during the preliminary study and the restoration of the frames of the interior of the open polyptych.

27 *St Luke Drawing the Virgin and Child*, workshop of Dirk Bouts, c. 1476, 109.2 x 86.4 cm, Durham, The Bowes Museum, Barnard Castle.

28 *St Luke Painting the Virgin and Child*, Derick Baegert (1460–1509), c. 1480–85, oil on panel, 62WKV, Münster, LWL – Museum für Kunst und Kultur.

29 This coloured underlayer could also indicate the frame during the execution of the painting, as in the first paintings on canvas covered in size, or in *tüchlein* whose edges were often indicated by a border painted in black, brown, orange or red, a reference to polychrome frames or their underlayers. See Verougstraete 2015, p. 78.

30 Whether for gold or silver on mordant, it is recommended to use a finer foil than the foil used for burnishing; see Bomford, Dunkerton 2000, pp. 22–23; Cennini, Chapter 139, 'Which gold, and in what thickness, is good to lay for burnishing and for mordants?' (Broecke 2015, p. 174).

31 See contribution 4b Augustyniak and Mortiaux in this volume.

32 For more details on this material see contribution 3 by Sanyova et al. in this volume.

33 Spring, Morrison 2017.

34 See contribution 6 by Jones, Augustyniak and Dubois in this volume.

35 The hinges connecting the frames are covered by the same polychromy, which disguises them completely.

36 Verougstraete 1989; 2015; Billinge et al. 1997, pp. 18–20.

37 Because of the different processes undergone by the frames, it has not been possible to study the transition area along the edges of the frames between the silver leaf, present on the reverses, and the gold leaf laid on the front of the frames. This information was lost when the frames were sawn along the grain and the edges were planed.

38 The most important early texts that refer to gilding and silvering techniques are: *Mappae Clavicula* (nineth–tenth century): Smith, Hawthorne 1974; *Schedula diversatum artium* by Theophilus Presbyter (twelfth century), Hawthorne, Smith 1979, particularly Book 3: *The Art of the Metal-worker*; *Il libro dell'Arte* by Cennino Cennini (1390–1435), see Broecke 2015; *Manuscript of Strasbourg* (1400–1570): see Neven 2016; *Experimenta de coloribus, Manuscripts of Jehan Le Begue* (1431) and *De coloribus et artibus Romanorum*, Heraclius/ Eraclius (XIII) in Merrifield 1999; See also contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

39 Especially in the techniques of *sgraffito* or applied brocades; see Geelen, Steyaert 2011 and Stroo 2009.

40 Even though Cennini does not advise its use because it tarnishes rapidly (Broecke

2015, p. 130), he recommends it for representing rich drapery, by applying a layer of vermilion bound in egg, or lake in oil (Chapter 148, Broecke 2015, p. 181), or ultramarine in glue, on burnished silver (Chapter 149), and then adding gold or silver decoration on mordant if required (Chapter 160, Broecke 2015, p. 182); Hoeniger 1991.

41 Halleux 2002.

42 See *'De la manière de colorier les feuilles d'étain en sorte qu'elles paraissent dorées et qu'on puisse s'en servir quand on n'a pas d'or'* in Théophile 1998, p. 20 and XXIX, *De la peinture transparente*, pp. 21–22. See also Hawthorne, Smith 1979, Book 1, XXIV: 'Tin Leaf', and XXVII: 'Translucent Painting'.

43 Plahter 2004, p. 44.

44 The prohibition of this practice is mentioned between 1371 and 1397 in Cologne (see Walcher, Stege, Von Baum 2014, p. 92); in Siena in 1355 (see Bomford, Dunkerton et al. 1994, p. 7); in Antwerp in 1470 (see Campbell, Foister, Roy 1997, p. 9); in Ghent the practice was referred to with the the terms *tentvelde* or *tintvellen* (see Martens 1986, p. 3).

45 Chapter 143: 'If you want to do cloth of silver you should have the same method and conditions for laying silver as for laying gold. In addition, I advise you that if you want to teach lads or young boys to gild, have them lay silver so that they get a bit of practice with it because it is less of a loss' (see Broecke 2015, p. 178). According to Bomford and Dunkerton the price of a sheet of silver was almost one fifth of the price of a sheet of gold; see Bomford, Dunkerton et al. 1994, p. 24 and 201.

46 There are numerous examples in Italian painting from the thirteenth century of silver leaf either on bolus or on mordant used to suggest sumptuous fabrics or the metallic glint of armour, as in the three panels of the *Battle of San Romano* by Uccello, c. 1440, 182 x 320 cm, now in Florence, London and Paris; see Roy, Gordon 2001; or to suggest the translucency of a window in the work of the Sienese painter Sassetta (Stefano di Giovanni, 1392–1450), *The Damnation of the Miser of Citerna*, c. 1440, 171 x 89 cm, Musée du Louvre, Paris, RF 1988–89.

47 For example, the *Virgin and Child* in which silver leaf decoration on bolus (the lining of the mantle) is combined with gold leaf decoration on bolus and mordant, as well as gold-silver laminate known as *or parti* or *zwischgold*: Master of Burgo de Osma (Valencian School), *The Virgin and Child Surrounded by Angels*, c. 1430, 171 x 89 cm, Paris, Musée du Louvre, RF 1579; see Martin, Eveno, Ressort 1998.

48 The use of gilding but also of polished silver covered with coloured glazes was widespread in the large centres of production of carved altarpieces in the fifteenth and sixteenth centuries in the Low Countries, particularly Brussels, Antwerp and Mechelen. See Serck-Dewaide 1998.

49 For Germany, see: Jägers 2016; Nadolny 2006.We cite the case of Norway here because a large number of polychrome sculptures have survived there in a far better state of preservation than those of the Low Countries, thanks to the historical context; they have been studied by a wide variety of scholars; see Plahter 2014, pp. 317–318.

50 Broecke 2015, pp. 180-183.

51 Hoeniger 1991, p. 155.

52 Von Baum et al. 2014.

53 Walcher, Stege, Von Baum 2014, pp. 85–131; Billinge et al. 1997.

54 In *Saints Gregory, Maurice and Augustine*, Circle of the Master of Liesborn, Westphalia, c. 1465–90, 120 x 67 cm, The National Gallery, London, NG 255, the saint's sword is executed on silver leaf on mordant; see Billinge et al. 1997, p. 55.

55 For example, the rendering of the arms in the *Fragment of a Triptych* by the Master of St Lawrence, c. 1420, Wallraf-Richartz-Museum & Fondation Corboud, Cologne, WRF 737, in Von Baum et al. 2014, no. 6, pp. 226–229 and ill. 102, p. 99; or Stephan Lochner's *Last Judgement*, c. 1435, also in Cologne, WRF 66, in which the details of the 'roofs, tip of lance, nails, buckets, cross guard, St Peter's key' are painted on silver leaf on mordant; see Von Baum et al. 2014, no. 18, pp. 274–278, and ill. 83, p. 92; or the plates and saucepans in *The Two Banquets*, Cologne, c. 1450, WRM 862; see Von Baum et al. 2014, no 13, pp. 253–257.

56 Outsides of two wing panels, c. 1435, Bayerische Staatsgemäldesammlungen, Alte Pinakothek, Munich, WAF 501–502; see Von Baum et al. 2014, p. 282 and cross section III.A195, p. 343.

57 Coremans (1953, p. 104) mentions the presence of silver foil under the floor tiles in the panel showing God, but as this area has been the subject of extensive over-painting he is doubtful of the authenticity of the application. As it has not yet been thoroughly examined, it is difficult to draw any conclusion. However, whether we are dealing with overpainting or the original, the technique of coloured glazes on metal foil was certainly used to lend a translucent effect to the tiling.

58 Broecke 2015, p. 130.

59 We have not been able to find any other examples of polychrome frames using silver leaf and coloured glazes to imitate stone.

60 Bernardo Daddi, *The Coronation of the Virgin*, c. 1340, egg tempera on wood, 112 x 65 cm, The National Gallery, London, NG 6599; see Di Nepi, Roy, Billinge 2007, pp. 12–13.

61 Rogier van der Weyden, *Philippe de Croy,* oil on panel, 49 x 30 cm, Koninklijk Museum voor Schone Kunsten, Antwerp, 254. In Metzger, Steyaert 2009, p. 174; Hand, Spronk, Metzger 2006, Technical Appendix, p. 300. From the point of view of symbolism, the choice of silver could in this case also be linked to the status of the person represented, in relation to the painting that completes the diptych, the *Virgin and Child* from the Huntington Library, San Marino, which has a gold leaf background; Nuechterlein 2013, p. 3.

62 Coremans 1953, p. 121.

63 Verougstraete, Van Schoute 1994, p. 104.

64 Dubarry de Lassale 2000; 2005; Marchi, Tourneur 2002; Cnudde, Harotin Majot 1987; Tordoir 2000.

65 Marleen de Ceukelaire is the curator of the geological collections at the Royal Belgian Institute of Natural Sciences, Brussels.

66 Francis Tourneur, Doctor of Science (geology), secretary general of the a.s.b.l. 'Pierres et Marbres de Wallonie', member of the CRMS of the Région Wallonne, tutor at the University of Liège and at KUL.

67 Camerman 2000.

68 *Pierres Naturelles, Notes d'Information Technique* 208, CSTC (Centre Scientifique et Technique de la Construction, September 1997.

69 Camille De Clercq, conservator-restorer in the Stone sculpture workshop at KIK-IRPA.

70 Verougstraete 2015, pp. 91–96; 1998; 2000, pp. 114–115.

6

The Authenticity of the Quatrain and the other Frame Inscriptions

Susan Frances Jones, Anne-Sophie Augustyniak and Hélène Dubois

The verse on the lower frames of the *Ghent Altarpiece*, known as the 'quatrain', was revealed in 1823, when, at the order of Gustav Friedrich Waagen, then a curator at the Königliches Museum in Berlin, a layer of dull, green overpaint was removed from the frames of the wings (fig. 6.1). It reads as follows:

Pict[or H]ubertus eeyck • maior quo nemo repertus [•]

Incepit • pondus • q(ue) Iohannes arte secundu[s] [•]

[Frater] [p]er[f]ecit • Iudoci Vijd prece fretus •

• Versu sexta mai • vos collocat [a]cta tueri •

According to the philologist Christina Meckelnborg, this can be translated as: 'The painter Hubertus Eyck, the greatest who was ever found, began this work, and his brother Johannes, second in art, completed the difficult task in accord with the request of Joos Vijd. With this poem he permits you to view the completed work on the sixth of May [1432]'.[1] The year 1432 is visualized by means of a chronogram, in which the letters that double up as Latin numerals are painted in red. The verse tells us that Joos Vijd (d. 1439), the last legitimate male heir of one of the highest-ranking families in Ghent, commissioned Jan van Eyck to complete the work and that it was begun by his brother Hubert. This information forms the first three lines of the text. In the final line – a separate sentence – the unidentified viewer is requested to look at the work on 6 May 1432. In the view of Meckelnborg, this line shifts the genre of the inscription from an artist's signature to an 'invitational epigram'.[2]

In 1823, at a period before the rise of archival research, the quatrain seemed to provide secure textual evidence for the work's patron, date and authorship by Hubert and Jan van Eyck. The idea that Hubert contributed to the work had already been accepted among writers of the late sixteenth and early seventeenth centuries, most influentially by Karel van Mander in his *Schilder-boeck* of 1604.[3] What dominated the historiography of the altarpiece in the period after 1823 in particular, however, was the debate over the respective contributions of Hubert and Jan van Eyck – so much so that the 'Hubert-and-Jan' problem has become a focus of methodological study in its own right.[4] What was at stake to scholars of the nineteenth and early twentieth centuries, however, was greater even than the problem of the attribution of one of the most deliberately ambitious altarpieces of its time. Because a succession of writers, starting in the late sixteenth century with Lodovico Guicciardini and Karel van Mander,

Fig. 6.1. The quatrain on the exterior frames of the *Ghent Altarpiece*, after cleaning, before retouching

had begun their accounts of Netherlandish painting with the Van Eycks, the problem of the quatrain was also a problem of discovering the identity of the individual genius whose art was the source and well spring of the entire tradition. If this genius were Hubert rather than Jan, as suggested by the wording of the quatrain, this would overturn a significant body of textual and literary evidence that indicated quite the opposite – and it was this that made the quatrain such a conundrum. The idea of Emile Renders that the quatrain was a forgery or addition composed and painted in the early seventeenth century, propounded in his book *Hubert van Eyck, personnage de légende* (published in 1933), has seen something of a revival in recent years, with Volker Herzner, for example, arguing that the quatrain must date from around 1580.[5]

The principal contributions to recent scholarship on the quatrain are philological studies by Hugo van der Velden and Christina Meckelnborg, which have produced conflicting results. In the view of Hugo van der Velden, the poem was composed before 6 May 1432 and was painted, along with a scene of Purgatory, on a canvas support that was hung beneath the altarpiece. The present inscription would have been painted onto the frames most probably in or shortly after 1461, and would be different from the lost original in its script and way of visualizing the chronogram.[6] His central argument is that the metre of the current verse is an erroneous version of Leonine hexameter: the presumed lost original as reconstructed by Van der Velden omits the word 'eeyck' in line one and substitutes the word 'perfunctus' for the current 'perfecit' in line three – both changes that 'correct', as it were, perceived problems in the current poem's metrical structure and rhyme. This idea was countered in 2014 by Meckelnborg, who, contradicting all previous analyses, has argued that the poem is written not in Leonine hexameter but in dactylic hexameter.[7]

The two studies have clarified some problematic aspects of the poem. Meckelnborg has affirmed that the subject of the final line – the person who invites the beholder to look at the painting – is not Joos Vijd, as has sometimes been thought, but Jan van Eyck.[8] With regard to the interpretation of line four, and in particular the problematic verb 'tueri', Van der Velden and Meckelnborg concur that the line is a straightforward invitation to view the work. Arguing that 'collocat' must be translated to mean 'to allow, to permit', Meckelnborg extrapolated from this that the final line must read: 'he [Van Eyck] permits you to view the work'.[9] The final line is thus an invitation to look at the painting rather than a request to the church authorities to protect or take care of it.[10]

A final question is the significance of the date 6 May 1432 in the last line, presumably that of the altarpiece's inauguration. Because this was the date of the baptism of Josse of Burgundy, the new-born son of Philip the Good and Isabella of Portugal, which took place in Ghent, a widely held theory is that the verse was composed to mark the baptism, which would have taken place at St John's – the parish church in which the *Ghent Altarpiece* was installed.[11] The argument is that a sophisticated Latin verse of this kind would have been suitable for such an audience, which would have been high-ranking and erudite (Henry Beaufort, Cardinal Bishop of Winchester presided over the ceremony).[12] That the parish church would have been chosen for the baptism has however been disputed by Bernard Ridderbos, who

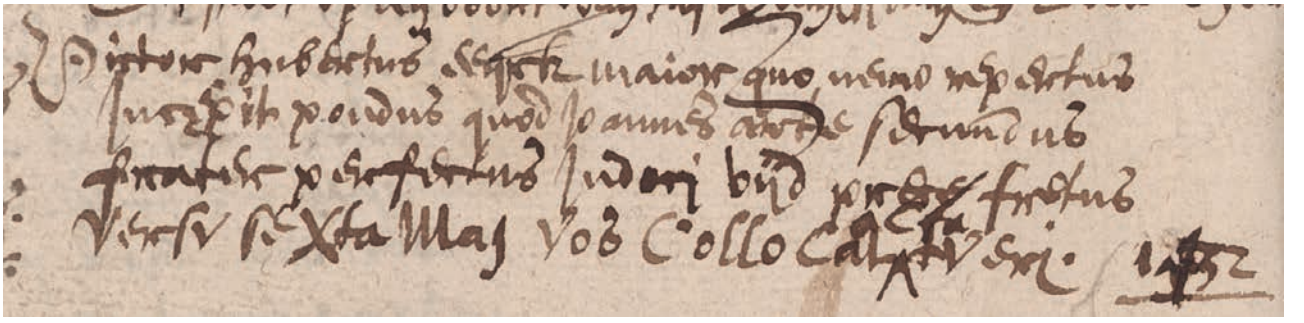
suggested that the infant was more likely baptized in a ducal chapel or church, as was the case with Philip's and Isabella's first child Anthony in 1430 and their third and only surviving child, the future Charles the Bold in 1433.[13] The aim of this article is to shed light on these matters by re-evaluating the visual, material and technical evidence. The main questions it asks are: is the quatrain authentic, i.e. was it designed and painted by Jan van Eyck and his workshop? When was it composed, and when was it painted onto the frames of the altarpiece?

Textual evidence

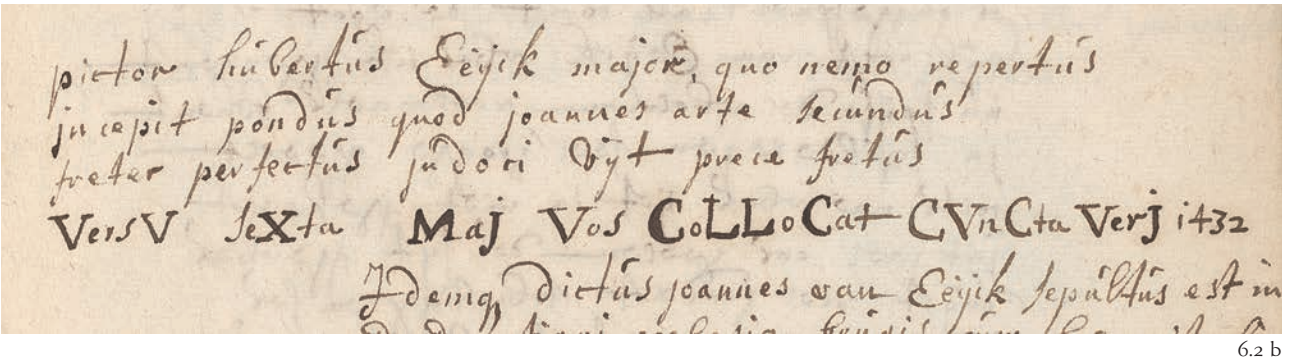
The earliest surviving evidence for the quatrain's presence on the frames before its rediscovery in 1823 consists of written transcriptions, the most prominent being that in a manuscript by Christoffel van Huerne (c. 1550–1629), a Ghent collector of heraldry, inscriptions and genealogical data (fig. 6.2a). Since Van Huerne inscribed the date 1575 on the cover of the manuscript, the transcription has generally been dated to the late sixteenth century, but it cannot in fact be dated precisely, as it was common practice for heraldry scholars to copy such transcriptions from earlier manuscripts, borrow them from each other or transcribe such texts onto sheets of paper that were earlier in date. Van Huerne inserted the verse at the bottom of folio 68 verso, which features transcriptions of Jan's and Hubert's epitaphs along with extracts from Marcus van Vaernewijck's *Den Spieghel der Nederlandscher Audtheyt* (*The Mirror of Netherlandish Antiquity*) of 1568.[14] The transcription is introduced by the words 'Nota. Dit staet up den boort vander tafel van Adam ende Eva te Gendt' ('This figures on the frame of the altarpiece of Adam and Eve in Ghent') and it provides the solution to the chronogram ('1432'); however, it is not entirely accurate, giving 'pondus quod' for 'pondus que', 'joannes' for 'Iohannes' and 'Frater perfectus' for 'Frater perfecit'.[15]

Two other transcriptions of the quatrain – one in a seventeenth-century book of heraldry in the Royal Library, Brussels, the other a manuscript in Ghent University – clearly go back to Van Huerne's version, for not only do they replicate his mistakes, they also misinterpret his insertion of the word 'acta' between the words 'collocat' and 'tueri' in the chronogram, transforming it into 'CVnCta VerJ' (figs. 6.2b and c).[16] Van Heurne himself may have observed the quatrain directly or made his copy on the basis of a now-lost version that contained minor errors.

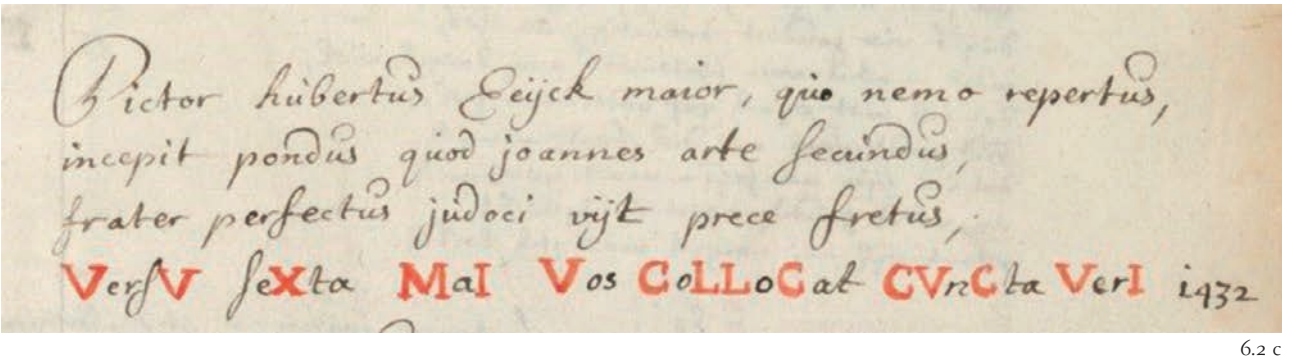
That the quatrain – or at least the chronogram – was legible in the early seventeenth century is attested by a further textual source: sometime after 1625, in his copy of Van Mander's *Schilder-boeck*, the Antwerp art collector Peeter Stevens (1590–1668) correctly transcribed the final line alongside a passage on the *Ghent Altarpiece*: 'VersU seXta MaY Vos CoLLoCat aCta tVerI. Dit staete opde schilderije van Joannes de Eyck tot Gent daer de Incarnatie vant iaer inis a. 1432' (fig. 6.3).[17] Although it cannot be ruled out that Stevens obtained this text from a written source, it is plausible that he transcribed the verse directly from the altarpiece during his travels in Flanders, where he actively sought out early Flemish masterpieces. There are no further surviving literary sources for the quatrain until the early nineteenth century.



6.2 a



6.2 b



6.2 c

Fig. 6.2 a-c. Transcriptions of the quatrain a) by Christoffel van Huerne (c.1550-1629), in 'Ville de Gand: sépultures et monuments par Christoffel van Huerne, 1575', private collection, Belgium, fol. 68v; b) in 'Inscriptions sépulcrales de la ville de Gand', Brussels, Royal Library of Belgium (KBR), HS S16901, fol. 206 and c) in the 'Crombrugghe de Loovelde manuscript', Ghent University Library, G 12926, f. 206

Nederlandtſche Schilders,

Dat deſen Ian van Eyck heeft d'Oly-verwe vonden :
Van dry ſchoon ſtucken wercx, van hem doet hy ghewach,
Die in Florencen ſchoon, t'Vrbijn, en Napels ſtonden.
Waer hoortmen erghen meer ſoo wonder dingh vermonden,
Dat ſulck een ſchoon nieuw Conſt, ſoo heel volmaeckt begint?
Van dees Maeſeyckers twee, en weetmen niet t'oorconden
Wie dat hun Meeſter was, t'beſcheyt men niet en vindt.
Ten rechten was dan Ian zijn leven langh bemint,
Van d'Edel Graef Philips, zijn jonſtigh Heer vol trouwen,
Die hem in eeren hiel, en hadde heel gheſint,
Als blinckende cieraet, van t'Nederlandt ghehouwen.
Zijn werck dat was ghefocht uyt alderley Landouwen,
Daerom men weynigh meer vindt als dees Tafel yet,
Dan datmen ſlechs noch eene in Brugghe mach aenſchouwen,
En eene t'Iper noch, die doch voldaen is niet.
Van deſer Weerelt vroegh dees edel bloeme ſchiedt,
Die uyt ſoo ſlechten Stadt, uyt Maeſeyck is becleven,
Te Brugghe t'lichaem ruſt, daer hy zijn leven liet:
Maer zijn naem en gherucht, onſterflijck ſullen leven.
Ons Graef Coningh Philips dit werck ſoo heeft verheven,
(Ghelijck als hy heeft ſin in alle Conſt eerbaer)
Dat hy dit nae liet doen, en heefter voor ghegheven
Vier duyſent guldens oock, oft op een weynigh naer.
Michiel Coxcie vermaert, den tijdt van een twee Iaer
Was doende om dit te doen, ter plaets in dees Capelle,
Zijn eer' heeft hy betreft, en wel ghenomen waer,
Van 'teerſte tot het leſte, als conſtigh werck-gheſelle.
In Spaengien dees Copie is (op dat ick't vertelle)
Te Vendedoly nu, tot een ghedachte bloot
Van onſes Conings liefde, als die ick boven ſtelle,
Van Eyck, en oock Coxcy, tot lof en eere groot.
Schade leer u. Lucas de Heere.

Vers VI sexta Mai Vos Colloca tatVerl

Sijn vroegh ſterven houd ick ſo niet te weſen: want hy eerſt in zijn ouderdom een Sicilianen d'Olyverwe leerde.

Nae dat Ioannes de Tafel te Gent voldaē hadde / heeft hy weder zijn wooninghe ghehouden te Brugge / alwaer oock van zijn gheleerde conſtighe handt is een Tafel ghebleven / tot een heerlijcke ghedachtenisſe. Veel meer wercken heeft hy gedaen / die dooz den Cooplieden verre verboert zijn ghewozden / en over al van den Conſtenaers met veel verwonderen aenghheſten / grootlijcks ghepzickelt weſende met een deughtſame ghedaente van nijdicheydt / oft luſt van navolginghe / niet wetende hoe ſulcke nieu maniere van ſchilderen mocht toegaen / en al creghen eenighe Pzincen van dit miraculeus dinghen / ſoo bleef even wel de Conſt in Vlaender. Den Hertogh van Vrbijn / Frederijck de 2e. hadde van Ioannes een baed-ſtove / die ſeer net en blijtich ghedaen was. Laurens de Medici hadde te Flozencen van zijner handt oock eenen S. Ieronimus, en veel ander loflijcke dinghen. Oock wozde dooz eenige Flozentijnſche Cooplieden te Napels ghezonden aen den Coningh Alphonſus den eerſten / een ſeer ſchoon ſtuck upt Vlaender / van Ioannes ghedaen: waer in waren ſeer veel beelden / en wonderlijck wel ghedaen / daer den Coningh hooghlijck om verblijdt was. Om dit wonderlijck nieuw werck te ſien / was grooten toeloop van den Schilders / gelijck elders oock. En hoewel d'Italianen vaſt toeſaghen / met alderley opmerckinghe / en rierckende daer aen / wel bevoelden een ſterckachtighe roke / die d'Olp met den verwen ghemenght van haer gaf / ſoo bleef hun dit ſecreet evenwel verborghen. Tot dat eenen Antonello, van der ſtadt Meſſina in Sicilien / beweeght / en luſtich om deſe wetenſchap van d'Olp-verwe

Fig. 6.3. Transcription of the final line of the quatrain by Peeter Stevens (1590-1668) in his copy of the 1618 edition of Van Mander's *Schilder-boeck*, Rome, Bibliotheca Hertziana, Gh MAN 1417-2030/b, fol. 125 v.

Material history

The pattern of damage and wear in the inscription is clarified by the material history of the quatrain. Areas of abrasion are doubtless the result of repeated manipulation of the wings when the retable was opened for masses and feast days and for visitors, and then closed again. Substantial damages to the inscription have also been caused by modifications to the structure of the frames.[18] The most important is the sizable hole on the left side of the lower frame of *St John the Evangelist*, which obliterates the word 'Frater', and which is clearly visible on a photograph taken in Berlin before 1894.[19] This loss may have been caused by the insertion of a lock, possibly the system alluded to in 1588 when reference was first made to safekeeping a key to restrict opening of the retable.[20] The removal of the hardware and further degradations caused additional damage to the wood in this area.[21] A few words at the left and right edges of the exterior frames (those on the panels of *Joos Vijd* and *Elisabeth Borluut*), were later covered by L-shaped, metal-hinged braces: on the left, 'Pictor Hubertus eeyck' and on the right, '…ocat acta tueri' (fig. 6.4).[22] These heavy reinforcements, removed from the lower register before the framed panels were photographed in the late nineteenth century, had a double function: to reinforce the weakened structure and joints and to provide new, strong hinges to attach the wings to the central part.[23] Such important structural modifications are likely to have been linked to a renewed presentation of the retable that occurred after Stevens transcribed the chronogram (after 1625) and before 1794, when the central panels were taken to Paris.[24] The occasion was probably the installation of the altarpiece in a new portico altar in 1662, to which the structure and the articulation of the panels would have been adapted. The green paint that coated the frames and the new metal fittings that would eventually be removed in Berlin in 1823 may well have been applied at this moment. The information provided by the quatrain would still have been visible in the chapel: the coats of arms of Vijd and Vijd-Borluut were present on the keystones of the vaults of the Vijd Chapel and that of the adjacent bay, but also figured by then on a monumental screen installed at the entrance to the chapel in 1639 under the influential patronage of bishop Antoon Triest, a descendant of Joos Vijd's sister, Elisabeth. A Latin inscription of around 1639, which survives only as a handwritten text but was evidently designed to be inscribed on the reverse of a cartouche above the entrance to the chapel, recorded the role of the donors in the commission and the dates both of the chapel's decoration with the altarpiece (1432) and of the endowment of the chapel with a daily mass (1435).[25]

After the transportation of the central panels to Paris in 1794, the wings were stored away in a dusty room, as 'objects useless to the church', where they remained for the next 22 years, until their sale (without the Adam and Eve panels) to the Brussels art dealer L. J. Nieuwenhuys.[26] In 1820, in the house of their subsequent owner Edward Solly in Berlin, a visitor read Hubert's name 'in the inscription', indicating that the first words of the quatrain were again visible. This suggests that the brace on the *Vijd* panel had been removed.[27] It must have been this tantalizing fragment of text that persuaded Gustav Waagen in 1823 (after the acquisition of the panels by Frederick William III of Prussia) to have the overpaint removed from the rest of the quatrain and from the inscriptions on the frames of the *Annunciation*. The brace on the frame of the portrait of Elisabeth Borluut (d. 3 May 1443) must have

Fig. 6.4. Diagram showing the sections of the inscriptions on the frames of the *Portrait of Joos Vijd* and the *Portrait of Elisabeth Borluut* that were formerly covered by hinged angle braces attached with large screws, probably in 1662

been removed at the same time.[28] In order to show these important discoveries and yet hide the poor condition of the original, the architect of the new royal museum, Friedrich Schinkel, designed ingenious double-sided gilded frames to encase the original ones. Openings provided with hinged hatches made the inscriptions visible– and these had already been reproduced in the visitors' guide of 1830, published when the museum was first opened to the public.[29] Schinkel's frames had been discarded by 1894, when the transformation of the panels and frames by sawing through their thickness necessitated a full restoration of the polychromy. The quatrain, although worn, was comparatively spared from the extensive retouching and reconstruction of the paint surface: only some localized retouching of certain letters resulted from this campaign.[30] Indeed, most of the present retouching on the letters is older than the nineteenth century and must predate the application of the green overpaint. Since it improves the legibility of the quatrain, the retouching was not removed in the present restoration.

The hardware used to fix the braces created significant losses in the first words of the verse 'Pictor Hubertus eeyck', specifically two round holes in the *P* of 'Pictor' and the first *e* of 'eeyck'. The H of 'Hubertus' is difficult to reconstruct with precision; however, the final missing letter r of 'Pictor' was very probably a round *r* rather than a straight *r*, a 'rule' of scribal handwriting that was followed in the 'or' of 'maior' in the same line (see 10.c, Reconstruction by Smith, Jones and Augustyniak). In the final section '…ocat acta tueri', the hardware has caused less damage to the inscription, with the holes falling in the first a of 'acta' and the punctuation mark that follows the

inscription. Indeed, this section of the final line of the quatrain is the best-preserved part of the inscription, doubtless partly because it was concealed by the metal brace for a longer period than the left side of the inscription. In this section, the red letters of the chronogram have not been retouched and, as a result, are relatively clear and well-defined (see figs. 6.4 and 6.7a).

The level of expertise

An idea that runs through the scholarly criticism of the quatrain is that its execution is clumsy. According to Emile Renders, the individual letters are neither carefully aligned nor evenly spaced, and the separate lines are not centred on the frames.[31] Renders was convinced that the extensive abrasion in the quatrain was caused by the use of paint that lacked opacity or solidity ('peu couvrante') and was unusually weak and insubstantial, and thus not typical of Van Eyck.

Such negative assessments of the inscription's quality, however, fail to take into account its poor condition. It is true that in the words 'Hubertus' or 'Iudoci', for example, some letters touch and others do not (see figs. 6.1 and 6.15a); nonetheless, if studied in a diagram in which a grid is imposed on the letters, most of the spacing is exceedingly regular (fig. 6.5).[32] With regard to the positioning of the letters, an interesting technical aspect of the execution is that the red letters of the chronogram appear to have been painted on top of black ones.[33] The idea that the layout is careless and unprofessional is likewise incorrect. Admittedly, the first line of verse occupies a different position on the frame from the subsequent three (see fig. 6.1): the beginning of the word 'Pictor' lies only 1.2 cm from the left edge of the frame, whereas the second, third and fourth lines all begin further to the right. This is not due to incompetence, however: instead, it suggests that the first line was a trial run, and that the inscriptions were painted freehand and with a degree of flexibility, without having measured out the length of each line against the available space. Moreover, to argue that the inscription is a forgery or later addition on those grounds would be to hold Van Eyck to standards to which he did not aspire. In the inscriptions on the lower frame of the *Portrait of a Man* in London (fig. 6.6) he ran out of space towards the end, making the letters increasingly narrow and omitting the final stop. His approach to the painting of inscriptions was often flexible and instinctive.

The letters of the quatrain are squarer in proportion than those in the same script on the scrolls of the prophets and sibyls represented on the exterior of the altarpiece (see fig. 6.9 and letter *o* in fig. 6.10b). This was another negative point for Renders and his supporters, but it may be partly to do with how the texts could best be fitted to the available writing-field. The flat part of the frame on which the text is painted is

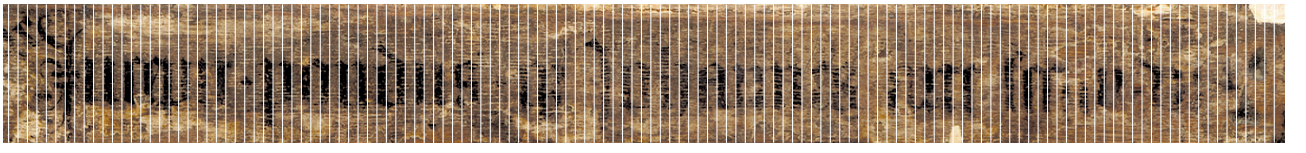


Fig. 6.5. Diagram showing a grid imposed on the second line of the quatrain by Marc H. Smith, Professor of Latin palaeography at the École nationale des chartes and the École pratique des hautes études

Fig. 6.6. Jan van Eyck, *Portrait of a Man (Self Portrait?)*, 1433, 33.1 x 25.9 cm (oak panel), London National Gallery, inv. NG 222, detail: the painter's name

5.2 cm high. The minims of the smaller letters (such as *n*, *c* and *e*) are just over one-third the height of the large, ornamental letters such as the *I* of 'Incepit' at the beginning of the second line, which takes up almost the entire height of the flat. The lines themselves, however, are quite short relative to the writing-field – only seven, six, six and seven words long respectively. Making the spacing between the minims relatively wide may have been a way to ensure that each line would reach the desired length.[34] The shortness of the lines along with the need for clarity and readability must also explain the virtual absence of abbreviation in the inscription and the presence of only one fusion between two letters (the only abbreviation is that of q(ue); the only instance of fusion is the 'do' of Iudoci).

In sum, the execution of the quatrain is by no means inexpert and the alignment, spacing and layout of the letters is professional. Its condition has prevented recognition of its quality. Abrasion of the paint layers and silver leaf has severely reduced their clarity, while most of the inscription's ornamental details have survived only in remnants. Only with examination under the stereomicroscope is it apparent that the ascenders of letter *l* in 'collocat', for example, were originally decorated (compare fig. 6.1 to the reconstruction). Furthermore, punctuation marks consisting of lozenges with hairline decoration were originally positioned at the beginning and end of the final line. The liveliness of the letters is still apparent in the best-preserved section at the end of the fourth line, where some of the letters are assured and even animated, including the *t* of 'acta', which seems to hold aloft a little decorative rhombus (fig. 6.7a). Furthermore, the present restoration has brought to light the elegance of the decoration and cadelling on the letters *P* of 'Pictor' and *I* of 'Incepit' (fig. 6.7b). Lost entirely is the overall effect of black letters set against a background of glazed silver, which must have given the letters exceptional clarity and precision.

6.7 a

6.7 b

Figs. 6.7 a and b. Detail photographs of the quatrain: a) the *t* of 'acta' and b) the *P* of 'Pictor' and the *I* of 'Incepit'. Not to scale

The polychromy of the frame

The question of the quatrain's relationship to its support was first addressed by scientific study in the early 1940s. Though all the painted panels had been evacuated to Pau in 1940, the frames of the wings (brought back from Berlin together with the wing panels in 1920) were left in the cathedral. At the behest of the historian Jozef Duverger, the chemist Eduard Bontinck undertook a thorough study of the quatrain at the University of Ghent, studying the stratigraphy of the polychromy and of the quatrain. In March 1942, with the collaboration of Paul Coremans, the frames were transported by train to the Central Laboratory of Belgian Museums in Brussels, where infrared and ultraviolet photographs were taken. Along with the analysis of paint samples, these documents were the basis of Bontinck's publication. His conclusion was that the quatrain was contemporary with the layer of metal leaf beneath the letters (which he thought to be gold) and was not an addition, a verdict that supported Duverger's proposals concerning the quatrain.[35] During the 1951 restoration of the altarpiece, observation and analysis of the paint of the inscription affirmed that it was contemporary with the application of the silver leaf – a layer that nonetheless appeared unusual to Paul Coremans and his colleagues Louis Loose and Jean Thissen. Though puzzled by the silver layer, they concluded carefully that further study might enable researchers to reach a conclusion about its originality and, as a result, that of the quatrain itself. This thorny issue has finally been put to rest by the technical and historical study carried out during the current project, which reaffirmed the authenticity of the layer of silver leaf.[36]

A key discovery of the project concerns the position of the black paint of the letters of the quatrain within the stratigraphy of the frame polychromy. Rather than lying on top of the uppermost layer of paint on the frame, the letters of the quatrain are embedded within it, as is clear from microscopic study of the word 'collocat'. The letter *a* is painted in black paint on top of the vertical black line that simulates the appearance of a join in the fictive stone. The coloured accent positioned to the left of the black join, however, painted in an opaque pink paint, clearly stops short of the letter at both the upper and lower edges (fig. 6.8). The inference is that the letters had been painted before the final coloured accents were added. This is a crucial piece of evidence because the polychromy in question is the oldest on the frames to survive. No fragments of metal leaf or mordant have been discovered below the present ones. As a result, the only way in which the inscription as a whole could have been painted later than the 1430s would be if all four frames of the lower register had been stripped of their original polychromy and redone.

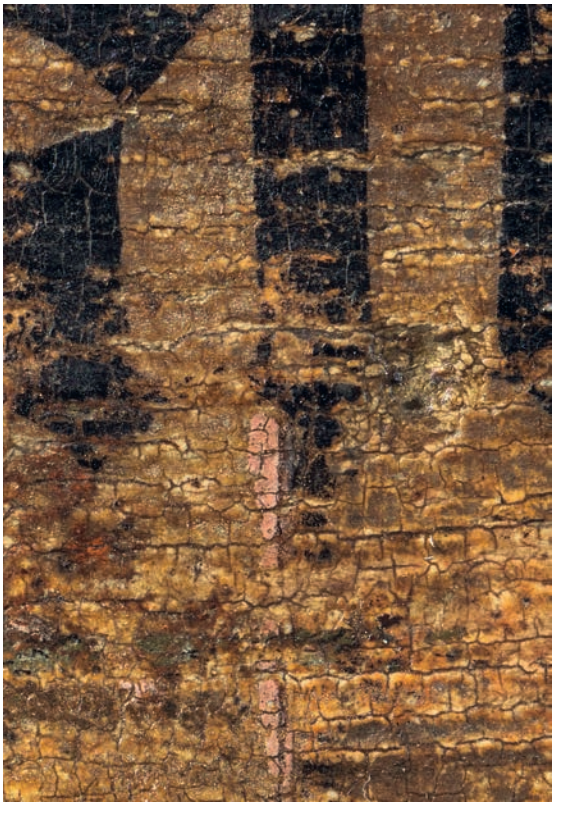


Fig. 6.8. Micro-photograph of the letter *a* in the word 'collocat': the vertical stroke of pink paint alongside the fictive join is painted up to the edge of the letter

Script and formal aspects

The script of the quatrain is *textualis formata*, one of three indicators being that the letter *a* has a double compartment.[37] The letters of the quatrain exhibit all the characteristic features of *textualis*, including concave strokes at the tops and bottoms of the letters, sharp 'thorns' projecting from the sides of the letters and the decorative use of hairlines, taking the form either of vertical pendants (as in the letter *r*), or of extensions at the tops of letters (as in the letter *e*). A more attenuated version of the same script was used for the words of the Archangel Gabriel and the Virgin Mary in the *Annunciation*, executed in real gold (fig. 6.9).[38] More specifically, the forms of the letters in the quatrain almost exactly match those in the scrolls of the prophets and sibyls on the exterior of the altarpiece, as demonstrated by comparisons of the letters *a*, *e*, *t* and *r*, in which those from the quatrain are on the left and those from the scrolls are in the centre (fig. 6.9).

It can be noted that the ascender of *d* in the quatrain has a concave rather than a forked top (for example, in the *d* of 'pondus'), and this is also true of the scroll inscriptions, for example in the *d* of 'adve(n)iet' in the scroll of the Cumaean Sibyl or the *d* at the start of 'dominator' in the scroll of Micah. With the letter *y*s of 'eeyck' (in the quatrain) and 'Syon' (in the banderole of Zechariah) the tops of the letters are virtually indistinguishable but the *y* in the quatrain is not a copy, as its tail swings in the opposite direction. The construction of the two letters is exactly the same: each consists of two bold vertical strokes cut across diagonally by a narrow tail that curls inwards at the tip. The similarities continue in the details: in each case, there is a small, spiky projection at the top right corner of the right-hand minim. It must be stressed that letter *y* is not always constructed this way in *textualis*. To offer another example, there is an alternation in the left-hand side of the crossbar of letter *t*: in some cases (such as the *t* of 'acta' or 'collocat'), it tapers gradually to a fine point as it curves down and inwards to the left, in others (such as in the *t* of 'tueri'), it remains wide to the end of the stroke and has a blunt end, decorated with a vertical pendant.[39] This variation in the execution of the crossbar is also a feature of letter *t* in the scrolls, as shown by the *t*s in the words 'Exulta satis' on the scroll of Zechariah.

In the concave top of letter *t* in the quatrain and in some of the letters on the scrolls, it appears that the brush has moved upwards as it travelled to the right, making the right-hand tip taller than the left (see fig. 6.10a). In both the *t* of 'acta' in the quatrain and the *t* of 'sit' in the scrolls, one of the two tips is slightly forked due to a split in the brush (compare figs. 6.7a and 6.10a). Additionally, if we take an *o* from the quatrain and the scroll inscriptions, we can see in both cases the trace of a brushstroke in the lower left, curving down from the left minim and moving upwards to join the right-hand minim – and it is not the case that every letter *o* in *textualis* of the period was painted in that way (fig. 6.10b). The application of decorative hairlines is also comparable. In both sets of inscriptions, decorative hairlines at the baseline at certain letters curl inwards towards the shaft of the letter: a particularly close example is the hairline at the base of round *r* of 'arte', which is very close to that at the round *r* of 'dominator' (in the scroll of Micah), in that it swells out as it curls inwards and then tapers again towards the tip.[40]

a of 'collocat' | *a* of 'dominator' (Micah) | *a* of 'plena'

first *e* of 'repertus' | first *e* of 'egredietur' (Micah) | *e* of 'plena'

t of 'collocat' | *t* of 'sit' (Micah) | *t* of 'tecum'

first *r* of 'repertus' | *r* of 'egredietur' (Micah) | *r* of 'gracia'

Fig. 6.9. Comparisons between the letters *a*, *e*, *t* and *r* in the quatrain (on the left), the scrolls of the prophets and sibyls (in the centre) and the letters of the Annunciation, in gold (on the right). Not to scale

t of 'Hubertus'

t of 'collocat'

t of 'sit' 6.10 a

o of 'maior'

o of 'dominator' 6.10 b

Figs. 6.10 a and b. Comparisons between letters *t* and *o* in the quatrain and in the scrolls of the prophets and sibyls: a) the concave top of letter *t* in the word 'Hubertus'; the letter *t* of 'collocat' and the letter *t* of the word 'sit' on the scroll of Micah, and b) the letter *o* of 'maior' in the quatrain and the letter *o* of 'dominator' in the scroll of Micah. Not to scale

Perhaps the most distinctive feature of the script in the quatrain is the presence of a lozenge in the decorative hairline of letter *e*, present in the two examples of *e* in 'eeyck' (fig. 6.11a). The lozenge is decorated with a further extension to the hairline, continuing upwards, which gives the letter a distinctly elegant termination.[41] This is a remarkably rare feature: the only other letter *e* with comparable decoration that we have yet found in any inscription in any medium is in the *Ghent Altarpiece* itself, in the scroll of Zechariah, in the final *e* of the word 'Ecce' – which is the first minuscule letter *e* in that inscription: there, the lozenge is positioned near the top of a single hairline (fig. 6.11b). It is assuredly not a restoration and is thus a feature of Van Eyck's style of *textualis*.[42] This feature undermines the theory promoted by Herzner that the quatrain was designed in the late sixteenth century by copying the letters on the scrolls, as it seems highly unlikely that a later painter or even a forger would have perceived a tiny detail such as this and then proceeded to reuse it systematically in

The two *es* of 'eeyck' in the quatrain 6.11 a

The *e* of 'Ecce' on the scroll of Zechariah 6.11 b

Figs. 6.11 a and b. Comparison between letter *e* of 'eeyck' (line 1 of the quatrain) and *e* of 'Ecce' on the scroll of Zechariah. Not to scale

the quatrain.[43] The scholars of palaeography Albert Derolez and Marc H. Smith have both affirmed that the script of the quatrain is in keeping with a date in the 1430s.

A more plausible way to interpret the relationships between these two sets of inscriptions – ones that diverge from each other only in minor details – is the adaptation of a single script to suit different needs. More specifically, the script used for the sacred texts on the banderoles is a higher grade of the same script, as it exhibits forked ascenders in letter *l* (and occasionally *b* and *t*).[44] The principle of varying the same script extends to the words of the *Annunciation*, also on the exterior of the altarpiece. There, the letters are notably ornamental and elongated. Given that these words were familiar to the viewer and that the Virgin's response is inverted, they were probably designed to be seen more than read.[45] In contrast, the words on the scrolls and the quatrain were undoubtedly meant to be read (at least to a degree), and this accords with the character of the letters in each case, which are bold, clear and legible. The differences in the treatment of the script between the quatrain and the banderoles may also take account of the viewing distance. In keeping with their location in the upper register, the scroll inscriptions are larger in scale than the quatrain and each text begins with a letter that is rubricated and unadorned—and thus highly legible. More elaboration and complexity was given to the quatrain: there are elaborate cadels on the *I* of 'Incepit' and the decorative use of the lozenge extends to the hairlines of *e* and *t*.[46] These interrelationships imply that the quatrain was an integral part of the design of the exterior view of the altarpiece, and that all these inscriptions were designed in a single workshop.

Several distinctive letter forms inhabit the quatrain. Among them is an elongated *s* that appears at the ends of the first and third lines, which Renders thought was too fantastical to have originated in the fifteenth century, but which is in keeping with similarly elongated forms of final *s* in painted inscriptions of the fifteenth century, including the word 'Lucas' in a painting of the evangelist by the German painter

Gabriel Mälesskircher (Museo Nacional Thyssen-Bornemisza, Madrid).[47] It also exhibits three alternative forms of the letter *a* (fig. 6.12). In the quatrain, the two-compartment form of *a* in the second line was restricted to the ends of words, appearing as the final *a* of both 'sexta' and 'acta'. There are also two instances of 'box'-*a*, in which both minims are straight and the transverse stroke is horizontal: one of them appears in the name 'Iohannes'. Using alternative forms of *a* was standard in formal, handwritten *textualis* and the practice extended to crafted inscriptions on objects. A stone-carved inscription in *textualis* from Zutphen is datable to around 1444, which brings an example of stone-carved epigraphy that is formally close to the quatrain – both in the use of more than two forms of letter *a* and the bold, solid rendering of the script – directly into Van Eyck's period (fig. 6.13).[48]

a of 'maior'

a of 'mai'

a of 'collocat'

a of 'arte'

final *a* of 'sexta'

final *a* of 'acta

a of 'Iohannes'

Fig. 6.12. The three alternative forms of letter *a* in the quatrain (note that the damaged letter *a* of 'arte' in the topmost line originally looked the same as that in 'maior'. The word 'acta' in line 4 also began with a 'box'-*a*, which is now largely missing.)

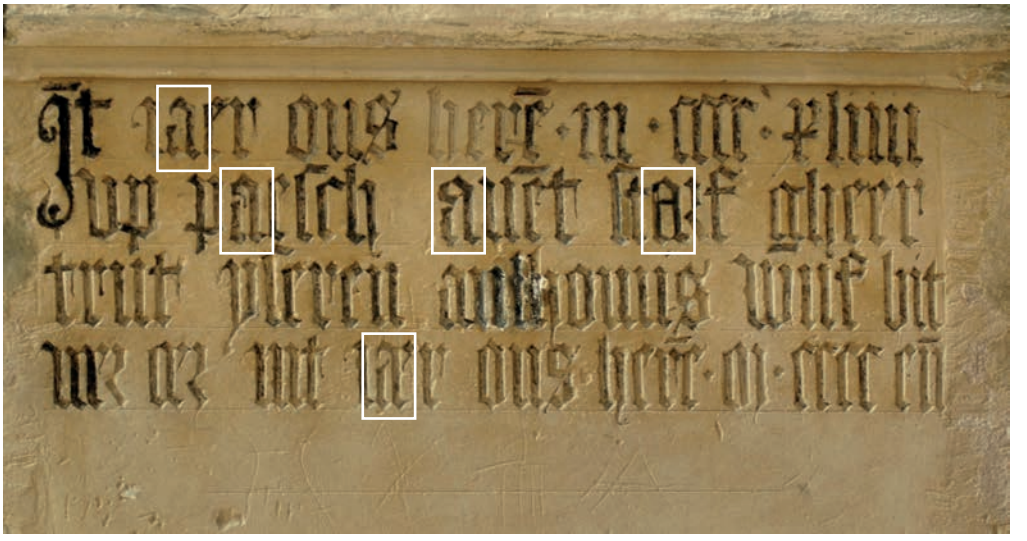


Fig. 6.13. Stone-carved inscription in *textualis*, Church of St Walburga, Zutphen, Gelderland, 1444 or shortly thereafter

Other notable forms can be picked out. The only instance of an 8-shaped *s* in the quatrain is the *s* at the end of Iohannes. Both these forms – 'box'-*a* and 8-shaped *s* – reappear in the inscriptions designed by Van Eyck in *textualis* on the exterior of the altarpiece in both the texts on the scrolls and the words of the *Annunciation* (fig. 6.14). The same set of letters has thus been used for all three texts. Interestingly, the word 'Hubertus' presents the only example in the quatrain of a particular form of *s*. Derived from a cursive form, this can be called 'straight-backed' final *s* (fig. 6.15a).[49] At first sight it appears unusual that this form would occur instead of round *textualis s*. Like a modern *B* in appearance, this letter was considered by Volker Herzner to be an erroneous form by a late sixteenth-century painter who did not understand the script; it is, however, in keeping with Van Eyck's usage.[50] The straight-backed *s* appears once more in the scroll of the Erythraean Sibyl at the end of the word 'sona(n)s' (fig. 6.15b). Moreover, it was a standard feature of Jan van Eyck's inscriptions in Gothic minuscule, appearing at the end of the word 'Iohannes' in the signature in the *Arnolfini Portrait*, the end of the word 'octobris' in *Léal Souvenir* and the end of the word 'mitis' on the scroll of the Infant Christ in the *Dresden Triptych* (figs. 6.15c-e).

A category of inscriptions that strongly recalls the treatment of *textualis* in the quatrain are the headings in *textualis* in accounts and inventories written by scribes working for the Burgundian court in the late fourteenth and early fifteenth centuries, in which the letters are bold and clear, and the ornamentation is relatively limited.[51] Alternative forms lend visual variety and interest to the text: scribes utilise both double-bow *a* and 'box'-*a* (fig. 6.16b), and deploy a straight-backed form of *s* at the ends of words (fig. 6.16a and c) sometimes in contrast to round *textualis s* (fig. 6.16a). When transferred from a written page of text to the frame of a monumental object such as an altarpiece, a visibly formal script of this kind would doubtless have carried some of its status with it. These various comparisons demonstrate that there are multiple formal similarities between the quatrain and inscriptions of Van Eyck's period, including ones that were designed and overseen by Van Eyck – most importantly those in the *Ghent Altarpiece* itself.

a of 'satis' (Zechariah)

a of 'ancilla' (inverted)

es (Erythraean Sibyl)

s of 'dominus'

Fig. 6.14. 'Box'-*a* and 8-shaped *s* in the name 'Iohannes' in the quatrain, in the scrolls of the prophets and sibyls and in the words of the Annunciation, all on the exterior of the altarpiece. Not to scale

In the quatrain, the name 'Iudoci Vijd' was given special prominence. Where the *I* of 'Iohannes' has only a single vertical stroke with a triangular projection on the left-hand side, the *I* of 'Iudoci' is embellished by a double vertical stroke, the left side of which was originally provided with a series of finely painted, decorative offshoots, now almost entirely missing (see 10.2 on folding page). The double vertical stroke and presence of offshoots in letter *I* is typical of high-status handwriting of a slightly earlier period: it appears, for example, in the name 'Iehan' as written by Jean Flamel, secretary to John, Duke of Berry, in the ornate ex-libris at the beginning of the 'Belles Heures', which was produced in 1405–08/09.[52] The letters *I* and *V* are decorated and the *d* of 'Iudoci' is looped, as is the graceful letter *d* of the word 'd(omi)ni' that emerges from the mouth of the Virgin Annunciate in the *Ghent Altarpiece*: evidently

s of 'dominus' 6.15 a

'sona(n)s' (Erythraean Sibyl) 6.15 b

'Iohannes', the *Arnolfini Portrait* 6.15 c

'octobris', *Léal Souvenir* 6.15 d

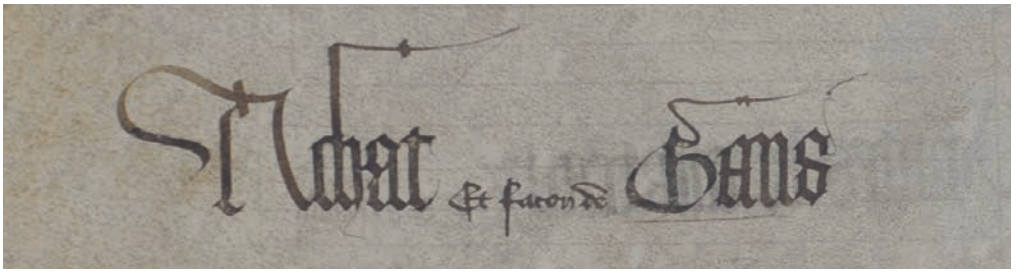
'mitis', the Dresden Triptych 6.15 e

Figs. 6.15 a-e. Straight-backed final *s* in the quatrain and in inscriptions by Jan van Eyck: a) 'Hubertus' in the quatrain; b) 'sona(n)s' on the scroll of the Erythræan sibyl; c) 'Iohannes' in the inscription in Jan van Eyck's *Arnolfini Portrait*; d) 'octobris' in Jan van Eyck's *Léal Souvenir* and e) 'mitis' on the scroll of the Infant Christ in Jan van Eyck's Dresden triptych

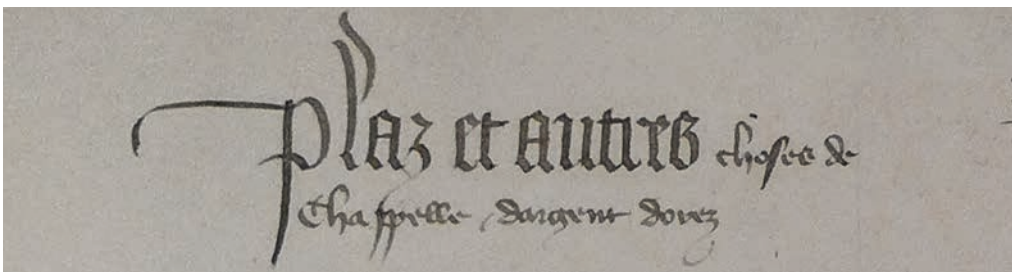
a high-status form (see 10.2 on folding page). The designer of the quatrain thus manipulated the forms of the letters to make a significant distinction: the greater elaboration of the name 'Iudoci Vijd' was surely a means to show the patron's higher social status.

This undermines the view of Volker Herzner that the quatrain must be inauthentic because by placing the patron's name after those of the painters it ignores inviolable social principles of Van Eyck's day. For Herzner, the Van Eycks are being given precedence over Vijd, according them a status that is 'a phenomenon of the early modern era and probably inconceivable without the influence of similar ideas that emerged in the Italian Renaissance'. This for him is 'the crucial argument against the authenticity of the quatrain'.[53] Nonetheless, medieval examples can be found. An inscription on an initial letter *D* in a late twelfth-century psalter made for a man

6.16 a



6.16 b



6.16 c

Fig. 6.16 a-c. Headings in *textualis* by scribes working for the Burgundian court: a) 'Tuilles et Laines', Accounts for expenses concerning the Chartreuse de Champmol, 1397-98 (Dijon, ADCO B11673, f. 23, parchment, 1397-98); b) 'Achat et facon de Gans', Accounts for expenses concerning the Chartreuse de Champmol, 1396-97 (ADCO B11672, f. 192v, parchment, 1396-7) and c) 'plaz et autres choses de chappelles dargent dorez', Inventory made for Philip the Good in July 1420 (Paris BN Colbert 500 no 127, f. 15, paper)

named Roger, possibly the abbot of Reading, reads: 'Ioh(ann)es me fecit / Rogerio' ('John made me for Roger').[54] An eleventh-century ivory cross, probably of Anglo-Saxon origin, bears two inscriptions, both in Latin, one of which states: 'Those who believe in the crucified Christ remember in their prayers Liutger, who carved me at the request of Helen, who is also called Gunhild'.[55] Clearly, these early inscriptions cannot represent an overturning of the social order: they seem instead to place the focus on the patron in a different way, as the person who requested the work from an esteemed craftsman. Herzner is correct that giving the painters' names precedence in the Burgundian Netherlands in the 1430s would be a distinct rarity and perhaps even unique, but the honour given to the two painters in the text is counterbalanced visually in the inscription by the superior status of Vijd's name, and presumably also in the wider context of the Vijd chapel by multiple representations of Vijd's name and heraldry. It is reasonable to suppose that Vijd was prepared to display deference to Hubert and Jan van Eyck despite their role as artisans, and that this was part of a deliberate representational strategy—one that aimed to commemorate the social identity of the Vijd family by communicating not just its wealth but also its ideologies and values.[56]

In view of the formal evidence, it is clear that Jan van Eyck could in principle have designed the quatrain, even if he did not paint it. But the idea that the letter style was inconsistent with Van Eyck was not the only argument wielded by opponents of the quatrain. Scholars of Van Eyck have always adhered to a generalized idea that his approach to inscriptions on frames or framing devices was overtly illusionistic: that the letters would always be painted to appear chiselled into a material or raised in relief out of it. On these grounds, Emile Renders raised the objection that the quatrain is painted on fictive stone but does not simulate stone-carved letters.[57] The fact that it is executed in a Gothic minuscule hand rather than in Van Eyck's standard mixed-hand majuscule has also been called into question, as has the fact that the chronogram in the final line is painted in red.[58]

These features, however, are perfectly compatible with Jan van Eyck's overall inscriptional practice, in which the choice of scripts and of simulated media was systematic. Where only Van Eyck's signature is present, as in the *Portrait of a Man (Self Portrait?)* in London (fig. 6.6), it is inscribed in his archaizing majuscule script. Where an inscription of higher status such as a sacred text was also present, however, he consistently utilised a minuscule Gothic script to depict the signature inscription, as is the case for the *Virgin of Canon Joris van der Paele, Léal Souvenir* and the *Dresden Triptych*. In these particular examples, the Gothic minuscule script used for the signature was *textualis*.[59] The hierarchical system of scripts on the frames of the *Ghent Altarpiece* is thus consistent with that used by Van Eyck, as all of the inscriptions on the exterior frames are in *textualis* (including the inscriptions that identify the sibyls and prophets in the upper tier) and all of the frame inscriptions on the interior wings are in Van Eyck's archaizing, mixed-hand majuscule.

Nor is it problematic *per se* that the quatrain appears to have been painted in black letters onto stone, rather than chiselled into stone. Judging by their visual appearance, the letters of the signature in *Léal Souvenir,* for example, appear to have been painted onto stone in whitish paint. With frames of this kind, inscribed with multiple texts, Van Eyck needed to make distinctions between texts that were different in function and in status and to do so without breaking the illusion that the epigraphic support was made of a single material, and he achieved this by imitating media – stone-carving and painting on stone – that were different in expense and durability but could both be used to inscribe stone in reality. The simulation of letters painted on stone is of course perfectly appropriate for the signature of a painter. A lost *Holy Face*, known from copies in the Berlin Gemäldegalerie and the Bruges Groeningemuseum, was the closest to the quatrain of all Van Eyck's known signature inscriptions in that it was evidently executed in *textualis*, in black paint on simulated stone (fig. 6.17). Moreover, the forms of the letters were also the same. The form of *I* of 'Iohannes' in the copied signatures is almost identical to that of the *I* of 'Incepit' in the quatrain in that the top of the shaft slants sharply to the right, tapering to a sharp point; the letter is elaborately decorated with cadels and the tail swings out widely to the left to counterbalance the cadel patterns above (compare figs. 6.17a and b to 6.7b). In the Bruges copy in particular, the decoration of the letter *I* almost duplicates the *I* of 'Incepit': the interwoven cadel pattern consists of lozenges preceded by a single looped form, and the shape and tapering of the large, curved stroke at the left is identical (compare fig. 6.17a to 6.7b and 10.2 on folding page). The *I* of 'Iohannes' in the

6.17 a

6.17 b

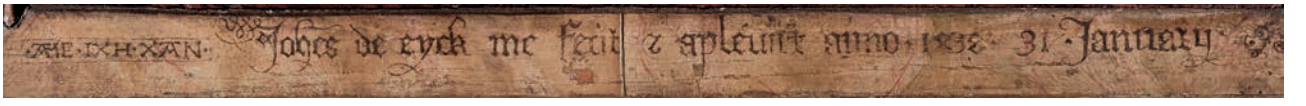


Fig. 6.17 a and b. Two copies of a lost *Holy Face* by Jan van Eyck: a. Detail of the word 'Ioh(ann)es' from the Bruges copy (Bruges, Groeninge Museum, inv. 0000. GRO0206.1), and b. The copy of Van Eyck's signature and a detail of the word 'Ioh(ann)es' from the Berlin copy (Berlin, Staatliche Museen zu Berlin, Gemäldegalerie, inv. 528, early sixteenth century)

Arnolfini Portrait (fig. 6.15c) is also comparable in that the shaft is decorated with horizontal, ribben-like strokes. All these comparisons further weaken the argument that the letters of the quatrain were copied from their counterparts in the scrolls above, as there is no example of this form of *I* in the painted panels of the altarpiece.[60]

It is true that the use of red paint to demarcate the letters of the chronogram differs from the chronogram by Jan van Eyck on the frame of the *Portrait of Jan de Leeuw*, in which the letters that double up as Latin numerals are subtly distinguished by making them appear to be raised in relief and made of a more silvery metal.[61] To argue that the chronogram in the quatrain cannot be by Van Eyck because it is painted in red paint, however, fails to take into account that Van Eyck must have adjusted the external, visual aspects of his inscriptions – their sizes, locations, scripts or simulated materials – to suit the anticipated conditions and habits of viewing. What was appropriate for a small-scale, circular inscription on a portrait that could be held and turned in the hand would not have been suitable for the exterior of a large-scale polyptych that was destined for a privately funded chapel and that might sometimes be looked at from a considerable distance – and red letters may well have seemed a better choice for that particular object. This could also explain that fact that the polychromy of the exterior frames itself differs from other frames by Van Eyck that simulate stone. Rather than the decorative, coloured marbles separated into small blocks that characterize the frames of several of his small-scale, autonomous paintings, the frame of the *Ghent Altarpiece* appears to have been constructed from large blocks

of warm-coloured stone, and the texture of the stone imitation itself is more broadly handled. These choices could in principle show Van Eyck tailoring the polychromy of the frame to the scale of the altarpiece and its immediate surroundings. It is possible that other features of the quatrain that stand apart from Jan van Eyck's surviving inscriptions, including the choice of a relatively bold Gothic script, can be understood in part as responses to the need for maximum clarity and legibility in an inscription of this kind, whose audiences were institutional and civic as well as familial. The choice of a silver leaf underlayer in the polychromy (presently much darkened) must originally have imparted a degree of luminosity to the stone effect, making the black letters stand out in contrast.

If the quatrain is studied with Jan van Eyck's artistic practice in mind, therefore, the arguments for its authenticity become stronger. The fact that the quatrain provides the only other surviving example of a chronogram in fifteenth-century Netherlandish painting aside from that in the *Portrait of Jan de Leeuw* becomes a point in its favour.[62] It is no longer necessary to argue that the present inscription was preceded by an original, now-lost quatrain that was painted on a different support and was more typical of Jan van Eyck. On the contrary, the quatrain is highly suitable for this particular location on this particular object. The poem's division into four short lines makes it appropriate to an object with four narrow frames, as recognized by Bernard Ridderbos.[63] Furthermore, the quatrain is carefully integrated into the exterior view of the altarpiece. At one level it is integrated through its script, more specifically the grade of the script; at another level, the colours chosen for the polychromy – the opaque pink, green and soft yellow accents of the stone effect – correspond to the original pink and green chromatic range of the paintings, revealed by the recent cleaning. The dominant pink-green tonality is established by the dress of Elisabeth Borluut, which was originally a cooler, paler colour. In other features, such as the costume of the Erythraean Sibyl or the undersleeve of the Archangel, both in the upper tier, the removal of blue overpaint has revealed that the original colour was pink. Both the colour scheme and the choice of script therefore seem to take into consideration the painted panels of the exterior – and not just those of the lower tier but also those in the upper tier. This suggests that the entire exterior of the altarpiece, including the frames, was designed to work as a unified whole.

In sum, none of the visual, technical or palaeographic arguments that have previously been made against the quatrain's authenticity stands up to scrutiny. Its execution and layout are not clumsy or inexpert; there are no errors in the execution of the letters, and the order of names, with those of the two painters preceding Vijd's, is permissible for the period of the 1430s, given that Vijd's name has greater hierarchical importance in purely visual terms. The letters in the quatrain correspond in extraordinary detail to their counterparts on the scrolls held by the prophets and the sibyls on the exterior of the altarpiece. The inscription is not an addition to the frame surface but rather participates in the layers of an illusionistic polychromy that is typical of Van Eyck, and it is integral to the closed view of the altarpiece on multiple levels. The choice of *textualis* for the painter's signature and the effect of black letters painted on a stone support are both in keeping with Van Eyck's inscriptional practice, and, finally, there is no model in the altarpiece for the form of the letter *I* of 'Incepit' – a form that is highly characteristic of Jan van Eyck. In the face of all this evidence,

it is reasonable finally to dispel the idea that the quatrain was composed or designed as a forgery in the late sixteenth or early seventeenth century. On the contrary, the weight of the technical, visual and formal evidence gathered thus far supports the view that the quatrain was designed by Jan van Eyck and executed in his workshop. An obvious caveat to drawing a more definitive conclusion at this stage is that findings from the next phases of the ongoing restoration project may yet force a re-evaluation of some of our suppositions. Furthermore, it is worth remembering that our argument does not address methodologies based on the verse's prosody, grammar or syntax, including the problematic construction of the name 'Hubertus eeyck'.[64]

6 May 1432

The evidence presented here is also relevant to current scholarly debates about the quatrain amongst scholars who consider it to be authentic. The key questions concern the date of the verse's composition and execution: whether the verse was composed to mark the baptism of Josse of Burgundy, which took place in Ghent on 6 May 1432, and whether it was painted onto the frames of the altarpiece before that event or immediately afterwards.

One possible solution, proposed by Stephan Kemperdick, is that the baptism of Josse of Burgundy was the motive for the quatrain's composition and that the text was painted onto the frames in time for the baptism on 6 May 1432.[65] The inherent problem with this idea is that it offers only the narrowest of time frames for the Latin verse to be composed, designed and executed. The date of the baptism would most likely have been settled between 24 April (the date of the infant's birth) and 27 April (when the date of the baptism was mentioned), while the ceremony took place on 6 May: this would leave only about ten days for the entire process.[66] It has been suggested that constraints of time might explain a certain clumsiness in the execution of the quatrain, yet from the new evidence there is nothing to indicate that the inscription was composed or designed hurriedly or that the painter who made it was pressed for time. In addition, because the text is integral to the polychromy of the frames, its execution was part of a more extensive, time-consuming process in which the final structure was built up gradually, layer by layer, using a variety of materials. While it cannot be excluded that the quatrain was created at speed by a well-organized team, this theory does not align particularly well with the visual or technical evidence.

A second option addresses (the problem) perceived by Maximiliaan Martens that Jan van Eyck could not have scheduled the completion of the altarpiece itself to 6 May 1432, as he could not have predicted the date of the ducal baptism.[67] In this scenario, the outer panels of the altarpiece were still incomplete on that particular day, including the quatrain.[68] The inscription would have been painted onto the frames subsequent to the baptism and in commemoration of it, something that would allow ample time for its design and execution.[69] This possibility is not excluded by the new technical study, as the frames of the exterior panels were polychromed subsequent to the painting of the 'pictures'.[70] The evidence seems to support only a relatively narrow time frame, however, ending in 1432 or 1433. Although it has been suggested that the altarpiece was brought to completion as late as 1435 (the date of the deed by which

the foundation of the daily mass in the Vijd Chapel was registered with the Ghent aldermen), there are indications that the Vijd Chapel was already in use and could accommodate the altarpiece before that date.[71] In the Latin inscription composed around 1639 that was designed for the Vijd Chapel (mentioned above) two dates were commemorated separately: 1432 is identified as the year in which the chapel was embellished with the altarpiece and 1435 as the year in which it was endowed with a daily mass.[72] In addition, an entry in an accounts book of St Peter's Abbey in Ghent, dated 20 November 1433, can reasonably be interpreted to mean that the altarpiece was then available to view either in the Church of St John or, potentially, in the Vijd Chapel itself.[73]

This brings us to the solution of Bernhard Ridderbos that the date 6 May 1432 was chosen for the altarpiece's inauguration not because of the baptism but because this was the feast day of St John in Oil.[74] This would reflect the devotion of the donors to the two saints John, and the fact that the feast was a holy day of obligation in the Bishopric of Tournai, to which Ghent belonged.[75] It has been suggested that the Vijd Chapel may have been dedicated to St John the Evangelist (the Baptist was the dedicatee of the church).[76] For Ridderbos, it is not to be excluded that the date of the baptism of the infant Josse was chosen to accord with that of the altarpiece's unveiling, rather than the other way round.[77] The two events would have been deliberately integrated. In his view, the quatrain could have been composed either before or after 6 May 1432, but it was never intended to memorialize Josse's baptism. This would be consistent with the fact that the quatrain does not refer to the baptism explicitly.[78] By rejecting the idea that the baptism was the cause of the quatrain, this theory eliminates the idea that Van Eyck suddenly found himself confronted with an imminent deadline. It thus allows for the kind of careful design and execution of the inscription that is supported by the formal and technical evidence.

The question of whether the quatrain was composed before or after 6 May 1432 is complex. Perhaps the most plausible interpretation, however, is that it was composed beforehand, with the intention of inviting the viewer to look at the painting on that particular day. If it were composed retrospectively, it would then invite the reader in the present tense to do something (i.e. look at the work) on a specific day that already lay in the past ('He invites you with this verse, on the sixth of May [1432], to look at what has been done'). This particular wording would seem a less likely choice subsequent to 6 May 1432.

An idea that does not seem to have been raised before is that Jan van Eyck must have worked to a predetermined deadline, agreed on either verbally or in writing, something that was standard practice for altarpieces at the period. The proposal that the date 6 May refers to the saint's feast day rather than the baptism is broadly in keeping with Netherlandish contracts for altarpieces, in which the choice of the completion or delivery date might be determined by the feast day of a saint, one to which the altarpiece or altar was dedicated. In a systematic overview of Southern and Northern Netherlandish contracts, Liesbeth Helmus provides six examples dating between 1505 and 1564 in which the completion or delivery date of an altarpiece was determined by the feast day of a saint.[79] Similar evidence can be cited from the fifteenth century, such as the specification in the contract for Enguerrand Quarton's altarpiece of the *Coronation of the Virgin* (dated 24 April 1453) that the painting be executed

'from the next [feast of] St Michael, for the next one continuous year …'.[80] Had Van Eyck scheduled the workload to a specific completion date, he would also have been able (in principle) to design and execute not only the quatrain but also a wider programme of inscriptions for all of the frames of the altarpiece. This would accord with other paintings by Jan van Eyck which have frames that bear not only the painter's signature and the date (the date sometimes given in full) but also inscriptions that relate to the imagery.[81] Given all these considerations, it cannot be discounted that Jan van Eyck had scheduled the completion of the altarpiece to 6 May 1432 before the date of the ducal baptism was fixed. All these options will no doubt continue to be debated.

The identifying inscriptions

The question of the quatrain's authenticity also involves study of the two sets of identifying inscriptions on the frames of the exterior and interior wings of the altarpiece. Although these inscriptions will be studied more thoroughly in the next phase of the restoration project, some preliminary comments can be made here. These texts identify particular figures in the paintings and were part of a programme that once extended to the frames of the central section, which are lost (figs. 6.18 and 6.19).[82] In formal terms, all the surviving inscriptions on the wing frames appear to be interconnected. To give an obvious example, all three sets of inscriptions –the quatrain and the identifying inscriptions on the exterior and interior frames –utilize elongated final *s* (in the quatrain, in the words 'repertus' and 'fretus'; in the identifying texts on the exterior frames (in a shorter version), at the ends of the names 'Sacharias' and 'Micheas', and in the texts identifying the Just Judges and Knights of Christ on the interior frames, at the end of the words 'IVDICES' and 'MILITES'). Careful thought has also been given to the way in which the frame inscriptions interrelate with the inscriptions painted inside the pictorial field. Just as the script and colour of the quatrain on the exterior of the altarpiece echoes the curved scrolls above the prophets and sibyls, so do the frame inscriptions on the interior of the object – which are in an archaizing majuscule script, painted in black on a support of real gold – respond to the majuscule inscriptions in the arches above the Deity, the Virgin and the Baptist, which crown the interior view and dominate the entire altarpiece. Clearly, the exterior and interior frames of the altarpiece were designed to create meaning in relation to each other: as the wings were opened, frame inscriptions painted in Gothic minuscule on simulated stone (on top of a layer on silver) gave way to frame inscriptions in Romanesque majuscule painted on gold. This hierarchical arrangement is consistent with Jan van Eyck's practice, in which his archaizing majuscule script ranked higher than his Gothic minuscule. Another way in which the three sets of inscriptions are connected is that the stratigraphy of the polychromy on the exterior frames is consistent with that of the interior frames, which are gilded: in both cases, the metal leaf is affixed to a mordant that was applied in two layers, the lower distinctly orange in colour and the upper richer in medium and more transparent.[83] This technical conformity suggests that the polychromy on both sides of the wing frames is contemporaneous.

Fig. 6.18. The inscriptions on the exterior frames of the altarpiece, which identify the sibyls and prophets

The authenticity of the identifying inscriptions has been doubted for some of the same reasons as the quatrain. They have repeatedly been criticized as clumsy and poorly executed. As is true of the quatrain, these assessments should be adjusted in view of the fact that the inscriptions exhibit serious wear and damage and have been retouched.[84] On the exterior frames, where the script is *textualis*, the names of the two sibyls are particularly severely abraded (fig. 6.18).[85] It is clear from the inscription below Zechariah on the exterior, however, which is the best-preserved of the group, that the letters are carefully aligned and elegantly proportioned. In the word 'propheta', moreover, a ruled base line was clearly used as a guide for the lettering – a mark of high-quality execution (see fig. 6.20). Renders criticized the fact that the word 'propheta' is abbreviated in the inscription 'Micheas p(ro)pheta' but not in the inscription 'Sacharias propheta', but this was surely done to balance each of the two inscriptions internally, and is thus a sign of careful design. A technical feature shared with the quatrain is that the inscriptions naming the prophets and sibyls on the exterior are integral to the frame polychromy.[86] Thus the vertical accent painted in

Fig. 6.19. Detail of the inscription 'EVA OCCIDENDO OBFVIT' on the interior of the altarpiece, on the lower frame of the panel depicting Eve

yellow to the left of the join above the first *p* of 'propheta' in the inscription 'Sacharias propheta' is painted carefully up to the top of that letter, as is the white highlight of the join (fig. 6.20). In the same section of the polychromy, on the other side of the fictive join, the black letters were clearly already present when pink accents were dotted between and inside them.[87]

In the opinion of Albert Derolez, the forms of the letters are in keeping with a date in the 1430s.[88] They are formally consistent with those of the quatrain, though they also exhibit differences. The alternative forms of letter *s* that appear in the quatrain and on the scrolls (8-shaped *s* and straight-backed *s*) are not present here. Like the quatrain, the inscriptions use a variety of alternative forms of letter *a*: in the word 'Sacharias', each example of letter *a* is different from the others (fig. 6.21). Two of the forms of double-bow *a* used in this set of inscriptions, however, do not appear either in the quatrain or in the inscriptions in *textualis* on the scrolls held by the prophets. One of them is used for the last *a* of 'propheta' and the *a* of 'Micheas'.[89] This particular type, in which the round stroke of the upper compartment curls tightly inwards, was certainly available in the early fifteenth century, as shown by a similar form in the painting of the *Annunciation* by Melchior Broederlam on the reverse of the *Retable of the Crucifixion*, datable to the 1390s (fig. 6.21).[90] Among the formal details shared with the quatrain is the decorative stroke that curls inwards at the top of letter *p* of 'propheta' in the inscription below Zechariah, a finer version of which is found in *p* of 'pondus' in the quatrain.[91] The inscriptions also share features with the inscriptions on the scrolls: in each case, the texts begin with a rubricated letter (the form of *E* in 'Eritrea' being identical to the *E* of 'Ecce' on the scroll of Zechariah) and letters *b, h, l* and *t* have bifurcated ascenders.[92] These observations present us with a set of inscriptions that are compatible with the quatrain and that are likewise embedded in a frame polychromy that is the oldest detected on the frames.

One of the issues most in need of resolution in relation to the texts beneath the two sibyls is whether they accord with the identities of the figures depicted. Among the arguments used by Herzner to date the inscriptions of the exterior frame to a period decades after Van Eyck's lifetime is that the painted labels misidentify the two sibyls, transposing their names.[93] According to Dana Goodgal and others, iconographic

Fig. 6.20. The inscription 'Sacharias propheta', detail

tradition demanded that the acrostic poem published in the pseudo-Augustinian *Sermo contra Judeos* (beginning 'E celo rex altissimus …') be associated with the Erythraean Sibyl and that the lines from book six of Virgil's *Aeneid* (beginning 'Nil mortale sonans …') be identified with the Cumaean Sibyl.[94] This impression may be misleading, however. It sometimes occurs in literature and the visual arts that a prediction accorded to one sibyl is transferred to another. Furthermore, although St Augustine in his *Civitatis Dei* attributes the sibylline acrostic to the Erythraean Sibyl, he acknowledges a debate as to '… whether she is the Erythraean, or, as some rather believe, the Cumaean …'.[95] In sum, scholarship has not properly established that these identifications are indeed a mistake.

On the interior wing frames, finally, the surface has been regilded and the majuscule inscriptions have been completely overpainted (fig. 6.19).[96] In broad terms, the letter forms are consistent with Jan van Eyck's standard mixed-hand majuscule script but the details are sometimes uncharacteristic: for example, the serifs at the

Fig. 6.21. Alternative forms of letter *a* in the inscription 'Sacharias propheta', with a comparison of the letter *a* in 'Micheas' to the letter *a* in the word 'gracia' in Melchior Broederlam's *Annunciation,* 1390s, Dijon, Musée des Beaux-Arts

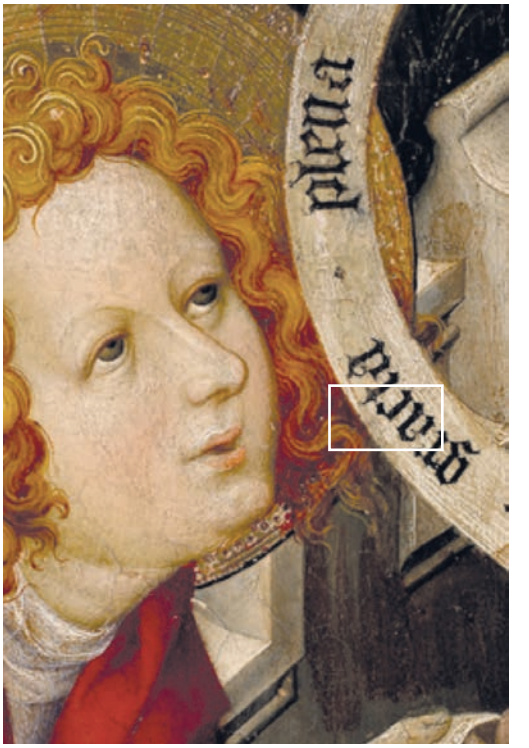
first *a* of 'Sacharias'

second *a* of 'Sacharias'

final *a* of 'Sacharias'

a of 'Micheas'

Melchior Broederlam, *Annunciation*, 1390s



baseline of certain letters in the lower register (those that identify the Judges, Knights, Hermits and Pilgrims) are not Jan van Eyck's typical wedge-shaped serifs but curve outwards and upwards. This underscores the need to make careful comparisons between these letters and those in other works by Van Eyck, his workshop and associates. Only with further study of the identifying inscriptions will the interrelationships between all the frame inscriptions become clearer, permitting a final re-evaluation of the quatrain itself.

Acknowledgements

We are profoundly grateful to Professor Albert Derolez for coming to look at the quatrain the during the restoration of the frames, and to Marc H. Smith for generously sharing his expertise, including valuable comments on a talk given by Susan Jones at the Ghent Altarpiece Study Day in 2018, which greatly improved the text.

Notes

1 Meckelnborg 2014, p. 118.

2 Meckelnborg 2014, p. 119.

3 For the idea that Hubert began the painting, see for example Lucas de Heere's *Ode* of 1559 (Weale 1908b, pp. lxxix [stanza 10] and lxxx [stanza 17]). Kemperdick has observed that the quatrain, if original, makes the altarpiece the 'very earliest firmly dated example of fifteenth-century Netherlandish panel painting' (Kemperdick 2014, p. 20).

4 For an analysis of the language of nineteenth-century connoisseurship on the altarpiece see Heyder 2017b, pp. 9–14.

5 Emile Renders's arguments have been rebuffed by several authors, most convincingly by Jozef Duverger and Elisabeth Dhanens (Renders 1933; Duverger 1945, pp. 38–45; and Dhanens 1965, pp. 10–17). For Herzner, see Herzner 1995, pp. 164–80; Herzner 2011; and Herzner 2013–14.

6 Van der Velden 2011b, p. 38; Van der Velden 2011a, pp. 140–41. Van der Velden envisaged a text in majuscule letters in which the letters of the chronogram were distinguished illusionistically by playing with different levels of relief, as they are in Van Eyck's *Portrait of Jan de Leeuw* (Vienna, Kunsthistorisches Museum).

7 Meckelnborg 2014, p. 115.

8 Meckelnborg 2014, p. 118 and n. 48. Meckelnborg pointed out that the subject cannot follow on from the name 'Iudoci Vijd' in the previous line because the latter is in the genitive case ('at the request of Judocus Vijd').

9 Meckelnborg 2014, p. 118; Van der Velden similarly translates 'collocat' to mean 'to summon, to invite' (Van der Velden 2011b, p. 35).

10 For the alternative reading of 'tueri' as 'to protect' or 'to take care of', see Ridderbos, Van Buren, Van Veen 2005, p. 52; Dhanens 1965, p. 12 (Dhanens translated the line: 'On the sixth of May he [Vijd] begs you by means of this verse to take care of what came into being').

11 Van der Velden 2011a, p. 140; Kemperdick 2014, pp. 27–29; Meckelnborg 2014, p. 119.

12 Meckelnborg 2014, p. 119.

13 Ridderbos 2017a, pp. 140–141; Ridderbos 2017b, pp. 172–73.

14 Renders (1933, pp. 36–37) thought the epitaphs had been copied from Van Vaernewijck's transcriptions in *Den Spieghel* because other passages on folio 68v are based on that text.

15 See Van der Velden 2011b, p. 10 n. 6; Meckelnborg 2014, p. 120 n. 6.

16 The watermarks on the paper of the Brussels and Ghent versions are different: a bearded foolscap looking to the left on top of a capital letter M in the Brussels manuscript, and a nesting pelican piercing her breast, surrounded by a wreath, in the Ghent copy. Duverger (1945, p. 42) considered the illuminated manuscript in Ghent University to be an eighteenth-century copy of the KBR version; the latter would be based on a work started by the family De Grutere around 1560 and completed in 1622. On the Ghent manuscript, see also Renders 1933, p. 45–47; De Smet 1912.

17 Briels 1980, pp. 171–175 and 211. Stevens's 1618 edition of the *Schilderboek* is now in the Biblioteca Hertziana in Rome.

18 See contribution 1 by Dubois, contribution 5b by Augustyniak, Mortiaux and Sanyova and contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

19 Van Huerne's transcription published by Norbert Cornelissen and Liévin de Bast in 1823 permitted the reconstruction of the third verse by the reintegration of the missing word 'Frater' at the beginning of line 3 (De Bast 1823, p. 263).

20 Duverger 1945, p. 55; Dhanens 1976, p. 19, p. 53 doc. 14 (*Acta capituli*, 27 October 1588).

21 Woodworm damage to the frames was alluded to in 1817 as a means to justify the sale to L. J. Nieuwenhuys on 18 December 1816: Van den Gheyn 1900.

22 For photographs of the braces, see contribution 1 by Dubois and contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

23 Reports by Anne-Sophie Augustyniak, Laure Mortiaux, Jean-Albert Glatigny. See also contribution 2 by Ketels, Glatigny and Augustyniak and contribution 4b by Augustyniak and Mortiaux in this volume.

24 The wings remained in Ghent but were sold by the church on 18 December 1816, just over half a year after the central panels were returned to Ghent. Since the wings were neglected in storage, it seems unlikely that the hinged reinforcements would have been applied in that short period.

25 See Dhanens 1976, pp. 27–32. The painted inscription itself is no longer visible: it may have been cleaned off, as was (probably) the polychromy on the sculpted coats of arms on the same screen. For the Latin text (Ghent, RAG, B 4929, fol. 13), see Dhanens 1976, pp. 73–74, doc. 48, and fig. 8.

26 The quotation is from a report dated 7 July 1817, sent by Jacques-Pierre-Joseph Le Surre (1763-1844), *vicaire général* of Ghent, to the governor of East Flanders, Karel Lodewijk Willem Joseph, baron van Keverberg van Kessel (1768-1841); see Van den Gheyn 1900, pp. 207–08; Coremans 1953, p. 44. The wings could have been stored away before the arrival of the French commissaries, although no written source comfirms this.

27 Kemperdick, Rößler 2014, p. 79, referring to Johanna Schopenhauer who, in her 1822 publication, identified Vijd as Hubert van Eyck, possibly basing her conclusion on the underlying inscription, and Johann Heinrich Meyer, who refers directly to the name Hubert van Eyck in 'the inscription'. Both viewed the collection in 1820. See Schopenhauer 1822, pp. 64–65, and Johann Heinrich Meyer, Notes on a visit to Berlin, Klassik Stiftung Weimar, Goethe Schiller Archiv, 64/100,2, pp. 42v–43v (not consulted).

28 Waagen 1824a. Late nineteenth-century photographs, taken in Berlin, show that all the inscriptions are free from the overpaint that still covers the rest of the mouldings. The corner braces on the frame of the Virgin Annunciate are still present whereas they have been removed from the frame of the *Archangel Gabriel* (see contribution 1 by Dubois and contribution 2 by Ketels, Glatigny and Augustyniak in this volume).

29 Waagen 1830, p. 132; Stehr, Dubois 2014, p. 128.

30 See the contribution 5b on the restoration of the frames by Augustyniak, Mortiaux and Sanyova in this volume.

31 Renders 1933, pp. 50, 162. Herzner (1995, p. 165) concurred that the execution lacks care and precision and that the lines are badly positioned within the writing-field.

32 We are very grateful indeed to Marc H. Smith for lending us his expertise and sending a diagram of the spacing.

33 Black paint is still partly visible around the edges of most of the red letters under the microscope. The *c* of 'acta' and the *u* of 'tueri' are visibly painted on top of black letters. As such, it is possible to argue that the red letters are not contemporaneous with the black ones; however, technical explanations are also possible: painting all

the letters in black paint first would presumably have facilitated correct spacing. Another possible implication is that the painter used a model for the inscription in which the chronogram was indicated not by colour but by some other means, such as underlining.

34 For the interest of comparison, the minims in the quatrain are roughly 2.0 cm high, while those in the *textualis* script used for the signature of the *Van der Paele Virgin* are only slightly taller, at 2.2 cm high. The height of the flat writing-field in the *Van der Paele Virgin* is currently 4.5 cm (it was originally slightly taller but has been reduced at the top and bottom by two horizontal bands of gilding, now largely covered with modern paint, probably bronzine). Since the inscription in the *Van der Paele Virgin* is long and almost half of the words have been abbreviated, it may have required greater compression to fit the planned text area: in accordance with this the letters are narrower and more attenuated than those of the quatrain.

35 Bontinck 1945, pp. 74–82. The photographs taken in Brussels were published in Bontinck's technical study in fig. VI (UV), figs. VII–XI (IR).

36 For the stratigraphy of the frame polychromy, see contribution 4b by Augystyniak and Mortiaux and contribution 5b by Augystyniak, Mortiaux and Sanyova.

37 The other two are that *f* and straight *s* stand on the line and have no descender and that the ascenders of *b*, *h*, *k* and *l* do not have loops; see Derolez 2003, pp. 72–102, p. 73. No attempt has been made here to suggest a narrower designation within the broad category *textualis formata*.

38 The technique is mordant gilding.

39 The downward curve of the crossbar of *t* in 'acta' is difficult to distinguish due to paint loss.

40 In the quatrain, this type of hairline decoration is visible at the baseline at round *r* at the end of 'maior'; *r* of 'arte'; final *a* of 'sexta' and 'acta', *t* of 'collocat' and *t* of 'tueri'; in the scrolls, they are found in letters at the ends of words: in the banderole of Zachariah, at *x* of 'rex', in that of the Cumaean sibyl, at the round *r* at the end of 'futur(us)' and in that of Micah, at the straight *r* at the end of 'egredietur', the *i* of 'qui', the *t* of 'sit', the round *r* at the end of 'dominator', the *n* of 'in' and the *l* of 'isr(ahe)l'. Both the inscriptions on the banderoles and the quatrain also show decorative hairlines at the headline at certain letters, including *e* and final *s*.

41 Our thanks go to Marc H. Smith for his help in characterising the use of the lozenge in the quatrain, and particularly this addition of a 'second hairline', a feature that he considers more painterly than scribal.

42 Bart Devolder, the restorer of that panel, has confirmed that the feature is original.

43 Herzner 1995, p. 166. As it appears only in the first minuscule letter *e* in Zechariah's text, and does not reappear in any of the other examples of letter *e* on the scrolls, the use of the lozenge here may represent a preliminary idea that was subsequently abandoned.

44 Our thanks go to Marc H. Smith for kindly sharing this observation.

45 The reason for the inversion of the Virgin's words, however, is surely not to make them readable by the Holy Spirit, as suggested by Elisabeth Dhanens, but simply to make them move in the correct order from Mary's lips towards the angel (see Dhanens 1980, p. 93).

46 Aside from its appearance in the hairlines of letter *e* in 'eeyck', the lozenge — likewise decorated with a second hairline — was also originally present in the letter *e* of 'nemo', 'Iohannes', 'arte', 'prece', 'fretus', 'sexta' and 'tueri'. The hairline of the letter *t* in 'acta' is also decorated with a sharp-cornered lozenge, to which an additional hairline is added. Other examples of *t* in the quatrain may once have had similar decoration. Note also that the lozenges used for dots over letter *i* in the scrolls and over letters *i* and *j* of 'Vijd' in the quatrain are treated similarly, with a second hairline growing out of the lozenge and curling inwards.

47 Renders 1933, p. 162. The *St Luke Painting the Virgin* is datable to 1478 (oil on panel, 77 x 32 cm, inv. 237 (1928.19)).

48 Another fifteenth-century inscription in *textualis* in an art work that introduces variant forms of letter *a* is the topmost of the two stone-carved inscriptions of the wall memorial of Jean de Libourc in the Church of Notre-Dame, Saint-Omer, made c. 1470. The inscription contains

four examples of *a* with a double bow and three examples of 'box'-*a*. For an illustration of the wall memorial, see Brine 2015, p. 118, fig. 53. No systematic study has been made of how such variants were deployed in painting, sculpture and other media.

49 Marc H. Smith kindly clarified the origin of this form of *s* and suggested this nomenclature (e-mail dated 3 December 2018), for which we are most grateful.

50 On that letter as an erroneous form, see Herzner 1995, p. 165 n. 44.

51 Our thanks go to Susie Nash for permitting us to study and reproduce her photographs of these inscriptions.

52 The Belles Heures of Jean de France, duc de Berry, The Cloisters Collection, 54.1.1a, b (folio 1r).

53 Herzner 2011, pp. 127–28; Herzner 2013–14, p. 99.

54 Oxford, Bodleian Library, MS. Auct. D. 4.6, fol. 91r (datable around 1160); see De Hamel 1994, p. 78, fig. 64.

55 The text in Latin reads: 'QUI IN CHRISTUM CRUCIFIXUM CREDUNT LIUTEGERI MEMORIAM. ORANDO FACIANT. QUI ME SCULPSERAT. ROGATU HELENE QUE ET GUNHILD VOCATUR'. See Favreau 1997, pp. 121–22, figs. 23b, c, d and e (Favreau provides a French translation: 'Que ceux qui croient dans le Christ crucifié fassent mémoire dans leurs prières de Liutger, qui m'avait sculpté à la demande de Hélène, qui est appelée aussi Gunhild'). The cross is in the Nationalmuseet, Copenhagen. The other inscription names only the patron.

56 These values must not be understood as urban or 'bourgeois': for one generation, the Vijd family managed to acquire all the necessary attributes of nobility; see Buylaert and Verroken 2013.

57 Renders 1933, pp. 49–50; Herzner 1995, p. 166; Van der Velden 2011a, p. 137.

58 Herzner 2011, p. 129 and Herzner 2013-14, pp. 95-98 argued that colour was not used in chronograms until the mid-sixteenth century; Van der Velden 2011a, p. 137, countered Herzner's argument while proposing that a lost 'original rendering' of the quatrain by Jan van Eyck would have visualized the chronogram differently. Irrefutable evidence that red chronographic letters were used in fifteenth-century panel painting was subsequently set out by Joris Heyder (Heyder 2015, pp. 5–16).

59 That *textualis* is the script in *Léal Souvenir* is clear from the verticality of the letters and their forms; the elegant treatment of the script recalls that of the words of the *Annunciation* in the *Ghent Altarpiece*. In the signature inscription of the *Arnolfini Portrait* (National Gallery, London) the *f* of 'fuit' is cursive in form but many of the letters in the body of the text are upright and recall *textualis* (e.g the *o*, *n* and *e*). Professor Albert Derolez kindly affirmed the characteristics of these scripts and discussed the script of the *Arnolfini Portrait* inscription in an e-mail dated 17 October 2016. *Textualis* was also used by Van Eyck for scroll inscriptions that represent speech or prophecy.

60 A notable feature of the quatrain that is not present in these copies of Jan van Eyck's signature in *textualis*, however, is that several of the letters lie exactly on top of fictive 'joins' in the 'stone'.

61 For a fifteenth-century chalice that predates the *Portrait of Jan de Leeuw* – himself a goldsmith – in which different coloured metals are used to distinguish a chronogram see Heyder 2015, pp. 13-14.

62 Heyder 2015, p. 12 sees the portrait of De Leeuw as a strong argument for the authenticity of the chronogram in the quatrain.

63 Panel discussion on the *Ghent Altarpiece* organized by Stephan Kemperdick and held in 2015 at an International Colloquium in the Berlin Gemäldegalerie to accompany the exhibition 'Der Genter Altar der Brüder van Eyck in Berlin 1820–1920'; now published in Ridderbos 2017b, p. 173.

64 Some of the perceived problems may be pragmatic solutions to the difficulties of balancing word choice, meter and rhyme. As suggested by Scott Nethersole, it may be that the word 'secundus' in the debated phrase 'arte secundus' was chosen to make the line scan correctly.

65 Kemperdick 2014, pp. 22–29; see also Meckelnborg 2014, p. 119.

66 For this theory, see Kemperdick 2014, pp. 27–28; Meckelnborg 2014, p. 119. For the letter in which 6 May is given as the date, dictated by Isabella of Portugal on 27 April 1432 and addressed to Thierry le Roy, the *maître des requêtes* of the hôtel of the duke and treasurer of Hainaut, see Lemaire and Henry 1991, p. 94.

67 On this question of Jan not being able to predict the baptism, see Martens 2017b, p. 170 and Kemperdick 2014, p. 27.

68 Martens here supports the view of Hugo van der Velden; see Martens 2017b, p. 170 and Van der Velden 2011b, pp. 38-39.

69 On this theory, see Martens 2017b, p. 170.

70 See contribution 5b Augustyniak, Mortiaux and Sanyova in this volume.

71 Van der Velden 2011b, pp. 38-39.

72 See Dhanens 1976, pp. 31–32. The verse reflects the knowledge of the descendants of the Vijd and Borluut families. Duverger was surely correct to suppose that the families' descendants had more evidence at hand than has come down to us and that they may have consulted documents that are now lost (Duverger 1945, n. 187).

73 See the recent discussions by Stephan Kemperdick in Kemperdick 2014, pp. 28–29, and Kemperdick 2017, pp. 167–68; see also Duverger 1945, p. 67 and n. 231, and Dhanens 1965, p. 89. On the deed of registration, see Dhanens 1976, pp. 9–14, p. 10.

74 Ridderbos 2017b, pp. 172–73.

75 Strubbe and Voet 1960, p. 170 (Johannes ante Portam Latinam). The date 6 May was probably that of the dedication of a church located at the Porta Latina in Rome and founded by Pope Adrian; this church would be the forerunner to the present San Giovanni a Porta Latina. The date also commemorates a miracle described by Tertullian (*De praescriptionibus*, chapter 36) in the year around 94 CE whereby the saint was cast into a cauldron of boiling oil by the verdict of the Senate but remained unscathed (see Farmer 1956, pp. 240–42).

76 For this idea, see Panofsky 1953, p. 208 and Dhanens 1965, p. 36.

77 The choice of 6 May for the baptism may have seemed fitting for other reasons. The feast day of St John in Oil may have been regarded as suitable for a baptism, as the sacrament of baptism seems to be evoked in certain pictorial representations of the miracle, in which the saint is shown standing in prayer in the cauldron as oil is poured onto his head (see for example the painting by the Master of the Winkler Epitaph, dated to the 1480s, in the Szépművészeti Múzeum Budapest, inv. 4147). My thanks go to Geoffrey Nuttall for bringing the visual analogy to my attention. It has been noted that other important feast days – ones that were celebrated in all Netherlandish bishoprics – also fell in this period: those of Saints Philip and James on 1 May and of the Invention of the Holy Cross on 3 May (See Strubbe, Voet 1960, p. 170). Neither was a holy day of obligation in the Bishopric of Tournai.

78 See Ridderbos 2017b, p. 173.

79 Six examples dating between 1505 and 1564 are discussed; see Helmus 2010, pp. 132–37 and Appendix 4, pp. 367–68, no. 24; pp. 373–74, no. 34; pp. 378–79, no. 41; pp. 388–89, no. 53; p. 395, no. 63; p. 361, no. 14.

80 Stechow 1966, pp. 141–45.

81 This is true of the *Dresden Triptych*, for example, and was true of the lost paintings the *Van Maelbeke Virgin* and the *Holy Face*.

82 For Herzner, the labels identifying the prophets and sibyls were painted in the sixteenth century and display the same defects as the quatrain; interestingly, as Herzner noted, Duverger also rejected them, dating them to the seventeenth or eighteenth century, despite considering the quatrain itself to be authentic. Focusing on the inscription identifying Micah, he criticized the lack of care and apparent haste of the work; see Herzner 1995, p. 165; Duverger 1945 p. 53.

83 See contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

84 All four of the rubricated majuscule letters at the start of the inscriptions have been partly repainted: the notably clumsy execution of the lower part of the *M* of 'Micheas', for example, is entirely modern, with little trace of original paint detectable.

85 For the separate material history of these panels and their frames, see contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

86 For the relationship of the polychromy of the upper tier to that of the lower tier, see contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

87 The same is true for the white line of the highlight of the join and the green accent below the letter *h* of 'Sacharias', for example – and again the green dots on the 'stone' were distributed around the pre-existing letters. A final confirmation that

the letters were painted contemporaneously with the polychromy concerns the original black paint of the hairline stroke that descends from the limb of the letter *h* of 'Sacharias': where it crosses over one of the fictive joins in the polychromy, it has dragged still-wet white paint of the highlight of the join along with it. The white highlights were not applied to all of the fictive joins on the exterior frames, but examples are present in both the lower and upper registers.

88 In conversation at the Museum voor Schone Kunsten, Ghent, 2016.

89 The other form not in the quatrain occurs only once as the first *a* of 'Sacharias'. Conversely, there is one form of *a* in the quatrain – that at the end of 'acta' – which is not present in these identifying inscriptions.

90 The *Retable of the Crucifixion* (Musée des Beaux-Arts, Dijon) is by Jacob de Baerze and Melchior Broederlam; the letter is found on the angel's scroll.

91 In the inscription of Micah, further, the punctuation mark between the two words is a lozenge decorated with four swirling hairlines, comparable in form to the best-preserved one in the quatrain, in the space after the word 'tueri'.

92 Those in the identifying inscriptions are exaggerated, with two examples of letter *h* having notably long, thick bifurcations that peel off the tops of the ascenders, curving to left and right.

93 Herzner 1995, p. 165. For a discussion of this problem, see also De Baets 1961, pp. 554-58.

94 On these textual sources, see Goodgal 1981, pp. 177–82; p. 197 n. 12.

95 Saint Augustine, *Civitate Dei*, Book 18, Chapter 23. In a thirteenth-century texts of the prophecies of the Tiburtine sibyl, the acrostic was attributed to her (see Rech 2000, pp. 443–473, p. 472).

96 The identifying inscriptions on the slanted inner moulding of the frame of the *Virgin of Canon van der Paele* (Groeningemuseum, Bruges) are similar in that they name the two saints Donatian and George, utilize Van Eyck's standard mixed-hand majusucle and were executed in black paint on a background of real gold. Given that the curved forms that decorate the descender of *P* are identical, these letters, which postdate Van Eyck, appear to be copies of those on the interior frames of the *Ghent Altarpiece*.

7
Imagining the Original Display

Bart Fransen and Jean-Albert Glatigny

Elisabeth Dhanens concluded her 1972 article on the presentation of the *Ghent Altarpiece* with the reflection that 'some aspect of the altarpiece's display has changed in almost every generation', and that 'historical logic suggests that the question will rear its head again within the next few years'.[1] Regardless of how future generations choose to approach this unique piece of world heritage, we are still groping in the dark when it comes to the original display of the *Ghent Altarpiece*. Leaving aside the question of whether the polyptych was initially intended for the Vijd Chapel at all, study of how it was displayed in that relatively small space is likewise the subject of ongoing controversy. Following the reconstructions proposed by Beenken (1933), Renders (1950), Brandt Philip (1971) and Dhanens (1972), Griet Steyaert (2015) and Hélène Verougstraete (2015 and 2017) have each recently presented a new and original view of the altarpiece's fifteenth-century presentation in the Vijd Chapel.[2] It is noticeable that the arguments in favour of each attempted reconstruction invariably rely on a mixture of concrete evidence, guesswork and imagination. From a methodological point of view, each of these studies blends a deductive with an inductive approach, with the upshot that not one of the theories in question has so far managed to persuade the scholarly community as a whole.

We set out in this study to scrutinize, both methodologically and substantively, the arguments presented in support of a number of theories. Where possible, we supplement the data with knowledge gained from the research performed during the first stage of the altarpiece's restoration. As a first step, we review several visual sources that are frequently cited in the literature as extrinsic arguments when seeking to reconstruct how the altarpiece was displayed. We look successively at the paintings of Pierre François De Noter, Jan Gossart, a follower of Jan van Eyck, and lastly Michiel Coxcie. In the second instance, we examine several intrinsic characteristics of the *Ghent Altarpiece*, which are often perceived as 'disturbing features' and for which multiple authors have offered a variety of explanations.

Fig 7.1. (facing page) Pierre François De Noter, *View of the Vijd Chapel*, drawing, 25.5 x 20 cm, Bruges, Groeninge Museum, Print Room, inv. 0000.GRO2335.II

Visual sources

Pierre François De Noter

Studies looking at how the *Ghent Altarpiece* was displayed frequently reproduce Pierre François De Noter's painting, dated 1829 (fig. 7.2).[3] De Noter was arguably the first to attempt a hypothetical reconstruction of the original appearance of the *Ghent Altarpiece* in the Vijd Chapel, installed on the altar, with two registers and with a predella bearing the Vijd-Borluut coats of arms. When considering this reconstruction, however, it should be borne in mind that only Van Eyck's central panels (already removed from their original frames) could be seen in the chapel in 1829: the wing panels were located in Berlin at the time, with the exception of Adam and Eve, which were stored elsewhere in the church.[4] De Noter's composition undoubtedly drew on the lithographs of H. Borremans, printed and distributed in Ghent by Lieven De Bast in 1824 and 1825.[5] The three central panels of the Deesis, for instance, have the same rounded form. The lithographs were, after all, based on the copy made by Michiel Coxcie in the late 1550s, the wings of which belonged at that point to the collection of King William I of Orange (1772–1843) (now in the Royal Museums of Fine Arts of Belgium, Brussels). What is more, the wing panels of the *Ghent Altarpiece* as depicted in De Noter's painting show significant differences in colour as compared to Van Eyck's wings or Coxcie's copies of them, particularly in the angel's mantles and in the tile floor in both scenes. We may conclude from this that De Noter drew primarily on engravings of the *Ghent Altarpiece* and that he coloured the wing panels as he himself saw fit.

De Noter's painting is an eloquent example of a reconstruction based partly on visual sources and partly on the imagination. A romantic vision led the artist to fill his image of the interior of the Vijd Chapel with a variety of art objects that were never actually located there. The 1431 *Tomb of Margaretha van Gistel*, for instance, serves as an altar in De Noter's composition, but was actually installed elsewhere – first in the ambulatory chapel adjacent to Vijd's and currently in the crypt.[6] The *Entombment* sculpture, a late fifteenth-century work by Willem Hughe, was likewise located in the crypt. While the ingredients De Noter used for his composition were based on existing models, he combined them in an imaginary *mise en scène*. It comes as little surprise, therefore, that in another painting of the Vijd Chapel (fig. 7.3), De Noter opted for a different configuration of the Adoration of the Lamb polyptych: set into wooden panelling, with a plain, unpainted predella, a different stone canopy and the Vijd-Borluut coats of arms. Neither the tomb nor the *Entombment* sculpture from the other version are present, and there are more variations besides. Numerous preparatory drawings, most of them preserved at the Groeninge Museum in Bruges, are highly illustrative of De Noter's working methods. Among these is a previously unpublished drawing with a view of the Vijd Chapel (fig. 7.1),[7] which undoubtedly served as a preparatory study for the paintings. In the drawing, the two chapels on either side of Vijd's have a baroque enclosure. The Vijd Chapel had also boasted an enclosure of this kind since 1636–39,[8] but De Noter omitted it from the drawing so as not to impede the view of the polyptych. It is also notable that there is no stone

7.2

Fig. 7.2. Pierre François De Noter, *The Ghent Altarpiece by the Van Eyck Brothers in St Bavo's Cathedral in Ghent*, oil on canvas, signed and dated 'P.F. de Noter 1829', 101.5 × 81.3 cm, Amsterdam, Rijksmuseum, inv. SK-A-4264

7.3

Fig. 7.3. Pierre François De Noter and Felix De Vigne, *Albrecht Dürer Viewing the Ghent Altarpiece by Hubert and Jan van Eyck*, c. 1840, oil on canvas, 133 x 106.6 cm, Enschede, Rijksmuseum Twenthe, inv. 0156

canopy in the preparatory drawing, while De Noter added one in both of the paintings. This addition is therefore likely to have been part of the artist's neo-Gothic imagining of the chapel's decoration, as a consequence of which De Noter's work is certainly not a reliable source for the fifteenth-century presentation of the altarpiece.

Jan Gossart

A second work that is frequently cited in the literature in connection with the display of the *Ghent Altarpiece* is Jan Gossart's *Deesis* (fig. 7.4). Recent infrared examination has revealed a drawing on paper below each of the four painted faces, containing the outlines of the heads, and copied precisely and on the same scale as the figures in the *Ghent Altarpiece*.[9] Despite this literal borrowing of the faces, Gossart used a firmly early sixteenth-century idiom for the other elements: the Dürer-like hands, for instance, are emphatically present and highly expressive, while the architectural setting is entirely in keeping with Gossart's flamboyant Gothic visual language of the late 1520s. The acanthus leaves with pomegranate seeds or grapes are found in a similar manner in Gossart's signed and dated wings of the 1521 *Salamanca Triptych* (Toledo Museum of Art, Ohio).[10] Given that architectural constructions of this kind – or 'hybrid structures' as Matt Kavaler calls them[11] – are very much a trademark element in Gossart's oeuvre, we feel it is not justifiable to use the configuration as a reliable document when reconstructing the display of the *Ghent Altarpiece*. We think it unlikely that the singing angel in the tondo also appeared above the Deesis in Van Eyck's work, as Verougstraete proposed.[12] Not least because the little figure has been directly borrowed from the Archangel Gabriel in the *Ghent Altarpiece*'s

7.4

7.5

Fig. 7.4. Jan Gossart, *Christ between the Virgin Mary and St John the Baptist*, c. 1525–30, oil on paper, panel, 122 x 133 cm, Madrid, Museo Nacional del Prado, inv. P01510

Fig. 7.5. Follower of Jan van Eyck, *The Fountain of Life*, c. 1435–40, oil on panel, 181 x 119 cm, Madrid, Museo Nacional del Prado, inv. P01511

Annunciation scene.[13] Nor is there the slightest iconographical reason to suppose a missing figurative element above Van Eyck's *Deesis*. Citing Gossart's *Deesis* as an argument in favour of the upper register's configuration as a tower altar, as Steyaert argues, likewise strikes us as a step too far.[14] In methodological terms, both interpretations contain elements of supposition, while seeming to overlook the fact that Gossart's powerful architectural imagination is a characteristic of his entire oeuvre.

Fountain of Life

A third painting, the oldest inspired by the *Ghent Altarpiece*, is the *Fountain of Life* in the Prado (fig. 7.5), attributed to an early follower of Jan van Eyck. The arrangement of this work does indeed show striking similarities: an Enthroned Christ at the top flanked by Mary and St John; small groups of angels singing and playing music on a lower level; and at the bottom, on either side of an octagonal basin, a group of worldly and ecclesiastical figures on one side, and Jews on the other.[15] But whereas the iconography of the *Ghent Altarpiece* has been linked to the Apocalypse, the End Days and the New Jerusalem,[16] the emphasis in the *Fountain of Life* is firmly on the Eucharist: hosts float on the water and, unlike the Adoration of the Lamb, it is not John the Baptist who is presented as intercessor at the Last Judgement, but John the Evangelist – like the Holy Virgin, a witness to Christ's sacrifice on the cross.[17] It might have been this Eucharistic significance that prompted the inclusion in the *Fountain of Life* of the

immense, pointed canopy, which has rightly been linked in the literature with fifteenth-century sacrament houses – tall, slender constructions topped with a spire used to store consecrated hosts.[18] It nevertheless remains extremely doubtful whether, and if so to what extent, the canopy in the *Fountain of Life* was inspired by a lost equivalent above the *Ghent Altarpiece*, as quite a few authors have suggested.[19] The follower of Van Eyck could equally have drawn on other architectural representations that were known in Van Eyck's immediate entourage, as witnessed by the fragment of architecture in Paris (Musée des Arts décoratifs), occasionally ascribed to Jan van Eyck,[20] or the miniature of a *Deity Enthroned* in the *Turin Hours*, attributed to Hand J or to the Master of Jean Chevrot (fol. 75v, destroyed in the fire of 1904).[21] As with De Noter and Gossart, there is no reason here to suppose that the construction was based directly on a postulated lost canopy above the *Ghent Altarpiece*.

Michiel Coxcie

There is only one surviving work, lastly, for which the commission must have specified that it was to be a more 'literal' copy of the *Ghent Altarpiece*, namely the polyptych that Michiel Coxcie painted on behalf of Philip II in 1557–58.[22] This was later dismantled and can now be found (with the exception of the Adam and Eve panels) at three different locations: Gemäldegalerie, Berlin; Royal Museums of Fine Arts, Brussels; and Alte Pinakothek, Munich (fig. 1.16-1.17).[23] Surprisingly, unlike the free copies discussed above, this work has never previously been cited by studies on the original display of the *Ghent Altarpiece*.

It would have been useful to examine the frames or hinges, but these have unfortunately not been preserved. It is possible, by contrast, to compare the dimensions and form of the panels. The dimensions of the pictorial surface in the original and in the copy are virtually the same in the case of both the wings and the central panel of the lower register.[24] Although the three Deesis panels in Van Eyck's polyptych were at some point cut down at the top (see below), the presence of unpainted edges (barbs) around Coxcie's copies shows that the latter were never reduced in size, a positive indication that nothing is missing from Van Eyck's original pictorial presentation. For his Deesis (fig. 7.6), Coxcie used three panels that are rounded at the top, which differs from the rectangular panels in the original. The reason why he deviated from his model in this regard undoubtedly reflects the fact that no spandrels were required in the copy, whereas Van Eyck's masterpiece probably incorporated sculptural ornamentation. Such decoration therefore did not form part of Michiel Coxcie's commission. Nor does the surviving documentation for the copy make any reference to a woodcarver. Coxcie limited himself to those parts of the altarpiece that were painted on panel. It is unlikely that he would have polychromed the frames following the original's stone imitation and inscriptions. Having been transported to Spain, the paintings were installed on the high altar of the royal chapel at the Alcázar in Madrid, which probably did not occur until 1563. The Spanish documentation records that the frames were gilded at that time by the court painter Cristiano de Amberes ('of Antwerp'), who originated in 'Flanders', and that a wooden crowning element was made by the sculptor Gilles de Bouillon, employed at the Spanish court to make

Fig. 7.6. Michiel Coxcie, Copies of the three Deesis panels: *Deity Enthroned*, 210.8 x 81.6 cm, Berlin, Gemäldegalerie, inv. 525, and *Virgin Enthroned* and *John the Baptist*, Munich, Alte Pinakothek, Bayerische Staatsgemäldesammlungen, inv. 653 and 654

frames and wooden decorations.[25] This upper element has not survived, but a single, vague description has been identified in a 1565 document, in which the commission to Gilles de Bouillon is described in the following terms: '[he] made the crowning structure of the altarpiece for the Royal Chapel in Madrid, with two pilasters above the shutters and placed the ironwork of the said shutters and crowning at my expense: total cost one hundred and twenty-six ducats'.[26] It is not impossible that Philip II had the original in Ghent in mind when placing this commission, but this remains highly speculative. We also have to take account, for instance, of the Spanish tradition in which canopies and *guardapolvos* were included in altar decorations.

The inventory of the Alcázar drawn up in 1600 contains further information regarding the configuration of Coxcie's altarpiece in Madrid.[27] The work is described there as a single large altarpiece consisting of two registers, with shutters at the top

and bottom that could be closed independently of one another. The description of the open polyptych, which explicitly refers to "Adán desnudo" and "Eba desnuda", conclusively confirms that the panels with the naked Adam and Eve also belonged to Coxcie's altarpiece – a fact on which doubt is still occasionally cast in the literature.[28] The inventory further states that the altarpiece stood on a wooden predella that was gilded and painted in oil. Juan Pantoja de la Cruz estimated the overall value at three thousand five hundred ducats, including the 'decoration', which might refer to the sculptural setting. The dimensions of the ensemble are not given in the inventory, but we do find them in a document dated 29 August 1563, reported by Steppe,[29] which describes how difficult it was to manoeuvre the large altarpiece of approximately 350 by 242 cm through a door at the Alcázar and to install it there. These dimensions more or less correspond with the current measurements of the central part of Coxcie's altarpiece (without the open wings), namely 345.8 cm (sum of the height of the *Deity Enthroned* and the *Adoration of the Lamb*) by 238 cm (width of the *Adoration of the Lamb*), certainly if we also take account of the lost frames.[30] If the reference to this large altarpiece relates to Coxcie's copy, which is highly probable but not absolutely certain,[31] this would suggest that his polyptych was displayed as a single large ensemble, with the upper and lower register joined together. It is indeed possible that Coxcie's *Deesis* panels were mounted in a single wooden structure together with the *Adoration of the Lamb*;[32] this would explain, for instance, why it was so hard to get the piece through a door. It seems probable, therefore, that the upper and lower register in Coxcie's copy were joined together, albeit with a narrow gap between the upper and lower wing panels, to allow them to be opened and closed easily. At first sight, it would seem premature automatically to treat this sixteenth-century situation as identical to the fifteenth-century configuration in the Vijd Chapel. However, since Philip II ordered a copy of Van Eyck's magnum opus, for which he was prepared to pay more if the copy exceeded his expectations,[33] it is not unreasonable to assume that the Spanish king was seeking a replica for his royal palace in Madrid not only of Van Eyck's paintings as such, but also of the polyptych's configuration in the Vijd Chapel, showing both registers on top of each other.

Relevance of visual sources

What provisional conclusion might be drawn based on the visual sources cited above? In the case of the lost sculptural decoration, it is important to distinguish between a monumental stone canopy fixed to the wall and wooden tracery attached to the panels of the Deesis itself. There is no evidence, in our view, for the existence of a stone canopy. As described above, De Noter's paintings, the *Fountain of Life* and Gossart's *Deesis* are not sufficiently reliable to serve as informative sources in this matter. Nor are there any archival documents or accounts of the Vijd Chapel that mention any such construction. Early documents consistently refer only to the *tafele* of Joost Vijd – a *tabula*, *pictura* or *tavola*.[34] Nowhere is there any reference to a monumental sculpted canopy.[35] Nor is there any archaeological evidence to suggest that a stone construction was incorporated in the wall behind the altarpiece. Above all, since it is not known whether a stone wall separated both radiating chapels in the fifteenth century, a thorough architectural and

archaeological study of the Vijd Chapel is definitely called for. Dhanens, among others, cites a photograph taken in 1951, which shows a wall in the Vijd Chapel shortly after the baroque altar structure was dismantled and before the wall was plastered over (fig. 7.7).[36] Holes are visible in the wall, but no protruding elements. Notches in the clustered columns on the left and right led Dhanens to conclude that there was once an arched partition between the Vijd Chapel and the adjacent radiating chapel. She visualized this partition as a wall that did not extend all the way to the vault, but terminated halfway in an arch, somewhat similar to the blue screen behind the high altar in Rogier van der Weyden's *Seven Sacraments Altarpiece* (Royal Museum of Fine Arts Antwerp). Closer study of the 1951 photograph reveals, however, that the incisions in the two pillars seem more like a later intervention, made without respecting the continuity of the Gothic pillar's moulding. The presence of springers might be expected in fifteenth-century architecture, but the photograph shows no trace of such elements.

Turning lastly to the predella, which the polyptych undoubtedly possessed, there are no reliable surviving sources that can offer us any further information regarding either its form or its visual content. Van Vaernewijck (1568) reported that the *Ghent Altarpiece* had a *voet*, on which Jan van Eyck had painted a hell scene in watercolours.[37] Possibly Michiel Coxcie was not asked to copy the predella in 1557–58: the Spanish inventory of 1600, referred to above, does not mention a hell scene but a gilded predella painted in oils. The predella of the *Ghent Altarpiece* might, as Van Vaernewijck reported, already have been wiped away (*wtgevaecht*) by clumsy painters by the time Coxcie was working there. Whatever the case, it was apparently necessary to repaint Van Eyck's predella in 1587–89, which was done by Jan Cools.[38] Nothing further is known about this painting.

Explanation of supposed incongruities

Since the nineteenth century, numerous art historians have expressed their irritation at supposed 'incongruities' or 'disturbing features'. Some of these have become steadily less problematic over time and as knowledge of art production in the Low Countries has advanced. Hotho (1861), Beenken (1933), Renders (1950) and Panofsky (1953), for instance, found the difference in height between the central panel and the side panels of the lower register to be unsightly.[39] In order to solve this shortcoming, they proposed all manner of hypothetical reconstructions in which the central panel was assumed to have been larger, possibly featuring a raised central section for the figure of God the Father. All prior reconstructions were rendered obsolete, however, when Coremans was able to show in 1953 that all the panels of the lower register had retained their original format and when Monballieu demonstrated in 1966 that central and wing panels of uneven height were actually common in Southern Netherlandish altarpieces.[40] This example illustrates the kind of trap that apparent 'incongruities' can lay for the art historian and the considerable care we must take to avoid projecting and then seeking to solve problems that are based solely on modern-day perceptions. We will now examine the three most important features of the *Ghent Altarpiece* that are still regularly cited in the literature as 'disturbing': the differences in perspective and scale; the form and finishing of the upper register; and the arrangement and articulation of the wing panels.

Fig. 7.7. Photograph of the wall of the altar in the Vijd Chapel after the dismantling of the baroque altar structure, 1951, Brussels, KIK-IRPA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Perspective and scale

Striking differences in perspective and scale are apparent not only between the lower and upper registers, but also between the individual panels of the upper register (fig. 7.8). While Panofsky argued that the panels with the singing angels and angel musicians came from an organ case, many other authors – including Sauermost and Van Asperen de Boer – believe that the difference in perspective can be explained by the positioning of the open polyptych.[41] The small Vijd Chapel possibly prevented the wing panels from being opened to the same flat plane as the central panels: the panels with the angels would have been opened at a more acute angle than those with Adam and Eve (fig. 7.20). With an 'accordion' display like this, not only is the perspective less 'disturbing', the difference in scale between the figures in the upper register is also less obtrusive.[42] Steyaert (2015) takes this a step further, arguing that the problem can be solved by considering the upper register as a separate tower altar, in which the upper panels are all positioned in an angle to each other, around an empty hexagonal space. Even leaving aside the issue of the missing sculpture in such an arrangement, it still by no means solves the problem of perspective. On the contrary: the perspective of the panels in a polygonal arrangement raises more problems still,[43] as the perspective lines of the tile floor in the Deesis panels run in the direction of the same vanishing area and argue in favour of display in a single plane. The shadows of the heads of the three figures are also rendered coherently, with the light projected from the same upper right corner. The flat arrangement is even more compelling in the case of the *Annunciation* scene on the exterior. Van Eyck's spatial construction of the large rectangular room with two small back rooms, one on the left and one on the right (fig. 7.9), is developed using a tile floor with nineteen parallel horizontal joints and a ceiling with seven parallel beams, both laid down using the same perspective. A polygonal arrangement, with the panels shown in an angle, would disrupt this spatial unity. The lighting effects also colour the space in a way that is only rendered correctly with a flat arrangement – a fact affirmed by the recent restoration. The painted wall, seen frontally, displays a similar range of colour in each of the four panels and is clearly lit by the same light source, which would not match a polygonal configuration. It is also notable that the four shadows cast in the lower right corner of each painting are projected in parallel, giving the impression that the frames are functioning as a literal two-dimensional framework for the depicted interior space.[44] The inscription with the dialogue between Gabriel and Mary – 'Ave gratia plena Dominus Tecum' and 'Ecce ancilla domini' – lastly, runs across the panels. All these elements indicate that the *Annunciation* scene was designed to be taken in at one glance and that it was arranged in a single plane.[45]

What Steyaerts's study was able to demonstrate, however, was that the frequently discussed differences in scale in the *Ghent Altarpiece* ought not to be perceived as an incongruity. Such a perception is exclusively that of a contemporary viewer – scale differences like this were very common in the fifteenth century in the structuring of altarpieces. In our view, the combination with a tower altar, as proposed by Steyaert, in which the Deity functions as a monumental sculpture group in *trompe l'œil*, is neither necessary nor plausible.[46] It is evident in fifteenth-century representations of

Fig. 7.8. Differences in perspective in the upper register. © Hélène Verougstraete

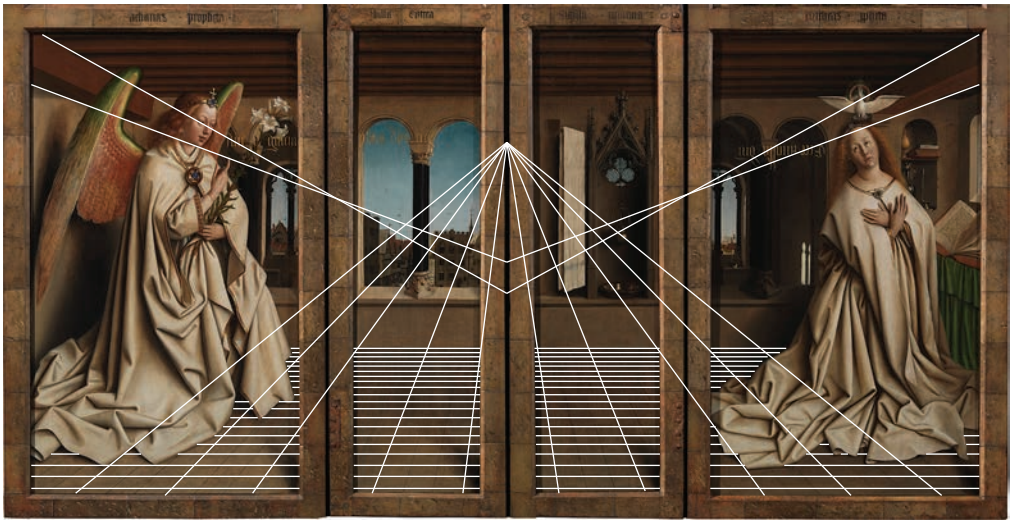


Fig. 7.9. Jan van Eyck, *Annunciation*, part of the upper register of the closed *Ghent Altarpiece*

church interiors – including those of Rogier van der Weyden – that altars and their accessories, whether painted, carved, wrought or woven, were able to function as an ensemble, without necessarily respecting the same scale.[47] We share Janzen's opinion in this regard that the problem of the difference in scale is not actually a problem at all and therefore does not require a 'solution'.[48]

Form and finishing of the upper register

A second element frequently perceived as 'disturbing' is the form of the upper register, which is unconventional in three respects (fig. 7.10). It is unusual, first of all, that the central panels are rectangular, while the shutters that close them off are arched. Secondly, the frames of the shutters have irregular contours at the top, with striking notches at the base of each of the arches. In our view, the structural idiosyncrasies of the form and finishing are all attributable to a single element that has since been lost: the carved wooden tracery that originally figured above the *Deesis*, and which might have been destroyed as early as the sixteenth century by iconoclasts.[49] We would like here to present additional technical and comparative evidence in support of this

Fig. 7.10. Upper part of the closed altarpiece showing the recesses in the frames of the wing panels

hypothesis, which has already been suggested by several authors. It should be borne in mind throughout that while the wing panels still retain their original frames, the central panels do not.

Rounded wings versus rectangular central panels

The fact that the rounded wing panels do not entirely cover the rectangular central panels (fig. 7.10) is not very common for a painted polyptych from the Southern Netherlands. This explains why the spandrels of the *Deesis* panels, which protrude above the closed shutters, have been perceived as unsightly and are hence edited out of most photographic reproductions of the closed polyptych. Early copies, including Michiel Coxcie's of 1558–59 (fig. 7.6) and the one done on canvas around 1590 (?) (Royal Museum of Fine Arts Antwerp),[50] similarly 'correct' this unconventional shape, so that the closed wings neatly cover the central panels. It is somewhat reminiscent of the form of the 1500–10 *Saluzzo Altarpiece* (City Museum, Brussels), with its double wing panels. While the first pair of wings (carved on the inside with a painted exterior) completely covers the rectangular retable case, the second pair of wings (painted on both sides) has rounded notches at the top, so that the ornamental spandrels of the first pair of wings remained visible when the altarpiece is closed.[51]

Various authors have argued that the panels in the upper register of the *Ghent Altarpiece* no longer retain their original dimensions and that the shutters did originally cover the central panels. Verougstraete, for example, argues that all the panels in the upper register were reduced in size at a later stage.[52] The three central panels were indeed cut down in 1798 (see below). But the wing panels, in our view, were never reduced in size. From an iconographical point of view, there is no reason to suppose a missing element above the wing panels. Nevertheless, on the strength of technical observations, Verougstraete assumes that the original wing panels would have extended beyond the curved frames at the top. This assumption is based on the fact that the current frame construction is unusual for the fifteenth century: the upper, rounded, frame elements are pegged on both sides of the panel with dowels ; and the edge on the closed side is bevelled, which is uncommon for the outer edge of a frame. New technical examination has shown, however, that the wings, despite their crude finish at the top, were never cut down.[53] On the contrary, the pegged rounded frame elements reflect an ingenious construction in which the weight of the 'hanging' panels is transmitted to the stiles.[54]

The three *Deesis* panels, by contrast, were once significantly higher. An unpainted edge runs all the way around the front, apart from the top, while the original bevelling has survived all the way around at the back, again with the exception of the upper edge.[55] This confirms that a piece was sawn off at some point. It is known from archival documents that on 30 August 1798, when the central panels were in the Louvre (1795–1816), the decision was taken to restore the three panels and to saw off the 'totally useless' surplus wood above these three paintings 'to facilitate framing'.[56] The measurements recorded by the French on 14 August 1794, when the three panels were packed up in Ghent for transportation to Lille – i.e. before they were cut down – were: 7 feet 9 inches by 2 feet 9 inches for the *Deity Enthroned*; and 6 feet 2 inches

by 2 feet 8 inches for each of the two panels with the *Virgin Enthroned* and *St John the Baptist Enthroned*.[57] We assume that the French used the eleven-inch 'Paris foot', also known as the *pied marchand* or *pied de Comté*, which was in common use prior to the introduction of the metric system (10 December 1799).[58] A foot of this kind measured 29.77 cm (i.e. 11 inches, where 1 inch = 2.7 cm); if we convert the 1794 measurements on this basis, the panels were roughly 20 cm (Deity) and 15 cm (Mary and John) higher at that time.[59]

The sawn-off pieces might have been painted an even blue colour, like the current spandrels.[60] That would make this part of the altarpiece eminently suitable for carved tracery,[61] as the blue sections would indeed have been 'totalement inutile', as the French put it, without a decorative crowning element. The presence of various fixation holes in the spandrels also makes it highly likely that a sculptural ornament was once fitted here.[62]

Irregular contours of the wing panel frames

The contours of the wing panel frames offer a physical indication that help us visualize the form of the ornaments. There is a horizontal recess at the springing of each arched frame – six locations in total (fig. 7.10). Recent research by Anne-Sophie Augustyniak has shown that the polychromy on all four sides of the wing panel frames is original,[63] confirming that the current form with its odd-looking jumps is original and probably designed to accommodate a protruding element when the altarpiece was closed. A fifteenth-century example that can illustrate the principle is provided by the wings of a Brussels altarpiece in the Victoria and Albert Museum, London, in which the cut-outs in the frame can only be understood when account is taken of the shape of the central section of the triptych (fig. 7.11). When the wings are closed, they fit perfectly into the architectural decoration that protrudes above the whole. Perhaps the *Ghent Altarpiece* had a similar piece of Gothic tracery, which is found primarily on carved altarpieces. The phenomenon of recesses in wings is not peculiar to a particular school or period, it is inherent to the logic of the construction. The *Spieken Altarpiece*, for instance, where the unconventional shape of the wings is also determined entirely by the sculptural crowning above the central section, dates from the sixteenth century (fig. 7.12).[64] Veit Wagner created the *Bergheim Altarpiece* (Musée Unterlinden, Colmar) in Alsace around 1510–20, in which each of the rounded wing panels has a small horizontal recess at the base of the arch, just like the *Ghent Altarpiece*, to allow the wings to close around the protruding sculptural decoration of the central section. We do not only find this feature in the art production after Van Eyck: the Romanesque decorative ironwork of the Mosan region, from which Van Eyck might also have drawn iconographical inspiration,[65] includes the *Reliquary of the Holy Cross* (Le Grand Curtius, Liège). In this case, the hinges have been designed in such a way that the wings are positioned further away from the central section, to make the reliquary easier to close, with the wings fitting neatly into the ensemble. It is a slightly different solution to essentially the same problem.

It is interesting to note that the craftsman who designed the frames for several photographic reproductions of the *Ghent Altarpiece* around 1900 (fig. 7.13) interpreted and executed the principle of the crowning element in a similar manner: there is a

Fig. 7.11. Brussels workshop, *Triptych of the Crucifixion*, c. 1490, 74.4 x 55.9 cm (open), London, Victoria and Albert Museum, inv. 4048-1856

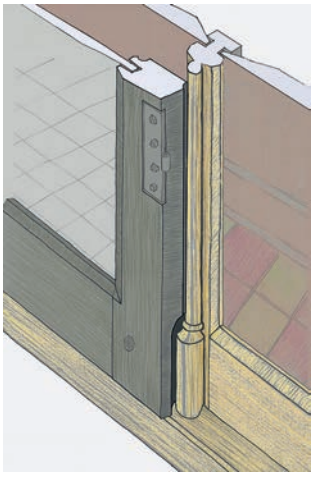
Fig. 7.12. Brabant workshop, *Altarpiece of the Holy Cross of the Spieken Family*, 104 x 65 x 10.3 cm, c. 1550, Zoutleeuw, St Leonard's Church

Fig. 7.13. Foldable model of the *Ghent Altarpiece*, Photographische Gesellschaft Berlin, c. 1900, Gemäldegalerie SMB

raised frame above the three *Deesis* panels, while the structure has an arcade form into which the closed wings fit perfectly. In terms of understanding how the form and contours of the upper register functioned, we believe that this joinery is a step closer to the original configuration than the sometimes highly speculative reconstructions we find in the literature.

Unlike the joinery of the early twentieth-century reproduction, however, the sculptural ornaments were not the only protruding elements in the original configuration of the *Ghent Altarpiece*. There might also have been a protruding moulding in the form of engaged colonnettes with pedestal and capital between the enthroned Mary, Deity and John, as suggested by the hollowed-out edges of the frames of the wing panels of the upper register.[66] The hollows are found at four locations, exclusively on the inside, over the entire height of the frame, between *Adam* and the *Singing Angels* and between *Eve* and the *Angel Musicians* (fig. 7.14). In the closed position, the hollow is semi-cylindrical in shape. The hollows might have been intended to form a precise fit, when closed, with the moulded posts that originally separated the three *Deesis* panels from one another (fig. 7.15). This confirms that the

7.14



7.15

Fig. 7.14 Curved moulding in the frame on the interior of the panel with Eve

Fig. 7.15. Hypothetical reconstruction of the frame of the central panels in the upper register, provided with a moulded frame. The curved mouldings widening at the bottom in the wing panel frames were designed to fit around the moulded frame

wings closed up against the Deesis panels and hence that they were displayed in a flat plane when the altarpiece was closed. The colonnettes in question probably had a wider pedestal at the bottom, as suggested by the widening hollows lower down in the wing frames. In fact they might have looked like carved versions of the painted colonnettes on the lower register of the closed altarpiece. Frames with carved colonnettes are found elsewhere in Southern Netherlandish painting,[67] but we are not aware of any other examples of shutters with hollows designed to close around such protruding collonnettes.

The aforementioned technical characteristics show that matching the shutters to the central panels – especially below the carved ornaments and on top of the little columns – was undoubtedly a highly precise and skilled task. The crude finish at the top of the frames was in all likelihood the result of planing, which was needed at some point to allow the shutters to close easily. Later sagging of the wings will explain why the edges of Adam and Eve's frames were planed, as they rubbed against one another at the top when shut, hindering closure.[68] It is not known precisely when this occurred. A Brussels painter called Noveliers was paid in 1612 for repairing and planing the paintings of Adam and Eve ('te repareren ende hulpen het tafereel van Adam ende Eva'),[69] which likely relates to the sagging of the wings. The construction seems at any rate to have been designed in such a way as to limit sagging of this kind. Monballieu has already pointed out that steps to avoid this were generally taken in the case of large altarpieces: crossbars could be fitted, for instance, to hold the uprights of the frame together more effectively, while thinner panels were often used for the wings, to limit their weight.[70] Both these measures were applied in the *Ghent Altarpiece*: the wings in the upper register are approximately 1.2 cm thick on average, whereas the three central Deesis panels average about 3 cm. And on the *Annunciation* side, meanwhile, the four wings are fitted with a crossbar that holds the two uprights together with dovetail joints. Each of the *Adam* and *Eve* wings weighs about 12 kg; we estimate the weight of the *Singing Angels* and the *Angel Musicians* at approximately 16 kg per panel.[71]

The arrangement and articulation of the wing panels

A third significant element that is consistently perceived as 'disturbing' in the literature is the articulation of the wing panels, which do not follow the same vertical line in the upper register as in the lower, since the wing panels above and below differ in width.[72] Once again, it might well be asked whether this 'incongruity' would have bothered a fifteenth-century viewer in a similar way? In our view, irritation at the supposed lack of aesthetic balance and harmony belongs solely to a later date.

It has already been pointed out in the literature that for a rectangular panel like that of the Adoration of the Lamb, it was logical for the joiner to make wings of two panels each, all of equal width, so that they would be easier to open and close.[73] By the same logic, altarpieces where the central element had three compartments and a raised middle part were usually provided with two pairs of wings, the outermost panels of which were narrower and higher, in order to close off the central element. Consequently, when we consider the two registers of the *Ghent Altarpiece* separately, the structure of the wings is the most logical one in both registers. We therefore agree, with Dhanens and Verougstraete among others, that the two registers could be opened and closed independently of one another, but without concurring with the idea of two separate altarpieces.

The hinges provide a clear answer to the question of how the wings were able to open and close. The altarpiece originally had sixteen hinges, but as none of these have survived intact, we have to rely on fragments and traces and on old photographs. There are several differences between the upper and lower register, in the number of nails and the shape of the hinge leaves. This, together with other structural differences, has prompted quite a few authors to suppose that both registers cannot have been produced by the same joiner.[74] These differences in design are not, however, the subject of the present study. What the two registers have in common is that the hinges in the upper and the lower registers were fixed in such a way that opening and closing occurred in a similar manner. On the one hand, we have the hinges between the fixed central element and the wing panels, installed on the edges of the frames. Traces of the positioning of these hinges have been noted in the frames of the *Singing Angels*, the *Angel Musicians*, the *Just Judges* and the *Hermits*.[75] On the other hand, we have the hinges that connected each set of two wings in both registers. These were all fixed to the front of the closed altarpiece, on the outside, against the flat of the frame, in both the upper and the lower register (fig. 7.16). Only traces – wood fills – are now visible in the lower register, but the original hinges can still be seen in old photographs taken in Berlin between 1878 and 1894.[76] The original hinge leaves are still present on the frames of the *City View* and of the *Interior View*.[77] There are two in each case, positioned at respective heights of approximately 18 cm and 127 cm. The knuckles were removed at some point, but the onset of their curvature is still present. The original hinges have been removed from the frames of the *Archangel Gabriel* and the *Virgin Annunciate* panels, but we know from the wood fills where they were attached. In this case too, the original hinges, complete with their knuckles, can be made out in photographs taken when the panels were in Berlin (fig. 7.16).[78] The knuckles seem perfectly to match those of the hinges on the frames of the *City View* and the *Interior View*. The wings were connected to one another by a metal pin in the three loops.

Fig. 7.16. Location of the original hinges on the outside of the *Ghent Altarpiece*. The original hinges are visible, still with their knuckles, on the black and white photos taken in Berlin, c. 1878–94

The type, location and arrangement of the hinges meant that the wing panels could be opened outwards, in a movement that allowed several different positions, thus creating the possibility of various iconographical combinations.[79] It should be noted, however, that the wings could only open outwards, as the hinges were located on the outside (fig. 7.17). Hypothetical reconstructions such as those proposed by Peters and Steyaert, in which the wing panels are turned inwards, are technically impossible.[80] If this had indeed been the intention, the joiner would no doubt have fixed the hinges to the inside, as we find in tower altarpieces.[81]

A degree of separation between the two registers is necessary if it is to be possible to open and close the wings individually. It is not known how much space there was originally between the two registers. Dhanens based her conclusion on a niche measuring approximately 90 x 40 cm, which can be seen in the 1951 photograph of the chapel wall (fig. 7.7). She argues that it served as a tabernacle and was positioned

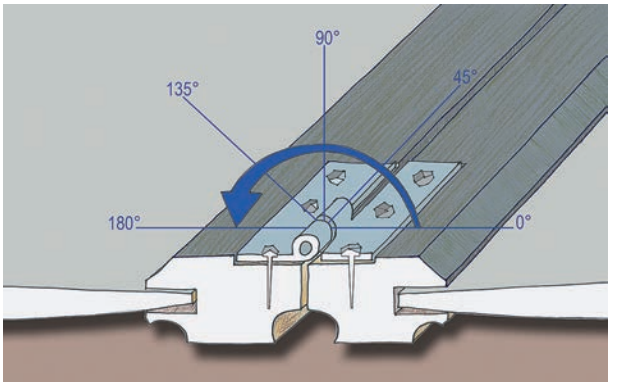


Fig. 7.17. Reconstruction of the position of a hinge fixed to the outside of the wing panels in the upper register. This position allows the panels to be opened outwards but prevents an inward rotary movement

between the two registers.[82] We cannot confirm from the photograph alone, however, whether the niche is fifteenth century – archaeological research in situ would be required for this.

The restoration of the frames has revealed new information about their original appearance.[83] Several differences have been observed in the execution of the stone imitation between the upper and the lower register. The lower register shows stones with small black dots and a regular pattern of white, green, yellow and red-coloured highlights next to each joint, while the upper one shows stones with bigger black dots and with an irregular colour pattern of (mostly white) highlights next to each joint. In spite of these differences in execution, however, there seems to be a link between upper and lower registers in the position of the painted stones. The horizontal joints are aligned between the different frames and visually connect all paintings horizontally within each register. The vertical joints at the bottom of the upper and the top of the lower register are not aligned (fig. 7.18). This strikes us as a deliberate choice on the

Fig. 7.18. Imitation stone creating the impression of ashlar masonry, on the frames of the *Ghent Altarpiece* in closed position

part of the painter, who intended to create the impression of ashlar masonry. At three locations, the painter used the space between the frames as a virtual joint between the stones. The one in the lower register coincides with the opening gap between the shutters. The impression of ashlar masonry seems to be the result of the well thought-out concept of the polychromy as a whole, as a result of which both registers are closely connected visually. Such is not the case, for instance, in the 1466 *Ambierle Passion Altarpiece* by a follower of Rogier van der Weyden (fig. 7.19), in which the painted stones on the frames of the shutters, do not follow a judiciously laid-out pattern: the painted vertical joints are simply positioned in the middle of each frame, without creating a visual link between the shutters of the lower and upper registers.[84]

If for the *Ghent Altarpiece* we imagine a minimal spacing between the two registers, just enough to allow the wings to be opened independently, the visual gap can also be interpreted as a horizontal masonry joint. The current display of the altarpiece in Ghent cathedral with both registers directly on top of one another might therefore be closer to the original than one would have thought at first.

Fig. 7.19. Imitation stone without the effect of ashlar masonry in the *Passion Altarpiece* by a follower of Rogier Van der Weyden, 1466 (Ambierle, St Martin's Church)

Conclusion

There can be no doubt that the final word regarding the original display of the *Ghent Altarpiece* has yet to be spoken. The altarpiece is an exceptional ensemble in many respects and numerous questions will remain unanswered. All the same, the following statements regarding its original configuration would appear the most plausible if we take an overall view based on the information currently available:

- There is no evidence of a monumental stone canopy.
- The altarpiece did have carved ornaments, fixed to the spandrels of the central panels with the *Deesis*. This decoration, possibly architectural, protruded and might have formed an ensemble with the moulded engaged colonnettes on the now-lost frame between the three *Deesis* panels.
- Both the *Deesis* panels (open altarpiece) and the four panels of the *Annunciation* scene (closed) were displayed in a flat plane.
- The two horizontal registers were probably joined together almost completely and were only slightly separated to allow the wings to be opened and closed.
- When open, the wings were not positioned in the same plane as the central panels but most likely at an angle to them.

Setting aside our modern-day aesthetic appreciation is undoubtedly a key challenge in the debate regarding the original display. At the same time, our fragmentary knowledge of fifteenth-century artistic production in Flanders does not make it easy to understand all the 'odd' elements of the *Ghent Altarpiece*, with its unique character. Because of this, we risk falling into the trap of trying to solve a problem that actually does not exist. After all the many and varied theories that have been advanced regarding the original display, we hope that the thoughts and conclusions set out above will contribute to what Janzen has called a 'basic reconsideration of the entire discussion'.[85]

Acknowledgements

We are grateful to our colleagues of the Centre for the Study of the Flemish Primitives (KIK-IRPA, Brussels) and the restorers of the *Ghent Altarpiece* for the fruitful conversations that preceded this article. We also thank Ted Alkins for the English translation.

Fig. 7.20
Reconstruction of the position of the open wings

Notes

1 Dhanens 1969-1972, p. 149.

2 A brief summary of the various theories can be found in Deneffe, Fransen, Henderiks 2015. For the publications of the authors cited here, see: Beenken 1933; Renders 1950; Brandt Philip 1971; Dhanens 1972; Verougstraete-Marcq, Van Schoute 1989, pp. 275-286; Steyaert 2015; Verougstraete 2015, pp. 191–235; Verougstraete 2017.

3 Sulzberger 1976.

4 Schmidt 2005, p. 38; Dubois 2018, p. 762.

5 Sulzberger 1958, pp. 314-315; Kemperdick, Rößler 2014, p. 87.

6 Dhanens 1965, p. 114; Geelen 2017, pp. 244–49.

7 Van de Velde 1984, I, p. 91, no. 0.2335. The drawing is catalogued under the title 'church interior' and is described by Van de Velde as a view of the ambulatory of a Gothic church, probably St Bavo's in Ghent. In our view, it is clearly a preparatory sketch for De Noter's paintings with views of the Vijd Chapel.

8 Dhanens 1965, p. 67; Dhanens 1976, pp. 27–32.

9 Finaldi, Garrido 2006, pp. 102–13; Ainsworth 2010, pp. 213–17.

10 Ainsworth 2010, pp. 214–16.

11 Kavaler 2010, p. 40.

12 Verougstraete 2015, p. 218; Verougstraete 2017, p. 159.

13 Finaldi, Garrido 2006, p. 102.

14 Steyaert 2015, p. 81.

15 Fransen 2009, pp. 109–22.

16 Regarding this iconography, see e.g. Herzner 1995, pp. 30–50; Borchert 2008, pp. 17–26; Ridderbos 2014, pp. 67–69; Ridderbos 2017a, pp. 139–42; Dequeker 2017, pp. 53–63.

17 Dequeker 2011, pp. 22–30, 76.

18 Bruyn 1957, p. 32. The best example is the sacrament house by Matthijs de Layens, 1450, Avesnes limestone, 12 m, St Peter's Church, Leuven.

19 Brandt Philip 1971, pp. 16–17; Verougstraete 2017, p. 159.

20 Blanc 1998, pp. 106–08.

21 Van Buren, Marrow, Pettenati 1996, pp. 332–33, reproduced on p. 672; Kren, McKendrick 2003, p. 87, n. 12; reproduction in Durrieu 1902, pl. 41.

22 It has frequently been claimed that Philip II placed the commission after failing to secure the original, but there is no evidence to support this. See Suykerbuyk 2017, p. 72. The main iconographical difference between the Van Eyck and the Coxcie versions is on the outside of the lower register where Coxcie replaced Van Eyck's donor portraits and the two Saint Johns by representations in grisaille of the four evangelists. Various authors have also noted other, minor, differences between the original and the copy, which show that the latter is by no means a perfect facsimile. See Duverger 1954, p. 55; Kemperdick 2014, p. 47; Dubois 2017.

23 All the surviving panels of the copy were exhibited together in Leuven in 2013-2014: the panels with the *Deity Enthroned* and the *Adoration of the Lamb* (Gemäldegalerie, Berlin), the *Virgin Enthroned* and *John the Baptist* (Alte Pinakothek, Munich), and the wings (Royal Museums of Fine Arts, Brussels). See Jonckheere 2013, pp. 196–97; Duverger 1954, pp. 55–60; Steppe 1990, pp. 31-38; Kemperdick 2014, pp. 44–48; Dubois 2017; Suykerbuyk 2017.

24 A comparative study has been performed by Dubois 2017 with the focus on the painting. The panel dimensions of the copy and the original are as follows: *Virgin Enthroned* 165.4 x 71 (Coxcie) versus 168.9 x 75.1 (Van Eyck); *Deity Enthroned* 210.8 x 81.6 (Coxcie) versus 212.2 x 83.2 (Van Eyck); *John the Baptist Enthroned* 165.4 x 71.1 (Coxcie) versus 168.5 x 75.1 (Van Eyck); *Singing Angels* 163.5 x 70 (Coxcie) versus 164.5 x 72 (Van Eyck); *Musician Angels* 163.5 x 70 (Coxcie) versus 164.5 x 73.2 (Van Eyck); *Knights of Christ* 147 x 52 (Coxcie) versus 149.5 x 54 (Van Eyck); *Just Judges* 147 x 51 (Coxcie); *Adoration of the Lamb* 135 x 238 (Coxcie) versus 138.1 x 243.3 (Van Eyck); *Hermits* 147 x 50.7 (Coxcie) versus 149 x 54.5 (Van Eyck); *Pilgrims* 147.5 x 52.5 (Coxcie) versus 149.1 x 54.5 (Van Eyck). See, for Coxcie's panels: Bayerische Staatsgemäldesammlungen Online Catalogue (https://www.sammlung.pinakothek.de viewed on 30 May 2017); Jonckheere 2013, p. 196; Kemperdick, Rößler 2014, p. 150. See, for Van Eyck's panels: Coremans 1953, pp. 14–15 and Glatigny et al. 2010.

25 Gérard 1984, p. 170 n. 16; Steppe 1990, p. 34; Pérez de Tudela 2013, p. 104. Gilles de Bouillon was also commissioned to design windows and doors at the palace of El Pardo and he likewise oversaw the restoration, maintenance and installation of paintings in the Escorial. See, in this regard: Jiménez Peces 2013, pp. 204–05; Véliz, Aterido 2016, p. 449.

26 'ha echo el remate del retablo de la capilla de la casa de madrid con dos pilastresençima de las puertas y assentado el herraje de las d[ic]has puertas y remate a mi costa: vale todo çiento y veynte y seys ducados.' Madrid, Archivo General de Palacio, Bellas Artes, leg. 43, carp. x. I am grateful to Almudena Pérez de Tudela for transcribing this text. The document was written by the architect Juan Bautista de Toledo, who was asked to assess the value of Gilles de Bouillon's work and is dated 6 December 1565. It is also cited in Gérard 1984, p. 170 n. 16.

27 'Un retablo grande, que sirve en la capilla, que tiene dos hórdenes de historias de pintura, al hólio, con dos órdenes de puertas; en la horden más alta en el medio, Dios Padre y, a mano derecha, Nra. Señora y, a la hizquierda, sanct Joan Batista y en las quatro puertas que cierran la dha. orden alta, en la una, de mano derecha, una historia de Vírgenes, y en la otra Adán desnudo; y en las dos de mano hizquierda, en la una, sancta Cicilia tañendo un hórgano, con otras virgenes, y en la otra Eba desnuda y en la horden de más avajo, en la tabla de en medio, que es la mayor y más principal, quatro de las vienaventuranzas, con un altar en medio, con el Cordero encima y un choro de ángeles a la redonda, con ynsignias; y en las quatro puertas de los lados, las otras quatro bienabenturanzas; puesto el d[ic]ho retablo sobre una peana de madera dorada, pintada al hólio. Tasólo Juº. de la Cruz, Pintor de su mag[esta]d, en tres mill y quinientos ducados, assí como está con guarnición.' Published by Sánchez Cantón 1951–59, p. 21. Thanks to José Juan Pérez Preciado for sharing this reference. During the time of editing this reference was also brought to light by Redzinski 2017.

28 The notion that Adam and Eve never belonged to Coxcie's altarpiece has been suggested by, among others, Miedema 1994–99, II, p. 207, and Kemperdick 2014, p. 47. The description in the 1600 inventory refutes this claim and confirms the supposition of Suykerbuyk 2017, p. 62.

29 Steppe 1990, pp. 34, 60 n. 39. Reference to Archivo General de Simancas, Casa y Sitios Reales, leg. 247, fol. 248. Also discussed by Suykerbuyk 2017, p. 78.

30 This total was obtained using the dimensions of the wooden panels of the *Deity Enthroned* (210.8 x 81.6 cm) and the *Adoration of the Lamb* (135 x 238 cm), as stated in Kemperdick, Rößler 2014, p. 150. It should be noted here that there is a printing error in the stated width of the *Adoration of the Lamb*, 283 cm instead of 238 cm.

31 Suykerbuyk rightly notes that the documents rarely refer explicitly to the name of the painter or to the iconography, leaving them open to interpretation. Suykerbuyk 2017, p. 78.

32 It is not clear whether a structure of this nature was of Flemish or Spanish manufacture. All that is known regarding the transportation of the polyptych from Ghent to Brussels is that it required three carts. There is no information as to how the panels were distributed among them. When the polyptych was transported via a pass in the Guadarrama Mountains to Madrid, it was stated only that it was 'un rretablo grande'. See Pérez de Tudela 2013, p. 113 n. 32, and Suykerbuyk 2017, pp. 76, 80 (appendix V).

33 Suykerbuyk 2017, p. 73.

34 See e.g. the documents cited and transcribed by Dhanens 1965, pp. 100–02.

35 According to Dhanens, the only written source alluding to a canopy is a romantically flavoured evocation by Kervyn de Volkaersbeke in 1874, the period in which the neo-Gothic was enjoying an exceptional efflorescence in Ghent. The description is too vague to be interpreted as referring to a canopy and is in any case insufficiently reliable to be used to reconstruct the fifteenth-century situation. See Dhanens 1972, p. 125; and Kervyn de Volkaersbeke 1874, p. 503.

36 Dhanens 1972, p. 122.

37 Van Vaernewijck 1568, fol. CXIX. See the transcriptions by Marijnissen, De Schryver 1953, p. 35, no. 10, and Dhanens 1965, p. 115. Doubt as to the reliability of this source has been expressed by, among others, Kemperdick 2014, p. 19, and Steyaert 2015, pp. 80–81 n. 60.

38 Dhanens 1976, p.52.

39 Hotho 1861; Beenken 1933; Renders 1950, pp. 43-52; Panofsky 1953, p. 208.

40 Coremans 1953, pp. 115–16; Monballieu 1966, pp. 41–53.

41 Panofsky 1953, p. 221; Sauermost 1982, pp. 290–91; Van Asperen de Boer 2004, pp. 109–10.

42 For Verougstraete, this display is also confirmed by the shadow of the frames, painted in *trompe l'œil*. Verougstraete 2015, pp. 211–13.

43 See also Janzen 2015.

44 See also Verougstraete 2015, pp. 211–13.

45 For the relationship between display and perspective, see e.g. Carleton 1982; Kern 1904, pp. 8–9.

46 The idea that the Deesis was inspired by sculpted altars is not new: see e.g. Panofsky 1938 and Monballieu 1966, p. 56. The scene which Van Eyck has created is plainly not a group of statues rendered in *trompe l'œil*, but figures of flesh and blood. See the criticism expressed in this regard by Heyder 2015, p. 5, and Janzen 2015.

47 See e.g.: Rogier van der Weyden, *Seven Sacraments Altarpiece*, Antwerp, Royal Museum of Fine Art, inv. 393–95; Rogier van der Weyden, *Exhumation of St Hubert*, London, National Gallery, inv. NG 783.

48 Janzen 2015.

49 Dubois 2018, p. 760.

50 Royal Museum of Fine Arts Antwerp, inv. 413–24. See: Duverger 1954, pp. 61–62; Vandenbroeck 1985, pp. 181–84; Kemperdick 2014, pp. 49–50.

51 D'Hainaut-Zveny 2005, pp. 165–66; Galand 2013, pp. 39, 40.

52 Verougstraete 2015, pp. 199-202.

53 Glatigny et al. 2010, pp. 67, 68, 92, 93, 116. This had already been suggested by Coremans too. Coremans 1953, p. 86;

54 See contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

55 The present bevelling at the top, although done in the customary way for mounting the panel into the frame, is not original. See Coremans 1953, p. 86; Glatigny et al. 2010, pp. 87, 109.

56 Emile-Mâle 1994, p. 66 ; Dubois 2018, p. 761.

57 The transcription of this archival document has been published by Coremans 1953, p. 41. Verougstraete drew on this archival document, too, but she did not apply a fixed coefficient when converting the measurements into centimetres. The size of the *Deity Enthroned* panel was calculated using a 30.24 cm foot, and those with Mary and John using a foot equal to 28.32 cm. Verougstraete 2015, pp. 227–28; Verougstraete 2017, p. 163.

58 Dourstther 1840, pp. 402–19.

59 Applying the *pied de marchand*, the measurements recorded by the French are: 232.74 x 83.89 cm (*Deity*) and 184.03 x 81.19 cm (*Mary* and *John the Baptist*). The panels currently measure 212.2 x 83.2 cm (*Deity*) and 168.9 x 75.1 cm (*Mary*), 168.5 x 75.5 cm (*John the Baptist*). Since the width of the panels has not changed, we have to assume a margin of error for the *Mary* and *John the Baptis*t panels of 6 cm, while the width given for the Deity panel is correct. The oddity remains, however, that the measurements for the *Adoration of the Lamb* that the French recorded in 1794 totally fail to match those of the panel, which has never been reduced in size. Not even the relative proportions between length and width correspond with the current measurements, suggesting that the French recorded the dimensions incorrectly. Care ought thus to be taken with these figures.

60 Cleaning windows and analyses in these spandrels have revealed that beneath the current blue there is an even older layer of dark-blue, azurite-based paint, which is probably original. See Glatigny et al. 2010, p. 345; Genbrugge, Roeders 2017, p. 101.

61 Verougstraete rightly notes the similarity with the fourteenth-century *Apostles Altarpiece* (Sint-Dymphnakerk, Geel), which also combines a blue background with gilded tracery. See Verougstraete 2017, p. 156, fig. 11.1.a.

62 Glatigny et al. 2010, p. 72. The nature of these fixation holes will be clarified when the blue overpainting is examined during the third phase of restoration of the *Ghent Altarpiece*.

63 See contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

64 Louvain 1971, pp. 632-636.

65 Among others, Brandt Philip 1971, pp. 7–8.

66 Dhanens 1972, pp. 138–41; Glatigny et al. 2010, pp. 18, 160; Verougstraete 2015, pp. 201, 216; Genbrugge, Roeders 2017, pp. 98–99.

67 For example, the pre-Eyckian *Large Carrand Diptych* (Museo Nazionale del

Bargello, Florence); the *Crucifixion of the Parlement of Paris* by the Master of Dreux Budé (Musée du Louvre, Paris) and the *St John Altarpiece* by Hans Memling (Bruges, Saint John's Hospital). For later examples, see Verougstraete, (note 3), pp. 321–22, 345–47, 398–401, 535–37.

68 Glatigny et al. 2010, pp. 25, 26, 168, 169.

69 Duverger 1945, p. 49; Coremans 1953, pp. 23, 38; Verougstraete 2015, p. 224. In carpentry the Dutch word 'hulpen' or 'helpen' refers to the planing of a wooden structure affected by sagging. See Van Keirsbilck 1898, p. 167.

70 Monballieu 1966, p. 51.

71 The Adam and Eve panels and frames were never sawn through their centre and it was possible to weigh them during the first phase of the project. The weight of the wings with the Singing Angels and the Angel Musicians is 15 kg, but both of these wings (panel and frame) were split in Berlin and therefore do not display their original thickness; what's more, they have been fitted with heavy cradling. The suggested weight of 16 kg is an estimate based on the surface area.

72 Panofsky 1953, p. 208; Steyaert 2015, p. 75.

73 Monballieu 1966, pp. 47-53; Brandt Philip 1971.

74 Glatigny et al. 2010, p. 140; Verougstraete 2015, pp. 198, 205, 221–23.

75 Glatigny et al. 2010, pp. 52, 220, 286, 326.

76 See contribution 2 by Ketels, Glatigny and Augustyniak in this volume.

77 Glatigny et al. 2010, pp. 13, 19, 155, 156, 161.

78 The Hague, RKD, ill. no. 0000215246 and 0000213833; reproduction E014250 at KIK-IRPA, Brussels. The photographs kept by the RKD and the reproductions at KIK-IRPA, were previously studied by Dhanens 1972, pp. 136–40; Van Asperen de Boer 2004, pp. 110–11; Stehr, Dubois 2014, pp. 126–27; Verougstraete 2015, pp. 220–22.

79 Dhanens 1969-72, p. 138; Sauermost 1982, pp. 290–300; Van Asperen de Boer 2004, pp. 107–18; Châtelet 2011, p. 95; Verougstraete 2015, p. 212.

80 This relates in Peters's case to the arrangements (numbered 4 and 5), in which the *John the Baptist* and *John the Evangelist* panels could supposedly be turned inwards, with the result that they and the *Adoration of the Lamb* were visible, but not the donors. Steyaert hypothesizes the closing inwards of the upper register wing panels around a polygonal tower altar. See Peters 1950, p. 74 n. 36, and Steyaert 2015.

81 For a survey of tower altars, see e.g. Lapaire 1972; Mund et al. 2003, p. 243. We are unaware of any tower altars with the hinges on the outside.

82 Dhanens 1969-1972, pp. 130–36.

83 See contribution 5b by Augustyniak, Mortiaux and Sanyova in this volume.

84 Follower of Rogier van der Weyden, *Ambierle Passion Altarpiece*, 1466, église Saint-Martin, Ambierle. See Bücken, Steyaert 2013, pp. 114–16. Another altarpiece with painted stone imitation on the frames is the *Burning Bush Triptych* by Nicolas Froment. Here the horizontal edge of the frame also functions as a joint in the masonry (1475–76, Cathédrale Saint-Sauveur, Aix-en-Provence). See Limentani Virdis, Pietrogiovanna 2001, pp. 137–47.

85 Janzen 2015.

8

Restoring in the Public Eye[1]

Bart Devolder

In October 2012 the Royal Institute for Cultural Heritage (KIK-IRPA) began the conservation treatment of the *Ghent Altarpiece*. Due to their turbulent history and cultural importance, the panels are not to leave the City of Ghent nor to be taken off view for a significant period of time. Taking these conditions into consideration, it was decided that the panels were not going to be moved to Brussels, where the KIK-IRPA conservation studios and laboratories are located. Instead they would be treated in a specially adapted gallery in the Museum of Fine Arts Ghent (MSK) (fig. 8.1). This approach created the need to provide information to the visitors who might not be accustomed to witnessing conservators at work. The large window of the conservation studio maintains a barrier between the restorers and the public, while its transparency creates new opportunities for engagement. How can the demystification of conservation work influence the perceived value of painting conservation? In what ways can information exchange occur in this specific situation? Are there chances for misunderstanding or misinterpretation on the part of the museum visitor? What are the visitors' expectations?

In order to touch upon these questions, this article will trace the development of public conservation, followed by a more in-depth look at the interaction with the public. Specific situations and ad hoc solutions for a better interaction with the visitors of the restoration of the *Ghent Altarpiece* will be described from which suggestions for similar conservation projects could be drawn.

The development of public conservation

Archaeological sites

The origins of restoring works of art in front of a public can perhaps be found in the work carried out on archaeological sites. When dealing with large archaeological sites which are open to the public, it is impossible to completely block off the archaeologists still excavating or conservators restoring the unearthed structures and objects. It was soon realized that the public is very curious to see and eager to learn more about what is going on. 'Public conservation treatments' such as the restoration of the arch of Septimius Severus in the Roman Forum already attracted large crowds in the 1980s. This success continued in the 1990s with major restoration projects such as the

Fig. 8.1. (facing page) View of the studio through the safety glass window (detail)

Thermae of the Caesars in Ostia Antica (Italy) or the Thermae at Masada (Israel).[2] These conservation treatments open to the public have become a marked trend during the last decade and not only for large archaeological sites.

Wall paintings and other immovable works of art

For as long as conservation treatments of works of art have existed, some of them have been carried out in public. In most of these cases (as with archaeological sites), this was done for merely practical reasons, as removing a wall painting from a church ceiling into a specialized conservation studio is not the most deontological or safe option.[3]

Delicate decorative stone masonry integrated in the structure of a building or heavy and refined tombs adorned with polychromy and sculptures, to name just two examples, are also impossible to move. When these types of artwork need to be conserved, there are no alternatives to treating them *in situ* and therefore, more often than not, under the watchful eye of the public.

Paintings

In the 1960s many large paintings and altarpieces were transported to (special) conservation studios. KIK-IRPA has a studio specifically adapted for oversized works in which, for example, Peter Paul Rubens's *Descent from the Cross* (1612–14; central panel 420 x 320 cm) was treated in 1960.

The first time that KIK-IRPA undertook a high-profile treatment inviting the public to witness every step was in the spring of 1983. A temporary conservation studio, including the provisional replacement of stained-glass windows with plain windows to create better lighting conditions, was set up in the western part of the north aisle of the Cathedral of Our Lady in Antwerp. This studio was built to facilitate the conservation treatment of Rubens's *Elevation of the Cross* triptych.[4] The decision to conduct this treatment *in situ* was primarily based on the difficult task of moving this triptych painted on oak, whose central panel is 459 cm tall by 339 cm wide.[5]

Over the last decade, this shift towards work done *in situ* and in front of the public has possibly been spurred by the experiences gained from the restoration of archaeological sites and immovable pieces. The removal of famous and important art objects (i.e. of both art-historical and touristic interest) for multi-year conservation treatments can be avoided by having the conservation work carried out in plain sight. Besides solving the obvious problem of not having the object on view, it has the additional advantage of attracting even more visitors. Indeed, as the archaeological sites have shown, the public is extremely interested in seeing what happens to artworks that are undergoing a conservation and/or restoration treatment.

This positive response of the public has prompted many museums to build new conservation studios, or to adjust the way these studios are implemented within the museum. This is particularly true for the United States, where a great example can

Fig. 8.2. Public View Frames Lab, courtesy Smithsonian American Art Museum, Washington, D.C.

be found in the Lunder Conservation Center at the Smithsonian American Art Museum and National Portrait Gallery (LCC). At the LCC, which opened in July 2006, five conservation labs (Frame, Paper, Objects, Structural Paintings, Paintings Conservation) are almost completely visible to the visitors of the museum(s) (fig. 8.2).[6] In Europe too, more and more (temporary) conservation studios are installed where the public can feel part of and witness the treatment process. Examples include the simultaneous restoration of Johannes Vermeer's *Girl with the Pearl Earring* and *View of Delft* in 1994 in the Mauritshuis in the Hague,[7] Memling's *Christ between Singing and Music Making Angels* from the Royal Museum of Fine Arts Antwerp (2000–2017), the restoration of the tapestry cartoon attributed to Pieter Coecke in the Museum of the City of Brussels (2016–17)[8] and, more recently, Project Blue Boy at the Huntington in San Marino (CA)[9] (2018-2019) and Rembrandt's *Night Watch* in the Rijksmuseum Amsterdam (2019-…), to name only a few instances.

The public

The public can follow every facet of the project: the meticulous examination and interventions, photography, documentation, scientific examination and even meetings (fig. 8.3). Visitors are intrigued to witness a process that previously happened in 'hidden' conservation studios, where restorers were believed to use all kinds of secret and mysterious techniques. The openness and the focus on the dissemination of correct and audience-based information allows for a further demystification of the conservator's profession. The audience sees why certain steps take a relatively long time and why specific interventions are needed to preserve the works of art for future

Fig. 8.3. Restorers at work while being carefully observed by the public

generations. This comprehensive view helps the public to acknowledge the need for conservation treatments and to understand why sometimes taxpayer money is invested in it.

Eager to learn about this process, the general public may be accustomed to seeing before-and-after-treatment images but not to what happens during the various phases of a treatment. A famous example illustrating the importance of witnessing the 'during-treatment' phase and not just the 'before and after' is beyond doubt Michelangelo's Sistine Chapel in the Apostolic Palace, Vatican City. After the restoration treatment was finalized, public response to the dramatically changed colour scheme was anything but unanimously positive.[10] To many visitors (and specialists) the difference between the image known from previous visits (memory) or older publications and the cleaned state was too radical; a more gradual transformation of the frescoes along with an explanation of the process might have prevented or softened this criticism. Similar comments could be heard when after twenty years the treatment of Leonardo's *Last Supper* wall painting for the refectory of Santa Maria delle Grazie in Milan was finally completed.[11] Embracing the public during the entire conservation/restoration process can avoid misunderstandings related to the performed treatment.

Interested people come to see these conservation treatments with certain expectations. It is important to note that the 'wow factor' and the uniqueness of the experience will diminish all the more as restoring in front of the public becomes a common event. This will make it easier to interact on a more in-depth level with an audience that is already accustomed to some of the terminology and gestures used by the restorers.

From a conservator's standpoint, it is clear that with time and experience the interaction with the audience has also changed significantly. The level of interaction

has evolved from a mere window where restorers go on with their daily job or a simple rope marking off the conservation space,[12] to entering the actual conservation studio where people are working[13] and even partaking in the actual treatment.[14] The development of social media has also played an important role in this evolution. It is now quite common for restorers to have blogs, Facebook pages and Twitter accounts.[15] In large museums there are technology and new media departments that take care of the museum's digital presence, often seeking information, impressive photos, and fun facts in the conservation department. The space where the public gets a glimpse of the work being done is very often adorned with touchscreens, wall texts, videos, monitors attached to microscopes, and sometimes nicely curated exhibitions. Even before leaving home the interested museumgoers can download or subscribe to podcasts or apps on their smartphones and tablets.[16] Yet although there are many ways to inform oneself on the conservation being carried out, there always seems to be the urge for a direct interaction with the restorers. To meet this desire restorers can open windows at set times,[17] come out of the studio, or answer questions jotted down on pieces of paper with their responses posted on a website.[18]

The attraction conservation treatments hold for the public has not gone unnoticed by governments, museum directors and private companies. An increasing number of private companies (many of which have had no intention of sponsoring restoration, art or culture in the past) are willing to support public conservation projects because it is a great way to associate their name with something positive and durable. Museum directors and governments see another advantage: the possibility of crowd funding. Ever more conservation projects are (partly) paid for by the visitors. People feel comfortable contributing to something that interests them and of which the results can be seen for a long time. For example, a portion of the total amount needed to restore the Museé d'Orsay's Courbet masterpiece *The Painter's Studio* was raised by crowd funding, with the other (larger) portion of the costs sponsored by a bank.[19]

The specific situation of the Ghent Altarpiece project

The conservation studio

On 2 October 2012 the eight panels constituting the first phase of the *Ghent Altarpiece*'s restoration project were brought to the MSK and placed into the studio.[20] In the museum an existing gallery, measuring approximately 143 m^2, was adjusted to house a conservation studio with room for up to ten restorers. In this refurbished gallery space, the public could follow every step of the treatment process through a large, safety glass window (10.75 x 1.69 m). In addition to this glass wall, a fire exit and a secured entry point for the conservators was built. The walls of the conservation studio were painted in a neutral grey colour to prevent reflection. The visitor area was painted in darker tones, which in combination with good sound insulation creates minimal disturbance for the restorers when large groups are visiting. Desks, shelves, computers and a computer network were also installed.

The climate, more specifically the relative humidity, in the studio is kept as close as possible to the average percentages of those in the Ghent cathedral (between 55 and

60%), slightly more humid than in the rest of the museum (50–55%). Maintaining this specific climate within the studio requires constant monitoring and regular filling of the two humidifiers by the conservation team. This is a far more comfortable work environment than in 1983, when the Rubens triptych was treated in the Antwerp cathedral. Back then the restorers could only work from May to November, when the temperature in the cathedral rose above 15°C.[21] These seasonal limitations are naturally avoided when working in a climate-controlled museum environment.

The studio in the museum is quite remarkable, but it goes without saying that there are drawbacks in comparison with a custom-made conservation studio built from scratch, including space limitations and lack of running water. The restorers must also replicate daylight in the space using extra equipment (fig. 8.4). A sort of tent was constructed in order to facilitate examination in ultraviolet light, photography, Raman spectroscopy and XRF analysis. Special care is also needed when conducting X-radiography examination due to the close proximity of the public.

Given the fact that the initial aim of the project for the first phase was changed from a mere conservation approach towards a full restoration project, at the end of 2016 an adjacent gallery of approximately 60m² (with daylight) was transformed into a multi-purpose room for desks, examinations, meetings, and the storage of materials. This new annex can likewise be seen by the public through a glass safety door.

Fig. 8.4. The interior of the studio showing the restorers at work with all their equipment

Communication and outreach strategies

In general the conservation team, often together with education departments and communication specialists, puts much effort and enthusiasm into offering the visiting public an unforgettable, unique, and above all interesting experience. The scenarios for public outreach are in most cases a group effort and the restorers should never be exclusively responsible for developing them. It is important to note that every project and situation is different and that limitations in terms of budget, schedule and responsibility are likely to occur.

The conservation/restoration project of the *Ghent Altarpiece* is a very specific undertaking involving an amalgam of many different institutions, stakeholders, and governments. This complex administrative structure can be concisely explained by referring to the administrative status of the *Ghent Altarpiece*: it is linked with the cathedral, whose maintenance and finances are under the guardianship of the Province of East Flanders. In the months preceding the start of the project no suitable work environment could be found in the cathedral or in any of the other buildings under the care of the provincial government. The City of Ghent and the director of the MSK, however, enthusiastically welcomed the restoration project into the museum building. The Commissioning Authority for the project consists of the Churchwardens of St Bavo's Cathedral. The project is funded by the Flemish Government (80%) and by the private sponsor Baillet Latour Fund (20%). The KIK-IRPA, a federal scientific institution, carries out the actual treatment while it also contributes in kind some personnel hours to the project.

From the outset it was decided that the public education and outreach component was in the hands of the Province of East Flanders. This component was not included in the project specifications or tender drawn up by the Commissioning Authority (Churchwardens of St Bavo's Cathedral) and handed over to the contractor (KIK-IRPA). The fact that public education and outreach were not included in the specifications does not mean it was not discussed among the different partners before the project started. The initial education and outreach concept included the installation of the large windows allowing the public to see the restorers at work, as well as mandating the Province of East Flanders to dedicate several exhibitions to the conservation/restoration of the *Ghent Altarpiece* in the Caermersklooster. However, as time went on and the project became more intricate, this initial concept did not suffice and the partners came up with several solutions, some of which will be discussed below.

Caermersklooster

The Province of East Flanders dedicated two exhibitions to the topic of the *Ghent Altarpiece* restoration project in the Caermersklooster Provincial Cultural Centre in Ghent, a building about six kilometers from the museum where the conservation treatment is being carried out. One of these exhibitions, a permanent installation that ran until the end of November 2017,[22] was entitled 'The Ghent Altarpiece Revealed' (figs. 8.5). It provided information about the original materials used to construct the

8.5 a

8.5 b

Fig. 8.5 a and b Views of the exhibition *The Ghent Altarpiece Revealed* in the *Caermersklooster* Provincial Cultural Centre in Ghent

panels and the paint used for the execution of the *Ghent Altarpiece*. Scientific equipment employed in the 1951 examination and treatment were on display too. The exhibition also included a life-size reproduction of the altarpiece showing the underdrawing, filmed interviews with the restorers and art historians involved, and webcam connections to the cathedral and to the conservation studio in the MSK. The other exhibition space was intended for temporary focus shows (fig. 8.6).[23]

As the physical distance between the different venues was far from ideal for the comfort of visitors, several initiatives were implemented to facilitate visits, including a joint brochure for all three locations (Caermersklooster, St Bavo's Cathedral and MSK), a hiking route,[24] a joint admission ticket for the three sites, and a specially designed package with playful assignments for children.[25]

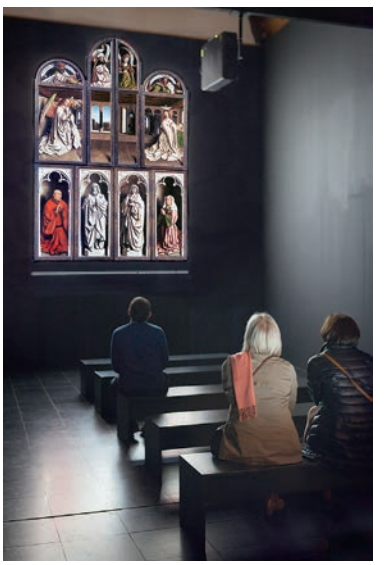


Fig. 8.6. Views of the exhibition *Restoration/ REVELATION- The exterior wings of the Ghent Altarpiece* in the *Caermersklooster* Provincial Cultural Centre in Ghent: didactic panels (a), life-size projection where the entire four year treatment can be seen in a couple of minutes (b)

Media and public interaction

From the start of the treatment onwards, all partners considered the best ways to disseminate information about the project. KIK-IRPA approached *Cobra.be* (now replaced by *vrtnws.be*),[26] the cultural website of the Flemish public broadcasting company VRT, to produce regular project updates including short video reports. This is an efficient way of sharing information with a large number of people. At the same time, it is also an appropriate solution for safeguarding that information for the future, since all recordings are carefully archived. The conservation team contacts the reporter when a new interesting stage of the treatment has begun. The actual filming has a relatively low impact on the team since the technicalities involved in the recording process are taken care of by the same person at every turn.[27]

In addition, a computer giving access to the *closertovaneyck* website was installed in the visitors' area.[28] Explanatory texts in three languages written by the restorers and placed outside the studio are updated as the treatment advances. An X-radiograph with explanatory caption was also installed for the public as well as a copy of the altarpiece painted by children, aged between ten and twelve, of the Go School, Ghent. All these adjustments and additions were made as the project progressed. The changes were closely monitored by the steering committee, in order to keep a good balance of involvement of all partners and to encourage visitors to go and visit the exhibition about the conservation project in the Caermersklooster too.

To support the dissemination of correct information, the restorers regularly provide training to museum staff, city guides, and other instructors leading tour groups to see the treatment in progress. This pyramidal approach was chosen because it is impossible for the restorers to constantly interact directly with the public. Direct interaction is possible thanks to another initiative, the monthly 'Meet the Conservator' moment. Each month, on a set day and time a restorer gives a short explanation about the project and answers questions from the visitors during a one-hour session outside the studio (fig. 8.7). These presentations are very popular and are booked full for months in advance.

Access to more detailed scientific information and imagery for the public and for fellow conservators, art historians, and other academics is also essential. After the first phase, the exhibition 'Restoration / REVELATION – The exterior wings of the Ghent Altarpiece', accompanied by a catalogue with the same title, opened in the Caermersklooster.[29] An updated version of the *closertovaneyck* website was released in late October 2017. A documentary by Visser & van Rijckevorsel will also be produced and publications for different audiences (academic level versus general public) are being developed as well.

Looking back and going forward

According to the International Council of Museums (ICOM) all museums should aim for public interaction.[30] As previously mentioned, the case of the *Ghent Altarpiece* restoration campaign is a very specific one. The KIK-IRPA team is the MSK museum's guest. This may not be immediately clear to museum visitors who expect the restorers

Fig. 8.7. *Meet the Conservator* presentation at the Museum of Fine Arts Ghent; a restorer comes out of the studio for one hour to give a short explanation about the project and to answer questions from the visitors

to make their visit to the museum as interesting as possible (read: actively at work at the easel). The conservation team collaborates with, among others, the MSK's education department and with the City of Ghent by providing didactic materials and the necessary information to enable communication. Nevertheless there is a limit to what the conservators can do within the scope of their specific commitment and the aforementioned tender. The same situation is described by several authors writing about their experience of participating in public conservation treatments. These publications often alert us to the shift from preservation to communication, in other words the fact that by focusing on the public, budget is taken away from the conservation as such.[31] It is clear that in the last couple of years things have been changing. Proof of this can be found for example in the restoration of larger (historic) buildings. It is now common for the owner to include a specific budget line for outreach.[32] The contracting authority can also ask the different companies bidding for a public tender about their views on public outreach, and their answers could be a decisive factor in assigning the project.

From the limited number of published articles and case studies on public conservation treatments, it can be deduced that an outreach coordinator, working solely as the liaison between the conservators and the visitors, is necessary to relieve the pressure of specialized communication tasks from the conservators. This person can actively monitor and improve communication with the general public. This position exists in the LCC, where a Program Coordinator is responsible for interpreting conservation on the public's behalf.[33] This approach could work well provided it is budgeted from the outset.

The restorers behind glass: a specific communication model

The large windows invite the public to experience what the treatment entails, while on a broader level it is a good platform to familiarize visitors with the profession of (painting) conservator. However, the conservators cannot directly interact with the visitors. This passive or indirect interaction between the conservators and the public can be translated into a general model of communication (fig. 8.8). In order for communication to take place, a sender, a message, and a receiver are needed.[34] The sender encodes the message, which is sent (via a medium) to the receiver, who then decodes it. The decoding of the message can only happen if and when there is not too much 'noise' and the receiver has the right skills to do so.

It is then possible to create a communication model for the specific set-up in the museum (fig. 8.9). Everything the conservators do (or don't do) in the studio, whether intentionally or otherwise, creates messages. The public – looking at the conservators through the windows – receives these messages. But the interpretation or decoding is not always an easy task. A reason for the difficulties the visitors might experience lies in the fact that what they get to see mostly consists of a moment in time. For example, they do not see the beginning or ending of the varnish removal. In addition, many visitors lack the knowledge to correctly decode these messages. In the case of varnish removal, the public needs to know the answers to important questions like: What is the cotton swab the restorer is holding and what are the transparent liquids in the glass jars? What is the brown layer they are removing? What is the purpose of putting a varnish on a painting? If these questions fail to be answered, the viewers will not be able to accurately decode the message. This is why the public education and outreach component of the project is so important.

Directly linked with this is the concept of 'visual literacy'. This concept is actually synonymous with the competence or skills that are increasingly needed in the museum world. In a museum setting this means: is the visitor competent in the field of the museum's collection? It is one of the tasks of a museum, besides preserving and

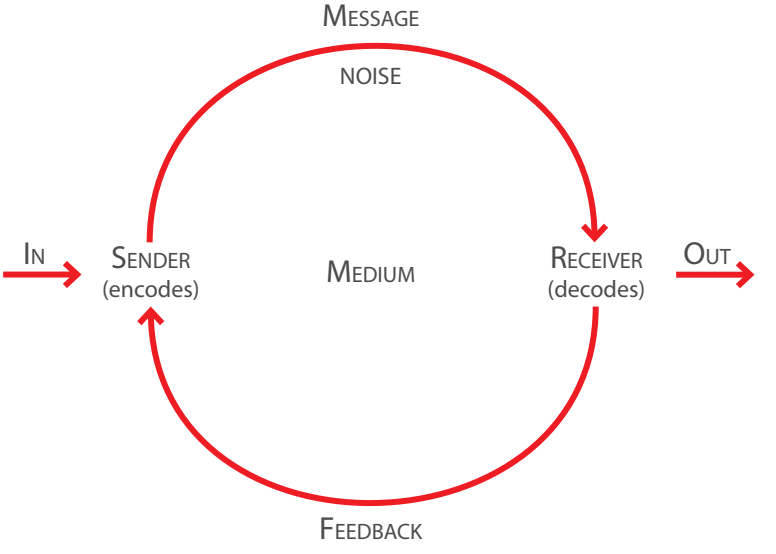


Fig. 8.8.
Communication model

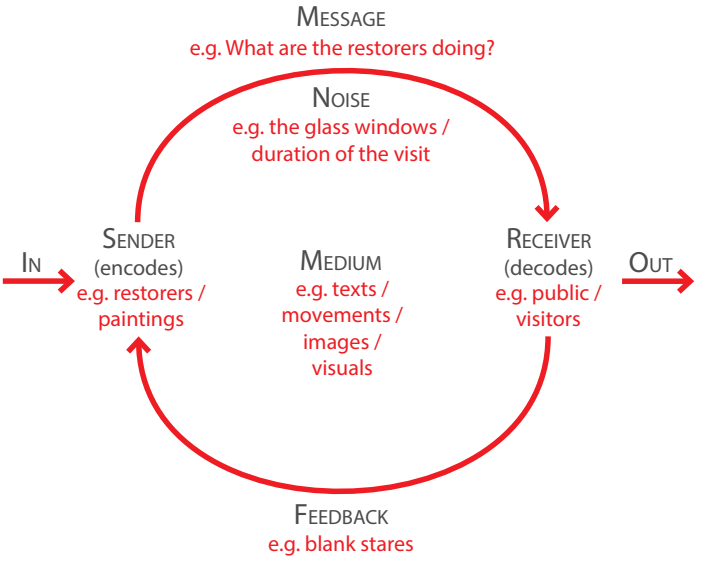


Fig. 8.9. Site and situation specific communication model

displaying art, to teach its visitors to be competent.[35] A public restoration can be a very valuable way to educate the visitor and in doing so teaching them to be competent. Bringing it back to the communication model, this means teaching the visitor the necessary skills to facilitate the correct decoding of the message. For example, with the restoration of the tapestry cartoon attributed to Pieter Coecke, short videos explaining certain conservation techniques were shown in the accompanying exhibition, thus preparing the public for what they were going to see.[36]

Some examples

1. A restorer (sender) is removing a discoloured varnish (message), but the partially cleaned painting also sends a message. With the varnish some inpainting is removed as well and the old damage of the paint layer becomes apparent. The message the restorer is sending (actively or passively) is: *I am removing a non-original, discoloured varnish without damaging the original paint layers with solvents that might or might not be toxic; we know what we are doing and the original intention of the artist will become more manifest after cleaning, etc.* These are in fact too many messages, which creates noise. The limited time visitors are watching the restorers, their lack of knowledge of conservation procedures, and the impossibility to directly interact with the restorers makes decoding these messages difficult.

Feedback from the visitor is something that has been somewhat overlooked in this and other public conservation projects over the past years. People's expressions through the windows and the questions asked during the monthly question hour are some of the pointers available to the conservators to evaluate the level of communication with the public. In these and other rare moments where direct interaction is possible, the audience is very enthusiastic and appreciative of the openness on the part of the conservators. A more systematic survey at the different venues could yield important information for adjustments in future.

2. A restorer (sender) is sitting with a computer in front of a panel (message). The message that passively is being sent: *I am currently examining the surface of the painting, looking for overpaint, retouching, or flaking paint and adding this information to the condition report.* In the worst case the visitor (receiver) reads this message as: the restorer is not working, but is checking the internet. In this case the decoding is completely wrong but due to the lack of direct feedback, the restorers are not always aware that inaccurate messages are being sent. In this particular case the decoding was helped by including a passage on the information sheets available to the public, stating that writing reports is part of the job.

3. When the restorers are absent during the weekend, for instance, the empty lab and the panels keep sending messages such as: 'during varnish removal', 'during overpaint removal', 'during filling', etc. In this case the information pamphlets and the computer with the video reports are the only help the visitors (receivers) have at their disposal to decode the messages.

These examples illustrate that it is not always easy to communicate in a correct and efficient manner. The simple adapted communication model can be used to test certain situations and to see where the problem with the communication lies.

Conclusion

It seems likely that the idea of restoring works of art in front of an audience derives from the usual practice encountered on archaeological sites. This example, in combination with practical considerations raised by moving large pieces and the unwelcome prospect of hiding important historic and touristic objects from view for many years, might explain the recent popularity of restoring in the public eye. This popularity opens up new views on how these projects can be financed in the future, such as crowd funding and private sponsoring.

The conservation/restoration of the *Ghent Altarpiece* in the Ghent Museum of Fine Arts provides a unique opportunity to invite the public to witness every step of the treatment. The large window opens up the entire studio and gives the visitor the impression to be part of this important project. Together with all the other partners, KIK-IRPA came up with several initiatives to make the information available to an interested audience. The exhibitions in the Caermersklooster together with their catalogues and the videos on *vrtnws.be* proved to be very popular and well received. As the treatment of the *Ghent Altarpiece* became more intricate and the duration of the project changed accordingly, ad hoc solutions were found to accommodate the growing need for information. These solutions included the adjustments made in the MSK visitor area and the 'Meet the Conservator' initiative together with extra efforts to encourage visitors (with their children) to visit all three venues. Initiatives to increase these efforts were taken on a regular basis.

Given the opportunity to witness the entire treatment of the altarpiece, the public can see the paintings change gradually and continuously. The openness of the undertaking and the dissemination of information (specific and general) help to avoid

misunderstandings and to demystify the conservator's profession. The audience sees why certain steps take a relatively long time and why specific interventions are needed to preserve the works of art for future generations.

It is clear that it is not always an easy task for conservators to strike the right balance between assisting with public outreach and conducting the actual treatment. Specifically for the *Ghent Altarpiece* project, all the initiatives (such as the 'Meet the Conservator' moments and the videos for *vrtnws.be*) need to be carried out while maintaining a constant dialogue with the different partners (Churchwardens, Flemish Government, Province of East Flanders, MSK, etc.) – and this without exceeding the deadline for the project.

A recurrent suggestion in the existing publications and published case studies is the position of an outreach coordinator. This designated person can focus specifically on the important task of dedicated communication and in doing so relieve the restorers.

A simple communication model with a sender, message and receiver was used in this article to illustrate the specific situation for this project. It will be clear from the above that in using this model it is sometimes easier to determine where the communication issues lie. Together with all the partners we are constantly trying to improve the outreach and public involvement in order to share as clearly as possible the unique, fascinating and interesting task we have been entrusted with.

Notes

1 This contribution is partially based on Devolder 2014. The idea behind writing this article came after reading the foreword in the postprints of the conference on public restorations held in Williamsburg (VA) in 2011. In the foreword it states that: '… outreach remains underrepresented in the conservation literature' (Williams 2013, p. ix). Even in researching this article it became evident that publishing experiences about public conservation treatments are rather rare; more often information can be found in newspaper articles and (temporary) internet sources.

2 Nardi 1999, p. 45.

3 The so-called *strappo* technique, which consists of removing the paint layer, has been – and in rare cases still is – used by restorers of wall paintings.

4 Masschelein-Kleiner 1992, p. 10.

5 Vynckier 1992, p. 55.

6 Heath 2009, p. 75.

7 Noble et al. 2008, pp. 168–85.

8 Brussels City Museum 2018.

9 Project Blue Boy is the name for the conservation/restoration project of Thomas Gainsborough`s *The Blue Boy* (around 1770). The Huntington Library, Art Collections, and Botanical Gardens 2018.

10 See e.g. Beck, Daley 1996.

11 Stanley 1999.

12 Images of the set-up can be seen in Frans Hals Museum 2015.

13 Visiting the conservation studio was possible during the restoration of the tapestry cartoon attributed to Pieter Coecke in the Museum of the City of Brussels; Brussels City Museum 2018.

14 The cleaning (maintenance) of a Roman mosaic (300 CE) by children under the age of ten (supervised by a conservator) in the Museum of London; see Ganiaris, Lang 2013, p. 215.

15 See e.g. the 'live tweeting mummy wrapping and conservator Q & A Tuesday'; Koss et al. 2013, pp. 76–87.

16 Several museums, such as MoMA, the Metropolitan Museum of Art and Smithsonian American Art Museum offer

several videos and spoken word information in the 'iTunes U' section.

17 Arista, Drayman-Weisser 2013, pp. 198–200.

18 Lantz 2016.

19 Carvajal 2016.

20 The eight panels comprising phase one are the following: *Archangel Gabriel, Virgin Annunciate, City View, Interior View, Joos Vijd, John the Baptist, John the Evangelist, Elisabeth Borluut.*

21 Masschelein-Kleiner 1992, p. 12.

22 The initial exhibition period was linked to the duration of the conservation treatment, but due to the change in ownership of the building the exhibition came to an end in November 2017.

23 These temporary exhibitions were in order of appearance: *Whither the Ghent Altarpiece*; *What Does The Ghent Altarpiece Tell Us?*; *From Tree Trunk to Altarpiece*; *A miraculous garden- Flora on the Ghent Altarpiece*; *Restoration/ REVELATION- The exterior wings of the Ghent Altarpiece*

24 The map *Follow Van Eyck – The 15th century Ghent of the Painters of the Ghent Altarpiece,* produced by the Heritage Department of the Province of East Flanders in collaboration with the East Flanders Tourist Board.

25 This package only exists in Dutch: *'Be(k) leef het Lam Gods'*; created by Mooss vzw.

26 VRT NWS 2012–18.

27 In name of the entire team the author likes to thank Steven van Campenhout for the great collaboration the past six years and we hope to continue this in the future.

28 Royal Institute for Cultural Heritage 2010.

29 Royal Institute for Cultural Heritage 2017.

30 Grammatikou 2013, p. 45.

31 For an overview see: Grammatikou 2013, p. 45.

32 Personal communication by Jochen Ketels, restoration architect; January 2017.

33 Heath 2009, p. 75.

34 Rotwell 1999, p. 7.

35 Wagner, Vermeersch 2017.

36 Brussels City Museum 2018.

9
Epilogue: Implications and Perspectives

Cyriel Stroo and Maximiliaan Martens

The exterior wings of the *Ghent Altarpiece* are a splendid example of Van Eyck's convincing imitation in oil of the visual world. They display his abilities to create an entire *trompe l'œil* universe merely using paint. That capacity became a value in its own right. No other artistic medium of the period could compete with the sophisticated optical properties of oil on panel. For the first time in centuries, this optical splendour can now be fully appreciated again. The underlying artistic skills remind us of the words of the Burgundian Duke Philip the Good, who expressed his appreciation for the inimitable qualities of his court artist: '*nous trouverions point le pareil a nostre gre ne si excellent en son art et science*'. Indeed, a brilliant intellect as well as a virtuoso artist.

Until the present conservation treatment, the outer panels of the *Ghent Altarpiece* had been overpainted to a considerable extent, to the point of obliterating the Eyckian technique and aesthetics. And yet, surprising as it may seem, this had never been observed before the start of the intervention. Modern neuroscience has taught us that we only see what we are expecting to observe, even though we consider ourselves knowledgable about the subject. On 17 March 2014, the members of the International Commission were unanimously surprised at the extent of the old overpaintings and at the same time amazed by the exceptional quality of the original coat of paint that was revealed after having been exposed in test zones.

Even the experienced eye of the connoisseur or the restorer can be deceived. Recognizing old overpaintings is also less straightforward than one might think. Renewed observations after the removal of the highly oxidized varnish layers, supplemented with the information obtained through Macro X-ray Fluorescence scanning (MA-XRF) documentation and detailed investigation with the high-resolution microscope, brought the conservators and the experts new insights. Further development, study and interpretation of all scientific imagery now available undoubtedly offers promising perspectives for the future.

By removing the overpainting, the composition on the exterior panels was restored into its original three-dimensional unity, conceived as such from the outset. The polyptych's chromatic richness and the coherent rendering of light and space have regained their original visual impact. Especially the suggestion of volume and the spaciousness of the ensemble gained strength due to the virtuoso play of deep shadows and bright light accents, and not the least by the surprising *trompe l'œil* effect of the frames conceived as a stone framework. As stated elsewhere in this book, it consists

Fig. 9.1 *City View*, detail

of 'a refined imitation of dressed stonework, using silver leaf covered with coloured glazes ranging from yellow to red, and heightened with small touches of colour and articulated by joints painted in black and white'. The unveiling of the original polychromy of the frames may be seen as the discovery of the missing link between the ensemble of individual paintings and the stone walls of the Vijd Chapel as architectural shrine of the altarpiece.

To put it in the words of one of the experts, Dr Maryan Ainsworth: 'The paintings live and breathe again in the time of the Van Eyck brothers.' The artist's sharp observation skills and accurate execution, as well as his knowledge, curiosity and ingenuity about the reality he painted are now unveiled after having been hidden for centuries. The results of the conservation/restoration treatment are of fundamental importance to the advancement of our knowledge of Eyckian aesthetics and painting technique, especially considering the exceptional scale of the work. And last but not least, the discovery of the quatrain's authenticity is nothing less than a *coup de foudre* in the discourse of art-historical research, for a long-standing debate can finally be concluded as we now can be sure that the quatrain was applied simultaneously with the polychromy of the frames. This has the very important implication that the information given in the quatrain – Hubert van Eyck started the work, his brother Jan finished it, on the request of Judocus Vijd, on 6 May 1432 – are historically reliable and authentic facts that cannot be disputed anymore. Nevertheless we are far from overseeing all the consequences for art history, as Hubert's contribution still needs to be identified. In any case, as Griet Steyaert and Marie Postec argue in this book, Hubert's hand is not to be found on the exterior wings. However, our new insights into the extent of the overpainting make it understandable why connoisseurs in the past experienced such difficulties in the division of Hubert's and Jan's hands. We eagerly look forward to the results of the research being conducted during the following phases of the project to gain further insight into this and similar questions that have puzzled art historians for nearly two centuries.

In the course of the ongoing research, the subtleties of Eyckian technique may also be mapped out in greater detail. We are continually getting a better understanding of how Van Eyck managed to keep the final result and the desired effect in mind during every phase of the execution, from the first concept to the finishing touches, or, in other words, how the end result is being build up from the moment of initiating the creative process, for example by exploiting the ground and the diversified underdrawing. The *Ghent Altarpiece* can be understood as Van Eyck's very statement about the essence of the art of painting, a showpiece of highly sophisticated pictorial technique.

The amount of overpaint on the *Ghent Altarpiece's* outer wings had a drastic and unfavourable impact. It dulled the strength and subtlety of the Eyckian aesthetic vision. Certain garments and backgrounds were almost completely masked, while the intensity of light and brightness of the colours were subdued. The original texture was obscured, the sense of space curtailed and colour harmonies were disturbed. 'Edits' and changes to the figures of Joos Vijd and Elisabeth Borluut are exemplary in this regard. In several places the arrangement of the folds in Elisabeth Borluut's robe was modified in the overpaint. The original, highly inventive drapery takes the shape of graceful arabesques that seem to follow an inner logic. Its richly diversified structure

of playful, rhythmic volumes in places recalls the drapery style of around 1400. Some dented and curved original folds seem to be indebted to the style and repertoire of André Beauneveu, as they appear in the robes of the prophets in the *Psalter of the Duke of Berry* (Bibliothèque nationale de France, Paris, Ms. fr. 13091). These were transformed into a greatly simplified angular pattern and therefore perhaps perceived as more 'rational'. After removal of the overpaint the cloth of the robe appears lighter, softer and more subtle. Such overpainting was not simply meant to repair damage to the original paint. It was purposely conceived, most likely from a different aesthetic experience and other artistic values. It therefore reveals much about the critical reception of Van Eyck's art in the course of past centuries. For the modern beholder it seems inconceivable that the delicate workings of light in Van Eyck's work could have been totally misunderstood. But then again, why had this never been noticed before the current treatment?

The study of nature, meaning and time of application of these old overpaintings must actually be further explored, although an important step has been made to this end in the contribution by Hélène Dubois. These interventions cannot be accurately dated at present. The oldest overpaintings must be anterior to the copy carried out by Michiel Coxcie for Philip II of Spain in 1557 and 1558, since Coxcie copied the overpainted surface. The interventions may be related to some historically documented campaigns, such as the cleaning by Jan van Scorel and Lancelot Blondeel, which according to Van Vaernewijck was initiated on 15 September 1550. A Jan-Baptist de Bruyn, who restored the altarpiece in 1617–18 and the work of the 'painter Noveliers' who was reimbursed in 1612 for his travel expenses in relation to a restoration of the altarpiece, are also possible candidates for an extensive intervention. In addition, the effect that was intended with these overpaintings also deserves more in-depth research.

A final point that deserves attention is the set-up of the conservation/restoration project, with its different committees and advisory boards. It allowed a steady follow-up of results delivered by interdisciplinary research and lead to a decision-making process that made a systematic, well-argued and durable treatment possible. Removing centuries-old layers of overpaint is far from evident within the framework of the current professional ethics of scientific conservation. The combination of a treatment executed with utmost care, the thoughtful application of (new) analytical methods of investigation, and the constant consultation of the conservators among themselves and with a wide range of experts, led to an overall consensus to reveal Van Eyck's work as much as possible in its original state. We are aware that such a dramatic shift in the professional ethical paradigm of scientific conservation cannot be justified merely by pointing out the general consensus among the committee members. It needs to be consolidated by a robust theoretical framework. What is more, this reflective endeavour will be continued during the following phases of the conservation and restoration treatment of the *Ghent Altarpiece*.

We hope that this restoration campaign and the publication of its results may help future researchers to ask more and better questions. It is to be hoped that the answers to these questions will produce an even more balanced picture of Van Eyck's techniques, methods and materials.

10a
Photography before and after Treatment

All high resolution images, before, during and after treatment, as well as scientific imagery, are all available in open access on http://closertovaneyck.kikirpa.be. They have been made by the KIK-IRPA team, Jean-Luc Elias, Katrien Van Acker, Sophie De Potter, Catherine Fondaire and Hervé Pigeolet, under the direction of Christina Currie.

Fig. 10a.1 Macrophotography by KIK-IRPA with the Hasselblad H4D-200MS. The rail system was designed by the Institut de Physique Nucléaire, Atomique et Spectroscopique (IPNAS) at Liège University.

Fig. 10a.2 *Archangel Annunciate*, before
Fig. 10a.3 *Archangel Annunciate*, after

Fig. 10a.4 *Interior with City View* and *Interior with Lavabo*, before
Fig. 10a.5 *Interior with City View* and *Interior with Lavabo*, after

Fig. 10a.6 *Virgin Annunciate*, before
Fig. 10a.7 *Virgin Annunciate*, after

Fig. 10a.8 *Joos Vijd*, before
Fig. 10a.9 *Joos Vijd*, after

Fig. 10a.10 *John the Baptist*, before
Fig. 10a.11 *John the Baptist*, after

Fig. 10a.12 *John the Evangelist*, before
Fig. 10a.13 *John the Evangelist*, after

Fig. 10a.14 *Elisabeth Borluut*, before
Fig. 10a.15 *Elisabeth Borluut*, after

Ecce ancilla Dni


S IOHES BAP

IOHĒS BAD


·IOHĒS·EWAN·


·IOHES·EWAN·


MEIADARO

10b
Inscriptions on the Exterior

Susan Frances Jones and Marc H. Smith

Note: Raised letters are lowered and abbreviations have been expanded with round brackets. Square brackets denote letters that are missing, largely missing or indecipherable. Some of the punctuation marks shown here are now visible only in remnants or traces.

On the frames

Below the Prophet Zechariah
Sacharias • propheta •

Below the Erythraean Sibyl
Sibilla • Eritrea :

Below the Cumaean Sibyl
Sibilla • cumana :

Below the Prophet Micah
Micheas • p(ro)pheta :

The quatrain
Pict[or H]ubertus eeyck • maior quo nemo repertus •
Incepit • pondus • q(ue) Iohannes arte secundu[s] [•]
[Frater] [p]er[f]ecit • Iudoci Vijd prece fretus •
• Versu sexta mai • vos collocat [a]cta tueri •

Note : The word 'Frater' at the beginning of line three is derived from the transcription by Christoffel van Huerne (see fig. 6.2a).

Fig. 10b.1 Erithrean Sibyl, detail

Inside the Pictorial Field

Scroll of the Prophet Zechariah
Exulta satis filia syo(n) Iubila Ecce rex tuus ve(n)it 9°

(Zechariah 9:9 : Exulta satis filia Syon : jubila filia jerusalem, Ecce rex tuus venit tibi justus et salvator)[1]

Scroll of the Erythrean Sibyl
Nil mortale sona(n)s • afflata • [e?][2][…]es nůmine celso •

(cf. Virgil, *Aeneid*, Book 6, lines 50-51): nec mortale sonans, adflata est numine quando / iam propiore dei)

Scroll of the Cumaean Sibyl
Rex a[dv?…ex?] • adve(n)iet p(er) secla futur(us) • sci(licet) i(n) carn[e]

(*Versus Sibyllini:* E caelo rex adveniet per saecla futurus / Scilicet in carne praesens, ut iudicet orbem; cited by Saint Augustine, *De Civitate Dei*, Book 18, Chapter 23)[3]

Scroll of the Prophet Micah
Ex te egredietur qui sit dominator in isr(ae)l • 5° [c?][4]

(Micah 5:2 : Ex te mihi egredietur qui sit dominator in Israel)

Neck of robe of the Cumaean Sibyl:
MEIAPARO[…][5]

Panels of the Annunciation
Words of the Archangel (running across two panels):
Ave gracia/ plena d(omi)n(u)s tecu(m)
Words of the Virgin (inverted):
Ecce ancilla d(omi)ni

Socle of Saint John the Baptist
• S(ANCTUS) •/ • IOH(ANN)ES • BAP(TIS)TA •

Socle of Saint John the Evangelist
• S(ANCTUS) •/ • IOH(ANN)ES • EWAN(GELIS)TA •

Notes

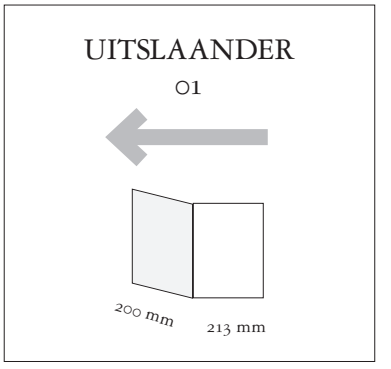
1 It has been suggested that a possible alternative reading of 'veīt' is 've(n)i(e)t', which does appear in bibles of Van Eyck's period, but the abbreviation can only be used for 've(n)it' (compare with the abbreviation of 'adve(n)iet' in the Cumaean Sibyl's prophecy). See De Baets 1961, p. 543.

2 Partly visible word, possibly 'es' anticipated.

3 De Baets 1961, p. 551-52 suggested that the second word on the scroll should read 'altissimus' and that the text as painted did not derive directly from Saint Augustine but reflected a tradition dating back to the thirteenth century. According to Marc Smith, however, the word 'altissimus' would disrupt the prosody, and it is more likely that the beginning of the word 'adveniet' was anticipated, possibly followed after the gap by the end of 'rex' similarly repeated.

4 Partly visible sign, possibly 'c' standing for 'capitulo'.

5 The half-concealed letter on the right was interpreted by De Baets as a four-stroke sigma (Σ); see De Baets 1961, pp. 550-51. As that form of sigma is not found elsewhere in Van Eyck's 'Greek' inscriptions, where sigma is either lunar or square, however, the letter is possibly a wavy lunar sigma.


UITSLAANDER
01
200 mm
213 mm

10c
The Quatrain
A New Reconstruction

Marc H. Smith, Susan Frances Jones and Anne-Sophie Augustyniak

This reconstruction of the quatrain was produced using a vector graphics editor (Inkscape) over high-resolution photographs of the inscription, taken both before and after conservation, thus offering maximum accuracy not only in single details but, above all, in general proportions and spacing. Doubts concerning unclear traces were checked *in situ* by Susan Frances Jones and Anne-Sophie Augustyniak. Comparisons were also made with earlier, low-resolution photographs of the quatrain, with other inscriptions on the frames and within the panels of the *Ghent Altarpiece* (on their overall consistency, see contribution 6 by Jones, Augustyniak and Dubois in this volume), and finally with lettering in other works by Jan van Eyck, notably the *Arnolfini Portrait*, *Léal Souvenir* and the extant copies of the *Holy Face*.

Minor irregularities have been preserved as far as possible, especially in serifs and decorative elements, but less so in longer rectilinear strokes (minims and shafts), the outlines of which are rendered essentially as straight lines.

Structural elements (thick strokes) are practically unambiguous, at least in minuscule letters, since fragmentary letterforms can be reconstructed by comparison with other instances of the same letters and following the modular principles of gothic lettering.

Ornamental elements, especially hairlines, subjected to more serious abrasion, are less straightforward. As far as possible, the reconstruction takes into account any visible traces, connected according to structural principles consistent with other inscriptions by Van Eyck and his contemporaries.

The lozenges (punctuation marks) have partly visible flourishes, in lines 1 (medial dot), 2 (second dot), 3 and 4, and all have been completed here with hairlines that are to some degree hypothetical — except for the first lozenge in line 2, the only one that does not indicate a metrical division, which we have left undecorated. Only line 4 appears to have been given an *initial* lozenge originally, and we have added none to the other lines. Only in line 2 has a *final* lozenge been added *ex nihilo*.

Fig. 10c.1. Detail

Fig. 10c.2. Reconstruction of the Quatrain

A modest degree of extrapolation was allowed in extending the oblique hairlines of some **e**s and the feet of a few other letters, mainly at the end of words. In some areas, particularly the lower parts of *I*s and *h*s, and the top of initial *V* (line 4), now severely worn, flourishing might have originally extended somewhat further than any clearly visible traces: the reconstruction is conservative.

The following letters, having unique forms, deserve special notes:

In line 1, *P* has two short curly hairlines. The lower curl is hypothetical (based on style), the upper, stronger curl is somewhat unusual but quite visible. A lozenge has been reinserted inside the bowl according to a frequent feature of that letter (see the drawing of the Apostle Philip by the Workshop or Follower of Jan van Eyck, Vienna, Albertina, inv. 3038).

Fig. 10c.3. Reconstruction of the Quatrain

In line 2, a short black stroke across the top of the initial *I*, which does not fit into the general structure, is presumably an accident (or a mark in the imitation stone background?), and consequently omitted.

In line 2, the tail of *I* in 'Iohannes' might have curved downwards (a more usual form). The reconstruction follows the initial of 'Iubila' in the Zechariah panel.

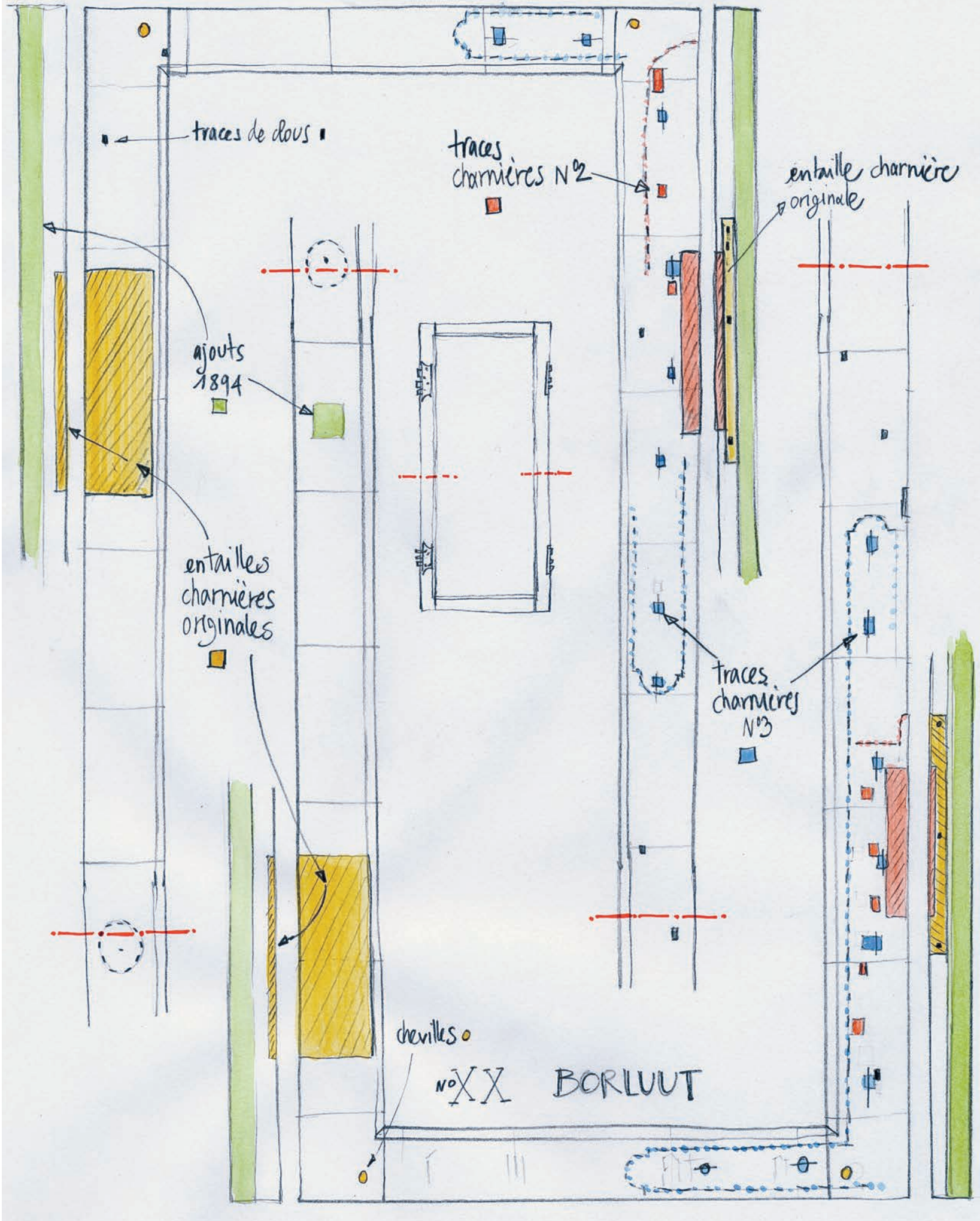
In line 3, 'Frater', preserved only in later copies, is reconstructed to provide the reader with a general impression of the missing word. The initial *F* is an arbitrary design based on cadels of the period, generically adapted to the style of other initials in the quatrain. The *a* is one of three possible allographs. The other letters could hardly be any different.

In line 4, the initial *v* in 'versu' appears to have been first painted as a *u* (both allographs being used as initials in the Low Countries at the time). The second minim has a foot, now faintly visible, but incompatible with the final *v*-form. The overpaint that would have been part of a *pentimento* may have later worn off, thus uncovering the undesirable stroke. The foot is suppressed in the reconstruction.

In line 4, the top of *ll* in 'collocat' is consistent with extant traces but slightly unusual. The 'disconnected loops' (ornamental curves) would normally extend further upwards, but are limited by the edge of the frame. Here again, some hairlines might have become invisible.

Fig. 10c.4. The Quatrain after treatment

Pictor hubertus eeyck · maior quo nemo repertus
Incepit · pondus · qꝫ Johannes arte secundus
Frater perfecit · Judoci Vijd prece fretus
Versu sexta mai · vos collocat acta tueri


traces de clous
traces charnières N°2
entaille charnière originale
ajouts 1894
entailles charnières originales
traces charnières N°3
chevilles
N°XX BORLUUT

10d
Dimensions of Frames and Supports

Jochen Ketels, Jean-Albert Glatigny, Anne-Sophie Augustyniak

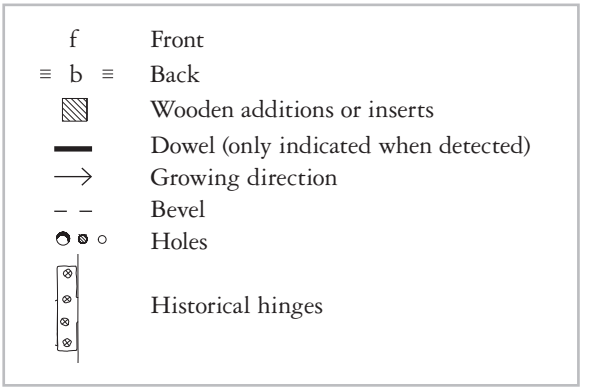
During the conservation and restoration of the *Ghent Altarpiece*, the panels and frames were remeasured in detail. In addition, the visible damage, infills, lacunae, holes and similar 'historical traces' were systematically registered. The profiles of the frames were also recorded meticulously. Finally, these technical data were supplemented with all available historical information and with notes from the restorers.

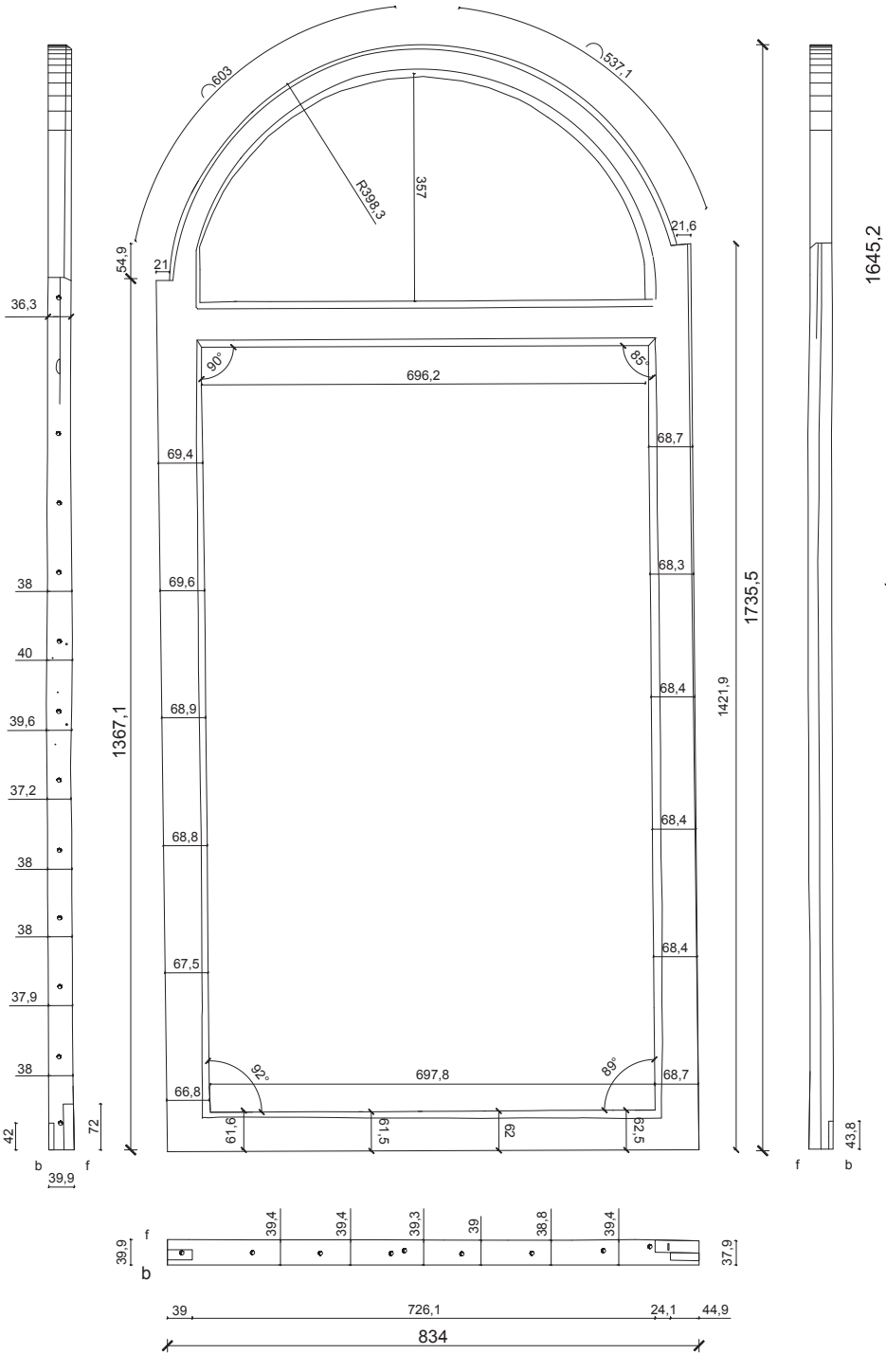
For this publication we have chosen to limit ourselves to simplified diagrams with the maximum height, width and thickness of the panels and frames for each painting. In addition, more detailed diagrams of the *City View/Adam* frame are included. All drawings with more information about retouches and material history will be added at a later stage on the website http://closertovaneyck.kikirpa.be. Facilitating magnification, comparison and exploration, these digital data will also circumvent problems of readability inherent in printed matter.

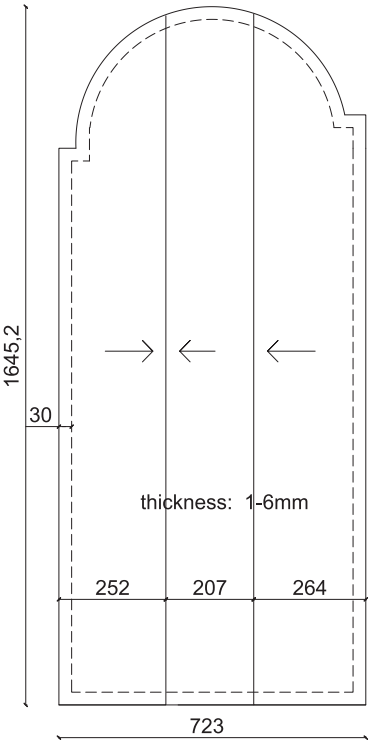
Acknowledements

Our special thanks go to Livia Depuydt-Elbaum and Hélène Dubois, the successive heads of the restoration studio, who gave us the opportunity to perform our detailed observations.

Fig. 10d.1. (facing page) Diagram of the frame of *Elisabeth Borluut*: notes of the restorers Anne-Sophie Augustyniak and Jean-Albert Glatigny during restoration



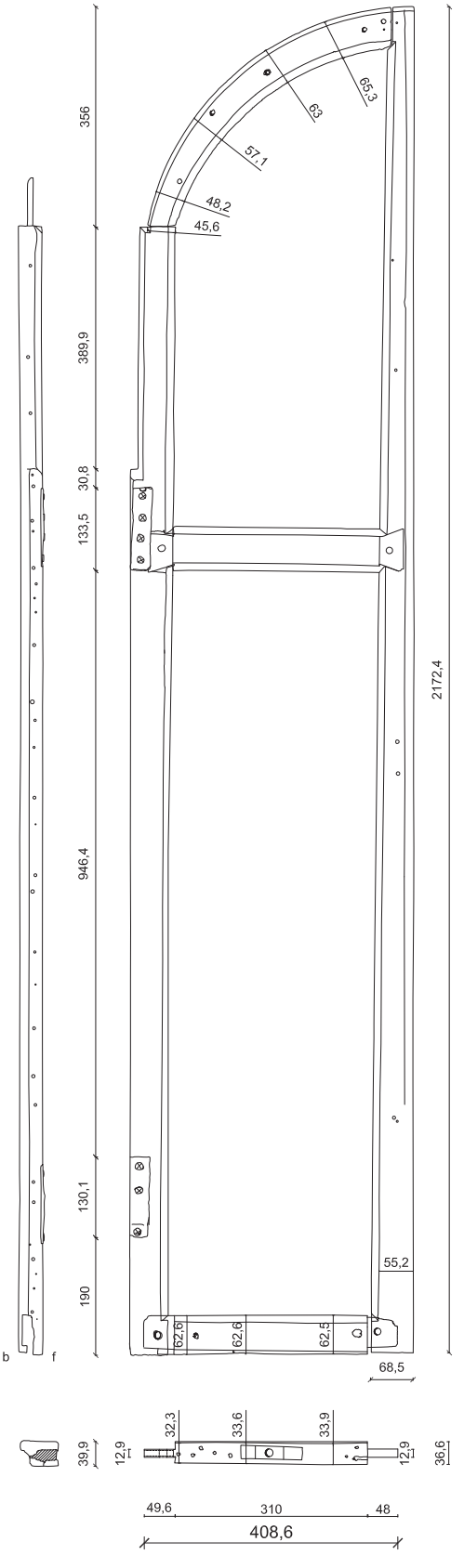


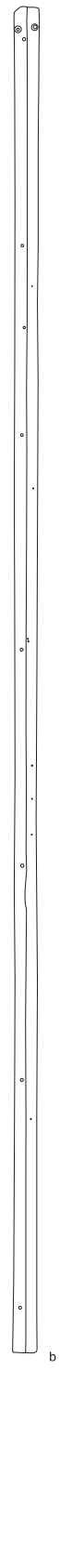


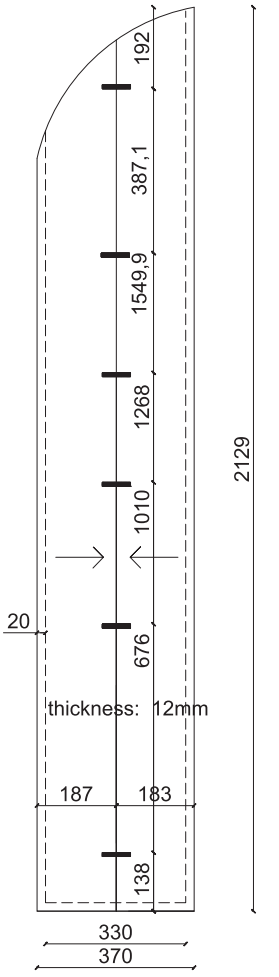
Panel

Frame

Archangel Gabriel





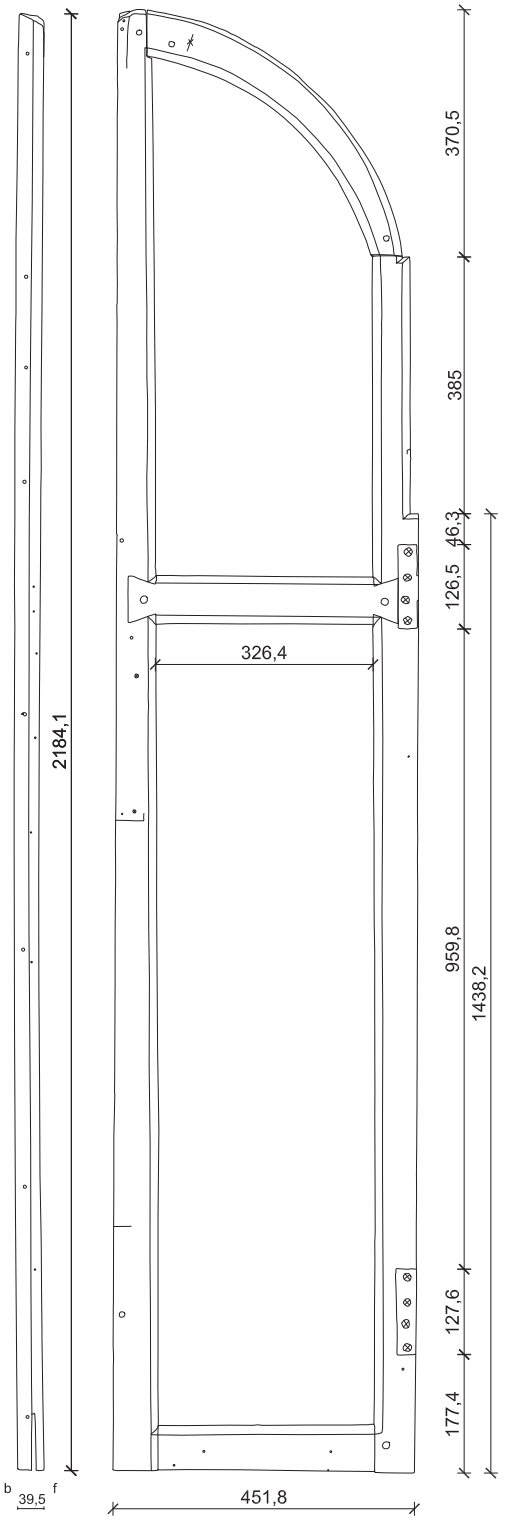


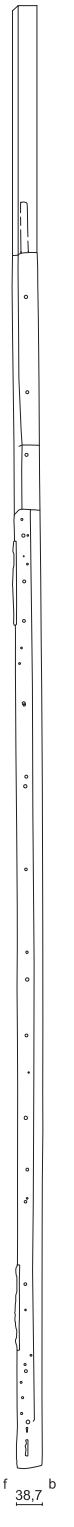
Panel

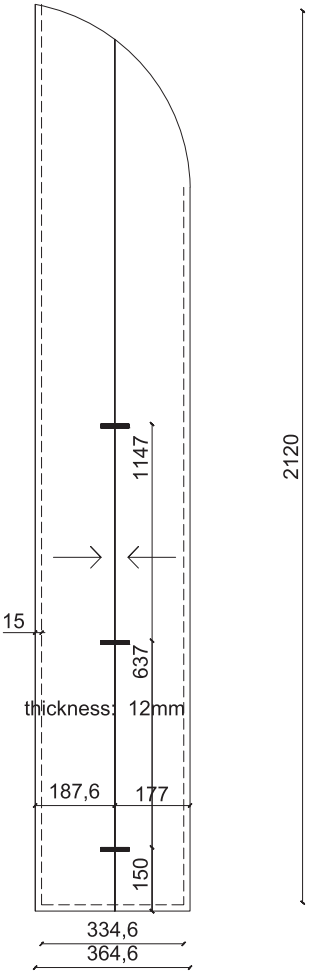
thickness at
the edges:
7-8mm

thickness at
the centre:
8-15mm

Frame







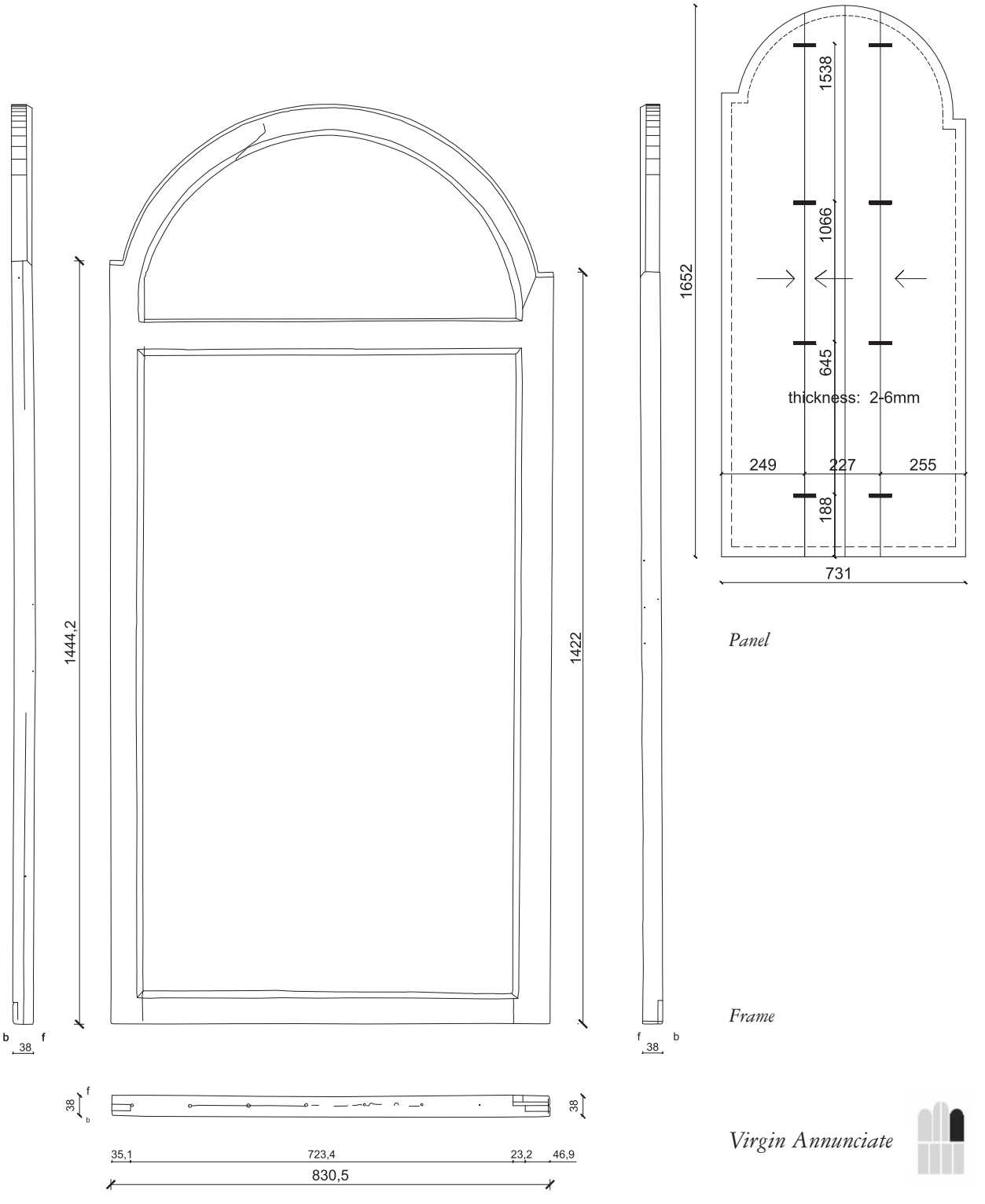
Panel

thickness at
the edges:
7-8mm

thickness at
the centre:
8-13mm

Frame

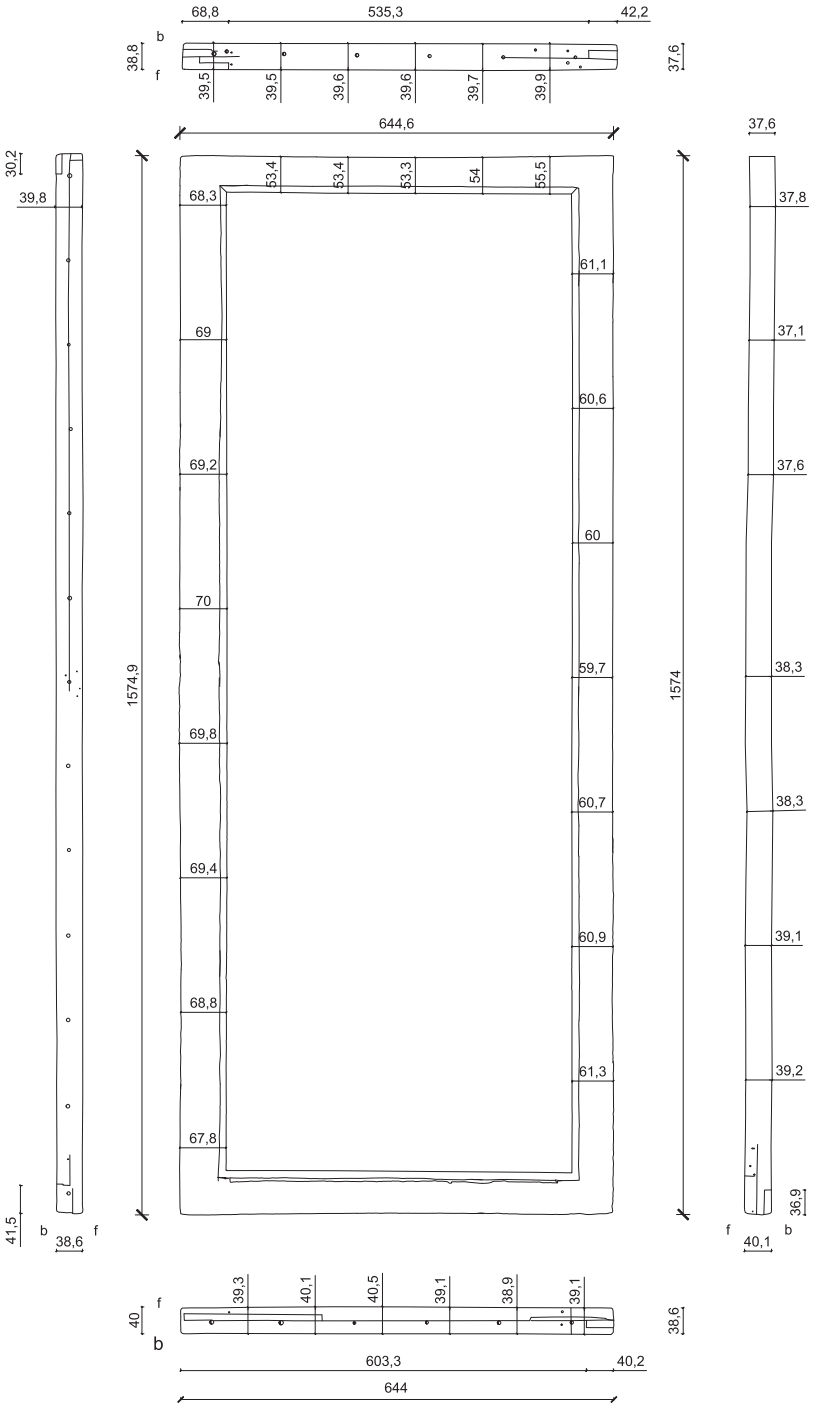
Interior View / Eve

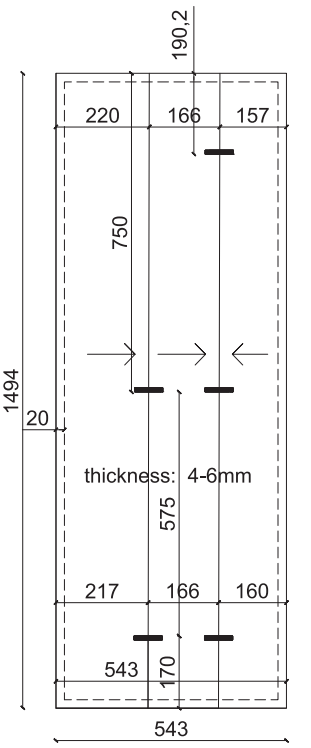


Panel

Frame

Virgin Annunciate

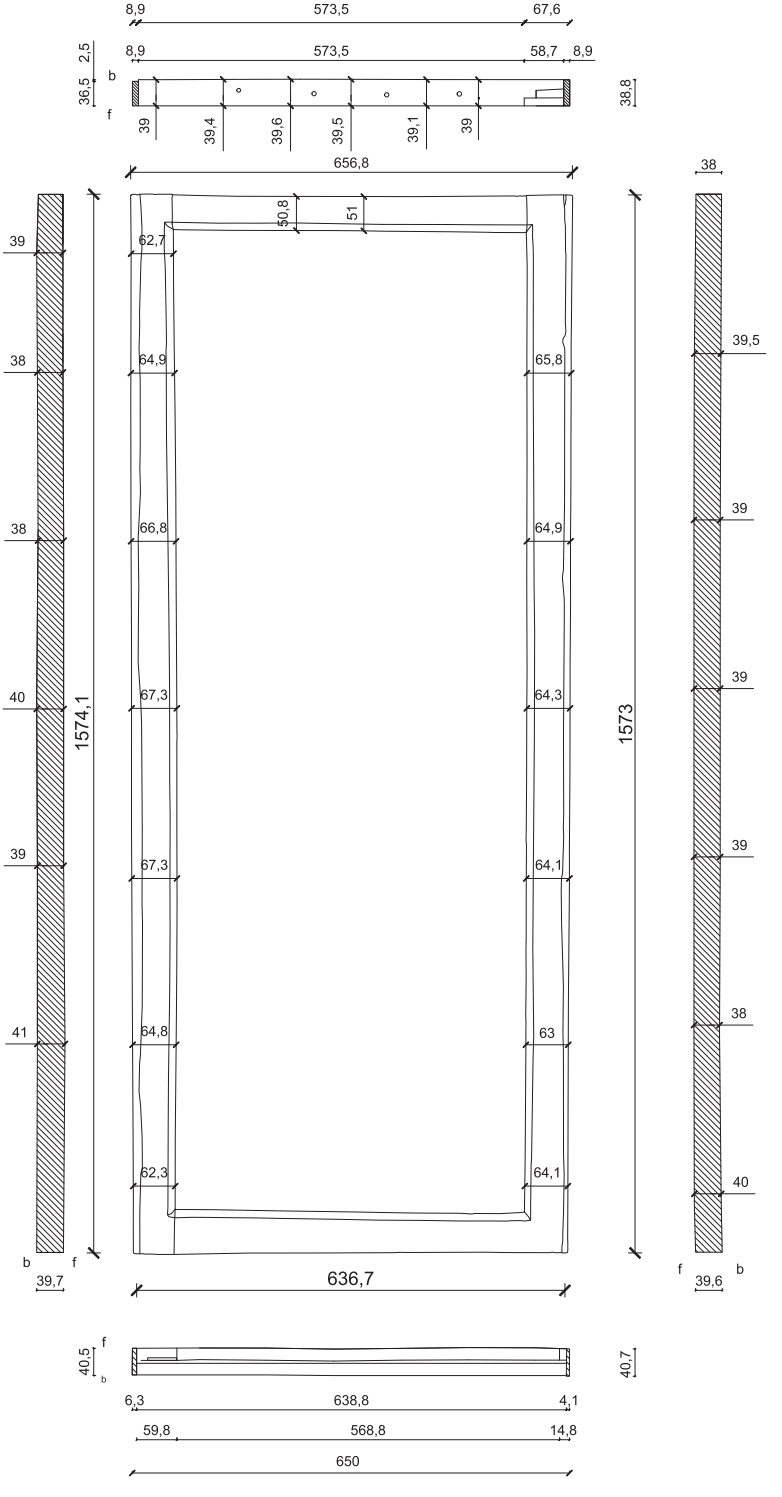


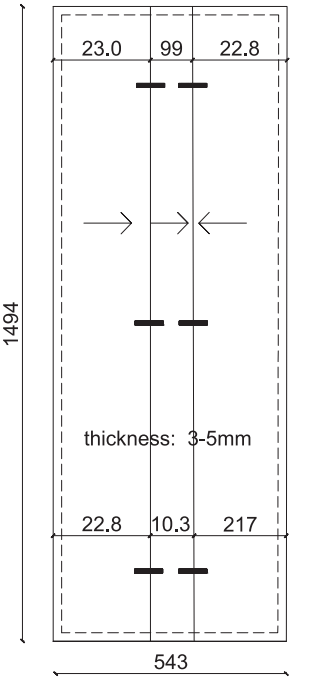


Panel

Frame

Joos Vijd

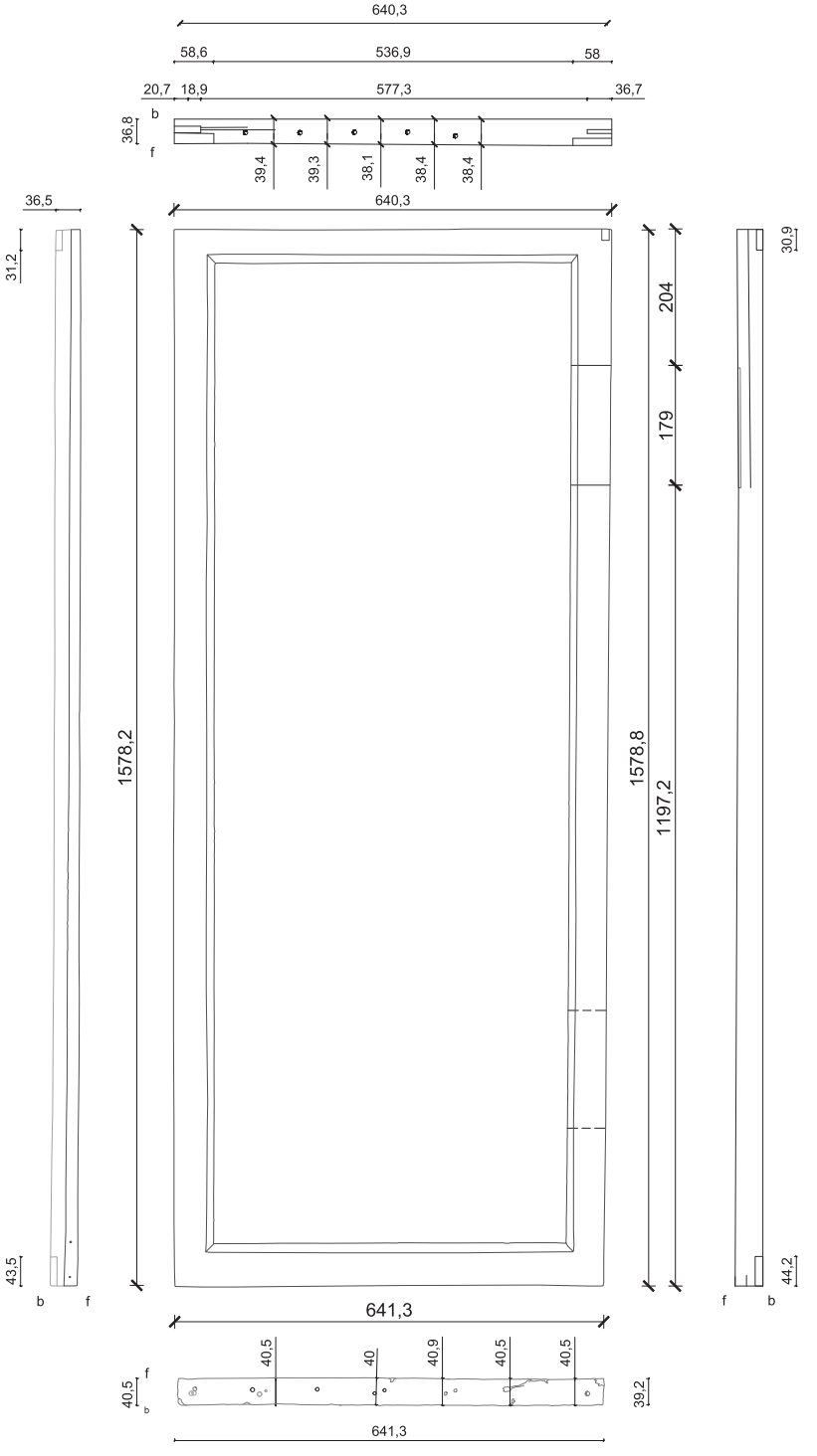


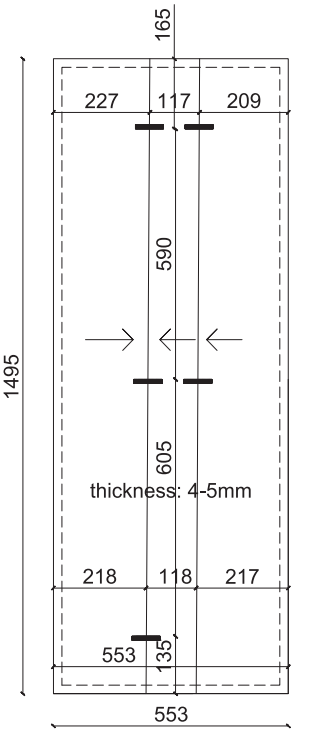


Panel

Frame

John the Baptist

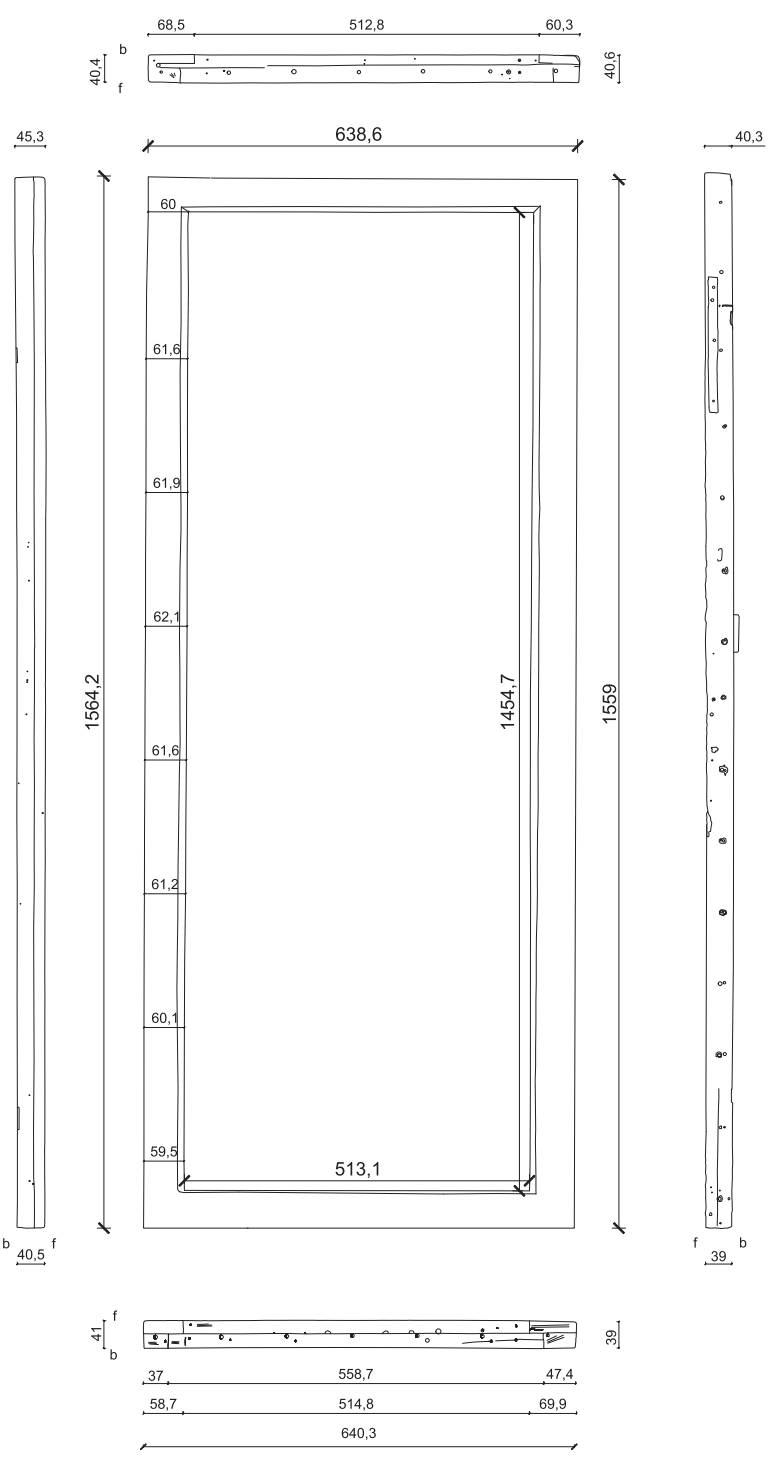


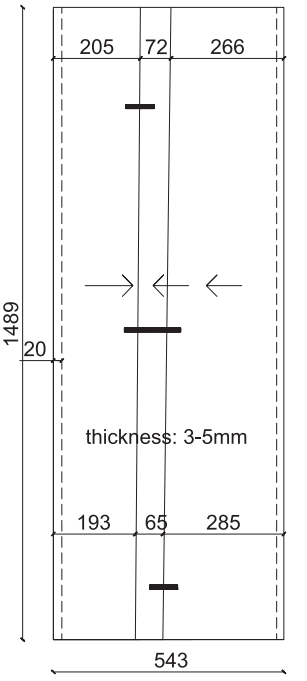


Panel

Frame

John the Evangelist





Panel

Frame

Elisabeth Borluut

FRAMES

UPPER REGISTER

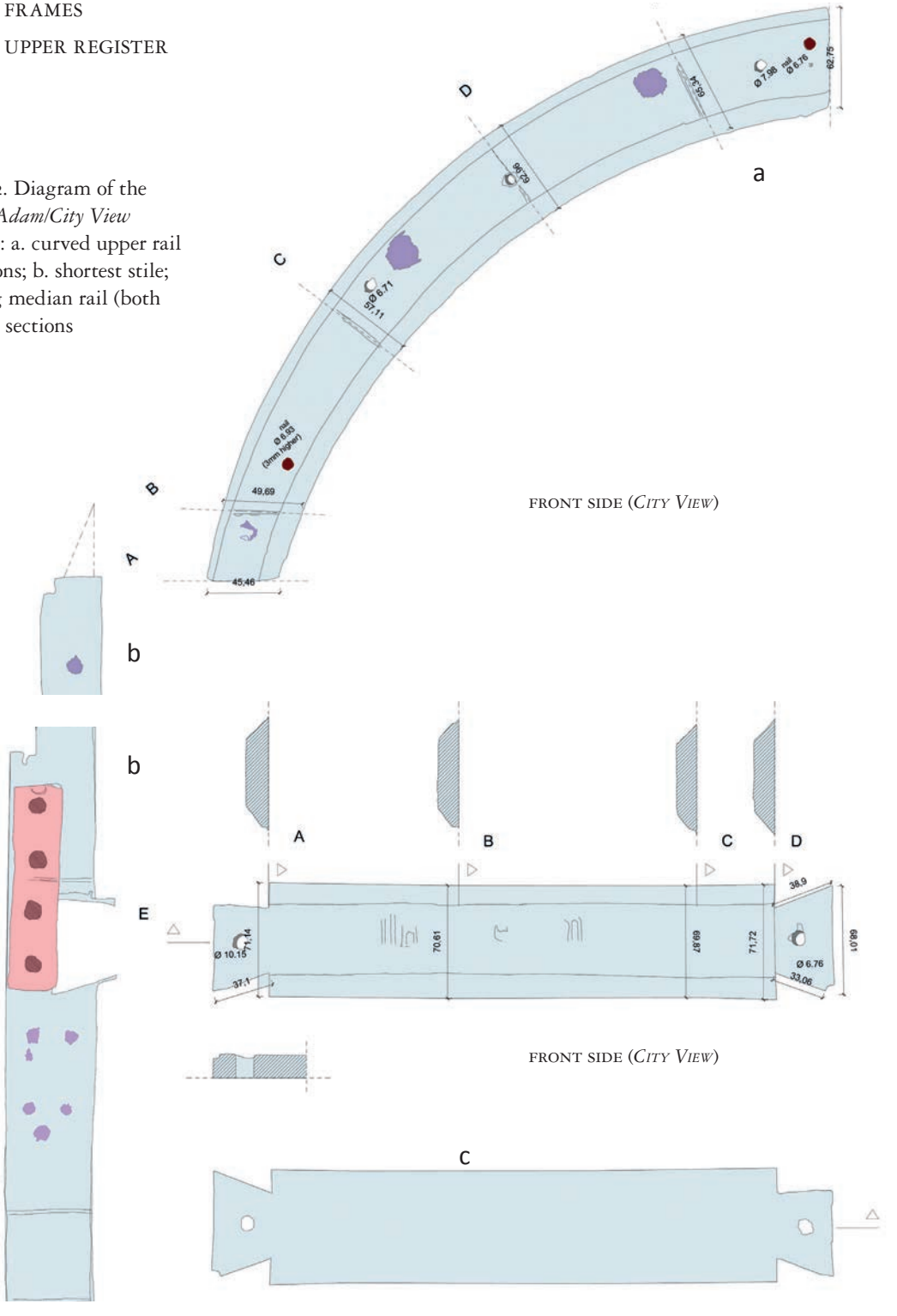


Fig. 10d.2. Diagram of the frame of *Adam/City View* (scale 1/4): a. curved upper rail and sections; b. shortest stile; c. floating median rail (both sides) and sections

FRONT SIDE (*CITY VIEW*)

FRONT SIDE (*CITY VIEW*)

REVERSE SIDE OF THE FLOATING MEDIANT RAIL

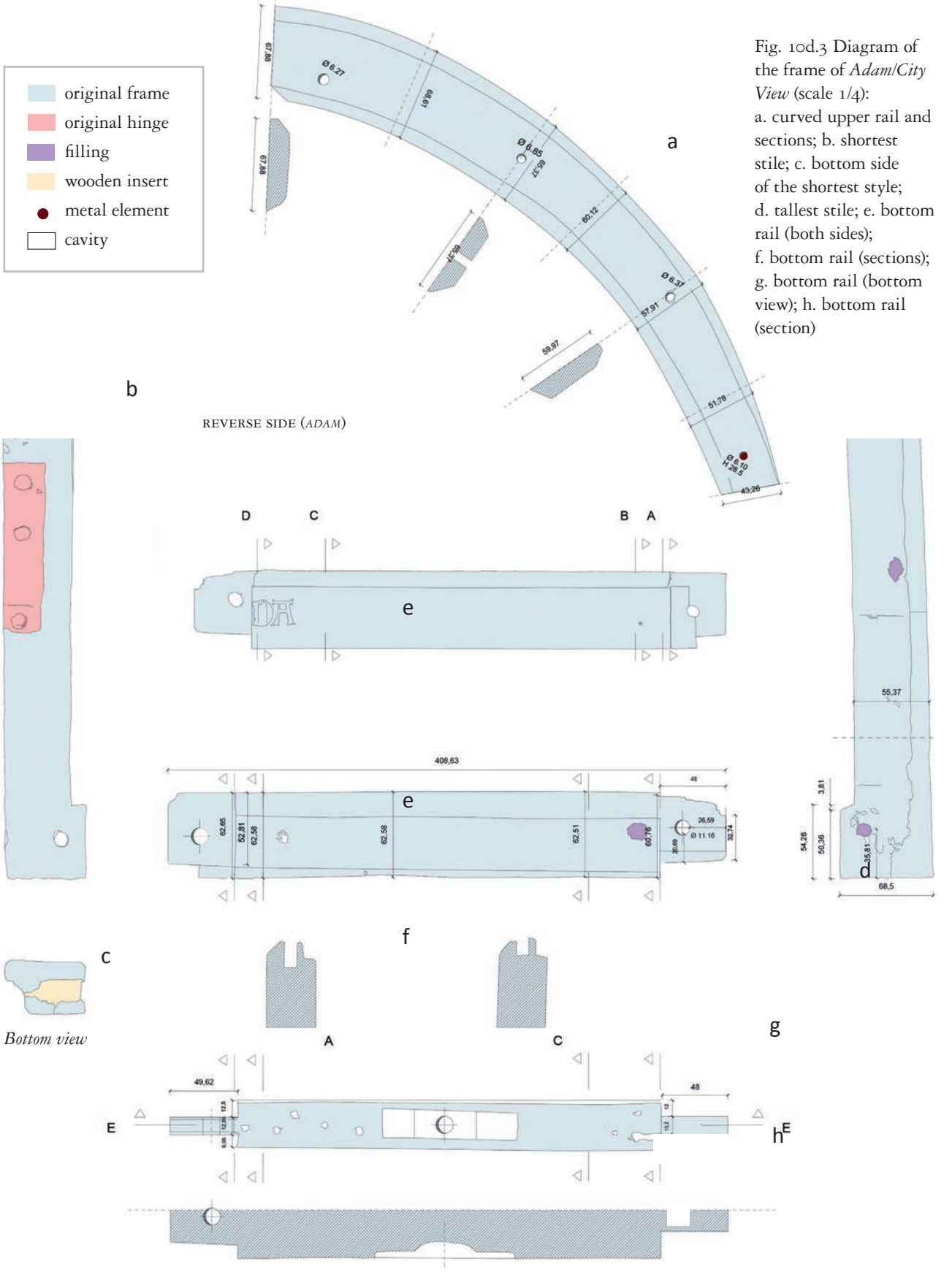


Fig. 10d.3 Diagram of the frame of *Adam/City View* (scale 1/4): a. curved upper rail and sections; b. shortest stile; c. bottom side of the shortest style; d. tallest stile; e. bottom rail (both sides); f. bottom rail (sections); g. bottom rail (bottom view); h. bottom rail (section)

10e.1

10e.2

10e
The Ghent Altarpiece: a Bibliography

Dominique Deneffe and Jeroen Reyniers

The immense body of literature that has grown up around the *Ghent Altarpiece* poses a particular challenge to anyone researching this masterpiece by the brothers Hubert and Jan van Eyck. Over the years, hundreds of articles have been published in different languages, together with numerous monographs and exhibition catalogues. In addition to these scholarly contributions, there is a whole range of publications aimed at a more general readership. The themes studied are, moreover, highly varied, a diversity that does not make it any easier to compile a survey of the literature that aims to be both complete and relevant.

Is there actually any point in compiling a bibliographic guide to the world-famous artwork when so much information is available online in open access form? Certain references appear to be shared abundantly but others much less so, due more to their online accessibility in some cases than the relevance of their content. Hence our initiative to publish a coherent survey of the existing literature on the *Ghent Altarpiece*.

The drive for compiling this specific bibliographic survey was the polyptych's ongoing restoration by the Royal Institute for Cultural Heritage (KIK-IRPA). A considerable amount of detective work and study has resulted in an e-publication with the title *The Ghent Altarpiece: a Bibliography*, which contains the fullest possible bibliography of the painting from the earliest literature through to the publication of this book, with the focus on relevance rather than exhaustiveness.

Fig. 10e.1. Meeting of the national and international advisory board during the treatment of the *Ghent Altarpiece* in Brussels: Paul Coremans introducing the first meeting (on 10 November 1950)

Fig. 10e.2. The scientific staff of the National Research Centre "Flemish Primitives" in 1964; clockwise: Micheline Comblen-Sonkes, Nicole Verhaegen, Denise Rossels, Christiane Van den Bergen-Pantens, Françoise Lambiotte, Christiane Deroubaix, Pierre Apraxine and Marguerite Baes-Dondeyne

From index card to digital reference

Bibliographic references on the *Ghent Altarpiece* began to be collected systematically in 1949 by the National Research Centre "Flemish Primitives" (now Centre for the Study of the Flemish Primitives), founded by Paul Coremans.[1] The Centre was set up under the auspices of the then ACL (Archives centrales iconographiques d'Art national et le Laboratoire central des Musées de Belgique), the predecessor of the KIK-IRPA, which was established in turn in 1957. Following the return of the *Ghent Altarpiece* after the Second World War, Coremans initiated an unprecedented project in which all the panels of the polyptych were thoroughly documented, analysed using the latest research techniques and restored (fig. 10e.1).[2] The Centre also embarked on the systematic inventorying and cataloguing of all Flemish Primitives' paintings throughout the world. Coremans drew on the advice of an inter-university committee for this large-scale project and three major scholarly series were first published by the

Centre in the period in question: the *Corpus of 15th-Century Painting in the Southern Netherlands*, the *Repertory of Flemish Paintings of the 15th and 16th Century* and the *Contributions to the Study of the Flemish Primitives*.

Erwin Panofsky once dubbed the researchers of the Centre Nicole Verhaegen, Jacqueline Folie and Anne Carton de Wiard 'the three recording angels',[3] expressing his admiration for the zeal with which they went about their daily task of inventorying paintings and registering all manner of bibliographic references (fig. 10e.2). Together with a substantial team of assistants, they painstakingly noted every reference in the literature to all the Flemish Primitives known at the time. The result is an exceptionally detailed system of index cards, which was supplemented further in the years that followed, laying the foundations for the bibliography on the *Ghent Altarpiece* that is presented here. Micheline Comblen-Sonkes took the initiative in 1984 to publish the collated references to all known Flemish Primitives in the form of a book,[4] for which Hélène Mund and Cyriel Stroo produced a supplement in 1998.[5] Ten years later, Dominique Deneffe, Bart Fransen, Valentine Henderiks and Hélène Mund published a further bibliographic survey online.[6] Other institutions, meanwhile, have also compiled overviews, annotated or otherwise, of the most important references regarding the Flemish Primitives or on the Van Eyck brothers in particular.[7]

Approach and methodology

The Ghent Altarpiece: a Bibliography differs from the previously published bibliographies in that it focuses solely on the Van Eycks' polyptych. The number of references is also larger, as more in-depth research has been done. To compile this bibliographic guide, no fewer than 1,700 of the Centre's index cards were systematically studied and screened. Selection was based primarily on the relevance of the content, reflecting the aim of only retaining references that might be useful to research into the Van Eyck brothers' *Ghent Altarpiece*. A conscious decision was taken, for instance, not to include the extensive literature relating to the theft of the 'Just Judges' panel in 1934. At the same time, the compilers have sought to achieve as complete as possible a survey, regardless of the form of publication, which includes articles in magazines, books, exhibition catalogues, reviews, historical publications, unpublished doctoral theses and several important early newspaper reports.

The bibliography is ordered chronologically and is a reflection to some extent of trends in the research devoted to the *Ghent Altarpiece* over the years. The publications deal with themes such as the work's eventful history, the role of Hubert van Eyck, the return of the panels from the Altaussee salt mines in 1945, the polyptych's original configuration, the stylistic formal idiom, the iconographic programme, the technical characteristics, the commission of the altarpiece, the historical context, the creation process and the role and organization of the Van Eyck's workshop.

Sharing is caring

By publishing this bibliography online, in open access form, the Centre for the Study of the Flemish Primitives aims to provide a readily accessible tool for anyone studying the *Ghent Altarpiece*. We hope that the specialist researcher and the interested art lover alike will find something here to their taste.

The Ghent Altarpiece: a Bibliography is the fifteenth issue in the series *Contributions to the Study of the Flemish Primitives* published by the Royal Institute for Cultural Heritage (KIK-IRPA). It may be consulted via the following websites: www.kikirpa.be, xv.kikirpa.be and closertovaneyck.kikirpa.be.

Notes

1 Folie 2000; Masschelein-Kleiner 2000, pp. 22-23; Fransen, Mund 2005; Dubois, Deneffe 2018, p. 132.

2 Coremans 1953.

3 Folie 2000, p. 225.

4 Comblen-Sonkes 1984.

5 Mund, Stroo 1998.

6 Deneffe et al. 2011.

7 Examples include the online series of *Oxford Bibliographies* by A. Acres (last modified: 27 June 2018) and by Linda Seidel (last modified: 30 January 2014). See http://www.oxfordbibliographies.com/view/document/obo-9780195399301/obo-9780195399301-0078.xml and http://www.oxfordbibliographies.com/view/document/obo-9780199920105/obo-9780199920105-0022.xml respectively.

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Abbreviations

ACL	Archives centrales iconographiques d'art national et Laboratoire central des Musées de Belgique
AOE	Agentschap Onroerend Erfgoed, Flemish Government
ASAJAG	Jean-Albert Glatigny, Treatment of Supports
ATR	Attenuated Total Reflection
AXES	Antwerp X-ray Analysis, Electrochemistry & Speciation, Research Group, University of Antwerp
BA	Bressers Architects bvba, Ghent
BELSPO	Belgian Science Policy Office
BnF	Bibliothèque nationale de France
BOU	Bougie, vzw
CRMS	Commission royale de Monuments et des Sites
CSFP	Centre for the Study of Flemish Primitives
CSTC	Centre Scientifique et Technique de la Construction
DBP	Dienst Bouwprojecten, City of Ghent
DI	Doerner Institute, Munich
DU	Duke University, Durham NC
EDX	Energy Dispersive X-Rays
FARO	Vlaams Steunpunt voor Cultureel Erfgoed, vzw
FPA	Focal Plane Array
FTIR	Fourier Transform Infrared Spectroscopy
G	City of Ghent
GCI	The Getty Conservation Institute
GC-MS	Gaschromatography-massaspectrometry
GM	Groeninge Museum, Bruges
GOA	Geconcerteerde Onderzoeksacties (Concerted Research Action)
HCS	Helicon Conservation Support bv
HPLC	High-performance Liquid Chromatography
hXRF	handheld X-Ray Fluorescence
ICN	Instituut Collectie Nederland
ICOM	International Council of Museums
ICR	Istituto Centrale per il Restauro, Roma
IPERION	Integrated Platform for European Research Infrastructure on Cultural Heritage
IR	Infrared
IRR	Infrared Reflectography
JE	JAAP Entreprise for Art Scientific Research, Amsterdam
KCKK	Karen en Celesta's Knotsgekke Kunstprojecten
KIK-IRPA	Koninklijk Instituut voor het Kunstpatrimonium – Institut royal du Patrimoine artistique – Royal Institute for Cultural Heritage
KE	Flemish Government, Agentschap Kunsten en Erfgoed
KHM	Kunsthistorisches Museum, Vienna
KKSB	Kathedrale kerkfabriek Sint-Baafs, Gent (Churchwardens of St Bavo's Cathedral, Ghent)
KMSK	Koninklijk Museum voor Schone Kunsten – Royal Museum of Fine Arts
KMSKB-MRBAB	Koninklijke Musea voor Schone Kunsten van België – Musées royaux des Beaux-Arts de Belgique – Royal Museums of Fine Arts of Belgium
KUL	Katholieke Universiteit Leuven (Catholic University Leuven)
KVAB	Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten – Royal Flemish Academy of Belgium for Science and the Arts
LAF	Lukas-Art in Flanders vzw
LCC	Lunder Conservation Center at Smithsonian American Art Museum and National Portrait Gallery
M	Museum Leuven
MA-XRF (Macro-XRF)	Macro X-Ray Fluorescence
MCT	Mercury-Cadmium Telluride
MetOx Project	Metal-Oxalates Project
MMA	Metropolitan Museum of Art
MoMa	The Museum of Modern Art
MRS	Micro-Raman spectroscopy
MS	Mass spectrometry
MSK	Museum voor Schone Kunsten, Gent – Museum of Fine Arts, Ghent
MV	Monumentenwacht Vlaanderen
NCU	Nicolaus Copernicus University, Torun
NG	The National Gallery, London
NGA	National Gallery of Art, Washington D.C.
PCC	Provinciaal Cultuurcentrum Caermersklooster, Ghent
PLM	Polarized Light Microscopy
P-RS	Portable Raman Spectroscopy
PPI	Panel Painting Initiative
POV	Provincie Oost-Vlaanderen – Province of East Flanders
Py-GCMS	Pyrolysis-Gaz Chromatography-mass Spectrometry
QU	Queen's University, Kingston, Ontario
RAG	Rijksarchief Gent – Royal Archives Ghent
RCE	Rijksdienst voor het Cultureel Erfgoed
RKD	Rijksdienst voor Kunsthistorische Documentatie – Nederlands Instituut voor Kunstgeschiedenis – Netherlands Institute for Art History, The Hague
RS	Raman Spectroscopy
RUN	Radboud University, Nijmegen
SAG	Stadsarchief, Gent – City Archives, Ghent
SEM-EDX	Scanning Electronic Microscopy-Energy Dispersive X-Rays Spectroscopy Analysis

SKD	Staatliche Kunstsammlungen Dresden
SMB-GG	Staatliche Museen zu Berlin, Gemäldegalerie
SMK	Statens Museum for Kunst, Copenhagen
SRAL	Stichting Restauratie Atelier Limburg
ToF-SIMS	Time of flight-Secondary Ion Mass Spectrometry
UAmsterdam	University of Amsterdam
UA	University of Antwerp
UCL	Université Catholique de Louvain – Catholic University of Louvain
UD	Universum Digitalis, Brussels
UGent	University of Ghent
ULB	Université Libre de Bruxelles
UNL	Universidade Nova de Lisboa
UV	Ultraviolet
UVA	Amsterdam University, Faculty of Humanities
VERONA	Van Eyck Research in OpeN Access
VKC	Vlaamse Kunstcollectie
VRT NWS	Vlaamse Radio- en Televisieomroeporganisatie, Nieuws – Flemish Radio and Television, News
VUB-ETRO	Vrije Universiteit Brussel, Department Electronics and Informatics
WOCK	City of Ghent, Werken aan Onderwijs, Cultuur en Kunst
XR	X-Radiography
XRF	X-ray Fluorescence

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The outer panels of the *Ghent Altarpiece* had been overpainted to a considerable extent. The virtuosity of the Eyckian technique and aesthetics remained hardly visible. And yet, this had never been observed before the start of the conservation treatment.

By removing the overpaint, the tonal richness and the coherent rendering of light and space once again came to the fore. Especially the suggestion of volumes and the spaciousness of the ensemble gained strength because of the virtuoso play of deep shadows and bright light accents, and not in the least because of the surprising trompe-l'oeil effect of the frames conceived as a stone framework.

Or to put it in the words of the comments of one of the experts, dr. Maryan Ainsworth: *The paintings live and breathe again in the time of the Van Eyck brothers*. The sharp observation skills, the quick, accurate execution, the knowledge, curiosity and ingenuity about all the things that are depicted, are now unveiled after centuries. The profit for the knowledge of and further research into the essence of Eyckian aesthetics is considerable. And finally there is the discovery that the much-discussed quatrain was applied simultaneously with the polychromy of the frames: a real 'coup de foudre' in the discourse of the current art-historical research!

The subtleties of the Eyckian technique could also be mapped out in more detail. How the Van Eycks managed to keep the final result and the desired effect in mind during every phase of the execution, from imprimatura to finishing touch. The artists made a statement about the art of painting, giving 'technique' as such a new prominence. *The Ghent Altarpiece* may be understood at some point as a major showpiece for a highly sophisticated pictorial technique.

We hope that this publication of the results of the research and conservation campaign on the exterior of the altarpiece can help future researchers to ask better questions. Questions, and answers, that may produce a more balanced picture of Van Eyck's techniques, methods and materials.

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