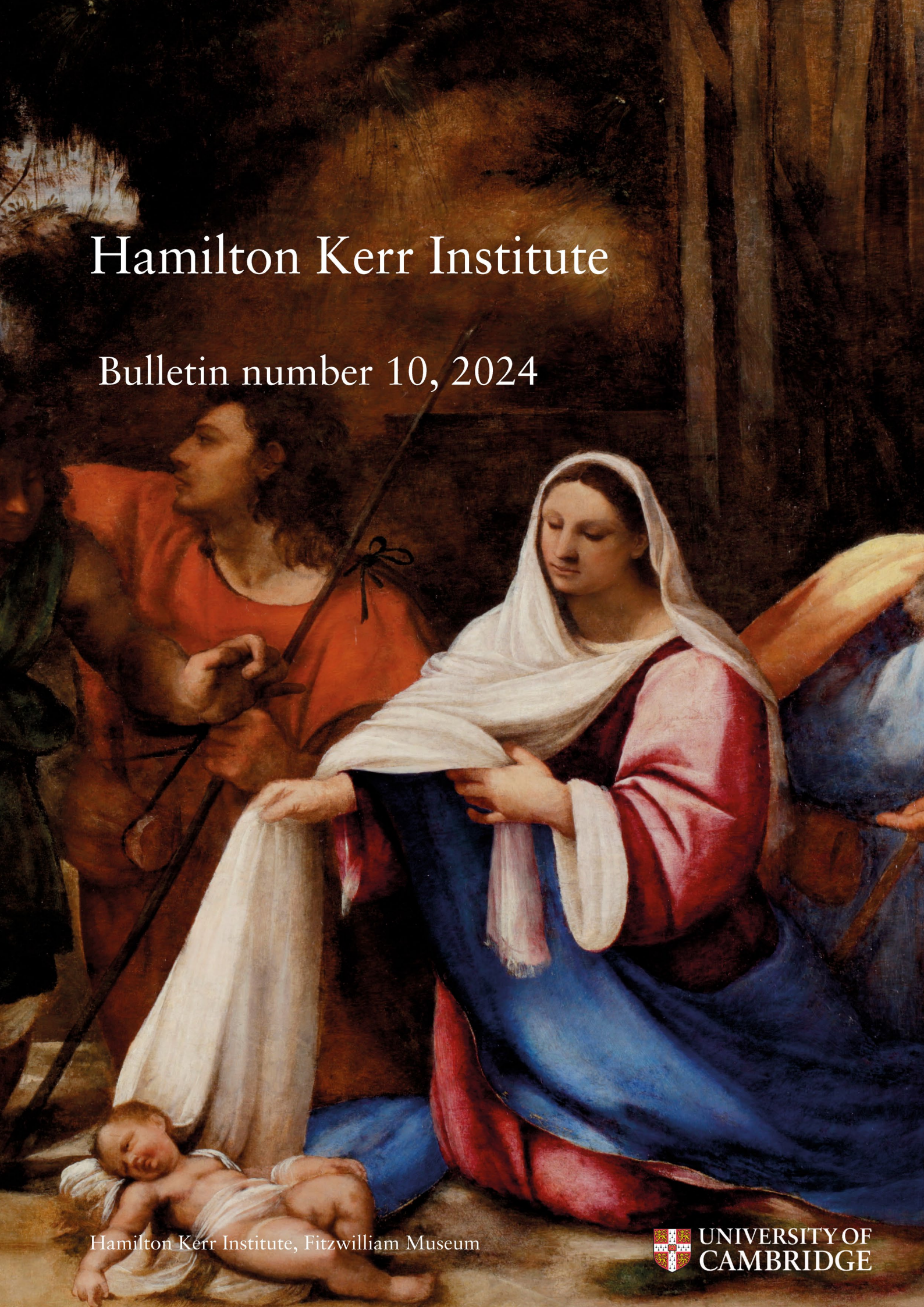

Hamilton Kerr Institute

Bulletin number 10, 2024

Hamilton Kerr Institute, Fitzwilliam Museum

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Editors: Adèle Wright, Lucy Wrapson, Emma Boyce Gore and Sally Woodcock

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Preface

Welcome to the tenth volume of the *Hamilton Kerr Institute Bulletin*. The Hamilton Kerr Institute (HKI) is the paintings conservation department of the Fitzwilliam Museum, University of Cambridge, working on paintings from the Fitzwilliam Museum as well as other public and private collections. The HKI is also home to conservators' and colourmen's archives. Our students train in easel paintings conservation – and this year sees the conversion of our postgraduate diploma into a masters' course. The HKI has long hosted recent graduates of conservation programmes from around the world as postgraduate interns. This edition of the *Bulletin* reflects the broad range of interests of our staff, students and interns, as well as the work of external colleagues connected to the HKI and its collections and/or members. The resulting papers, some long in gestation and others concerning works in the studio as recently as this year, span seven centuries. They also range widely in theme; some describe innovative conservation treatments, others engage with technical problem-solving and questions of perception, there are think pieces, as well as studies of individual paintings and artists' materials and techniques. We hope you enjoy the range and breadth of the resulting papers.

Our first article illustrates the collaborative nature of research at the HKI with a fascinating contribution from Paul Binski, Emily Guerry, Lucy Wrapson and Chris Titmus on the murals at Angers Cathedral. This article brings technical photography and technical analysis into conversation with art historical research in a medieval architectural context. Readers will enjoy mentally and visually exploring the murals in their ecclesiastical space and time.

Remaining in the medieval period, but exploring overlapping material ontologies from the nineteenth century, Spike Bucklow contributes a wonderful think piece inspired by the smallest and most hidden parts of the construction of the Westminster Retable: a square peg and a round hole. Bucklow skilfully interweaves the technical and cultural significance of woodworking practice that persuasively connects the materiality of thirteenth- and nineteenth-century carpentry.

Moving on to the fifteenth century, Alice Limb, Lucy Wrapson and Kate Waldron describe the materials, condition and conservation treatment of rood screen fragments from Wighton, Norfolk. This was a long project involving staff and interns at the HKI finding their way through the complexity of stabilising these fragile, but historically significant, panels, as well as negotiating an aesthetic solution for their display. Embodying the religious upheavals of the Reformation, these panels represent the simultaneous fragmentation, transformation and survival of England's spiritual material culture.

Another example of an intern project is the article by Camille Turner-Hehlen, Christine Slottved Kimbriel and Nathan Daly on their treatment and research into *Portrait of a Young Man* by Hans Maler. The authors explore different hypotheses regarding the sitter's identity making reference to contemporary codes of fashion. They also investigate details of Maler's technique, such as the unusual undedrawing and sourcing of azurite in the context of his patronage. This contribution demonstrates that Maler is an artist who deserves greater recognition in the context of sixteenth-century European artists.

Among the papers that have been long in gestation we are delighted to have three articles dedicated to Sebastiano del Piombo's *Adoration of the Shepherds* from the Fitzwilliam Museum. The painstaking treatment of this heavily damaged work, described here by Youjin Noh and Rupert Featherstone, took more than ten years and won the restoration and conservation award at the Museum and Heritage Awards in 2017. Papers by Piers Baker-Bates and Paul Joannides respectively place the painting in context and elaborate on its attribution and dating. We are grateful for their art historical contributions to both the award-winning project and this publication.

Christine Slottved Kimbriel and Louis Newman trace the interesting history of a copy of Rembrandt's *Old Man with a Gold Chain* and present a compelling argument for the origins of the painting in Rembrandt's workshop not long after the original was painted. This hypothesis suggests that canvas was in use earlier than previously thought, and that the painter was a pupil of Rembrandt.

In an article summarising her student dissertation research at the HKI, Joanna Neville delves into the eighteenth-century fashion for tinted varnishes. She explores the interconnection between the aesthetic value of age and the picturesque, while contextualising these abstract ideas in the material world of the art market. Readers will be captivated by her illustrated experiments with tinted varnish recipes!

Moving on to the early twentieth century, Camille Polkownik employs her own professional biography to reconstruct that of conservator and artist Stanley Kennedy North. She makes innovative use of newspaper articles, alongside condition and treatment records from various institutions, to present a coherent narrative of North's interwar career.

The next two articles were inspired by the treatment of several Duncan Grant paintings from King's College, Cambridge. This long-running collaboration with King's offered HKI interns Alice Limb and Justyna Kędziora the opportunity to treat, analyse and compare several fascinating paintings by Grant. In their joint article, the authors focus on Grant's interesting use of repurposed supports and present the results of inorganic analysis, suggesting the materials and layering techniques used by Grant at this period. In her article on structural treatment, Justyna Kędziora describes and illustrates the process of designing an innovative method for rejoining the separate boards of Grant's hauntingly beautiful painting *Poplars*.

Our final contribution is by Christine Braybrook who guides the reader on a journey through the, often unfamiliar, territory of human visual perception and the ways in which it impacts the interpretation of technical images (such as X-radiographs and infrared scans) used in conservation. By combining information from scientific research into the processes of perception with conservation case studies – and comparing these with similar challenges faced in the medical field – she exposes an area of reflective practice that is sometimes overlooked in conservation.

The editors would like to thank all the authors for their hard work, especially over the past year during which the HKI has been preparing to move out of Mill House to a new central Cambridge location and begin teaching its new masters' course. It is testament to the commitment of the authors, the editorial team and the HKI as a whole, that this issue is particularly well populated despite the challenges we have faced in producing it. Particular thanks must go to Christine Braybrook for her help with the images, to the other institutions and private individuals involved in these collaborative research projects, to the peer reviewers for their expeditious contributions, to the team Archetype Publications for their patience and forbearance, and to the Director of the HKI, Erma Hermens, for supporting the *Bulletin*.

Adèle Wright, Lucy Wrapson, Emma Boyce Gore and Sally Woodcock

The Gothic murals of Angers Cathedral

PAUL BINSKI, EMILY GUERRY, LUCY WRAPSON AND CHRIS TITMUS

Abstract This paper publishes and discusses photographic reconstructions of the thirteenth-century wall paintings about St Maurille, painted in the Gothic apse of Angers Cathedral. These were discovered in the 1980s but until now have never been fully reproduced because of the difficulties posed by their location behind the apse's Baroque woodwork. Emily Guerry begins by discussing the cult of St Maurille, an early bishop of Angers who, according to his legend, spent some time in England. She then evaluates the evidence for the patronage of these otherwise undocumented murals, executed at some time after the mid-1250s. Paul Binski goes on to examine their layout, painted architecture and figurative style, placing them in the wider context of Gothic French and Anglo-French painting and manuscript illumination. Bringing these data into relation with the evidence for patronage, an agreed date for the murals is proposed of *c.*1270. In her contribution, Lucy Wrapson discusses the technique of the murals and, together with Chris Titmus, sets out the method used in the reconstructions.

Introduction

Paul Binski

Forty years ago in Angers Cathedral (figures 1–4), conservators led by Robert Baudouin of the Laboratoire de Recherche des Monuments Historiques (LRMH) began to uncover a set of magnificent Gothic murals arranged in a band around the bays of the cathedral's early thirteenth-century apse. Having been discovered initially in 1980, the revelations began in 1984 with the removal of whitewash, the work continuing into the 1990s. Murals of striking elegance and sureness of drawing emerged, together with a vivid and beautifully preserved palette of colours rendered in oil pigments. Their subject is the Life of St Maurille, whose shrine lay at the cathedral's high altar. His is the story of a fifth-century French bishop and follower of St Martin who failed to raise a child from the dead

Figure 1. Angers Cathedral, general view from the west end. Photograph © Paul Binski.

Figure 2. Angers Cathedral, apse exterior from the south east. Photograph © Paul Binski.

Figure 3. Angers Cathedral, interior view of the east end. Photograph © Paul Binski.

and, ashamed, fled to Britain where he worked penitentially as a gardener to the king, only to return to his See and successfully resurrect the child, who was to become St René, over the site of whose shrine the murals were painted. His tale, full of romance and circumstantial detail, is one of happy redemption. The murals, published here for the first time in their totality as reconstructed photographic images and dated by us around 1270, are arguably the finest of their type executed in France in the second half of the thirteenth century, bearing in mind the remarkable discoveries also made in recent years in the south transept of Poitiers Cathedral.

Full appreciation of their importance internationally as well as nationally was for years hampered by the position of the murals a few feet behind the late eighteenth-century woodwork which surrounds the cathedral's chevet, at a height of over 3 m, which required scaffolding and selective lighting. This made impossible the creation of anything other than partial and oblique camera angles. The aim of this publication is to bring these paintings before a wider audience, and to offer a further, if all too brief, commentary on their contents, patronage and style which builds upon the already substantial French literature led by the work of Marie-Pasquine Subes. The chronology of Anger Cathedral's building in a distinctively western French manner, the provision of its stained glass windows and the history of its cults have been fully treated by Marie-Pasquine Subes, Karine Boulanger and others (see the References), and for reasons of space are not extensively reiterated here.

Our aim is to provide an up-to-date account of the patronage and content of the pictures (the two are related), as well as a new perspective on the style, date and affiliations national and international of these paintings. Emily Guerry considers first the cult and the evidence for patronage. Paul Binski then reviews the stylistic and dating evidence with a view to a wider horizon of understanding. Lucy Wrapson and Chris Titmus discuss the technique of the murals and the method of photographic reconstruction. That a group of scholars working in England would be more inclined than previous interventions to stress connections with Normandy and England is perhaps not surprising, but our findings suggest that technically and stylistically these paintings are of relevance to the emergence and understanding of Anglo-French and indeed Northern European painting more generally. That the murals still present intractable puzzles, in regard to their mixture of hands or workshops and their slightly differing formats, goes without saying. We hope that by presenting these findings at an interim stage we will provoke further work on their documentation and study.

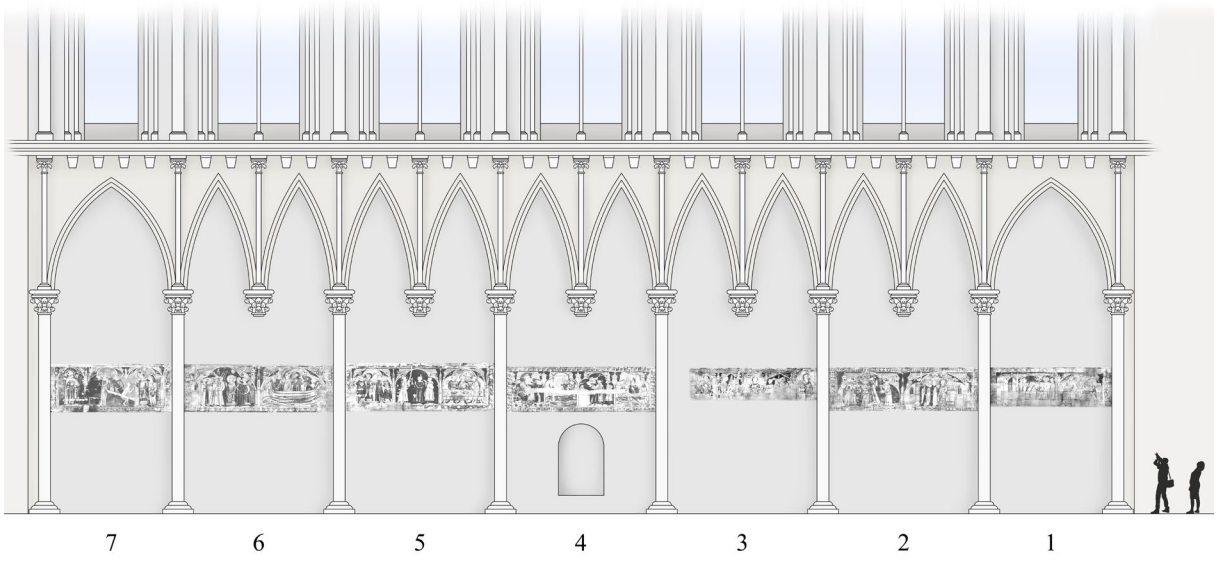

Figure 4. Schematic elevation of the apse with wall paintings (scales approximate). Image: Matilde Grimaldi.

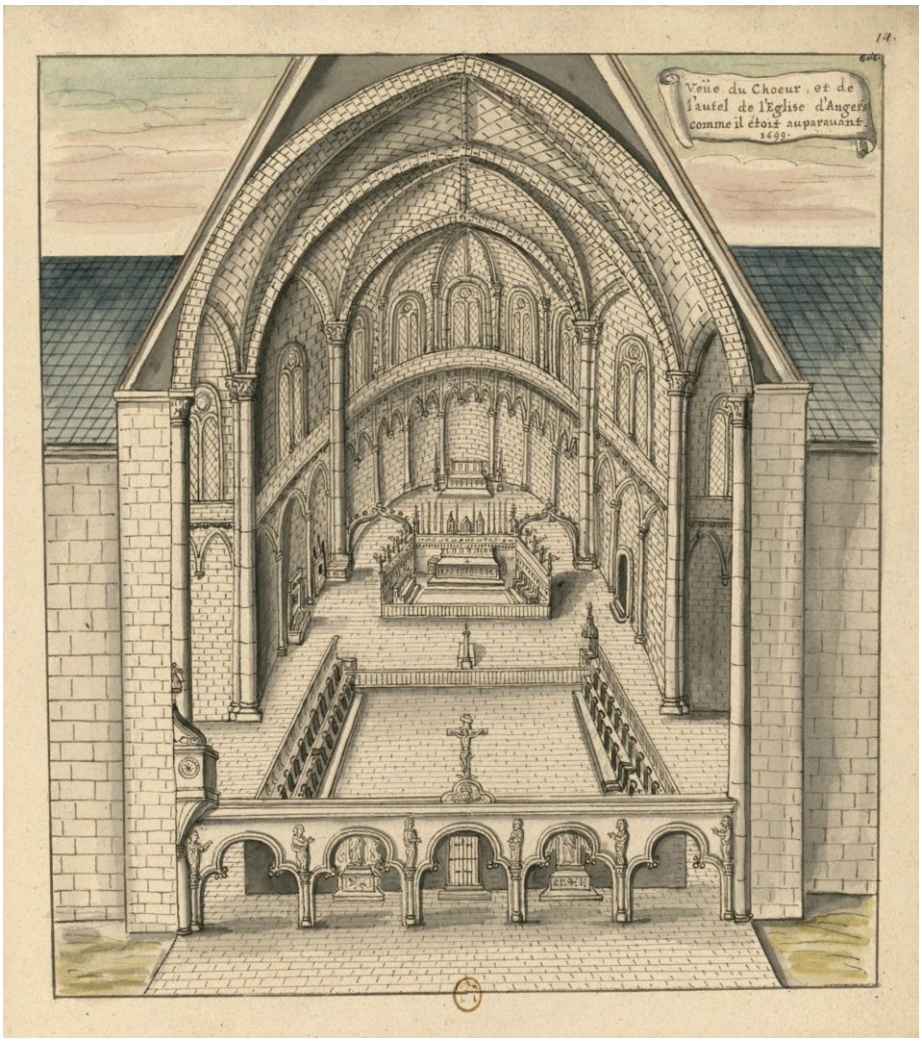

Figure 5. Angers Cathedral, interior view of the east end *c.*1699. Louis Boudan, 'Veüe du choeur et de l'autel de l'Église cathédrale d'Angers, comme il étoit auparavant 1699', Paris, Bibliothèque nationale de France département Estampes et photographie, EST VA-49 (5), f. 14r. Photograph © Bibliothèque nationale de France.

Cult and patronage

Emily Guerry

The Gothic painting cycle in the cathedral's apse (figures 3 and 4) disappeared from view after the fire of 1451, when the chapter compelled their master mason (Guillaume Robin) to whiten the vaults and walls. This inadvertently hid these paintings of saints and miracles from the iconoclasm of the Huguenots in 1562. A drawing from the Gaignières collection (figure 5) illustrating the interior before the demolition of the medieval choir in 1699 reveals the appearance of the whitewashed apse with its fictive masonry lines. The interior would be whitewashed again in 1783, and, by 1786, the addition of the present wooden dado and choir stalls, known as the *boiserie*, protected the apsidal walls from the Revolution that soon followed. After another fire in 1831, decades of restoration began, with most of the cathedral's whitewash removed by 1872, excluding the walls behind the *boiserie*.

In 1980, conservators were alerted to fragments of medieval wall paintings behind the *boiserie* and, from 1984 until 1993, a team from the Laboratoire de Recherche des Monuments Historiques (LRMH) removed the whitewash in stages. They confirmed that the murals were executed in oil using rich and varied colours such as vermilion, copper green, azurite and large amounts of lead white (Demailley *et al.* 1998). These and other pigment samples were collected alongside the ongoing art historical research of Marie-Pasquine Subes-Picot, who wrote her doctoral dissertation on the cycle (1996). She identified its subject matter as the miracles of St Maurille by observing their concordance with his *vitae*, and she produced detailed drawings to facilitate interpretation (Subes-Picot 1998; 2001). Although her first publications suggested the murals could date to *c.*1260–80 (Subes-Picot 1992; 1995), she eventually concluded that the master painter was called to Angers around 1255 to celebrate the translation of the relics of St René and decorate the walls surrounding his shrine. She argued that Guillaume le Bâcle (d.1256), the canon treasurer who paid for René's reliquary, also paid for these

wall paintings (Subes-Picot 1997; 2001; 2003). However, the style of the paintings, as well as the inclusion of certain heraldic blazons in their frames, indicates the possibility of a later date as well as a different context for their creation.

The condition of the paintings has been impacted over time by graffiti, localised burning and losses through flaking paint. The metal struts which connect the *boiserie* to the walls have damaged the paintings in numerous locations. There are also rectangles of facing tissue securing flaking paint, likely applied by conservators in the last campaign of treatment. The colours, however, remain bright since the paintings disappeared from view for five centuries.

The cult context

A brief overview of the cults of Sts Maurille and René at Angers Cathedral will help to clarify the content and devotional significance of the cycle. St Maurille ventured to Angers on his apostolic mission and led the community as bishop before his death in 453. In 620, Bishop Maimboeuf (r.610–627) compiled the earliest extant *Vita sancti Maurilii episcopi Andegavensis* (BHL 5730, CPL 2123), stating that he was born in Milan and travelled to Tours to meet the famous St Martin (d. 397), who ordained him (§ 1); Martin's support and consecration of Maurille appears in bay 1. His first miracle occurred when he called upon heavenly fire to destroy pagan idols at a temple near *Calonna* (Chalonnes-sur-Loire) and founded a church, which is depicted in bay 2. Many more miracles are enumerated by Maimboeuf, including one about a woman who was barren but, with the intervention of Maurille's prayers, gave birth to a son who would one day become his episcopal successor (§ 5). In 905, this particular miracle would be elaborated and embellished by Archanaldus in a new *vita* (BHL 5731). Extending the story about the barren mother (§ VI), he inserts a lengthy chapter (§ XVI) that begins with the boy's sickness and death and ends with his resurrection and baptism by the bishop, with Maurille embarking on a cross-Channel odyssey in between. Around 1120, this adventurous episode became the focus of the Latin verse life composed by Bishop Marbode of Rennes (r.1096–1123).[1] It is this extraordinary interpolation in the hagiography of Maurille that marks the birth of the spurious cult of René (*Renatus*), the child who was 'reborn'. The scenes adopted exclusively from § XVI stretch across bays 3–7, dominating the painting cycle.

In 1239, Bishop Guillaume de Beaumont (r.1200–1240) oversaw the translation of Maurille's body into a silver-gilt châsse suspended above the high altar. The surrounding sanctuary, seen in various drawings by René Lehoreau (1671–1724), transformed into a solemn place for oath-swearing, testament-witnessing and the forging of diplomatic relations, as well as the election of bishops (Farcy 1901–1910; Port 1874). In this way, Maurille's resplendent châsse was the centrepiece of the Gothic cathedral interior, and the devotional heart of Anjou. This microarchitectural shrine is described in the inventory of 1421, which refers to *repoussé* medallions framing as many as ten narrative scenes from the saint's life, while noting the iconography of only two images: the 'resurrection of blessed René' (*resuscitatio beati Renati*) and the 'voyage of Saint Maurille across the sea' (*de transitu sancti Maurilii in mari*) which also appear in the murals in bays 7 and 4 (Godard-Faultrier 1841: 298; Farcy 1901–1910: 173). The goldsmiths could have relied on a variety of visual sources for their hagiographic designs, such as a lost illumination of the saint's life or a bespoke *rotulus*, and the painters might have adapted their compositions from these visual sources. There are a handful of extant depictions of Maurille's miracles in medieval manuscripts, but in every case the iconography is different from the murals in Angers Cathedral.[2]

Although the veneration of Maurille has a well-documented history, there is no record of René's existence before his mention in the *vita* by Archanaldus. His cult has been dismissed as a fabrication since the seventeenth century (Houtin 1901). It is possible that the Angevin community is responsible for René's invention. They could have borrowed legitimacy from the longstanding reputation of another fifth-century bishop, namely St Renatus of Sorrento, conflating the homonymic identity of a Neapolitan prelate with the boy resurrected by Maurille. By the later Middle Ages, both cults had fused into a singular persona, so that René was born near Angers and resurrected by Maurille, and died as a hermit in Sorrento (*AA SS* Octobris III, 380–95). The precise date of this conflation is unknown, but it could have occurred in the mid-thirteenth century, when Charles I of Anjou aspired to rule over Italian lands. He began his campaigns in Italy in 1253, and he would be crowned king of Naples and Sicily in 1266. In fact, the presence of Capetian heraldic charges in the mural decoration suggests the count's possible involvement in some aspect of the cycle's design.

Patronage

The major *translatio* of René's relics occurred in 1255, with the installation of a silver-gilt châsse at his altar in the centre of the Gothic apse (Jarousseau 2006). The cathedral's necrology confirms that the chanter, Guillaume le Bâcle (1200–1256) paid for René's shrine, adorned with gold and gems from his personal collection (Urseau 1929: 38). For Subes-Picot, this generous act of patronage invites speculation that he and members of the chapter could have contributed towards the cost of the *translatio* celebration – and its related decoration – in the cathedral (Subes-Picot 2001). The canons at Angers had a distinguished history of funding their own architectural and artistic projects. For instance, Karine Boulanger has identified the arms

of Richard de Tosny (d.1252), who was treasurer at the cathedral throughout the 1230s, in the borders of the John the Baptist window (Boulanger 2000). The presence of confused, haphazardly restored coats of arms suggests, for Boulanger, that both lay and ecclesiastical patrons financed the chevet glass throughout the 1230s (Boulanger 2003).

Unnoticed until recently, the decorative borders in bays 2 and 3 actually contain multiple heraldic charges. Their identifications completely shift our understanding of the cycle's patronage towards a more complex political picture, which positions a leading local seigneurial family at the centre of their creation around 1270. Christian Davy (2014) first realised that these heraldic motifs imply the involvement of the Craon, Lusignan and Gellent families, as well as the Capetians. This research opens up numerous new avenues for exploring the design and cultural significance of the painting cycle.

The Capetian arms –
Count Charles I of Anjou (*c.*1226, r.1246–1285)

In the border of bay 3, a tiled-effect decorative pattern appears with the arms of Capetian France, azure semé-de-lis or, alternating with Castille, gules with a triple-towered castle. Its presence probably refers to the personal arms of Charles I of Anjou. The same heraldry appears in another wall painting scheme dated to *c.*1246–1254 in the nearby abbey of Notre-Dame-du-Ronceray (Davy 2003). Charles was virtually absent from the Loire valley throughout his ambitious career, so it is unlikely that he had any direct engagement with the cathedral's painting scheme, but he managed administrative operations in Anjou via his bailiffs. He styled himself as the count of Anjou before he was crowned the king of Sicily in Rome in 1266, but he kept the same coat of arms until 1277, when he purchased his claim to the Kingdom of Jerusalem and added the golden cross per pale (Dunbabin 1998). The inclusion of this pattern in bay 3 suggests the sponsorship of Charles I and – by extension – the Capetians, implying the approval of the cycle's devotional and political message by the count and the king.

The Lusignan and Craon arms –
Isabella de la Marche (*c.*1226, r.1250–1265, *d.*1299) and her son Maurice Craon V (*c.*1245, *r.*1270–1293)

Davy identified arms of the Craon family (whose crest is lozengy or and gules) in the border of bay 2 (Davy 2014; Denais 1879–1884). Throughout the thirteenth century, the Craons benefited from their privilege as hereditary seneschals (originally *dapifers / discifers*, or 'dish-bearers') of Anjou, controlling more land in the region than any other aristocratic Angevin family (Gautier 2017; Verry 2014). The count of Anjou was technically a vassal to the king of France and the seneschals served the count, so the Craons could adopt the full judicial, financial and political authority *de jure*. They also maintained a longstanding personal and strategic relationship with the Plantagenets, the former counts of Anjou. With the marriage of Maurice Craon IV to Isabelle de la Marche in 1243, the Craons were in a unique position to help facilitate the reconciliation of the Plantagenets with the Capetians (Barton 2009).

Isabelle belonged to the powerful Lusignan family, who had joined King Henry III in the rebellion against the Capetians (before their decisive defeat at Taillebourg in 1242). After her husband's death in 1250, their eldest son Amaury Craon I was only six years old, so Isabelle became the seneschal *suo jure* for fifteen years (Bertrand de Broussillon 1893). She was the half-sister of the Plantagenet King Henry III through her mother, Queen Isabelle d'Angoulême, and her second marriage (after King John) in 1220 to the count of La Marche, Hughes X de Lusignan, whose coat of arms is barry argent and azure (Denais 1879–1884). It is this heraldic pattern that appears in 19 out of the 38 decorative panels in the border of bay 2, alternating with the Craon and Gellent charges. Isabelle used the Lusignan arms as seneschal, which also appear on her pendant seal, where the inscription confirms she is *senescalle Andegacie*. The impression depicts a thin female figure standing in three-quarter profile facing right, holding her cloak strap with her right hand and balancing a bird on her left (figure 6). Her hair is tucked into a barbette and fillet and she wears a floor-length robe and mantle, belted at the waist. The smiling mother in bay 7 who witnesses the resurrection of her son looks similar: facing to the right, wearing her hair in netted a barbette, she

Figure 6. Moulage of the seal of Isabelle de Craon, Seneschal of Angers [+ S' YSABELLIS : DNE : CREDON... ..NESCALL . ANDEGACIE]. Paris, Arch. Nat. Douet d'Arcq 297. Photograph © Ministère de la Culture de France.

Figure 7. Detail of the mother witnessing the resurrection of René, bay 7. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

casts an equally elegant silhouette in her rosy-pink bliaut and ermine-trimmed blue mantle (figure 7).

In 1250, Isabelle wrote to Queen Blanche of Castille, acting regent of France, to confirm her administration of numerous fiefdoms (including Sablé and Craon as well as Rochefort-sur-Loire, la Roche-aux-Moines, and Champtocé, a strategic cluster of châtellenies near Angers), promising these fortresses to *carissimo* Louis IX or *dilecto* Charles I and holding them in trust (Paris, Arch. Nat. J//400 no. 45; Laborde 1875, III: 109). Isabelle also styled herself the Dame de Champtocé, the chateau situated at the centre of a canton of the Loire under her near-total control, surrounding Chalonnes-sur-Loire (Lachaud 2012; Bertrand de Broussillon 1893). Chalonnes is notably the location of Maurille's first miracle, which is framed by her blazon in bay 2. Alongside her allegiance to the Capetians, Isabelle cultivated a warm relationship with her Plantagenet relatives and received a generous pension of 100 marks per annum. In 1251, King Henry III first wrote to his *dilectae sorori* to confirm arrangements for her life annuity, which Edward I continued to supply (Rymer 1816, I: 278). Isabelle would live for another 48 years, but her eldest son died young in 1269 or 1270. Amaury Craon II had no children, so his younger brother, Maurice Craon V, became the next Craon seigneur and seneschal of Anjou around 1270.

Over the next two decades, Maurice V managed to balance diplomatic arrangements between the Capetians and Plantagenets, earning their trust and arbitrating on behalf of both ruling families. He was highly valued by Count Charles II of Anjou, who personally paid for Maurice V's ransom when he was held hostage in Naples and returned the fiefdom of Ingrande (which had been taken from Isabelle's parents) in an exceptional act of restitution. The count relied on Maurice V for negotiating difficult and significant loans owed to Queen Marguerite of France, and he appointed Maurice V as his vicar general in Anjou and Maine (Bertrand de Broussillon 1893; Dunbabin 1998; 2011). Maurice V also benefited from Henry III's affection and his largesse as soon as he came to power. In 1270, the king agreed to restore an annual rent of 40 livres from the Craon manor at *Burnes* (i.e. Eastbourne), which had been seized from the family in 1224 (Bertrand de Broussillon 1893: 168). In this patent letter, the king addresses *dilectum nepotem et fidelem nostrum Mauricium de Craon*, implying his familiarity.

In fact, Fabrice Lachaud (2012: 487) has speculated that Maurice V spent his youth at Henry III's court in England, growing up alongside the future King Edward I. Edward I evidently respected and relied on Maurice V, nominating him as his personal diplomat in negotiations with King Philippe III, and appointing him as lieutenant general of all English Crown lands in France; he also gifted him falcons, suggesting they shared an intimate friendship (Trabut-Cussac 1972). After almost a century of violent conflict, the seneschals of Anjou – first Isabelle and then her son, Maurice V – had succeeded in facilitating peace as loyal, reliable and diplomatic allies to both the Plantagenets and Capetians.

The Gellent arms –
Bishop Nicolas Gellent of Angers (r.1261–1290)

Nicolas Gellent was first an archdeacon before he became bishop of Angers. His heraldic blazon of an argent fretty of gules matches the final pattern seen in the frame of bay 2 (Davy 2014; Denais 1879–1884). Known for organising church councils and instigating a period of pastoral reform in the diocese, the survival of one of his 'livre des comptes' covering six years' worth of household payments provides extraordinary insight into his career and taste (Urseau 1920). These records confirm that Gellent was especially generous with his personal patronage of the Dominicans in Angers, which is noteworthy given the painters' choice to anachronistically portray four young preaching friars in bay 2. St Dominic's followers came to Angers in the *c.*1220s and took refuge at the church of Notre-Dame de Recouvrance, just to the south of the cathedral, before its replacement **– a Jacobin convent – in the** *c.*1240s (Lebrun 1981). Gellent oversaw its expansion from the 1260s alongside the community's incorporation into his thriving cathedral school (Lebrun 1981).

Gellent also supported the Franciscans as well as the Sack Friars (*Fratres Saccati*) in Angers (Urseau 1920: 97). The Sack Friars were renowned as the most radically penitent new order, whose members had a reputation for living off the land for food (Andrews 2006: 175). When St Maurille appears as a gardener during his penitential sojourn in bay 4, he is probably dressed in the contemporary habit of a Sack Friar, wearing a loose brown-grey robe and hood worn like a sack with no visible cords (figure 8). The Couvent des Frères Sacs in Angers was founded under Gellent in 1263, but the order was suppressed a few years later at the Second Council of Lyon in 1274 (Andrews 2006); this date could mark the *terminus ante quem* for the painted cycle. Gellent's successor, Bishop Guillaume le Maire (r.1291–1317), banned the Sack Friars from his diocese and gave their building to the Augustinians (Urseau 1920: 97). Despite their brief period of existence, the Sack Friars reached the height of their popularity in 1270, when both King Louis IX and Hugh Lusignan XII (Isabelle's nephew) died on crusade and left them money (60 livres and 100 *solidi,* respectively) in their wills (Andrews 2006: 199).

The combination of the personal arms of Count Charles I and Bishop Nicolas Gellent with those of the hereditary seneschals of Anjou, who enjoyed warm relations with both the Capetians and Plantagenets, speaks to various opportunities for the cycle's design. In the next section, an examination of the iconography of the paintings will elucidate new aspects of what might have been a collaborative project. The cycle probably emerged alongside the rise of Maurice V around 1270, with the support of his mother, Isabelle de la Marche. In light of this speculation (which accords with the stylistic date of the images proposed below by Paul Binski), it is possible that Maurice V – like many Angevin nobles before him – undertook an oath of service and swore on the relics of St Maurille, surrounded by paintings of his most famous local miracles.

Figure 8. Detail of St Maurille in the guise of a Sack Friar, bay 4. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Narrative design

Divided into 21 figurative scenes and spread across seven bays of the apse (figure 4), the cycle of St Maurille floats about three metres above the pavement. The narrative proceeds – perhaps counterintuitively – in two different directions across two uneven sets of miracle stories. One group of early miracles appears in bays 1–2, where the story proceeds from left to right, launching from the left panel in bay 2 and ending on the right in bay 1. Most of what we see on the walls is adapted from the aforementioned embellished chapter of Maurille's *vita* by Archanaldus. Beginning with a figure of St Paul, the scenes in bays 3–7 project a detailed visualisation of the death of René followed by Maurille's penitential adventure to Britain and back again; this story begins to the right panel of bay 3, continues from right to left, and culminates with René's resurrection in bay 7, ending with a figure of St Peter.

Figure 9. Bay 1: The consecration of Maurille by Martin. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 10. Bay 2: The destruction of a temple and foundation of a church. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

In bay 1 (figure 9), the first picture to the far right of the cycle shows two prelates standing and anointing an enthroned, haloed figure of Maurille. Wearing his episcopal mitre, Maurille faces outwards towards the cathedral congregation. St Martin of Tours is the probably the haloed prelate pictured to the right (Subes-Picot 1995: 140), bookending the decorative programme with his sacred authority. Here, we witness the moment when Maurille is consecrated bishop of Angers, while sitting in a dog-headed faldistoire. The inclusion of this item of liturgical furniture in this picture led Subes-Picot to see a 'pôle liturgique' stretching from the mural to Maurille's shrine via the actual location of the bishop's faldstool, displayed to the south of the sanctuary (Subes-Picot 2001: 51). Perhaps this connection helps to explain the unusual disposition and orientation of the cycle.

The next panel to the left represents a miracle that occurred during a dispute about the episcopal election at Angers. The *vitae* relate that there were various candidates, but only Maurille was worthy enough, so Martin journeyed to Angers to support his pupil (§ 13 / § XIII). Just as Maurille entered the convocation, a dove flew above his head – and when Martin placed his hand above Maurille to transmit his blessing, a dove flew through the church. This was perceived as a sign of the Lord's favour, and the people shouted that Maurille is a bishop chosen by God (§ 13/ § XIII). In this mural, Maurille is haloed, but noticeably missing a mitre. He kneels in profile before Martin, who blesses Maurille and holds his hands while a dove flies between them carrying a banderole in its beak. A group of seven standing and kneeling priests act as witnesses to this miracle. Given the absence of his mitre here and its presence in the picture to the right, the narrative direction in bay 1 actually moves from left to right, so that Maurille is supported and then consecrated by Martin.

Another miracle appears in bay 2 (figure 10), where the Lusignan, Craon and Gellent heraldic charges line the border. In the picture to the right, Maurille stands in a church dressed as a deacon without a mitre, which suggests that this scene also precedes his appointment as bishop. He holds a closed book and speaks with four lively young men who wear the robes of preaching friars. One friar

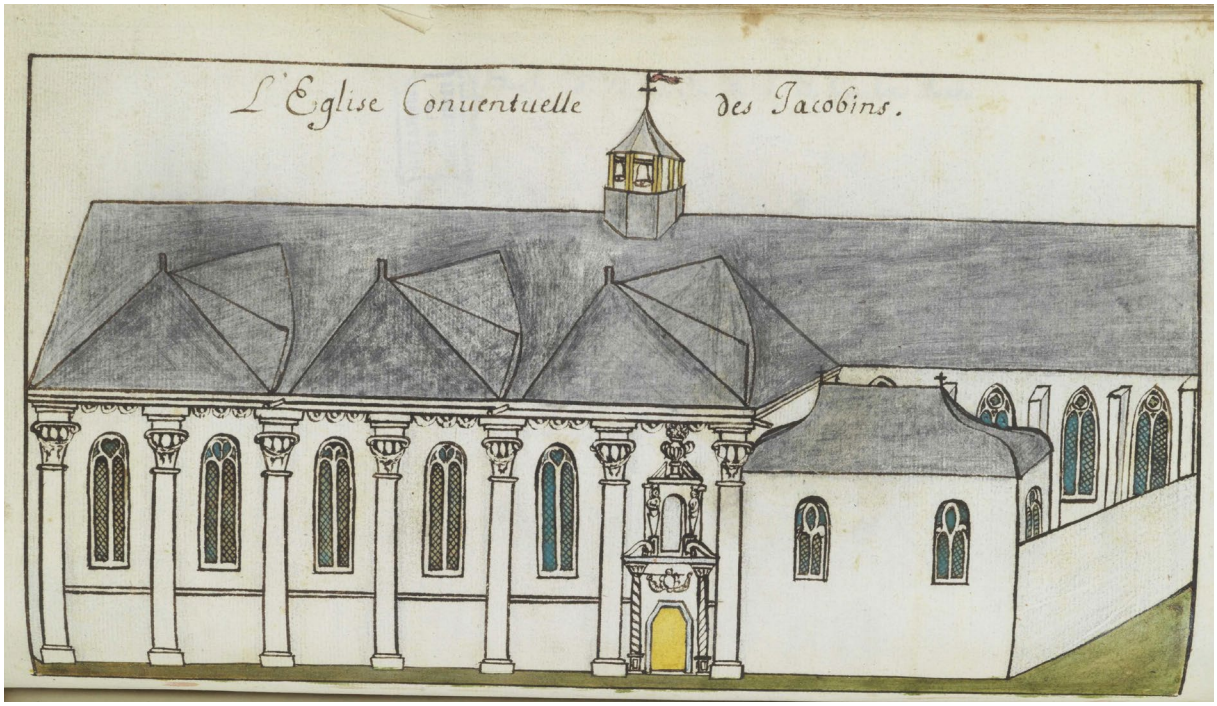

Figure 11. Miniature showing the Jacobin church in Angers *c.*1716. Jean Ballain, "L'Église Conventuelle des Jacobins," Annales et antiquités de l'Anjou/ Angers, Bibliothèque Municipale Ms. 991 (867), p. 305. Photograph © Bibliothèque municipale d'Angers.

points to Maurille while a group of three huddle together to the left, sharing looks of astonishment. A Gothic ivory statuette of the Virgin and Child appears behind Maurille on the altar. Mary looks towards the saint as if she were alive and listening, indicating her support of his actions. Taken together, the portrayal of Dominicans gathered before a Marian image could serve as visual references to the contemporary Jacobin church in Angers, located just beyond this wall. A 1716 drawing of this convent by Jean Ballain reveals that its aisles were lined with two-light lancets topped with quatrefoils (figure 11), also matching the design of the windows seen on the church in bay 2. Moreover, Maurille is believed to have founded the first church in the city dedicated to the Virgin (Comte and Jarousseau 2020). These details anachronistically but intentionally represent Maurille as the founder of the Jacobin church, funded in the present day by Bishop Gellent.

The next scene to the left shows Maurille's first miracle at Chalonnes (§ 2 /§ II) – or a similar one that took place on a hilltop nearby (§ 6 / VII) – when he burned a pagan temple to the ground through prayer and destroyed its idols. In both texts, Maurille then builds a church on the site, which is probably what we see in the adjacent picture to the right. Maurille kneels in a belted and hooded robe like a Franciscan, looking to Heaven and staring directly at an angelic messenger, who points to another banderole. To his left is the conflagration, where three unknowing pagan men in fine clothes – one wears an ermine-trimmed cloak in stark contrast to Maurille's humble appearance – kneel

Figure 12. Detail of St Paul in bay 3. Photograph © Lucy Wrapson.

Figure 13. Bay 3: St Paul; the death of René and the departure from Angers. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 14. Detail of the cup-bearer and king in bay 5. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

before an altar with two nude, horned golden idols. The painter represents the idols collapsing, splitting and breaking at the waist and neck while vaporous, winged demons escape from them. Flames fall from the sky and cause the gables to crack and crumble. Here, in what might be the start of the narrative cycle, Maurille works his first miracle near Chalonnes – on the lands owned by the Craon family, held by Isabelle de la Marche.

Like bay 1, the pair of pictures in bay 2 probably proceed from left to right, focusing the narrative on the representation of Maurille as a conduit of divine power, affirming his sacred authority. Subes-Picot suggested that the church scene represents Maurille healing a monk named Clement from fever (§ 7 /§ VIII), which occurs just after the destruction of the last temple in the *vitae* (Subes-Picot 1995: 142). However there is no clear visual reference to any aspect of this miracle in the iconography. Instead, bay 2 shows how Maurille destroyed a temple and built a church, so that a formerly profane site (left) is made sacred (right).

After bays 1–2 reveal how Maurille came to Chalonnes and became bishop of Angers, the sequence of pictures that span bays 3–7 is adapted entirely from the interpolation by Archanaldus (§ XVI), illustrating his penitential adventure to Britain and back again. Oddly, the cycle is interrupted by a standing figure of St Paul to the right of bay 3 (figure 12), effectively ushering in the story of René. Here a new team of painters appears, who painted heads with distinctive yellow-green irises, a kidney-bean-shaped profile and sliced-mushroom ears. These artists also used a different set of darker, muddied pigments which have degraded significantly. However, this is not the case with the figure of Paul, who is executed by the same hands in bay 3 (figure 13), but with the brighter pigments used by another artistic team in bays 5 and 6 (figure 14) (Demailley *et al.* 1995). Because of these stylistic and technical anomalies, Subes-Picot (1995: 143) initially suggested that this portion of the cycle was repainted in the early fourteenth century, but there were no visible instances of overpainting when this surface was viewed under ultraviolet light and examined with an adapted near infrared (NIR) camera. Instead, the material intervention implies some degree of collaboration between different painters, working on-site together but with different standards of work.

The story begins on the right with a representation of Mass that spans two panels framed by an uneven, asymmetrical trefoil arcade. Maurille leads the celebration, haloed and mitred and carrying a crosier. He faces an altar to the left – towards the axial altar of St René just below – while another

Figure 15. Bay 4: A cross-Channel journey and penance at the palace. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 16. Bay 5: The discovery of the keys and the return to France. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

angelic messenger descends from Heaven, suspending the Eucharist above the altar. Six figures trail behind him, including a tonsured deacon plus five lay people, with a mother and infant at the rear. The next scene to the left takes place outside, with the Gothic towers of the west front of this cathedral in the background. To the right, a mother faces Maurille while holding her dying infant, who is wrapped in a white cloth. The *vita* explains that she had attempted to bring her son to Maurille for baptism and healing, but the bishop was busy at Mass, so her child passed away without the sacrament. Maurille felt negligent and despaired, so he left the city in disgrace taking the cathedral's keys with him. To the left, in the most damaged scene of the cycle, a set of keys dangles from Maurille's wrist. He carves an inscription in Gothic majuscule letters on a rock reading, '--]C : TRĀSIT : MA[------] : ĒPS: AND[---' (or *[Hi]c tra(n)sit Ma(urilius) ep(iscopu) s And[eg(avorum)]*), which is quoted directly from the *vita*. Thus, he begins his cross-Channel journey just as the painting cycle traverses the central axis of the apse.

At the centre of the cycle and the east end of the cathedral, Maurille sails in a cog ship with a billowing sail, gliding from right to left, from Brittany to Britain. To the right, a pair of lively figures at the bow and stern row their oars, leaning against the ship's dog-headed helms. At the centre, Maurille drops his keys at sea, but the viewer knows what Maurille does not: a large fish has swallowed them. The next two scenes to the left show an Angevin search party near the end of their seven-year quest to find and retrieve their spiritual leader. Archanaldus specifies that they were four virtuous denizens of Angers, while Marbode refers to them as 'ambassadors' (*legati*).[3] Leading the troop is a tonsured figure in blue; he deciphers the Latin inscription while two men watch: one wears a pilgrim's cap and the other a fur-lined hood. The *vita* states that the search party wandered across Europe before they found Maurille's inscription, which is

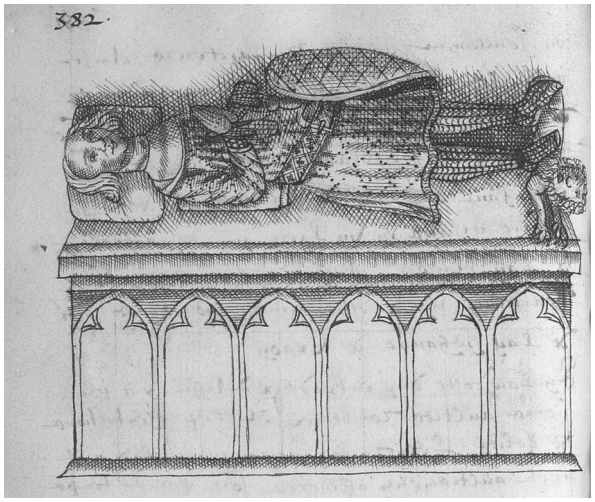

Figure 17. Miniature by Jacques Bruneau de Tartifume showing the tomb of Maurice Craon in the Couvent de Cordeliers in Angers *c.*1623. Angers, Bibliothèque municipale d'Angers Rés. Ms. 99, p. 382. Photograph © Bibliothèque municipale d'Angers.

rendered in bay 4 (figure 15) as 'HIC.[---MAV[------] ANDĒG.' (or *Hic [tra(n)sit] Mau[rilius ep(iscopu) s] Andeg(avorum)*). They then set sail across the Channel in the next scene to the left, pictured on another dog-headed cog. The *vita* describes how a fish leapt onto their ship, and when they gutted it, they discovered their bishop's keys. However, this 'key' part of the story is obscured by the damage at the centre of this scene.

In the final panel of bay 4, Maurille gardens while wearing a loose, ungirded brown robe like a Sack Friar. He crouches down, hoeing the earth not unlike images of Adam delving after his expulsion from Paradise. The *vita* recounts how Maurille found work as a gardener at the residence of a *princeps* in Britain, where he could devote himself to penance and conceal his identity. Three trees loom above him: to the right, the red fruits seem to bleed (suggesting the paint was applied too wet and needed more time to dry); and at the centre, a magpie curls its neck to look towards Maurille, echoing the curving shape of the cusped trefoil above. In the next bay, Maurille is reunited with his keys.

The same dynamic painter of bay 4 continues in bay 5 (figure 16) with three more pictures, beginning on the right with a royal banquet. Three men appear at a table with fish presented as the centrepiece. Throughout the later Middle Ages, the cathedral chapter dined on a variety of river fish on special occasions, including the celebration of the feast of St Maurille, serving carp pike, barbel and bream (Port 1855: 3; Farcy 1901–1910: 123). There is no clear textual source for a banquet in the *vita*, which indicates both its significance to the cycle and some degree of artistic licence. Haloed and still in disguise, Maurille stands to the right to offer a dish of food to the king, but the contents of the bowl are obscured by damage. To the left, an elegant youth dressed in green with curling, chin-length hair holds a large golden cup against his chest, waiting to serve his king to the right. He tilts his head down with respect towards the ruler at the centre (figure 14), whose face and crown of fleurons resemble the features of King Henry III as seen on his tomb in Westminster Abbey (see Paul Binski below).

In light of the inclusion of the Lusignan and Craon blazons in the cycle, the courtly feast in bay 5 could be viewed as a quasi-portrait of the seneschal of Anjou on duty at court, serving as the dish or cup-bearer to the king's table. If this king resembles Henry III, then the cup-bearer might look like his nephew, a young Maurice Craon V – who became seneschal around 1270. A similar chin-length, curling haircut appears on his effigy, the likeness of which survives in an antiquarian drawing by Jacques Tartifume (figure 17). To the left of the banquet, the next two scenes condense the narrative into simple, clear pictures. First, the key is revealed to Maurille by the search party, who convince him to return to Angers. The tonsured figure in blue stands at the centre, pointing to the key with a man carrying a walking stick behind him. They face Maurille, still wearing his sack. Then, in the adjacent picture, Maurille changes into his episcopal robes, mitre and gloves again, bidding farewell to the king dressed in purple.

The penultimate bay (figure 18) has a pair of happy scenes with no precise root in the hagiographic source material. In each case, the painters convey a thrilling sense of movement, with the figures sailing and then marching from right to left, engaging in a variety of poses, gestures and expressions. In the first picture to the right, Maurille stands at the centre of another cog ship – the third in the cycle – with an energetic helmsman and a napping passenger at the bow. After they sail back across the Channel, Maurille makes a jubilant entry into Angers in the second image. This busy, 12-figure composition is another imaginative departure from the *vita*, one which emphasises the joy of the bishop's return to Angers from Britain. To the right, a young man rests his chin on the shoulder of a taller celebrant to catch a glimpse of Maurille. The atmosphere is jubilant: the tapers glow, the bell is peeling, and the cathedral canons are shocked but smiling, eager to welcome back their leader. From the single sentence in the text reading *regressus ad urbem*, the artists seem to have revelled in the opportunity to imagine a civic celebration in front of the cathedral. They also appear to have invented a new miracle: if Maurille came back to Angers in August, it seems that snow fell in summer.

The cycle ends in bay 7 (figure 19). The *vita* explains that when Maurille returned to Angers, he immediately visited the tomb of the boy who died before baptism and achieved his greatest miracle: resurrecting him from the dead. This large scene,

Figure 18. Bay 6: A triumphant entry into Angers. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 19. Bay 7: The resurrection of René; St Peter. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

measuring twice the size of other panels in the programme, takes place in a graveyard. Two lay people, including the boy's mother, who wears the same hairstyle as the woman in bay 3, stand in awe. Maurille is dressed in his episcopal garments and lifts his right hand to compel the boy to sit up. A tonsured attendant stands behind him, looking on as the boy emerges from his tomb – depicted as a porphyry sarcophagus – wearing his death shroud but blushing with rosy cheeks. *Pentimenti* are visible here, including some red underpaint showing two legs dangling over the tomb; in the end, only one leg was painted (figure 20). The boy folds his hands in prayer and stares back at Maurille. The painters have opted not to give René a halo. Given the significance of the translation event in 1255 and its emphasis on the authentic, miracle-working relics of René, it would be especially puzzling for painters hired for this occasion to omit his halo. Although René's resurrection is clearly the climax of this story, Maurille is the protagonist of this cycle,

Figure 20. Detail of the overpainting on the tomb of René in bay 7. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

which emphasises various aspects of his miraculous powers as well as his humble, penitential persona.

The final figure of St Peter in bay 7 complements the position of St Paul in bay 3. These apostles act

as bookends for the story that stretches between them. Here, the gatekeeper of Heaven looks back at Maurille's actions in wonder, clutching an enlarged version of the same key that Maurille lost and found. Peter also possessed the power of resurrection (Acts 9: 36), aligning Maurille with the rock of the Church and confirming the extraordinary power of the bishop of Angers.

Style, date and commissioning

Paul Binski

The choir and transepts of Angers Cathedral were built in the first four decades of the thirteenth century under Bishop Guillaume de Beaumont (1202–1240).[4] They were executed in a form of Gothic architecture characteristic of western France which consisted of domical vaulting, plate tracery windows above large expanses of wall space and blind arcading (figures 1–3). A well-known variant of this *parti*, indicating its suitability for murals, is the basilica of San Francesco at Assisi consecrated in 1253. The seven-bay vaulted apse at Angers has blind arcade arches running beneath the windows. The murals about St Maurille occupy a band on the plain masonry beneath this arcade running across all seven bays, to a maximum height of 4.61 m, interrupted only by the main vault shafts. They were thus clearly visible from the main choir spaces to the west, represented in something like their medieval layout by a drawing of *c.*1699 in the Gaignières collection (figure 5) (see also Lehoreau 1967/1699). By the 1230s, the nave and transepts were complete and glazed; the apse was glazed last, probably in the 1230s, including a window with scenes depicting the cathedral's fourth-century bishop St Maurille, important not least because he was consecrated by the 'model' bishop St Martin and was a cathedral founder (Boulanger 2010). As well as furnishing the stained glass, Bishop Beaumont or his successor Bishop Michel de Villoiseau (d.1260) provided the choir and choir enclosure, and also the shrine of St Maurille at the high altar, in 1239, a good indicator of the general progress of work. A second shrine for St Maurille's episcopal successor René, placed in the apse, was supplied in 1255.

Whether or not the murals' execution was related directly to the history of the shrines is unprovable and the paintings are undocumented. The stylistic and heraldic evidence reviewed here, however, suggests that the paintings somewhat postdated the provision of the known liturgical arrangements in the sanctuary.

Arrangement and painted architecture

The murals (figure 4) are disposed in approximately 16 scenes across the seven bays of the apse, in a horizontal register *c.*3.13 m from the present pavement, the register varying in height from 1.48 m (bays 5, 6, 7) to 1.23 m (bays 1, 2, 3) and in width from *c.*3.7 m (the narrower north and south bays) to 4.6 m (centre bay). In effect the picture fields get smaller to the south. The narrative order, however, is counterclockwise, reading from right (south) to north (left), and that is how we have numbered the bays. Counterclockwise layouts are encountered in a variety of combinations in early Italian nave murals, but not in apsidal decoration, which became less common with the advent of the Gothic multi-bay vaulted chevet. Their layout 'protocol' was therefore not unknown in the Middle Ages, but was archaic, and it is unclear whether it had some apostolic significance given the antiquity of Maurille's cult, although this is unlikely (Lavin 1994: 6–9, 15–42; Subes-Picot 2003: 57). It might imply a lost clockwise register above or below, forming a boustrophedon, perhaps with scenes relating to St René starting after his resurrection by Maurille. It should be borne in mind that René's shrine was positioned below the images, but as yet there is no evidence for such a lost register – unlikely given the probability that the murals were whitewashed as early as the 1450s – or indeed for any type of René 'cycle'. The narrative is 'closed' by St Peter's presence at the far left facing the resurrection of René, holding a book and large key and standing within a trefoil cusped canopy (figure 19). This reminds us of his sermon in Acts 2:22 referring to Christ's 'miracles and wonders and signs' which the Resurrection miracle echoes. St Paul, however, is inexplicably placed facing bay 3 (figure 13) and not at the opposite end to Peter; but the presence of the two main apostles as the only two non-narrative images, set within their own canopies, is notable. The Resurrection miracle (figure 19) is the most dramatic episode in an arrangement that otherwise has no strong rhetorical emphasis bar, perhaps, the witty emphasis in the central bay 4 on passages by ship from France to England, 'crossing' from the south of the apse to its north (figure 15), which may, according to one proposal about its original display, also have been true of the images of the invasion fleet in the Bayeux Tapestry around and across the nave of Bayeux Cathedral (Norton 2019: fig. 13).

The episodes are framed by foliage scroll patterns (bays 1, 7), heraldic motifs (2, 3), key patterns and ribbons (4, 5) and linked trefoil buds (6), forms known widely in thirteenth-century Western European wall painting. The 'naturalistic' foliage scrolls in the borders of bay 7 indicate only a date from the second quarter of the thirteenth century onwards. However, the most distinctive motifs are formed by Gothic architecture within and around the scenes. Each scene is canopied differently, with between two and four enclosures with a range of motifs. There are three basic arrangements: Gothic trefoil, or trefoil cusped, arches with intermediary buttress pinnacles and upper transverse town canopies (bays 1, 5, 7) (figures 9, 16, 19) some of which turn the gable ends outwards over the haunches of the arches (bays 2, 4, 6) (figure 10), others of which convert the pinnacles into thicker crenellated towers viewed slightly from above (bay 4) (figure 15).

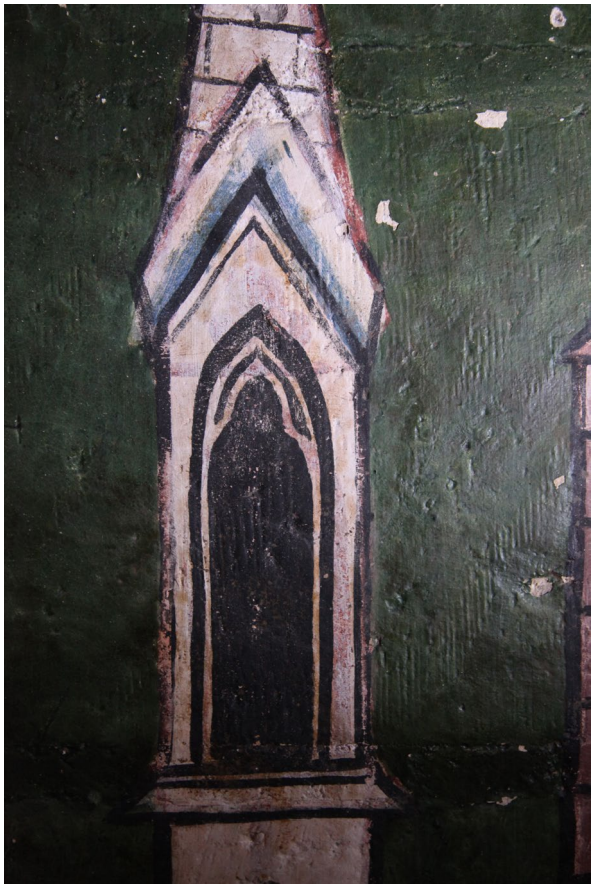

Figure 21. Detail of the buttress in bay 6 showing *pentimento*. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 22. Westminster Retable: detail showing St Peter. Photograph © Hamilton Kerr Institute.

This variation shows that the scenes did not form some sort of surrogate painted triforium running around the apse, where regularity of form would be in order. The repeated use of essentially identical canopies over narrative scenes is common in Gothic art. A specific debt, however, is to the 'rotulus' format, as found in the French illuminated Velletri Roll showing the Passion of Christ (Museo Civico Archeologico) of *c.*1270 (Morgan 1982–1988: no. 273, incorrectly designated as 'English'), and the murals in the Leonhardskapelle at Landschlacht (Thurgau, Switzerland), *c.*1310 (Michler 1990: 101). The fact that *rotuli* commonly depicted Saints' Lives (e.g. the Guthlac and St Eloi rolls) may be relevant to aspects of the depicted architecture (Morgan 1982–1988: no. 22; Branner 1967). The central bay 4 (figure 15) employs rounded trefoil arches (not cusps unlike the other scenes) robustly detailed crenellated towers and thickset town canopies with out-turned gables. Bays 2 and 6 use similar town canopies over more lightweight cusped arches. The motifs in bay 4 are typical of the first decades of the thirteenth century: round trefoil arches with town canopies of this weighty ornate type occur on the pillars of the left and central doorways of the south transept portal at Chartres Cathedral, and in the Vienna and Toledo Moralized Bibles (Sauerländer 1972: pl. 125, 79; Guest 1995: fols. 22, 38). The round crenellated towers with conical tops viewed slightly from above occur in the Morgan Bible Picture Book of *c.*1250 (e.g. fol. 15r) (Plummer 1969) although their origins are certainly late Romanesque.

Because stylistically and circumstantially the murals are most unlikely to predate the third quarter of the century, their 'earliest' forms were by then *passé*, so some explanation must be found for their use. One is that the motifs were derived from an authoritative source relevant to the scenes' iconography. A picture Life of Maurille, possibly recorded in roll form, must have existed by the 1220s or 1230s because his shrine, provided in 1239 by Bishop Guillaume de Beaumont (d.1240), as well as the shrine of René provided in 1255 by Canon Guillaume le Bâcle, possessed narrative

images which presuppose a cycle of about the same length and content as the paintings (Farcy 1901–1910: 163–76). This cycle might have been preserved in illustrated roll form in such a way that the wall painters cited aspects of its style when reproducing its images. That the more old-fashioned idiom of some of the murals' architecture may reflect the visual environment of the 1239 shrine and its sources is also suggested by the rounded trefoil arches of the lost choir *jubé* probably provided under Bishop Beaumont before 1240 or so, as recorded by Lehoreau and Gaignières (figure 5). The similar trefoil arches painted in bay 4 at the centre of the apse would have appeared above and beyond this screen.

Given that dating should take into account the most recent motifs, however, it is notable that the majority of the scenes are set under much more lightweight trefoil cusped arches with slim intermediary square-section buttress pinnacles. The cusps are red or green with spandrel trefoils, which in bay 6 have slightly ogival tips. In two cases (bays 2, 6) these substructures are topped by the weightier town canopies used in bay 4, indicating a blending of forms. Generally, the arches are rounded, but pointed cusped instances with gables, one with crockets, occur within scenes 1 and 2. By the 1240s such trefoil cusped arches had begun to enter the repertory of French Gothic in arcading at Amiens Cathedral (choir radiating chapels, dado, *c.*1230) and the Sainte-Chapelle (1240s), and Parisian illumination by the 1250s (Branner 1965: fig. 65; Branner 1967: figs 133, 135, 268). By *c.*1270, as in the Velletri Roll, these forms, including trefoils on the cusp surfaces, were much more common and can be found throughout the third quarter of the century with or without gables on datable French incised tomb slabs (Greenhill 1976: pls 8a, 11a, 12a, 105c, 133c). These forms are thus on balance more up-to-date, or at least of somewhat more recent origin, than those in bay 4 and imply that the earlier, simpler forms are not necessarily indicative of the actual date of execution.

The arches are supported on simple shafts with bifurcated foliage capitals and intervening buttresses. Usually these buttresses have a single light, but in one instance, bay 6, the central buttress has an imperfect trefoil-cusped upper light with a gablet fronting the pinnacle base. Close inspection shows that this is a revision (figure 21); from the *pentimento* we see that originally the buttress was topped by a triangular gablet inscribed with a trefoil, like outwardly-turned gables in a number of the town canopies or the original thirteenth-century nave chapels of Notre-Dame in Paris (Branner 1965: fig. 84). By editing out this 'older' form and extending the gablet upwards in front of the rear spire, the painters were bringing it into conformity with the type of shaft, gablet and spire arrangement found on the north transept portals of Notre-Dame, now redated by Albrecht and Breitling to the late 1250s

Figure 23. Detail of the traceried window in bay 6. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

(Albrecht *et al.* 2022), and on the Westminster Retable (figure 22) (*c.*1259–69).

Knowledge of the Parisian sphere is also shown by the cusped two-light with quatrefoil windows painted on the left-hand flanks of bays 2 and 6, the quatrefoil in 6 being inscribed in a circle (figure 23). The form, apparent in the windows of the upper Sainte-Chapelle in the 1240s, appears in the Paris-derived windows of the chapter house of Westminster Abbey also designed in the 1240s, among the micro-architectural details in the post-1263 murals in the king's chamber, eventually the 'Painted Chamber', at Westminster (Binski 1986: col. pl. 1, lower right) and in the *c.*1260 nave triforium of Lichfield Cathedral. In Angers an identical window, probably of slightly later date is found in a building forming part of the undated Augustinian

Figure 24. Window forming part of the Augustinian foundation (on the site of Sack Friars), Rue de la Harpe, Angers. Photograph © Paul Binski.

Figure 25. Mural of Canon Guillaume de Geu, *c.*1300, Clermont Ferrand Cathedral, detail. Photograph © Paul Binski.

house once on the Rue de la Harpe (figure 24), the date of construction of which is uncertain, but which followed the foundation of a *couvent* of Sack Friars on the site in 1263 by Bishop Nicholas Gellent (see Emily Guerry above).

The genesis and editing of such forms thus postdates those exemplified by scene 4. By the century's end, Angers Cathedral possessed an up-to-date Rayonnant monument in the bronze tomb of Bishop Gellent (d.1290) in hand in 1286, while the comparable but slightly later Gothic structures in the murals at Clermont Ferrand Cathedral are more advanced (figure 25) (Farcy 1877; Urseau 1920: 61–62; Avril *et al.* 1998: nos. 288, 292) as are those in the newly uncovered murals in the south transept of Poitiers Cathedral (Andrault Schmitt *et al.* 2017).

In sum, the mix of motifs in the murals indicates that while some sources may have dated to around the first third of the century, others dated from the mid-century and remained common well into the third quarter, but not long thereafter. The earliest forms point to the possibility of conformity to an older source such as an illustrated roll, but they also suggest that a date after 1280 or so would be unlikely. The figure style also suggests, on balance, a date towards the end of this period.

Figure style

The teams of painters were working in two basic idioms, one represented by the more fully finished, firmly and beautifully drawn, and richly coloured, northern and central bays 4–7, and by the slightly more bleached or loosely drawn southern bays 1 and 2, where the dimensions of the panels change slightly, bay 1 showing signs of haste, perfunctory work and poorer preservation. Bay 3 on the south side is in a second, entirely different, idiom, and there is no obvious explanation as to how this mix came about.

Although no other work by these painters is known in France, dating may be clarified by noting first that the figure styles they use are a late iteration of the so-called 'broad-fold' style developed in France, particularly in sculpture, in the mid-thirteenth century. This idiom is most extensively preserved in manuscript painting, which very seldom coincides exactly in style, rather than generalised stylistic tendencies, with monumental painting.

The style of the first group is technically the more distinguished, and the brushwork drawing in places deft and superb. Unlike the northern French and English broad-fold manner in its first phase, the figures are quiet, broad and monumental, standing erect with carefully modelled draperies that fall smoothly and vertically, with relatively large heads and making comparatively circumspect gestures. This is unlike the slimmer proportions, small sharply detailed heads, mannered and lively S-bend postures and baggy triangular drapery formations of the core broad-fold style represented by the illuminators leading up to the pre-1270 St Louis Psalter (Paris BNF, MS Lat. 10525) (Branner 1977; Stahl 2008). The broader physiques are more in keeping with the St Louis Psalter's companion volume, the Isabella Psalter (Cambridge, Fitzwilliam Museum MS 300) (Binski and Panayotova 2005: no. 72) or the Martyrology of Saint-Germain-des-Près (1267–79) (Paris BNF, MS Lat. 12834) (Avril *et al.* 1998: no. 180). Indeed, as with the micro-architecture, there are Parisian reminiscences. Although she stands more erect than many figures in the St Louis Psalter, René's mother witnessing the resurrection of her son in bay 7 has a similar bonnet and sharp, foxy features as Potiphar's wife in the psalter (fol. 19v)

Figure 26. Detail of heads in bay 2. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 27. Virgin and Child, Lyre Psalter. (From the British Library Collection, MS Add. 16975, fol. 18.) Photograph © British Library.

(Stahl 2008: p. 82 for enlargement). René in the same scene and the frontmost figure kneeling before the idols in bay 2 (figure 26) have profiles which strikingly resemble work from the Cholet atelier of the 1270s, as at fol. 162r of the Murthly Hours (Edinburgh National Library of Scotland, MS 21000) (Higgit 2000: 105–13 and fig. 94): we note the continuity of the brow and nose, the strongly arched eyebrows and the shallow jaw with protruding chin. The torqued form of the hooded helmsman in bay 6 bears comparison with the gamesplayers in the Montpellier Codex (Montpellier, Bibliothèque Inter-Universitaire, Section Médicine, MS H196) (fol. 88r) of the same period (Wolinsky 1992; Avril *et al.* 1998: no. 171; Stones 2013–14). Not untypically of the decades after about 1260, images of people physically at work are more animated than the main characters, as for example in the case of the similarly hooded backwards-looking charioteer in the mural about Elisha and Naaman (*c.*1292–97) formerly in the Painted Chamber at Westminster (Binski 1986: col. pl. IV). This animation and torquing is a more general feature of painting and illumination in northern France and England from around the 1260s.

The male figures also conform to work of the last third of the century in depicting facial signs of ageing, which only become common in the last third of the thirteenth century in painting and sculpture. The senior age of some men is indicated by loosening their jowels with or without stubble, as with René's father in bay 7, the king of Britain in bay 5 and the hindmost older pilgrim in bay 5, as found in the post-1269 choir triforium glazing at Amiens Cathedral and the mural of Canon Guillaume de Geu of *c.*1300 in Clermont Ferrand Cathedral (figure 25) (Avril *et al.* 1998: nos. 298A, 292, 298). However, although the figures and groups compare in bold monumentality with those in the so-called picture book of Madame Marie (Paris BNF, MS nouv. acq. fr. 16251) from the eastern territories (Hainaut) dating to between 1268 and 1291, and probably to the 1280s, a number of conventions in the picture book do not occur in the murals: for example, the markedly convoluted hair and the tendency of hemlines to fall in serpentine lines (Stones 1997). The hairstyles of the (mostly clerical) participants are simpler, and draperies fall almost exclusively in straight lines. Parisian or northeastern French or Netherlandish work of the sort represented by the work of Honoré in Paris or the Madame Marie picture-book suggests that the Angers murals are somewhat earlier.

There may be an Anglo-Norman or 'Plantagenet' dimension. The single most telling non-Parisian

Figure 28. Scenes from II Kings, Painted Chamber, Westminster Palace, destroyed 1834, copied 1819 (after Stothard-Rokewode, *Vetusta Monumenta*, vol. 6). Photograph © Paul Binski.

connection is with the Lyre Psalter produced for Lyre Abbey in Normandy (London BL, MS Add. 16975) (Ragusa 1971; Stones 2013–14: no. II-7). The psalter has a series of full-page images from the Old and New Testaments including saints, prophets and apostles, set beneath trefoil cusped arches with town canopies of the type at Angers. As well as a general correspondence of figure style, the Lyre Psalter's drawing of facial types is in places remarkably close, such as the Christ Child on fol. 18r (figure 27), which compares well with the younger male heads at Angers, St Anne and the Virgin at fol. 16v that resemble René's mother and the cupbearer in bay 5; compare also the head of the Virgin in the Annunciation on fol. 16r. The psalter has some English rather than French features, and its calendar points to a date after 1262 and probably before 1282, and certainly before 1297 (its original calendar includes the obit of Abbot Gilbert de la Haye, 1261–62, at fol. 6r; there is no obit for Abbot Robert de Gauville, d.1282, and St Louis was added at fol. 5v).

Since the murals show no links with extant wall painting in Angers (Davy 2003), it may be worth proposing that their idiom reflects training or experience in Normandy or even in the Anglo-Norman domain. The Old Testament scenes executed in the king's chamber at Westminster in the 1290s, which used architectural stage sets extensively, are the first documented large-scale English response to the type of work represented by Angers (figure 28) (Binski 1986: 2001), although the Angers murals are typically French in detailing and arrangement compared with the freer Rayonnant micro-architectural mode of the English court artists. The very striking resemblance of the crowned king of Britain at table in bay 5 to the gilt bronze effigy of Henry III (d.1272) in Westminster Abbey executed in the 1290s (figures 29 and 30) (Binski 1995: fig. 147) tells us nothing about the date of the Angers pictures because they predate the effigy, but may shed light on their patronage. It could indicate a generally accepted idea of what Henry III looked like prior to his death in 1272, which would be of interest to those with Plantagenet family connections and even direct links to his court.

It is difficult to insist on a Plantagenet dimension to the Angers images, produced as they were at a time when the politics of the western French territories were a matter of English interest; but it may be in the background, and it is relevant that the painting technique used at Angers (discussed by Lucy Wrapson), with oil paint applied to thin preparatory layers, accords in places with the contemporary murals in Westminster Abbey and documented practice at the English court in the late thirteenth century (Demailly *et al.* 1998). The coloration of the murals with strong alternating vermilion and green grounds is close to the later thirteenth-century murals of Sts Thomas, Christopher and Faith (figure 31) (*c.*1270–1300) in the abbey, which also resemble them in oil technique and primed ground; as well as in the copied Old Testament scenes formerly in the Painted Chamber (figure 28). We should recall that the masterpiece of this technique and idiom – the Westminster Retable probably of the 1260s (figure 22) – may well be partly of French manufacture (Binski and Massing 2009) at a time of significant inter-court exchange.

The work in bay 3 stands apart in composition, figure style and technique, and tends to suffer by comparison with the main group. Whereas the main group in bays 1–2 and 4–7 overlapped in important regards, the bay 3 artists did not. Their architecture is casually drawn and the figures obey quite different conventions from the main group. Their drawing is stolid and the faces blank and doll-like, with prominent staring eyes with blue irises, conventions which hold true of the St Paul figure also by this team, despite the fact that the coloration of his panel resembles that of the main group. The bay 3 team uses sombre colours, and

Figure 29. Head of the effigy of King Henry III, cast in 1292, Westminster Abbey. Photograph © Angelo Hornak/ Alamy Stock Photo.

Figure 30. Head of the king of Britain, detail of bay 5. Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

its finish is frequently coarse or unthinking, as in the case of René's mother, whose bonnet has been mistakenly overlaid by the red and white masonry structure behind her. The informal detailing indicates that these painters were not working over drawings supplied by the main team, but acting semi-independently. There is no evidence that this scene was an overpaint. The blank expressions and large blue eyes can be found in the south transept murals at Beauvais, probably before 1284, and also in the work of sculpture polychromists as at Bourges and Amiens (Joubert 2008: 199–202 and col. pls xl xli; Verret and Steyaert 2002: fig. 1).

However, nothing in the style of this bay markedly contradicts the dating evidence of the

Figure 31. Mural of St Faith, *c.*1300, Westminster Abbey. Photograph © Paul Binski.

whole. The question is what this mix indicates about working methods. Bays 1–3 imply that the teams were apportioned principally by bays. It is evident from their mix of styles, differing degrees of finish and preservation, that while bays 4–7 were executed in an essentially consistent manner, bays 1–3 were realised by painters working not only in different styles but, as is evident from the loose and hasty drawing in bay 1, even under time or resource pressure. Their paintings were also designed within slightly narrower bands.

How these features are to be interpreted is an open question. The lopsided diminishing width of the bands – from 1.48 m (bays 5, 6, 7) to 1.23 m (bays 1, 2, 3) – indicates that a single method for layout across the apse, typically by the use of snapped cords, cannot have been used, not least because the apse bays and the variations in preparatory layers prevented it. If the murals were executed from the south northwards in narrative order, the images must have begun in a hurry, and would have been the product at the outset of more than one team. Yet it was in these bays that what appears to be patronal heraldry was inserted. The work from bay 4 northwards would then represent a tightening up and regularising of the work.

Alternatively, and perhaps more probably, the nature of the work in bays 1–3 could suggest

destabilisation, which might in turn indicate that the bays were executed left to right, later in the process than bays 4–7 where consistency and control are more evident. The actual style of bays 1 and 2 indicates that at least some of the painters in bays 4–7 remained at work. Discontinuities of this type are not unknown in some contemporary narrative manuscript illumination (e.g. the English Abingdon Apocalypse) where the work of colourists and draughtsmen can loosen remarkably or just peter out (Morgan 1982–1988: no. 127). The master of bay 3 is sufficiently disruptive for us to enquire whether he was appointed at the behest of a specific patron. The fact that the extant heraldry is concentrated in the 'weaker' bays 1–3 might hypothetically suggest that the work was begun and funded steadily in bays 4–7 by one patron such as the cathedral chapter for example, whose interests may be apparent in the subject matter (Subes-Picot 2003) but completed by a group of donors who had their heraldry added. However, no conclusive explanation is as yet forthcoming.

As regards style dating, while the architecture is mixed in its origins, it, together with the figure style, favours a date within the period 1260–90, specifically within a core period of *c.*1265–85. It is suggested here that Subes-Picot's proposed date of *c.*1255–60 may be a little early (Subes-Picot 1997, but compare Subes-Picot 1992: 86 for *c.*1270–80). To explore this, we now return to the issue of patronage.

Commissioning and date

The murals cannot be dated circumstantially beyond noting the activity, itself hardly conclusive, concerning the shrines of Maurille and René in 1239 and 1255 respectively. However, as already noted by Emily Guerry, bays 2 and 3 have heraldic borders with identifiable arms, which have some bearing on the date range advanced here. Christian Davy (2014) was the first to note identifiable arms in the border of bay 2. These belong to: (1) Gellent, specifically Nicolas Gellent, canon and archdeacon of Angers since 1240, and bishop 1261–90; (2) Marche, specifically Isabelle de la Marche (d.1299), daughter of Isabelle of Angouleme (dowager queen of King John of England and so half-sister of Henry III) and of Hugh X de Lusignan, whose fourth son was William de Valence. She was seneschal of Anjou to 1265; (3) Craon, specifically for Isabelle de la Marche or her sons by her husband Maurice IV de Craon (d.1250). Isabelle married Geoffrey de Rancon in 1250 (d.*c.*1263) so it is unclear whether she bore the arms of Craon between 1250 and 1263. However, the Craon arms were certainly borne by her sons Amaury II (Lord of Craon 1265–69) and Maurice V (1269–1293) (Bertrand de Broussillon and de Farcy 1891: 441–54). We note in addition (4) Anjou, specifically for Charles d'Anjou (*d.*1285), king of Sicily and count of Anjou/Maine from 1246 by the bestowal of his brother Louis IX. These arms are found solely in the border of bay 3.

These arms supply the absolute date brackets of 1240–90 (Gellent), 122?–99 (Marche), 1265–93 (Amaury II Craon and Maurice V Craon), and 1246–85 (Anjou). Isabelle's Marche blazon embraced the entire period and cannot really help, but the bracket can hypothetically be narrowed if the Gellent arms are taken only to apply to the period of his episcopate, 1260–91, and those of Anjou to the period *c.*1266–85 after Charles' accession as king of Sicily in 1266, given the question of the relationship posited between St René of Sorrento and St René of Angers. It is curious that the arms of Charles dominate the frame of the scenes including the death of René in bay 3 but do not occur with the resurrection of René in bay 7. In fact, Charles seems to have shown little interest in Angers Cathedral bar having ceded land immediately to the east of the cathedral to the chapter in 1274 for some undisclosed purpose, which was once wrongly associated with the construction of the chevet (Farcy 1901–1910: 29; Mussat 1964: 33). Whether the images in bay 3 bearing his arms relate to this action is unknown. It may be relevant that between 1246 and 1254, Charles had probably commissioned a large scheme of wall paintings in the abbey church of La Ronceray in Angers that included a wide range of topics, with a noteworthy display of the heraldry of the Capetian royal family including himself, his mother Blanche of Castile and Alphonse de Poitiers, but which are in a different and earlier style (Davy 2014: 268–70). The possibility that certain patrons such as Charles or the Craon family controlled specific groups of painters should be countenanced. The gathering of the blazons around the miracle in bay 2 strongly suggests either a particular votive significance or a group subscription to the anti-idolatrous message implicit in the narrative. Finally, it has already been noted that if a reference to the Sack Friars was intended in bay 4, this is more likely to have occurred before the order was suppressed in 1274.

More can be said in particular about one bearer of the Craon arms, Maurice V, lord from 1269. Bertrand de Broussillon and de Farcy (1891: 544–86, esp. 550–51) note the strong links between Maurice and the court of Henry III, his half-uncle. Maurice enjoyed the favour of the English crown as its kinsman, as documents in the *Cartulaire de Craon* attest. In November 1270 following his assumption of the lordship of Craon, Maurice obtained an annuity from Henry III in lieu of his possession of a manor in the hands of Queen Eleanor (Bertrand de Broussillon and de Farcy 1891: 551, 555 no. 294; as *Calendar of the Patent Rolls*, 1266–72: 491). This in turn was followed by a number of grants and favours to Maurice from Edward I, some concerning Plantagenet interests in

western France, throughout the 1270s and 1280s (Bertrand de Broussillon and de Farcy 1891: nos. 309, 320, 321, 327, 328, 340; also *Calendar of the Patent Rolls*, 1275: 93, 113). Maurice was serving as Edward's lieutenant in Aquitaine and Guyenne in 1290 (Bertrand de Broussillon and de Farcy 1891: 567–78 nos. 353, 354). Maurice's relationship with Charles of Anjou's son, Charles II, of whom Maurice was vicar and procurator in Anjou, was also cordial (Bertrand de Broussillon and de Farcy 1891: 551).

Advancing a date of execution of the murals within the lordship of Maurice V, perhaps after or around its inception in 1269–70, is attractive partly because it fits both the stylistic evidence and the maximum period indicated by the heraldry. Given that Maurice, not Amaury II, was a documented beneficiary of Henry III and Edward I, we might also explain the resemblance between the image of the king of Britain at table and the effigy of Henry III as a form of compliment to the old king (d.1272) at Maurice's 1269–70 inception as lord of Craon. This would be even more feasible if Maurice had in fact spent time as a child at the English court (Lachaud 2012: 487). Whether it could account for any leaning towards the Norman and Plantagenet domains as well as Paris in regard to style is less obvious but possible, and there is technical and stylistic evidence in favour of the idea. The 'likenesses' of Isabelle de la Marche in the form of René's mother, close to Isabelle's seal, the cup-bearer or dapifer at table 'as' Maurice V and the king of Britain 'as' Henry III point at least in theory to patronal self-inscription. With the possible exception of the Sainte-Chapelle painted medallions, the Angers murals in any event give us the best indication of the type of high quality French wall painting that lay in the background of both the French and English court styles.

In conclusion, it is suggested here that the pictures are somewhat later in date than proposed by Subes-Picot (*c.*1255–60), the optimum period for the coincidence of the salient stylistic features and the heraldry being broadly *c.*1265–85, possibly within the lordship of Maurice V de Craon (1269–93), but with a preference for the late 1260s or early 1270s.

Painting technique and photography at Angers

Lucy Wrapson and Chris Titmus

Technique

Lucy Wrapson

The painting technique was tackled in brief by Subes-Picot (1992), Stirnemann (1995) and Demailly *et al.* (1998), following a comprehensive unpublished official report by Demailly *et al.* (1994) at the Laboratoire de Recherche des Monuments Historiques. The LRMC interpreted several materially distinct preparatory methods on the panels, with four methods used on the same scene in bay 1 and two methods used on the same scene in three further bays (3, 6, 7) (Demailly *et al.* 1998: 11).

In some places in bays 1 and 7, and everywhere tested on bay 2, the pigments were applied to the dressed stone with no visible prepratory layer. Other methods were found on bay 1, including painting over (a) a lime-based ground, (b) on a lead white ground and (c) on a lead white/red lead ground. In bays 3 and 6, the paint layers were found over both lime-based and lead white-based grounds. Bays 4 and 5 have lead white and lead white/red lead grounds. The preparatory layers therefore fundamentally fall into three main types: no ground; lime-based grounds; and lead white grounds, warmed to a greater or lesser extent with the addition of red lead.[5] Grounds analysed from bays 2, 3, 5 and 7 were found to contain a protein identified as casein, a milk-derived glue. The paint layers were identified as being undertaken in a linseed oil medium (Demailly *et al.* 1998: 12).

Howard sees the presence of both lime-based grounds and lead white grounds at Angers (which she dates to *c.*1270) as transitional, with lime-based grounds representing the older lime painting tradition, which lent itself to specific visual effects (Howard 2003: 6–7). Comparing the schemes in the Ante-Reliquary Chapel of Norwich Cathedral in England, she shows how the earlier lime paintings there use unmixed and opaque pigments, whereas the later paintings employ the bright lead white ground to impact the subsequent paint layers optically. These subsequent paint layers deliberately make greater use of translucent glazes made with red lakes and copper greens, effects 'central to Gothic wall painting' as well as to the use of drying oil as a medium (Howard 2003: 7).

At Angers, bay 3 appears both technically and stylistically anomalous in this way, when compared with other parts of the cycle. The painter of bay 3 uses solid blocks of colour and bold lines to depict clothing in contrast to the glazier, more softly modulated pink robes seen, for example, in bay 5, which rely on the use of the oil glazing technique. Red lake glazes were not used by bay 3's painter as extensively as the other painters – and possibly not at all (Demailly *et al.* 1998: X). In essence, he was more traditional in style, perhaps an older painter, and although condition impacts the visual appearance of this bay, his choice of palette is generally more subdued in colour.

Differing choices of pigments clearly suggest the presence of multiple hands with personal paint supplies, or perhaps different paint supplies in various seasons of work. It is however, not clear cut how the work was divided up from the technical evidence alone. For example, orpiment was only found on bay 2, and only bays 5 and 7 used lead-tin yellow. At times, the same style can be seen, but exploiting a different palette: stylistically, the St Paul figure was evidently painted by the same hand as the rest of bay 3, but uses the brighter pigments of the

adjacent bay. Only bay 6 uses indigo in the whole scheme (Demailly *et al.* 1998: 11).

Far from there being an Eyckian turning point, oil painting on panel is well attested in Northern European medieval artists' treatises (such as Theophilus in the twelfth century), as well as in analysed surviving examples such as the Hemse Crucifix from the late twelfth century (Hawthorne and Smith 1963; Plahter 1984: 35–40). By the thirteenth century, drying oils were well established as a paint medium on panel in Northern Europe (White 1995: 127–35; White and Kirby 2006: 215–22). Although the use of oil as a wall painting medium is not made explicit in surviving treatises, painters worked across different substrates, painting panels, walls and polychrome sculpture. The taking up of oil as a paint vehicle likely relates to its efficacy in conveying translucent and luminous aesthetic effects. Nonetheless it remains to be established when and where drying oils first became the main medium of wall painting.

The suggestion from currently available evidence would point to the mid-to-late thirteenth century as the time of change. The use of an oil medium at Angers can now be further contextualised by analyses of contemporary wall painting technique in both France and England undertaken since Demailly *et al.* (1998). In France, this includes analysis of the roundels at Sainte-Chapelle which date to 1248 and, where original, have been identified as being undertaken 'a sec' (as opposed to traditional lime/fresco) in a technique that uses a material that has been proposed as a resin (Mairey 2001: 77), but which is more likely an oil.[6]

At Poitiers Cathedral in the case of the south transept vault paintings, the picture is more complicated, but the analysis more detailed (Martos-Levif *et al.* 2017; Jeanneau 2017). There the late thirteenth/early fourteenth-century paintings are undertaken in a mixture of glue tempera and oil, over a limewash ground (Martos-Levif *et al.* 2017: 74). Tin relief adornments, gilded in silver and gold, are also present at Poitiers but not at Angers, perhaps indicative of its slightly earlier date. The pigments found at Poitiers were the same as Angers, with the exception of copper resinate (Martos-Levif *et al.* 2017: 74).

In Plantagenet England, tested contemporary wall paintings and polychrome sculptures also provide a close technical comparison. The *c.*1280–1300 wall paintings of the *Incredulity of St Thomas and St Christopher Carrying the Christ Child* are located in the south transept of Westminster Abbey.[7] A further wall painting of similar date in St Faith's chapel depicts the saint above a fictive retable (figure 30) (Howe 2006a,b; Binski 1995: 171; Howard and Sauerberg 2009: 290). The striated, minimally limewashed dressed stone provides a similar aesthetic to the paintings at Angers, and the technique is also similar; both the transept paintings and *St Faith* are undertaken mostly over a lead white ground (Howe 2006b: 12).[8] Other polychrome surfaces at Westminster find concordance too – on the tomb of Edmund Crouchback (d.1296), there is a pinkish sealant, levelling chalk and then a lead white ground with a little red lead (Howard 2009: 324). The paint medium was heat-bodied linseed oil (Howard 2009: 333). The palettes of the Westminster examples again compare closely with Angers.

Creating photographic reconstructions of the Angers wall paintings

Lucy Wrapson and Chris Titmus

The two key challenges of this work were the constraints of both the site and the budget, which required an ingenious method for imaging these paintings. Access could only be gained from either a ladder in the central section or via a narrow 1 m wide walkway behind and enclosed by the east end wood panelling (figure 32). The lighting was also problematic, coming from both electric and daylight sources, and the image capture was further complicated by the curvature of the paintings around the apse.

We therefore took photographs in small sections, with Chris Titmus painstakingly stitching the images together. Ideally, when intending to photograph something using a number of shots which

Figure 32. Photography being carried out, highlighting the problems with access to some areas of the paintings. Photograph © Paul Binski.

Figure 33. Two adjacent, overlapping areas of a scene that have been stitched using automated stitching software. Although the metal bar fixing beside the dove has been well handled, there is a clear difference in the perspective interpretation and scaling between the images that would need to be corrected. But, which of the two is correct? Photograph © Lucy Wrapson and Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

will need to be stitched together to complete the whole, there are a number of accepted prerequisites required to get a good quality artefact-free image at the end of the process. Each one of these factors is important in getting a good result:

- The camera should be set up at a set distance from the painting and therefore capture all images at a consistent magnification.
- The camera should be kept square to the object for all shots to avoid getting unwanted parallax distortion.
- The camera should be moved in a regular pattern to give even spacing, allowing for a constant overlap to aid stitching.
- It is vital that the shots are taken without any blurring from camera movement.
- Ideally the camera should use a lens with a reasonably long focal length to minimise lens distortion. While to some extent this can be corrected as part of the stitching process by using suitable algorithms in the stitching software, it is better to minimise this where possible.
- The camera must be correctly focused for all shots, shooting with an adequate depth of field to avoid blurring or out of focus areas.
- It is important that the lighting for each shot is consistent. The area to be photographed should be evenly lit to avoid repeat pattern anomalies during stitching. A 'flat' and untextured surface will yield a better stitched image. Stitching a highly textured surface can lead to more complications.
- Each photograph should be given the same (ideally correct) exposure to maintain consistency. A variety of lighter and darker images across an area that is actually all the same will produce a mottled finish that is not representative of the original.
- Each shot should be taken at a constant colour balance for consistency.

However, had photographing the Angers wall paintings been an easy challenge, someone would have produced these images a long time ago. The location of the paintings renders most of the ideal conditions impossible. As previously mentioned, the paintings are accessed via a narrow gangway with irregular flooring. Due to their size, adequate access to all areas of all paintings is impossible, therefore keeping the camera level and square to the surface was difficult. A regular even pattern of capture is also a problem in changing positions, as is maintaining a constant working distance at all times. This results in varying magnification between shots. For a photograph to cover all areas means that the camera has to be tilted to include some of the areas, thus creating a degree of parallax within some of the images to be stitched. This also means that the distance from the surface, and hence the degree of magnification of the images, varies.

The limited access also compromised the choice of lens. While a long focal length would have been ideal, there was not adequate space available to get far enough back to use one. It was therefore necessary to take a larger number of smaller images while trying to keep magnification consistent. The painted walls curve with a narrow gangway, so it was important to keep the lights reasonably close to the area being photographed. To move the lights too far away risked creating a 'raking light' effect which could hamper the stitching. We deliberately used lighting that was battery powered to remove the risk of trailing cables from a potentially already hazardous situation.

Stitching the images could not be achieved automatically, as in some areas the distortions created by the difficulty of the photography were too great for the software (Adobe Photoshop) to cope (figure 33). Instead, the images were manually stitched, meaning that these images should be regarded as photographic reconstructions rather than accurate, measured photographic records of the paintings. Nonetheless, they allow study of the style, technique and iconography of the originals in a way that has never before been possible.

Conclusion

Photographic reconstruction of the Gothic murals about St Maurille in Angers Cathedral places them for the first time in the public domain and allows a deeper understanding of their iconography, patronage and date. The murals, among the finest of their date in Western Europe, were executed around 1270 by painters familiar with developments in Normandy, Paris and England. Emily Guerry set out the evidence for the cult and considered the patronage of the murals in the light of local seigneurial power apparent in the use of family-specific heraldry in the paintings. Executed during the episcopate of Nicholas Gellent (1261–90), a detailed examination of the content of the paintings and the cult of St Maurille demonstrates local religous interests specific to the probable patrons, the Marche and Craon families. Paul Binski triangulated the discussion of patronage and date by discussing the style of the murals, showing that the painters were exceptionally skilled and worked in a style typical of western and northern France around 1270. This included discussion of date-diagnostic features such as painted architecture and figure style. Resemblaces to work in Paris, Normandy and Westminster indicate that the workshop was far from provincial, its choice perhaps explained in part by the life experience of Maurice V, lord of Craon from 1269. Discussion of the painting technique by Lucy Wrapson, especially the use of thin primed grounds and oil pigments, is entirely consistent with these art historical findings. Finally, the method of reconstruction was discussed by Wrapson and Chris Titmus.

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Notes

1. '*Incipit vita sancti Maurilli, episcopi et confessoris*', Migne 1844–55, vol. 171, 1635–1648.
2. These include vernacular translations of Vincent de Beauvais' *Speculum* (e.g. Paris, BnF MS Fr 51, Fr 310, Fr 964, and NAF 15943, produced in either Paris or Bruges).
3. '*Hunc ubi legati venientem sunt speculati /Prosiliunt stratis, oculis manibusque levatis*', Migne 1844–55, vol. 171, 1645.
4. The pages which follow use the following on Angers Cathedral and its murals: Boulanger 2003, 2010; Davy 2014; Demailly *et al* 1998; Farcy 1901–1910; Mussat 1964; Subes-Picot 1992, 1996; Subes 1997, 2001, 2003.
5. Although the absence of ground may well have been assuredly identified (given the thorough nature of

the study), sometimes samples do not catch all paint layers, especially from a highly dressed and textured wall where there may have been only a very light skim of lime or lead white.

6. The description of the paint as 'onctuese' is telling – it implies it has the body of oil paint. In addition, the presence of certain pigments such as lead white, which does not survive well in an alkaline context, again suggests the paintings are not lime-based.
7. Howe dates the transept paintings to *c.*1260–70 and St Faith to *c.*1300, Howard and Sauerberg 2009 date the transept paintings *c.*1280–1300; see now Binski and Guerry 2015.
8. As is the case at Angers, the St Faith wall painting had a few red lead inclusions in the lead white layer (Howe 2006b: 101). In areas where a smoother finish was sought, a calcium carbonate layer containing a little lead white was applied before the lead white layer, again perhaps analogous to some of the preparatory layers found at Angers.

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Woodworking and meaning in the Westminster Retable

SPIKE BUCKLOW

Abstract This paper establishes the historic cultural significance of practical day-to-day, hand-tool woodworking with reference to late nineteenth-century cart- and waggon-making. It then draws parallels between those documented techniques and the similar, but undocumented, woodworking techniques that were involved in making the thirteenth-century Westminster Retable. The paper then focuses on a particular method of joining boards that – to the modern observer – may appear counter-intuitive. The cultural significance of medieval woodworking is briefly alluded to through biblical references, artists' manuals and pictorial evidence. The apparently counter-intuitive method of joining boards is then considered from practical and speculative points of view. The paper's approach to speculation – on a technical and originally hidden aspect of woodworking – is historically informed.

Introduction

This paper expands on observations of the Westminster Retable (*c.*1260) and discussions with the late Ray Marchant about his experience of joining oak boards. He joined oak boards in the initial stages of a partial reconstruction of the Westminster Retable by Clare Heard. Ray's trials and Clare's reconstruction were a research aspect of the Hamilton Kerr Institute's teaching programme (Heard 2005; Heard and Bucklow 2008). Building on Ray's experience, this paper suggests that at least one aspect of board-joining could have had cultural, as well as technical, significance. However, in the absence of any detailed discussion of the thoughts and personal experiences of thirteenth-century London carpenters to help bridge the gap between modern and pre-modern approaches to the construction of complex wooden objects, this paper starts with a consideration of more recent rural craft practices where, in contrast, some personal experiences were recorded. This paper's experiential approach, based on copying the construction of paintings, reflects the well-established methods of 'experimental archaeology' and is central to the Hamilton Kerr Institute's teaching programme (Kempski 2012: 1–16).

Making carts

Examples from late nineteenth-century English Home Counties woodworking suggest that carpentry's technicalities had potential cultural significance. In rural 1880s Surrey, horse-drawn carts and waggons were made using many techniques that were directly comparable to late medieval woodworking. Surrey carts and waggons were made from a mixture of different woods, including local, twisted-grained timbers that had to be sawn down to size. After felling, preparation and transport, the tree was sawn by one man standing on top of the horizontal trunk and another below, in a pit. The man in the pit set the rhythm and provided most of the power while the man on top followed the rhythm and steered the saw, assessing the tree's grain and the 5-foot saw's need for oiling or sharpening. The two worked as one, operating itinerantly as a pair, and George Sturt, the manager of a rural wheelwright's shop, recalled that sawyers were all heavy drinkers. It was the top-sawyer's responsibility to sharpen the saw which was time-consuming, thereby giving the under-sawyer an opportunity to go to the pub. After the top-sawyer had finished, he sought out his mate, who might no longer be fit for work, so he would start to drink and by the time his mate sobered up, he was drunk: 'I have known sawyers unable to get together and start their week's work until Thursday morning' (Sturt 1993: 39).

Good sawyers were nonetheless highly respected since their skills impacted on the whole workshop and its clients. For Sturt (1993: 36), watching sawyers negotiating a felled tree 'was like watching Fate at work. There is no need to picture "The Mills of God" to anyone who has seen sawyers converting a big elm-tree into boards.' As well as being able to assess the potential of the timbers hidden within the tree, sawyers showed 'devotion to [their saw's] welfare' and understood its 'mystery' (Rose 1937: 6). Mistakes could be costly – dislocated shoulders, damaged saws, wasted wood – producing sub-standard timber and therefore sub-standard carts and waggons. In Sturt's words:

> timber was far from being a prey, a helpless victim, to a machine. Rather it would lend its own subtle virtues to the man who knew how to humour it; with him, as with an understanding friend, it would co-operate … The grain of the wood told secrets to them (Sturt 1993: 45, 55).

Over decades, Sturt acquired some of the secrets of wooden cart- and waggon-making and acknowledged that;

> the lore was a tangled network of country prejudices, whose reasons were known in some respects here, in others, there … for the most part the details were but dimly understood; the whole body of knowledge was a mystery, a piece of folk knowledge, residing in the folk collectively, but never wholly in any individual (Sturt 1993: 74).

According to Walter Rose, in rural 1890s Buckinghamshire a craft-specific 'body of knowledge' was distributed across the whole community and village carpenters 'served the particular needs of our district and no other' (Rose 1937: 64). For example, axle heights and wheel gauges were determined exactly by the pre-existing ruts on local roads and, since soil types varied, ruts, and consequently axle and gauge measurements, also differed across regions. By observing very subtle patterns of abrasion on rutted muddy roads, Sturt learned the unspoken reason why the hub, spokes and rim of a cart wheel were dish-like and not in plane. This unquestioned age-old design vastly complicated wheel construction: 'Of the stock (the nave or hub) I dare hardly speak, such a fine product it was and so ignorant about it do I feel' (Sturt 1993: 100). Dish-like wheels also complicated the construction of axle shafts and cart bodies. However, the complex wheel design compensated for the almost imperceptible lateral movement of the horse's body as it drew the cart. These would have shaken apart an in-plane wheel. Similarly, the almost imperceptible lateral movement of human gait almost shook apart London's Millennium Bridge, which opened in 2000 and closed two days later because of dangerous oscillations. The problem took two years to fix by the retrofitting of lateral fluid dampers (Strogatz *et al.* 2005).

Sturt's process of learning was slow and painful and made him realise that '[i]ntellect made a fumbling imitation of real knowledge, yet hardly deigned to recognise how clumsy in fact it was'. He recognised that 'only by following a certain tradition' could wheelwrights 'partially meet the difficulty' posed by some technical issues. They were guided by 'rule of thumb' and 'the traditional good sense of Surrey waggon-builders [over] generations'. What he considered 'real knowledge' occurred when 'one's arms learnt' (Sturt 1993: 83, 70, 60, 71, 80).

That slow dawning of understanding – of the muscles, the materials and the end-user's needs – allowed him to see that 'the waggon grew into a thing of beauty' (Sturt 1993: 73). To 'understanding eyes', waggons looked 'like living organisms', with each component efficiently fulfilling its role (Sturt 1993: 66). For example, 'properly tapered shafts looked graceful' but this grace was a side-effect of function and was never 'deliberately sought' (Sturt 1993: 81). This graceful beauty was of course also a consequence of woodworkers' methods, which varied according to the individual requirements of each waggon component.

As well as connecting cart design to soil types, horses' gaits and local traditions, Sturt also identified connections between cart design and the natural habit of local trees. Upon seeing 'trees growing with exactly the right shape for shafts [he] chuckled inwardly, admiring how accurately woodland nature seemed to know the shape of moving horses' (Sturt 1993: 79). Trees that grew in shapes that prefigured specific parts of a cart or waggon produced woods with internally twisting grain. That twisted grain ensured that, under duress, any splits in the wood could develop without catastrophically connecting up, thus allowing the wooden component to fulfil its load-bearing function.

But while splitting was to be avoided in the finished product, woodworkers could sometimes use splitting as an alternative to sawing. Splitting took less effort than sawing and had its own mysteries. Sturt was fascinated by the splitting of wood and compared it to the exploration of virgin territory.

> With the wedges cleaving down between the clinging fibres – as he let out the wood-scent, listened to the tearing sounds – the workman found his way into a part of our environment – felt the laws of woodland vitality – not otherwise visited or suspected (Sturt 1993: 192).

Rose shared the fascination of wood's 'hidden arteries … that the eye of man had never seen before' (Rose 1937: 3, 30). The exact topography of the 'not otherwise visited' place that the workman 'found his way into' was determined by two things. Firstly, the way the tree responded to its environment as it had grown decades or centuries earlier and, secondly, the woodworker's skill – the ways in which they read the visible signs on the wood's surface and struck it with their axe or hammer and wedges. The tree's inherent response to its unique environment, or the 'laws of woodland vitality', determined where branches should grow and therefore how the hidden inner current of grain would flow. Branching was a response to the local availability of light, and the flow of grain was an inevitable consequence of branching but, elsewhere in the tree, it could also protect the tree from storm damage. If the tree had grown in an exposed position, its twisted grain would have helped it dissipate stresses into multiple small splits – each one channelled by the tree's complex anatomy – thus preventing the development of a single large split that might threaten its integrity.

Woodworkers needed to know how the hidden grain flowed through all the pieces of wood destined for the carts and waggons. For example, one at a time, in turn, a very few thin spokes in the dish-like

wheels had to support the entire weight of a fully-loaded cart or waggon. The enormous compression forces to which individual spokes were subjected could be safely transmitted along the grain but not across the grain. Sawing wood 'might have produced a cross-grain spoke that would be liable to snap disgracefully [so] spokes were never sawn'. Instead, they were split from straight-grained oak; this cleaving of oak was done in summer when the wood was full of sap to ensure that the split would '"run" from end to end' (Sturt 1993: 46). For some jobs, wedges were used to split wood, but small 'sausage shaped' dowels could be made by splitting wood with a circular steel cutter, although the slightest offset in the woodworker's mallet blow could render a dowel 'crooked and useless' (Sturt 1993: 84).

The idea that splitting wood requires skill accords precisely with the origin of the word 'skill', which is derived from the Old Norse for 'distinction', 'discernment' or 'separation' and has a Proto-Indo-European root meaning 'to cut'. Skilful dowel- and spoke-making involved a single well-aimed mallet or axe blow and knowledge of how the split would 'run', which involved discerning exactly where the piece of timber had grown in the tree. Good dowels and spokes must have straight grain and there are obviously parts of all trees – around branches – where the grain is not straight. More difficult to discern are those pieces of timber that have straight grain but nonetheless also contain tensions that could distort the piece after splitting, when the piece was no longer constrained by the original bulk of the wood. This was not mentioned by Sturt or Rose, probably because it was common knowledge outside of the wheelwright's shop among all who chopped logs for firewood. They knew that a short cylindrical section of a straight-grained, once-vertical tree trunk would have uniform tensions running through it and could be spit easily and safely in any direction. However, tensions are not uniform through a similar-looking, short cylindrical section of a straight-grained, once-horizontal tree limb. The once-top half of the limb will be in tension while the once-bottom half of the limb will be in compression and the injudicious splitting of such a log can release the different – compression and tension – forces with enough power to break someone's leg.

It was worth learning how to identify a separated log's original orientation in the tree. Rose (1937: 40) claimed that, for each fragmented offcut of wood in the timber yard, the carpenter could remember the exact tree from which it was originally sourced. Some wooden products even required the carpenter to discern the obscured history of the tree's growth. For example, wooden water pumps, the making of which was 'a craft definitely attached to a remote past', had to be made from long tree trunks that had never supported branches – not even branches that had been lopped off centuries ago with wounds hidden beneath new growth (any dead knot, the remnant of a subsumed branch, would affect the shrinkage of the surrounding wood and render the precision-cored water pump useless) (Rose 1937: 76–9).

Small straight-grain oak spokes were split from branch-free lengths of once-vertical tree trunks. When they were driven into an elm wheelstock they had a 'glamour' that Sturt appreciated, although he knew that his employees felt it more strongly since 'they lived in that glamour as fishes live in water' (Sturt 1933: 101). Immersion in the technicalities of a craft could shape a craftsperson's entire life. Sturt gave the example of one of his most skilled employees, an 'unsophisticated provincial', who 'took his breakfast and dinner' at the pub every day, along with itinerant heaving-drinking sawyers: 'I think his idea was to slip through life effectively and inconspicuously, like a sharp-edged tool through hard wood' (Sturt 1993: 108).

A 'sharp-edged tool' might provide a good role model for a late nineteenth-century woodworker, and watching sawyers may have been like 'watching Fate at work', but Sturt (1993: 202) and Rose (1937: 137) both saw the passing of the craftsman's 'intimacies' and mourned their loss. Rose said he 'sought to recapture the elusive spirit of the old Gothic craftsmen, [which was] so far above the concept of the present age' (Rose 1937: xx). Around the turn of the twentieth century, as petrol and iron were beginning to replace horses and wood, Sturt and Rose were obviously a few steps closer materially to the makers of the Westminster Retable than we are, but culturally, they were still far removed from thirteenth-century London, even though Sturt's approach to work was informed by what he self-deprecatingly called the 'Ruskinian absurdities' of Christian socialism (Sturt 1993: 53).

Michael Baxandall (1980) called the identical way in which fifteenth-century limewood sculptors read the wood 'chiromancy'. They read the grain to determine how to split off small chips of wood while simultaneously preventing splits in the remaining ever more complex-shaped carcass, whether those splits occurred immediately upon impact or later, due to the slow release of the wood's inherent tensions. The thirteenth-century woodworkers who made the Retable also read their wood's grain, but in their case, they aimed to create simple broad, plain, featureless topographies that required very little further preparation to become suitable surfaces for painting.

For their purposes, splitting could be easier than sawing, although the Retable was assembled from wood that was both split (along the grain) and sawn (across the grain). But the pieces they needed to split were much bigger than the cart-builders' dowels and spokes and, for that, they needed very large pieces of straight-grained oak. The styles of forest management which produced trees that could supply such timber died out in England in

Figure 1. Anon., Westminster Retable, *c.*1260s, oil on oak, 96 × 333 cm. Photo © Chris Titmus, Hamilton Kerr Institute, University of Cambridge, permission of the Dean and Chapter, Westminster Abbey.

the thirteenth century (Bucklow 2022). The Retable therefore contained pieces of wood from the last of those native straight-grained trees (probably from the Thames Valley) as well as wood imported from Northern Europe (probably from Denmark or northern Germany). The remaining sections of this paper consider how the Retable's split-and-sawn components were joined together (figure 1).

Making retables

Westminster Abbey was founded as a Benedictine Monastery in AD 960. Some 300 years later, supported by Henry III's patronage, the Benedictine ethos still flourished in Westminster when the Retable was made there. Consciously emulating craftspeople, St Benedict (1865: 26) described the ideal monastery as the 'workshop where we are to apply ourselves'. The Benedictine application of craft labour – specifically painting, glassmaking and metalworking – to divine purposes is best expressed, in writing, by a twelfth-century manual, *On Divers Arts*. This text indicates how its craftsman-author, Theophilus, inextricably entwined manual labour and prayer (Gearhart 2017: 15–41). Close reading of that text supports, in extraordinary detail, the assessment of an historian of science who stated that 'the monk was the first intellectual to get dirt under his fingernails' (White 1964: 65). As George Sturt observed, carpenters' knowledge grew out of 'doing' rather than 'learning' and Cardinal Newman (1876, III: 410) described the Benedictine style of 'doing' as working 'so quietly, patiently, gradually, that often till the work was done, it was not known to be doing'.

We do not know the identity of the woodworker(s) who made the Retable and, while most craftsmen and women working in Westminster were laity, mid-thirteenth-century Abbey records include William of Westminster, a Benedictine monk and a favoured painter (Lethaby 1916). Other contemporary Westminster painters mentioned in Henry III's accounts include John of St Omer (from France), William of Florence (Italy) and Peter of Spain, as well as Walter of Durham, so the Retable was made in a well-connected cosmopolitan workshop (Colvin 1973). However, exact identities are unnecessary since, as Lethaby commented in the context of architecture, a 'work of art is not the product of an act of design by some individual genius, it is the outcome of ages of experimentation' (Lethaby 1912: 206). Nonetheless, we know that, unlike Sturt's rural Surrey woodworkers, who were surrounded by farmers and heavy-drinking sawyers, the Retable's woodworkers were surrounded by artists and monks.

The Retable was examined and conserved between 1998 and 2005 (Binski 2008). It measures 96 × 333 cm and its oak carcass consists of six 3 cm thick boards, reinforced by eleven 6 cm thick battens. The front was elaborated upon by carving some sections to a depth of approximately 1 cm and elsewhere attaching decorative elements approximately 1 cm thick. It was also the subject of a student's reconstruction that is now displayed at Westminster Abbey alongside the original. In the course of creating that reconstruction, a mistake was made that highlights the extent to which the apparently rudimentary act of joining boards could impact on all the sophisticated creative processes that follow. It was an easy mistake to make – involving the placement of a dowel – and, by chance, exactly the same mistake was made in the construction of another medieval altarpiece, the Thornham Parva Retable, that still survives. That altarpiece, 93 × 374 cm, was made in a workshop about 70 miles north of Westminster, some 60 years after the Westminster Retable, and consisted of 32 oak boards joined by 99 dowels (more dowels joined the boards to a frame that has now been lost so in total, perhaps 160 dowels were used, requiring 320 drilled holes). In that altarpiece, one dowel was placed in a part of the structure that was later thinned to accommodate a glass decoration. This led to the dowel being cut and the joint being weakened. The mistake is now visible because the glazed element that had been set into the wood has since been lost (Marchant 2003: 99). In that provincial altarpiece and in the student reconstruction of the Retable, the placement of a dowel failed to take into account the

processes that were to follow the assembly of the wooden carcass.

The Westminster Retable's cosmopolitan thirteenth-century woodworker did not make that mistake: as he joined the rough, heavy oak boards, he knew exactly where and what would happen next. This suggests either extremely detailed communication between the Retable's designer and woodworker or – much more likely – that the designer *was* the woodworker. The person who hammered the iron dowels (about which, see below) into the oak boards – or, at the very least, the person who closely supervised the drilling of holes for each dowel – was the same person who envisaged the entirety of an intellectually challenging and highly complex project. It involved coordinating the woodwork with specialist preparers, gilders, metalworkers, glaziers and painters on a square-root-of-two-based design that conceptually and aesthetically integrated the Retable with the Cosmati pavement as well as Wetminster Abbey's whole floorplan and western façade (Bucklow 2014: 141–90). If the carpenter was indeed the designer then, one way or another, they seem to have been well informed about both French architecture and goldsmithing (Binski and Massing 2008: 66–135).

Once the four boards had been joined, the carcass had its edges made square and parallel, or 'true', since the individual boards were shaped as they had come from the tree, with gradually tapering sides. The front and back faces were then prepared, with the back receiving reinforcing cross-grain battens and the front a detailed drawn design. Some areas on the front were thinned while other areas received scores of other pieces of split-and-sawn wood that acted as framing and micro-architectural elements. All these additional pieces of oak were joined to the carcass with oak dowels of varying sizes. After the frame and decorative details had been fully defined, the Retable's specifications were changed – possibly because it was intended to grace a wider altar – and it was extended with two further heavy boards, making the outermost panels effective afterthoughts. All evidence of woodworking was then hidden under layers of gesso, gilding, metalwork, glass and paint.

After centuries of neglect and abuse, damages to the metal, glass, paint and gilding have revealed details of the woodworking that were originally hidden from view. No other objects of comparable status or complexity survive, so we cannot know whether or not the Retable's woodworking techniques were standard. However, the available physical evidence suggests that the method of construction was not idiosyncratic – on the contrary, it appeared routine, although one aspect of the joining method came as a surprise.

Drills were used in George Sturt's wheelwrights' shop and also by the Westminster carpenter. Modern industrially produced dowels all have fluted circular cross-sections, and Sturt's shop had circular dowel cutters, presumably of different sizes, just as it had drills of different sizes. The Westminster woodworker had precision high-grade steel drills that ranged from about the thickness of a thumb all the way down to that of a matchstick. However, to join pieces of wood, those drilled holes were not fitted with round dowels but with square pegs. Everything in the Retable was held together with square pegs in round holes.

Square pegs

The *Cambridge Dictionary* defines the meaning of the phrase 'a square peg (in a round hole)' as 'a person whose character makes them unsuitable for the job or position they are in'. The modern definition of this technical-sounding phrase involves the relationship between a person's 'character' and the circumstances in which they find themselves. But why would such a phrase exist when, for well over a century, woodworking has lost its wide cultural significance and, in any case, for well over a century, woodworkers' practice has involved round pegs in round holes? The phrase may have survived from the time when the use of square pegs in round holes was common practice. For example, examination of an altarpiece made in Norfolk in the 1330s and a piece of screenwork made in Dorset, also in the 1330s, show that, like the Retable, these oak structures were joined by square pegs (Marchant 2003: 102). Possibly, when the practice became less and less familiar – as a consequence of the increased distance between producers and consumers – the phrase changed its meaning, surviving by virtue of its graphic expression of an apparent mismatch.

However, the physical evidence of the Retable's continued structural integrity after centuries of neglect and abuse suggests that contrary to the dictionary definition, a square peg in a round hole is not 'unsuitable'. Given that the Retable's surviving metalwork, glazing, gilding and painting are all of the highest quality, it would be strange if the woodwork upon which they depended was not, at the time, considered to be of an equally high quality, particularly if the woodworker determined the actions of metalworkers, glaziers, gilders and painters. The likelihood of high quality at all stages of production is indicated by the fact that while the metal, glass, gold leaf and paint are all now heavily damaged, the woodwork is still in excellent condition. We must therefore consider how a square peg in a round hole might, contrary to the popular saying, actually be 'suitable'.

The ability of a dowel or peg to join two pieces of wood effectively depends on two things: firstly, it must be possible to insert the peg or dowel into the holes and secondly, the peg or dowel must grip the sides of the holes sufficiently to hold the pieces of wood together. For circular pegs or dowels, both conditions are only satisfied when there is a very close match between the diameter of the hole and that of the peg or dowel. This requires tools, such as

Figure 2. Anon., Westminster Retable (Figure 1). Detail of the reverse showing a slightly proud square peg exposed by loss of gesso and paint. Photo © Chris Titmus, Hamilton Kerr Institute, University of Cambridge, permission of the Dean and Chapter, Westminster Abbey.

sets of drills and dowel cutters, capable of producing positive components and negative spaces with precisely coordinated, but not identical, diameters. Such a jointing system is unforgiving: too big and the peg or dowel cannot be inserted into the hole; too small and it will not hold the pieces of wood together. Hence the fluting on modern dowels.

However, there can never be a perfect fit between a square peg or dowel and a round hole, so precision matching – small enough to insert, but large enough to grip – is obviously not the solution being sought. A square peg or dowel in a round hole presupposes a degree of distortion as the peg or dowel goes into the hole. Any solution that requires degrees of distortion in one party – either the square peg or the round hole – necessarily has higher tolerances and is more forgiving. The square peg therefore just has to be more-or-less the right size for the hole. Peg-and-hole combinations that require much distortion will be harder to insert but will grip better and combinations that require less distortion will be easier to insert but will not grip quite so well.

Drills were demonstrably present in the thirteenth century as were lathes that, theoretically, could have made circular pegs or dowels (the Retable includes micro-architectural columns that were made on a lathe), but, as George Sturt noted, even a nineteenth-century custom dowel cutter could produce 'crooked and useless' dowels. And the much simpler technology for producing square pegs or dowels also existed – the axe, chisel or wedge, as used for splitting or cleaving straight-grained wood. In addition, if wood was cleaved when full of sap so that the split 'ran true', the resultant pegs or dowels would inevitably align with the grain and possess maximum strength. So, square pegs or dowels were easier to make and potentially stronger than round ones and, due to their inherently higher tolerances, they also had a better chance of performing well when joining pieces of wood.

The Retable's six heavy main boards were joined with 31 square-section iron dowels in round holes. It would have taken a very significant amount of hammering to insert them as they ripped through the oak while themselves remaining unchanged. But these metal dowels were unusual: the 100 or more other dowels in the rest of the structure, joining more delicate pieces of wood, were made of split straight-grain, square-section oak. From the close examination of the Retable, the following method of joining can be asserted with a high degree of confidence.

When relatively small pieces of wood, such as framing or micro-architectural elements, were joined to the heavy carcass, the drilling proceeded from the smaller piece towards the bigger piece. This allowed more precise location of the smaller, more mobile, piece with respect to the bigger, less mobile, piece as well as ensuring that any damage caused by the drill's exit did not occur on the more delicate surface. In those places where drill holes gave the woodworker a choice about how to insert the peg or dowel, it was always placed so that it entered the bigger piece of wood first, opposite from the direction of drilling. This is evident from the shape of dowels where they have been exposed by the accidental loss of paint (figure 2). The end of the dowel that had been hit by a mallet – in other words, the end of the dowel on the entry side of the two aligned pieces of wood – was slightly proud, splayed across the surface of the larger piece of wood and retained some of its original square cross-section. Where exposed, the other end of the same dowel displayed a perfect round cross-section and was flush with, or slightly below, the surface of the more delicate piece of wood. So, while a square peg was inserted into a round hole, by the time it had passed through the thick piece of wood, it entered the thinner piece of wood as a round peg of exactly the right size for the drilled hole. The thicker and stronger piece of wood acted as a 'former' that prepared the peg for the thinner piece of wood that might have been more prone to splitting had the peg been too big, requiring more distortion.

Where reinforcing battens, framing or micro-architectural elements were joined to the carcass,

the pegs and boards were all the same material – oak – and the hole acted as a former. Yet when the peg and board were different materials, for example, the iron pegs that joined the oak carcass together, the peg could distort or 'form' the oak. In the astrologically determined metallurgy that guided craftspeople such as Theophilus, this may have been rationalised by observing that iron was governed by the planet Mars, the god of war. A martial material might be expected to conflict with, rather than conform to, an alien environment (Chaucer 1975: 475).

Since the Westminster Retable is England's oldest surviving altarpiece, any similar earlier objects upon which the technique may have been pioneered, allowing the Westminster woodworker to hone his skills, no longer exist, although evidence may exist in other contexts (Hewett 1980). However, the quality, sophistication and complexity of the Retable's woodwork suggests that the technique was already well established by the 1260s. With several hundred square pegs in round holes for every comparable object, the woodworker would have repeated the joining operations many times. Such repetition would have deepened their understanding of their materials and, like Sturt's wheelwright, also of themselves and the ways they could navigate the world. After all, active engagement in repeated actions leads to habituation and the transcendence of conscious individual limitations (Ravaisson 2008). According to Rose, the well-practised hand could execute even the most complex woodworking tasks 'without conscious direction' (Rose 1937: 1, 94).

Even though we may consider woodworkers' activities to be primarily practical, in reverie, they also offered opportunities to contemplate or speculate.[1] This was even borne out in 1880s Surrey, when splitting wood enabled woodworkers to explore places 'not otherwise visited or suspected' and when watching sawyers in action was 'was like watching Fate at work'. Working in an abbey on a devotional object, putting hundreds of square pegs into round holes, the Westminster woodworker's mind was free to wander.

Speculative potential

In order to consider the potential cultural significance of woodwork in a medieval altarpiece – or even a 'Ruskinian' cart or waggon – we should first recall that Christ was a carpenter (Mark 6:3). He was also the son of a carpenter, Joseph (Matthew 13:55). Craft analogies abound in the Bible with God's handiwork being described in terms drawn from ceramics, sculpting, weaving, metallurgy and architecture. An architect was a 'master builder' – from the Greek, *archi* and *tektōn* – and Joseph was described as *tektōn*. Joseph's earthly vocation was therefore analogous to God's heavenly creative aspect, thus legitimising his role as the 'earthly father' of the son of God. Christ was a 'joiner' who – with his Harrowing of Hell, Resurrection and Ascension – was the Christian tradition's original *pontifex* or 'bridge builder'. And while, of course, human and divine artisanship are incomparable, the merely mortal artisan nonetheless directly participated in the divine since God declared that 'I have given skill to the skilful so that they may make what I have commanded' (Exodus 31:6).

Such biblical statements informed the general perception of mundane carpenters and the symbolic role of carpentry. For example, from the twelfth century, a tradition arose that Nicodemus had carved an image of Christ after witnessing the crucifixion (Schleif 1993). Connections with woodworkers continued, and the wing of the fifteenth-century Merode altarpiece by Robert Campin depicts Joseph in his workshop among 20 faithfully depicted woodworking items, including instruments associated with making the cross and those that would, in time, draw his son's blood. The disposition of tools on Joseph's 'tabletop theatre' has been described as 'like actors in a Passion play' and Joseph's vocation in making the cross was depicted as giving honourable assistance to Christ's mission in the redemption of mankind (Russell 2017: 335–50). Even in 1890s Buckinghamshire, the wood and tools on the carpenter's bench provided 'insight into the soul of wood craftsmanship' (Rose 1937: 43). We can therefore assume a close relationship between the Retable's woodworkers, their materials and methods, and the cultural significance of their processes and product.

So, what are we to make of the practice of using 'a square peg in a round hole'? The modern dictionary's interpretation of the phrase – judging a character as 'unsuitable' – does not question the particular circumstances, i.e. the 'job or position', in which that person finds themself. Yet the phrase could also be interpreted from the individual's point of view, in which case we might assume a square peg to be 'uncomfortable' in a round hole. As a material analogy, this way of reading the phrase is in keeping with Sturt's admiration of his wheelwright's aim to 'slip through life effectively and inconspicuously, like a sharp-edged tool through hard wood'. I would suggest that the phrase's original meaning could have been interpreted from the individual's – or the peg's – perspective.

We can imagine that being hammered into a round hole might be uncomfortable, but in the process of being hammered, the square (oak) peg was changed into a round peg. After the peg's initial 'forming', its journey became more comfortable and it fulfilled its function perfectly, being enculturated by, or 'conformed' to, its circumstances. If we are to consider the square-then-round peg's circumstances in anthropomorphic terms, then it was a model of how to 'slip through life effectively and inconspicuously', like a person who responded positively to, and became reconciled with, their situation.[2]

Figure 3. Anon., Westminster Retable (Figure 1). Detail showing a slightly recessed once-square now-round dowel above the heart of a metacosmic Christ. Photo © Chris Titmus, Hamilton Kerr Institute, University of Cambridge, permission of the Dean and Chapter, Westminster Abbey.

Given biblical mentions and surviving pictorial evidence, we can expect craft practices to have been considered more deeply in a cosmopolitan thirteenth-century Benedictine abbey workshop than in rural nineteenth-century Home Counties workshops. In the thirteenth-century context, four different aspects of the Westminster carpenters' technique suggest themselves. First, the idea of using a drilled hole – a negative space – to 'form' a peg is completely consistent with the theory of hylomorphism in which physical reality is understood to consist of immaterial or disembodied shapes, 'forms', that become embodied in matter, or *hyle*, the Greek for 'wood' (Manning 2013). Second, hammering and the consequent distortion might bring to mind the redemptive potential of suffering, as exemplified by Christ's Passion. Third, the change of shape from a rough-hewn square into a perfect circle might prompt reflection on the well-known symbolism of those two geometric shapes (Seidenberg 1981).[3] Finally, we should note that it was a means of joining, in the case of the Westminster Retable, of making 17 heavy boards and battens and scores of lighter boards into one altarpiece. As a making of 'one from many' it followed the laudable biblical model of 'gathering', not abhorrent 'scattering' (Matthew 12:30).

Of course, this does not assume that the carpenter who made the Westminster Retable necessarily contemplated the possible meanings of square pegs in round holes, just as we can now use vernacular phrases without considering their origins. As Sturt said of his own nineteenth-century carpenters' lore, it was 'a tangled network … known in some respects here, in others, there … a piece of folk knowledge, residing in the folk collectively, but never wholly in any individual' (Sturt 1993: 74).

Nonetheless, the task of driving a square peg into a round hole actually does involve forming matter, harnessing violence, transforming geometries and achieving unity. The connection between the process and its product could have been seen by anyone who followed the tradition of four-fold exegesis.[4] According to Dante, the *Divine Comedy* written in the 1310s can also be read at those four levels (Latham 1891: 194) while Gearhart (2017) suggests that Theophilus' entire manual can be read at multiple levels. Multiple levels of meaning also help explain the widespread popularity of some artists' recipes, such as vermilion, and the endurance of other, impossible, ones like dragonsblood and mercury blue (Bucklow 2009).

It is therefore entirely possible that craft practitioners who did not write manuals – possibly including the anonymous Westminster woodworker – may also have seen connections between their labours and the fruit of their labours. After all, the connection between physical effort and metaphysical endeavour is a prerequisite for the biblical recognition that 'in the handiwork of their craft is their prayer' (Ecclesiasticus 38:34) (figure 3).

The potential meanings of once-hidden, now revealed square pegs in round holes reinforce the assertion by Helms that, in non-industrial societies, 'professional artisanry is not merely a secular occupation but a value-laden activity that exceeds ordinary functionality because it is imbued with ideological significance and moral qualities that bespeak connection with the supernatural' (Helms 2006: 452).

Notes

1. Like the phrase 'square peg (in a round hole)', the meaning of 'speculate' has also changed. Today, 'speculation' can mean allowing the mind to race off, unsupported by facts. But originally, it meant stilling the mind, enabling it to faithfully reflect higher realities. The positive connotations of speculation are evident in the name of medieval encyclopaedia, *speculum*, literally, 'mirror (of God)'.
2. In this respect, the less common square iron peg in a round oak hole might represent a person who was permanently in conflict with, and then 'conspicuously' prevailed over, their situation.
3. The square symbolised the world with its four seasons, directions, etc., while the circle symbolised the heavens with their orbiting planets, etc., so the peg's transformation might suggest the passage from a worldly state towards a heavenly one.
4. According to four-fold exegesis, all biblical statements can be simultaneously understood at four different levels – the literal, allegorical, tropological and anagogical, or respectively, what something is, what it means, how it can guide our lives and what spiritual consequences it offers.

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Spike Bucklow's first degree was in Chemistry (Southampton) and he obtained a PhD in Art History from the University of Cambridge in 1996 after training as a painting conservator at the Hamilton Kerr Institute. He had the good fortune to work on the Thornham Parva Retable and the Westminster Retable, followed by the Paston Treasure. These experiences prompted a research interest in medieval and early modern artists as well as their materials and methods. His sole author publications on those subjects include *The Alchemy of Paint* (2009), *The Riddle of the Image* (2014), *Red* (2018), *The Anatomy of Riches* (2020), *Children of Mercury* (2022) and *The Art Beneath* (2024).

Treatment and characterisation of rood screen fragments from All Saints church, Wighton, Norfolk

ALICE LIMB, LUCY WRAPSON AND KATE WALDRON

Abstract In 2018, a group of six painted rood screen fragments from All Saints church, Wighton (Norfolk) came to the Hamilton Kerr Institute for conservation treatment. Three dado panels, severely damaged by rot and woodworm, retained much of their fifteenth-century stencil-patterned paint scheme, albeit flaking and grey-tinged with grime. In contrast, the other three fragments – the panels' accompanying tracery heads – were in good structural condition, but were covered in a bold twentieth-century paint scheme that obscured all but glimpses of medieval colour and intermediate coatings. The objective was twofold: to make the panels structurally stable so that they could be displayed upright in the church; and to find an aesthetic solution for all of the fragments that would enable them to be displayed alongside each other in a way that conveyed their original relationship to each other as part of a medieval rood screen. The decision-making process required tracing the story of these fragments, from their conception as elements of a piece of late medieval craftsmanship, through their post-Reformation concealment and subsequent repurposing, and finally to their survival as superfluous objects in a damp church environment. Findings from the technical investigations expand the wider corpus of knowledge on fifteenth-century medieval craft workshops, their working processes, the nature of their collaboration and the areas in which they operated within the region. This article presents these findings and the steps taken to meet the objectives of the conservation treatment. The account of these screen fragments' conservation, which became a long and complex project that was interrupted by unexpected and distressing events, is one of collaboration, uncertainty, patience and discovery.

Introduction

Six fragments – three tracery heads and three dado panels (figures 1 and 2) – are all that remain of the Wighton rood screen. Made for – and constructed within – the church of All Saints in the north Norfolk village of Wighton, the complex histories of these fragments and their recent treatment at the Hamilton Kerr Institute form the basis of this article. For a long time, the worm-eaten and partly rotten dado panels lay in a corner of the church, while the tracery heads, in better structural condition, had been repainted and affixed to the organ. The conservation of the six fragments was commissioned as part of a major restoration project, sponsored by the National Lottery Heritage Fund, to mark the church's 600th anniversary. The rood screen's story is one of good intentions, active destruction, accidental damage and benign neglect, and illustrates the history of Christianity in East Anglia over the six centuries from its construction in the mid-fifteenth century to the present day. This article will outline findings concerning the positions of the fragments within the rood screen, the process of their construction and the original appearance of their painted decoration. The authors then present the evidence for the fragments' physical history. Finally, we will discuss the objectives of the conservation treatment, the decision-making processes, and the approaches that were taken.

Rood screens were a common feature of medieval churches in England, especially from the fifteenth century until the Reformation.[1] East Anglia – including Norfolk – is home to the largest concentration of surviving English screens, which typically combined architectural elements such as a rood loft gallery with flat painted areas and polychrome sculptures (Wrapson 2014; Wrapson forthcoming). The rood screen served a liturgical function: to separate the nave from the chancel as well as to frame the Mass. It also served to elevate the 'rood' (a sculpture of the crucified Christ), which was typically flanked by sculpted figures from the Crucifixion, predominantly Mary and John the Evangelist. The combined schema also acted as a memorial to its funders and was local and specific to its parochial context (Marks 2017: 9).

The rood screens of later medieval England were typically wooden structures, which were sometimes planned simultaneously with the construction of church masonry, although more often retrofitted to existing architectural spaces. They generally had a dado level with solid, painted panels and decorative tracery elements, surmounted by a transom, then a register of open lights topped by tracery running upwards to the rood loft which often supported the rood sculpture, although this could also be placed on a separate beam (Wrapson 2013: 34). Related architectural features such as the rood stair used to access the loft can still be seen in many churches, including at Wighton. Rood screens were typically at least part-constructed in the churches themselves, often at a permanent or temporary workshop

Figure 1. Wighton rood screen fragments before treatment in normal light: (a) tracery head II, (b) tracery head III, (c) tracery head IIII, (d) panel A, (e) panel B, (f) panel C. Photographed in 2019 by Kate Waldron and Chris Titmus © Hamilton Kerr Institute, University of Cambridge. By kind permission of All Saints church, Wighton.

Figure 2. Wighton rood screen fragments after treatment in normal light: (a) tracery head II, (b) tracery head III, (c) tracery head IIII, (d) panel A, (e) panel B, (f) panel C. Photographed in 2023 by Elaine Holder © Hamilton Kerr Institute, University of Cambridge. By kind permission of All Saints church, Wighton.

Figure 3 The reverse of the Wighton rood screen fragment panel A after treatment with the auxiliary support in normal light. Photographed in 2023 by Elaine Holder © Hamilton Kerr Institute, University of Cambridge. By kind permission of All Saints church, Wighton.

nearby (Hanham 1970: 76; White 2010: 50). The timber elements were built first, then the decorative scheme was applied once the structure was in place. Records show that the construction of screens was usually undertaken by those medieval craftsmen named carpenters and carvers. The term joiner was rarely used in medieval East Anglia. Carpenter was a general title, less specific than carver, but usually denoting heavier work in wood. Carvers undertook smaller work including religious statues, and sometimes a crossover with painting is found where carvers would also carry out painting (Baker 2011: 95). Usually, however, the construction and the decoration of rood screens were the work of different craftsmen, as documentary and physical evidence repeatedly demonstrates.[2] Related groups of screen structures and paintings can be identified, but they rarely overlap in a way indicating that the carvers and painters are the same (Wrapson 2014; Wrapson forthcoming).

Wighton's screen is likely to have followed the usual pattern of production of division between construction and decoration. Exposed wood at the edges of the painted panels, and slight barbs around many of these, demonstrate that the ground and paint layers were applied *in situ*, after the tracery heads and other carved decorative elements were attached to the dado panels.

One medieval object, six surviving parts

The treatment of these fragments enabled their close study, which is often not possible where screens remain more complete and the mechanics of their construction remain partly hidden. Technical analysis helped unpick the complex physical histories of the Wighton screen, enabling identification of earliest (perhaps sixteenth-century) additions as distinct from the original fifteenth-century scheme. Close looking, combined with paint samples, formed the analytical basis of the painted and gilded scheme: scanning electron microscopy coupled with energy dispersive X-ray spectroscopy (SEM-EDS) was used to elucidate findings and to confirm the original palette and other materials present.[3] Accessible and well-preserved end-grain at edges of the fragments enabled precise dendrochronological dating (Tyers 2020: 1, 4–5). The surviving parts were then considered in context, both in the church at Wighton and also within the existing body of research into East Anglian rood screens and their production (Baker 2011: 91–111; Wrapson forthcoming).

Screen design and the architectural context

The Wighton screen was originally six bays wide, with a central doorway: the lowest level was a solid dado set into a recessed channel in the stone flooring (this is still visible in the church). Placed side-by-side, the two painted panes on the front of each dado panel – the west-facing side that would have been visible from the nave – alternate between red and green, a traditional colour scheme for painted screens in East Anglia (Bucklow 2014). Stencils of both gold and silver leaf are present in an alternating chequerboard design across all panes – both red and green. The gold-leaf stencils feature an eagle with spread wings: those in silver are a floral design. No decorative elements appear to be present on the panel reverses. The reverse of the panels – which would have been east-facing and visible from the chancel – are now covered with a later paint scheme, but historical cleaning patches in the scheme show that this side was also painted, again in red and green (with no subdivision into panes as is the case on the front). The red and green colour scheme would have continued throughout the rest of the screen dado front and reverse. The tracery heads are all red with green spandrels and gilded and polychromed carvings: on one, a pair of lions and dragons in combat; on another, a pair of griffins; and on the third, a pair of green men, or humanlike faces emerging from foliage. It is notable that metal leaf, which was costly, is present only on the front of the screen. Unlike the majority of surviving rood screen dados in East Anglia, this dado

Figure 4. The interior of Wighton church photographed *c.*1885.

is unlikely to have contained any painted figurative designs, although curiously Keyser referred to 'screen; panel paintings of Saints' at Wighton in his list of buildings with mural and other decorations, published in 1883 (Keyser 1883: 277).[4]

This group of three sets of dado panels and tracery heads represents half of the total number of panels that originally spanned the width of the church at this level, divided by a central doorway. A photograph of *c.*1885 (figure 4) shows three dado panels and their tracery heads within a framework that appears to consist of a sill, a horizontal transom and two upright muntins.[5]

The design and format of the screen and loft above this lower register are not known, but probably followed the same six-bay/central doorway rhythm. Chiselled carpenter's marks on the upper once-hidden edge of the surviving tracery heads denote them as 'II', 'III' and 'IIII'. Through matching idiosyncrasies between the tracery heads and panels, such as peg holes and painted cut-out shapes, it was possible to identify which tracery head originated with each panel: Panel A links to tracery head III, B with II, and C with IIII (Tyers 2020: 3). These matching pairs of tracery heads and dado panels indicate that the six surviving components comprise three near-complete bays of the dado level – likely to be the two immediately to one side of the central doorway ('II' and 'III') and one to the other side of the doorway ('IIII'). They therefore do not represent one original side of the screen, but instead parts of each side.

Dendrochronological analysis produced a date range of *c.*1441 to *c.*1453 for this group of screen fragments (Tyers 2020: 1). This corresponds well with known building work at All Saints church, Wighton. Of particular relevance is the construction of a new chancel between 1440 and 1470,

Figure 5. Detail of the rood screen in St James's church, Castle Acre. Photograph © Lucy Wrapson.

which followed on from the completion of a new nave in 1417 (Trend 2017: 17–19, 22, 31, 39, 44–45). This building work is likely to have created a requirement for a new rood screen to fit the new width of the chancel arch. This may have been the church's first rood screen, or perhaps replaced an older example.

Payments to the carpenter William Bishop for the chancel roof are recorded in 1449–50 (Trend 2017: 17). Bishop, a Norwich-based craftsman, is also known to have worked on a roof at East Dereham (Harvey 1987: 26–27). It is highly likely that the screen came after the chancel roofing, since expensive and intricate furnishings of this type were usually put into buildings once they were weathertight. Intriguingly, in one instance in Essex, both the nave roof and rood screen can be seen to have been the work of the same carpenter. At Gestingthorpe, Thomas Loveday was a signed donor to the roof and also responsible for the screen beneath (Wrapson 2022: 209–26). Since carpenters responsible for roofs also made screens, at Wighton it is possible that William Bishop may also have been contracted to make the rood screen following on from his work on the roof, although there is no surviving documentary evidence for this.

The tracery heads are close in design and dimensions to those of the screen at St James's church, Castle Acre (*c.*1420–40) (figure 5), to the extent that both screens are likely to have been outputs of the same carpentry workshop (Lunnon 2010). Especially strong are the similarities between the spandrel carvings of the tracery heads from both screens, especially of birds and griffins. In addition, the tracery heads share a heavy and extensive use of scored lines to lay out the tracery design, which remains visible through the paint (Wrapson forthcoming).

Construction of supports

All surviving elements of the Wighton screen are constructed of oak, the most common material for English medieval rood screens. The dado boards are made from a straight-grained oak, which would have been imported from the Baltic region (Wrapson 2012: 392). Dendrochronology established that individual boards from the six separate elements derive from the same trees or planks (Tyers 2020). The oak used in the Wighton panels was prepared by splitting, and the panels tooled to make them flush; the marks are perhaps indicative of an adze (Wrapson 2014: 119). Each of the dado panels is constructed from two wider boards with a central slimmer board. If the panels had been painted with saints, this would have ensured that no joins ran through the middle of the figures (as on the rood screen at Castle Acre). This suggests that the pattern seen at Wighton was a well-established construction technique used by this workshop, regardless of the screen's intended decorative scheme, which in any case lay in the hands of the patrons. The boards are butt-joined with small dowels: crumbly fill-like material within the joins may indicate that they were also glued (although later treatment of

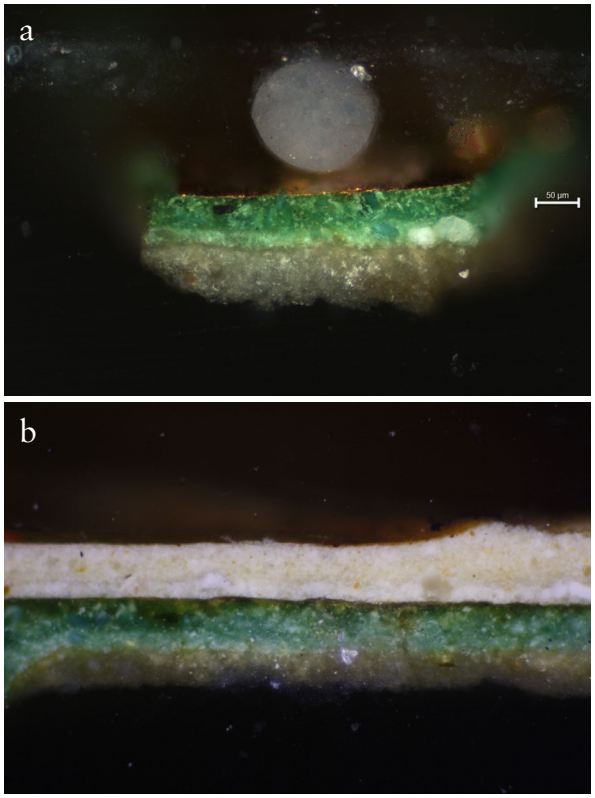

Figure 6. Paint samples taken from panel B. (a) Sample 3251-B-r1 shown at ×20 magnification in dark field and (b) sample 3251-B-v1 shown at ×20 magnification in dark field. Samples and images taken by Alice Limb, 2022–23 © Hamilton Kerr Institute, University of Cambridge.

the panels has also contributed material to this area). Each of the tracery heads was carved mainly from a single width of board (two have a horizontal join near the bottom), of thicker depth than the dado boards. Here, the grain runs horizontally rather than vertically. These are also of high-quality Baltic oak.

Incision lines on the tracery heads show how the cut-out shapes were first marked out using a straight edge and a compass: the occasional mistakes indicate that the carvers knew the surfaces would be concealed with paint (Wrapson 2014: 80). The tracery heads (and accompanying tracery) overlaid the panels (and were fixed in place with dowels) and the whole was then assembled within a larger external framework. Incision lines along the top and bottom edges of the panels probably demarcate the positions of the frame's inner edges. The Roman numerals on the tracery heads would have sped up the task of putting all the components together once in the church (Dawes 2011: 101). Although the original external framework for these dado fragments no longer survives, comparison with the screen of similar date at Castle Acre provides further indication of Wighton's original arrangement. The reverse of the Wighton dado panels has a shallow bevel along their upper edges, enabling them to slot into the wider structure. The depth and evenness of the bevel varies between panels, which may suggest the involvement of different hands.[6] Additional intermittent tooling marks along these edges on the front of the panels suggests that amendments were made *in situ* while the whole structure was being assembled, possibly to help ease the panels into the frame surround (Tyers 2020: 5).

Other aspects of the original construction are less clear. The purpose of the dowels through the unpainted areas of the front of the panels was to reinforce the fixture of the tracery, but the reason for the dowels present in painted areas at the top of panels B and C is not clear. The purpose of the holes in the reverse of the tracery heads, which do not extend through to the front, is also not known. One possibility is that they formed a fixture to a workbench while the spandrel carvings were being worked on.[7]

Polychromy and gilding

Preparatory layers and the red and green paint

Preparatory and paint layers were applied after the whole structure was assembled in the church. The white ground applied to the panels was confirmed by SEM-EDS as chalk, rather than gypsum: its white colour, along with its water-solubility, indicate that it was bound in an aqueous medium, probably animal glue. Chalk-glue grounds are typical of medieval painting in this period and region (Wrapson 2014: 336; Wrapson forthcoming). The ground layer of panel B is unusual within the group in containing traces of tin: it also has a more greyish tonality than that of the other panels, setting it still further apart. It is not known if these two features are related.

In each of the samples from the tracery heads it appears that a lead white priming was applied directly to the wood: no ground layer was observed. No such priming was found on the panels, where the paint is applied directly over the aqueous chalk-bound ground and there is no firm explanation for the different uses of intermediate layers on different parts of the screen. However, Wrapson reports that primings on East Anglian rood screens are not always present and vary in appearance, sometimes being unpigmented and hard to confirm (2014: 341).[8] The different preparatory layers seem to indicate that the tracery heads were primed separately to the main panels, and might suggest that their decoration was the work of a different workshop or individual (Wrapson 2014: 444). There is further evidence that multiple painters were at work in the contrast between the fine, delicate painting on the spandrel carvings versus the splashy application elsewhere (see further below). Differing preparatory layers could also reflect a different conception of flat, pictorial surfaces as opposed to three-dimensional, structural polychrome surfaces that may have required more 'durable' grounds (Nadolny 2008: 1).

Aspects of the same palette were used on both the tracery heads and the panels, although methods

of application vary. The green is verdigris, and the red a mixture of red earth and vermilion. A key difference between the application of the paint layers to the panels as opposed to the tracery heads is the number of layers present on the panels: in the green samples taken from both the front and reverse of panel B (figure 6) it can clearly be seen that the green was applied in two layers: first a lower, more opaque and slightly paler layer (which includes some yellow and whitish pigment particles, likely to be lead-tin yellow or yellow ochre and lead white as well as verdigris) and then a slightly more translucent, green glaze layer on top, consisting mostly of verdigris. The red paint on both sides of the panels was also applied as a double layer – this is in contrast to the red areas of the tracery heads, where only a single layer is present. The lower layer of red on the panels generally contains more iron oxides and red lead; the upper layer has more vermilion and, remarkably for a large painted area, a little red lake.

Metal leaf stencils

The pattern of gold and silver stencils is a common feature of medieval rood screens. A mordant does not appear to have been used for the stencils here: they were applied directly to the oil paint while it was still tacky, and no mordant is visible in any of the paint samples taken from the panels (see figure 6a). This technique is commonly found on screens and on other English medieval panel paintings (Straub and Wrapson 2018: 13).

Remarkably, much as the carpentry of the surviving screen can be seen to connect closely with another rood screen at Castle Acre, the painted decoration also connects Wighton to other schemes and potentially even to a named carver/painter, Robert Grey. The spread-eagle stencil motif on the panels is an identical match to that on the south side of the screen at Attleborough St Mary (*c*.1446–65), and also at Tibenham All Saints (*c*.1420–30) (figures 7 and 8).[9] A tracing of the eagle stencil was overlaid in both cases to confirm the match. Eagles, although a common motif in medieval art, are also found in the stained glass at Wighton (Trend 2017: 52, 71). It is not known if these have any local heraldic significance, or point to specific sponsorship. However the stencils found on screens were sometimes highly specific. For example, at Southrepps (Norfolk), 'M' is likely to denote an altar dedicated to the Virgin, and 'R' at Strumpshaw (Norfolk) probably dictates the altar attribution to a king (R for Rex). Merchants' marks are also found, although these are usually painted: for example, on the parclose screen at Grundisburgh (Suffolk). A complex floral motif connects the screen at Wighton with further screen fragments at Ashwellthorpe.[10] Attleborough in turn has figurative painting which may well connect with Pulham St Mary the Virgin (Wrapson forthcoming).

Figure 7. Detail of gold eagle stencils on the rood screen at St Mary's, Attleborough. Photograph © Lucy Wrapson.

Figure 8. Detail of silver eagle stencils on the rood screen at All Saints, Tibenham. Photograph © Lucy Wrapson.

Attleborough's screen can be attributed to carver/painter Robert Grey and joiner/carver Robert Faukes, as both are named in debt records with several of the donors named on the screen at the date of its making (*c*.1446–65).[11] This supports the assumption that there were no 'fixed' teams behind rood screens, since Robert Grey worked with Robert Faukes on Attleborough, but possibly with William Bishop on Wighton. Comparatively little is known about Robert Grey's life. He became a freeman of Norwich in 1422/23 (as a graver – the local word for carver). He worked at Caister Castle in 1434–35 and appears in Common Plea records from 1422 until 1458, which corresponds closely with the known dates of these screen paintings. He was based at Thornham in 1422, Norwich in 1432 and, from 1442 until 1458, in Attleborough.

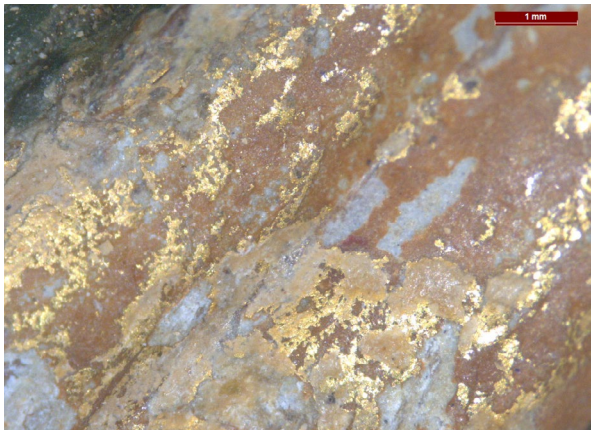

Figure 9. Photomicrograph detail taken during cleaning of tracery head II: the leaf to the left of the right foliate head showing the chalk ground, orange mordant, gold leaf and residues of whitewash layers. Photographed by Alice Limb, 2023 © Hamilton Kerr Institute, University of Cambridge.

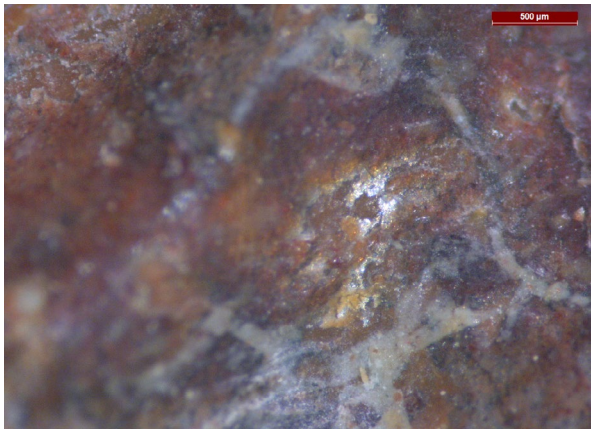

Figure 10. Photomicrograph detail taken during cleaning of tracery head II: in the right cheek of the right foliate head showing the orange mordant below silver leaf, itself below a red lake glaze with residues of whitewash layers. Photographed by Alice Limb, 2023 © Hamilton Kerr Institute, University of Cambridge.

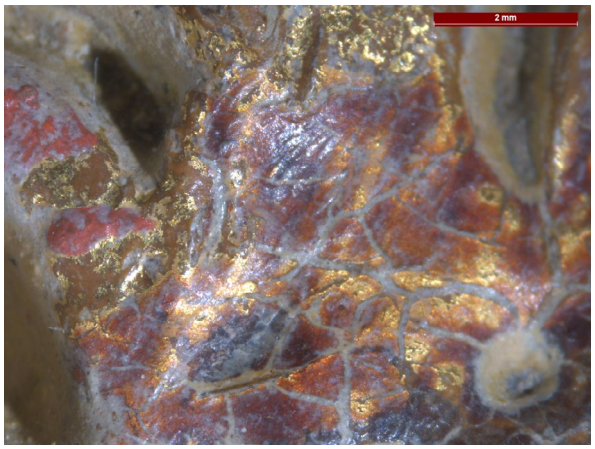

Figure 11. Photomicrograph detail taken during cleaning of tracery head II: in the left cheek/beard of the right foliate head showing the orange mordant below gold leaf, itself below a red lake glaze with residues of whitewash layers above. At the right of the image, the original red paint used to paint the tongue has splashed over the gilding of the beard. Photographed by Alice Limb, 2023 © Hamilton Kerr Institute, University of Cambridge.

Stencil matches of this kind raise the question of whether one tool is enough to link disparate objects together. Simple rosette shapes are very commonly found on East Anglian screens and cannot be taken as evidence of the same painters at work. However, complex stencils are more indicative. Painters had to travel to sites and were not working in urban centres where they could easily swap tools with other craftsmen. There was also no separate class of preparers undertaking part of the decorative work on larger structures.

The paint and gilding on the sculpted tracery heads

Unlike many other screens, the Wighton tracery heads do not alternate between red and green: all are red, with green spandrels. The carved concave bevels of the tracery cusping were originally white. The green is verdigris in an oil medium. The medium-rich quality of the layer is evident from the slightly glossy sheen that the surface retains. This glaze was not mixed with lead white or lead-tin yellow, as was often done, and it was applied in a single layer. Admixture with lead white or lead-tin yellow would have helped preserve the green colour, since verdigris is notorious for turning brown in an organic medium. The fact that the paint has retained its intense green colour without the addition of stabilising lead-based pigments suggests that a high-quality pigment was used, and indicates that the proportion of pigment to medium was high: no expense has been spared. In some places the brushstrokes are clearly visible and the white priming can be seen through them, while in others the paint has pooled and is thick and opaque. It was applied in a rather haphazard fashion, and splashed onto the sides of the carved creatures (the red used to paint the tracery face was also applied haphazardly). This may attest to the difficulties of painting with precision inside the screen framework and around shapes carved in high relief while *in situ* in the church. These splashes and a red dribble over green on tracery head II (see figure 2a) indicate that the detailed decoration of the spandrel creatures was completed before the green background of the spandrels, and that the green was applied prior to the application of the red.

The spandrel carvings were decorated with a mixture of paint and both gold and silver leaf. Tracery heads III and IIII (figures 2b and 2c) have been harshly cleaned in the past, exposing bare wood over much of the carvings, and remnants of whitewash in the interstices conceal the original decoration. The scheme on tracery head II (figure 2a) is the best preserved of the three, offering a glimpse of the original visual effects. The oak leaves were gilded with gold leaf over an orange mordant (figure 9), while the acorns are silver leaf (now oxidised to a dark grey), also applied over the orange mordant. The foliate heads on this tracery head have gilded hair, while the flesh was executed

Figure 12. Detail of tracery head IIII during treatment in normal light showing spandrel carving of the lion and dragon wrestling, with remnants of original polychromy and gilding visible. Photographed in 2020 by Kate Waldron © Hamilton Kerr Institute, University of Cambridge.

Figure 13. Detail of tracery head III after treatment in normal light showing spandrel carving of the griffin, with remnants of original polychromy and gilding visible. Photographed in 2023 by Elaine Holder © Hamilton Kerr Institute, University of Cambridge.

in a red lake glaze over silver leaf (figure 10). The discoloration of the silver through oxidation now means that the flesh appears glossy dark reddish-brown in most areas. In passages where the flesh is blended into the hair/beards of the heads, red lake glaze has been applied directly on top of the silver and gold leaf, possibly as an imitation of copper (figure 11). The eyes, eyebrows and teeth of the heads were picked out in black paint: while cleaning it was discovered that in the pupils this black was applied over silver leaf, so that highlights deliberately left unpainted in the eyes would catch the light.

On the dragons of tracery head IIII, painted details were added in a variety of colours: the eyes are outlined in dark red, the pupils painted black, the belly yellow, and there is red on one of the dragons' teeth, alongside green details, although these have subsequently discoloured to brown (figure 12). Tracery head III had a griffin, gilded (over an orange mordant) on the body, with red painted talons and a red interior to the beak (figure 13).

On the spandrel carving motifs of all three tracery heads, the lead white priming is followed by an orange mordant – likely to be oil-based – consisting primarily of earth pigments and red lead, confirmed by SEM-EDS. This mordant extends beneath painted as well as gilded areas of the spandrel carvings, but is not present beneath the green paint used for the spandrels (or associated with the red paint used on the tracery head faces). The orange mordant is used for both gold and silver leaf, although a different, yellow layer underlying the silver leaf was observed in one location on tracery head IIII. Both orange and yellow mordants have been previously found for silver leaf in medieval wall paintings.[12] The dark reddish-brown paint used on the body of the dragon (tracery head IIII) appears to be a high-quality red earth – under the microscope the particles are large, coarse and ruby red. Some of the painted details are applied over silver leaf and samples show the presence of transparent red and possibly green glazes, through which light from the silver would have reflected back. Unlike water gilding, oil gilding (metal leaf applied to an oil mordant or directly to the oil paint, as in the stencils) could not be burnished to achieve a high shine. Oil gilding has been detected more frequently on rood screens than water gilding; however, if there were areas of water gilding on Wighton's screen, these would have contrasted visibly with the matte finish of the oil-gilded areas, creating variety and different levels of emphasis.[13]

The more elaborate decoration, and the use of a wide variety of luxury materials on the west-facing side, is typical of medieval rood screens. This reflects the fact that the screen was usually funded by members of the parish community, who were responsible for the upkeep of the nave while the rector was expected to care for the chancel (Cragoe 2010: 20). The range of materials employed for the west-facing decoration of the screen, and especially the exquisite quality of the carved spandrel motifs and varied decorative effects, point to highly skilled craftsmanship and attest to the wealth and status of Wighton and its lay inhabitants at this point in the fifteenth century (Trend 2017: 10).

Physical history: good intentions, active destruction and benign neglect

The Wighton rood screen has been subject to numerous campaigns of intervention over the almost six centuries of its existence. As is so often the case, there is a dearth of documentary evidence for interventions on the screen. Nonetheless, physical evidence, coupled with knowledge of the religious and cultural contexts that the screen was situated

Figure 14. Detail of panel B after treatment in normal light showing painted medullary rays over the whitewash scheme. Photographed in 2023 by Elaine Holder © Hamilton Kerr Institute, University of Cambridge.

Figure 15. Detail of tracery head II during treatment in normal light showing the bronze-toned gilding layer situated above the third layer of whitewash (upper two layers of gold paint removed). Photographed in 2023 by Elaine Holder © Hamilton Kerr Institute, University of Cambridge.

within, allow us to piece together the likely interventions and their order. Prior to their removal to the Hamilton Kerr Institute for treatment in 2018, neither the panels nor the tracery heads had ever left All Saints church. As such, their physical histories serve to illustrate the history of Christianity in Wighton since the fifteenth century, manifest in the additions, damages and decay to which they have been subject.

Iconoclasm, whitewash and wood grain

One of the most obvious aspects of the campaigns of intervention to which the fragments have been subjected are the numerous non-original layers applied across the surfaces of both panels and tracery heads. All components of the Wighton screen were once covered in multiple campaigns of what we shall refer to here as 'whitewash', surmounted by paint applied to imitate wood grain. At an unknown time, these layers were partially removed – to a varying degree – from all components of the screen, but the graining scheme remains most fully intact on the reverse of the panels. The extent of damage to the original, medieval paint scheme indicates harsh cleaning, probably with abrasive materials. For the tracery heads, this was followed by a modern campaign of overpainting in the late twentieth/early twenty-first century. The responses of all whitewash layers to chelating agents affecting lead during cleaning indicates that they all contain lead white, with other inclusions and pigment additions – including chalk – in some of the layers. The presence of lead white may suggest that the binder was a material in which the other important white pigment, chalk, was transparent: for example, oil. This would set these white layers slightly apart from the more traditional characterisation of whitewash as a lime- or glue-bound, chalk-based aqueous paint,[14] and may suggest that greater permanence was desired by those adding these white layers to the rood screen (Henry and Stewart 2011: 446, 472).

The earliest of these whitewash layers was applied to all six components after at least one campaign of vandalism had caused damage to both panels and tracery heads. Damage to the panels mostly takes the form of rough punchmarks and scratches incised with a narrow, but blunt object, while on the tracery heads areas of carving (particularly the undercut areas, such as the oak branches on tracery head II) were snapped off or mutilated, leaving bare wood. The first campaign of whitewash – in cross-section it is the whitest in colour (see figure 6b) of the three layers – sits within most of these areas of physical damage, on top of a dirt layer, indicating that a period of several years or decades elapsed between completion of the original scheme and the iconoclastic damage to carving and initial application of whitewash. Given the history of religious turmoil in England – and surviving evidence from other rood screens in the locality – it is strongly suspected that this initial phase of damage and whitewashing occurred during the English Reformation, precipitated by Henry VIII from 1536. At North Elmham (Norfolk), the churchwardens' accounts show that a painter called William Tylney was responsible for 'colouring … ye for pt of ye lofte' in 1548, during the reign of Edward VI (Legge 1891: 44). During cleaning, it was observed that this oldest whitewash layer was slightly sensitive to water, indicating that it also contains chalk and that it may be bound in

an aqueous medium. During treatment, numerous insect channels were found throughout the whitewash layers, particularly through the lowest layer. In some instances, dead beetles were found within channels. The presence of insects may relate to the binding media of the layer, as animal glue can provide a source of food for insects.

The second campaign of whitewash (see figure 6b) is a more yellowish colour, and visual examination of paint samples indicated that it contains some small, orange iron oxide pigment particles (iron earths). There appears to be a partial dirt layer between the first and this second layer of whitewash, although this is not continuous across the sample pool.

The third campaign of whitewash (see figure 6b) relates to the false wood graining scheme, and also to the surviving bronze-toned gilding found on tracery head II's carvings. This layer is slightly whiter than the second layer, but not quite as bright white as the first. This whitewash acted as a base for the application of a scheme of false wood graining, which was applied with combs and brushes using a palette of mostly iron oxide pigments, bound in oil, to imitate the grain of oak. Combing was carried out while the layer was still wet: small indentations were observed both optically and in cross-section in samples from the reverse of the panels. Medullary rays and knots were then painted on to further underline an association with the original materials of the rood screen (figure 14). A mordant layer (likely to be oil) appears to have been applied over this white layer (which is also the base of the graining scheme) to facilitate application of a bronze-toned gilding to the carving details on tracery head II (figure 15). It is thought that this gilded layer may originally have been present on the other two tracery heads, but that it was removed during the abrasive campaign of cleaning – indicated by the much greater extent of loss to the original paint schemes in tracery heads III and IIII, which resulted in complete removal of almost all layers, except where they lay in interstices of carving or other harder-to-access locations. Tracery head II was not subjected to this abrasive cleaning, which was also carried out to varying – and generally slightly lesser – degrees on the dado panels.

Greyish-blue paint: the panel A and tracery head III group

Small passages of a greyish-blue paint were found on two fragments within the group. This paint was present on tracery head III at the lower right corner and on the upper left opening of the main arch, as well as on the red pane of panel A (within a scratched circle thought to be iconoclastic in origin). This paint was only found on these two objects, which represent an original pairing of tracery head with panel. It sat above the third layer of whitewash in the stratigraphy, and so appears to have been applied prior to the abrasive cleaning campaign(s).

Modern overpaint: the tracery heads

Following the abrasive cleaning campaign to panels and tracery heads III and IIII, all three tracery heads were completely covered with a campaign of modern overpaint (see figures 1a–c). The panels avoided this fate. This overpaint sat above all other surface coatings, and was applied in multiple layers. A very glossy, much darker red paint, which appeared to be an enamel-type paint (visually similar to that often used for decoration of model aircraft) was applied directly over the original, medieval, red. The green spandrels were painted in a similar enamel-type green paint – which matched the original green quite closely in colour. Over the carvings, two layers of gold overpaint were applied – the lower a slightly bronzy layer, the upper a more gold-toned layer with larger glitter flakes present. The lobed openings of the tracery were outlined in only the upper layer of gold paint.

Churchwarden Sophie Trend indicated that this campaign was applied by a well-meaning former parishioner towards the end of the twentieth century, in order to match the colour scheme of the organ, which was also worked on by the same individual.[15] Screw holes are present from the tracery heads' attachment to the organ in various locations, depending on the design of the spandrel carvings.

Neglect, accident and intervention: the panels

As with the tracery heads, the three panels are now devoid of the wider context of their original framework. However, the physical evidence present across the group indicates that the rood screen was not merely dismantled: the six components were resituated in different configurations at various points in time. All of the wood in the lower half of the panels is almost completely eaten through by woodworm, with larger death watch beetle holes also evident in the lower third of each panel. This is likely to have occurred due to the presence of rising damp in the church when the panels were still *in situ*, providing an optimum environment for the beetles to flourish as these panels once sat directly in the channel cut into the stone floor of the church, with no intermediary layers – wood or otherwise – to isolate them from the porous stone around their bottom edges.

There is a chamfered pine batten attached horizontally with clenched nails to the reverse of each panel. The ends of these battens overlap the narrow unpainted sections of wood once covered by the original framework (hence left unpainted by the workshop). This demonstrates that they were attached after the panels were removed from their original configuration in the wider framework. Their exact date of application is not known, but the extent of rusting of the nails and the corrosion of surrounding original wood indicates that they have been present for a very long time; they have the top two layers of whitewash present (applied directly over the wood), and also exhibit the false

Figure 16. Detail of panel A in raking light showing raised and flaking paint as a result of water ingress in December 2021. Photographed in January 2022 by Alice Limb © Hamilton Kerr Institute, University of Cambridge.

Figure 17. Detail of panel A during treatment showing the extent of frass staining at the lower edge: (a) before treatment and (b) after treatment with agar. Photographed by Alice Limb © Hamilton Kerr Institute, University of Cambridge.

wood graining seen on some original components. It is not known if the earliest layer of whitewash is present below these two upper layers. These battens now play an essential role in structurally supporting the panels: it was quickly decided that removal would be catastrophic for the physical integrity of the panels given the extreme fragility of the original dowels, board joins and the worm-damaged wood itself.

A non-original horizontal pine cross-batten was also applied to each of the panel fronts after removal of the panels from their original framework. The ends of the pine battens are profiled as though made to fit within a wider framework (perhaps they were added to fit the framing structure visible in the *c.*1885 photograph, figure 4), and they were attached after the application of the first whitewash layer to the rood screen dado. These front battens were painted with a mixed brownish paint (mostly consisting of iron oxides and carbon blacks), which has since been covered with the second and third layers of whitewash.

At an unknown date in the twentieth century the framework in the *c.*1885 photograph was dismantled and disposed of, and the panels and tracery heads kept. No one within the current church community remembers the panels being displayed in this format, indicating that this took place prior to living memory: most likely during the early decades of the twentieth century.[16] When the HKI first surveyed the panels and tracery heads *in situ*, the panels were stored stacked against a church wall on their extremely fragile lower edges (Wrapson 2016: 7). The tracery heads had been repainted and affixed to the organ as decorative elements. Removal of the rood screen fragments from these locations in order to ensure their survival was a priority, and the fragments were transported to the Institute in 2018: the first time since their creation that they had left All Saints church.

The Covid-19 pandemic (2020–21) meant that initial testing and the commencement of conservation treatment by Kate Waldron was halted. Due to their size, extreme fragility and inability to safely support their own weight on their end-grain, the panels were stored flat on a table in the HKI's panel workshop (an outbuilding separate from the main studio spaces). Disaster struck over Christmas 2021, when a winter storm resulted in roof damage and water ingress to this location. Panel A lay directly in the path of the leak and was subject to direct contact with the water for a period of several hours, although all three panels were affected to varying degrees due to the rapid increase in relative humidity provoked by these unfortunate circumstances. Upon discovery, removal of the panels to a safe and dry location was the immediate priority: the panels were kept flat throughout. A fan was installed in the room (aimed above, not at, the panels) to help increase air circulation, and the panels were laid onto a metal grille lined with blotting paper, allowing air flow under as well as over the saturated wood in an attempt to ensure they dried evenly and did not warp due to a moisture differential at one side. Flaking was widespread across both front and reverse due to expansion and then rapid shrinkage of the wood following the water ingress. Flaking originated at the ground–panel interface due to the aqueous nature of the glue-bound chalk ground. Tannins from the oak, frass from insect bores and

rust staining from nails across the lower half of the panels migrated to the surface upon drying. Additionally, whitewash migrated to the edges of some wet areas as they dried. The overall result of this water damage was extreme and widespread flaking, as well as these differing types of tidelines and stains (figures 16 and 17).

Treating the fragments

Treatment of the Wighton rood screen fragments was a major undertaking, involving four conservators, consultation with numerous experts and the cooperation of All Saints church. The two main objectives of the treatment were to make the six fragments structurally sound and safe to handle and display in the church, and to improve the fragments' aesthetic appearance, such that it was possible to display them together as cohesive parts of the same object. The vastly different physical histories of the tracery heads from the panels meant that the first objective applied mainly to the panels (which displayed the medieval paint scheme but were structurally severely compromised) and the second objective applied mostly to the tracery heads (which were structurally sound but covered with modern overpaint).

The pandemic delayed starting the work on the panels because, due to their fragile nature, they required multiple conservators to be present to handle them, which would have breached the social distancing protocols in place at the Institute from its reopening in August 2020 following the lockdowns. Cleaning of the tracery heads had begun in October 2019, but as Kate Waldron's internship ended in December 2020, the treatment was resumed in January 2022 by Alice Limb. From this point onwards the treatment of the tracery heads and panels was conducted in tandem. The process was further extended by the water ingress in 2021: it took almost four years until the fragments were stable enough to return to Wighton. At the time of writing, construction of a new framing and mounting system is yet to take place so the panels are not yet back on full display, although it is hoped that this will happen soon.

Paint consolidation: panels

Following the water damage incurred in December 2021, consolidation of flaking paint became an immediate and urgent treatment priority. As the water ingress proved that high humidity and/or contact with water resulted in the release of the ground layer from its interface with the wood, consolidants that remain reversible in water were ruled out. This also excluded many animal-based consolidants, which had the additional disadvantage of offering a further food source for insects. The consolidant also had to meet several other criteria, notably longevity and good flow properties. Prior to the water ingress in 2021, the case was presented at a 'Matte Paints' workshop held at the Fitzwilliam Museum in March 2020, which featured other presentations by conservators working with paper and archaeological objects, as well as a work by the modern multimedia artist Marcos Grigorian (Sutcliffe and Barker 2016). The workshop was an invaluable opportunity to explore a range of scenarios and questions relating to the consolidation of complex objects for which a matte surface is just one factor among many other broader issues. Ultimately, the water ingress and resultant flaking precipitated a less nuanced approach than might otherwise have been pursued, as the scope of the flaking was so widespread and so extreme, necessitating urgent treatment to retain the paint layers across large areas of the panels.

Figure 18 Detail of panel A during treatment in slightly raking light after consolidation (to the left of the join) and before consolidation (to the right of the join). Photographed by Alice Limb © Hamilton Kerr Institute, University of Cambridge.

Panel A was the first priority for consolidation using this method due to the widespread flaking present after the water ingress. The consolidant chosen was Lascaux 3471 Medium for Consolidation, applied with a small sable brush. It was left to dry for a short period of time until it developed enough 'tack' to hold the flakes, at which point the embrittled paint flakes were gently plasticised and lowered with the aid of a hot air pen (set to the lowest possible fan intensity) and small silicone-tipped tools. Once the flakes were relocated and secure, the area was then cleared, carefully and with control, with deionised water on a cotton swab. In areas where clearance was not possible

straight away, clearance was carried out later using acetone, rolled gently over the surface with a swab. During the clearance phase, minor surface cleaning was carried out to remove some of the stains from rust and migrated frass where possible (see figure 18). Lascaux 3471 has excellent flow properties, meaning that it penetrated beneath the lifting flakes and under areas of blind cleavage extremely well. The disadvantage is that it inevitably penetrated into areas of woodworm channelling, although this would have been unavoidable with any liquid consolidant due to the extreme porosity of the wood. Loose flakes which could not be relocated were gathered as sample material and the approximate area of their origin labelled if known. These have been added to the HKI samples archive so that they can be of use to future researchers.

Following consolidation of the paint/ground layers on the panel fronts, it was apparent that the wood was in an extremely fragile state, with numerous woodworm channels on the verge of collapse. The lower third of each panel had minimal structural integrity, with an internal structure similar to that of a sponge due to the extensive insect channelling (many cavities were filled with loose frass). Benefiting again from insights gained at the Fitzwilliam workshop, various consolidation methods were tested. Ultimately, consolidation of the wood was carried out using Paraloid B72 (10% in acetone), applied variously with a pipette, a brush and/or a syringe. Some higher concentrations of Paraloid B72 (ranging between 15 and 25% in acetone) were used to reattach splinters or pieces of wood that had become loose. Consolidation was carried out with portable extraction present, and several rounds undertaken to ensure that the consolidant had penetrated as fully as possible, although the panels had to remain flat during this process. While the panels remain extremely vulnerable (particularly at their lower edges), they no longer have a soft, spongy texture – this has hardened, as the Paraloid B72 has coated the internal structure of both the wood cells and the insect channels. While the panels should never be rested on their lower edges, the structural integrity of the lower half of the panels is improved and they are able to withstand transportation.

Aesthetic treatment of the panels: leaving layers in place and mitigating the visual impacts of water damage

Various surface cleaning methods were tested for removal of the whitewash/wood-graining layers from the front of the panels. The original paint was found to be vulnerable to most methods, with the red layers in particular gaining saturation from free aqueous methods, rendering the cleaned passages patchy. As the cleaning of the tracery heads progressed concurrently it became clear that there had been – and were – layers in common on the tracery heads and the panels. It was decided not to proceed with removal of the whitewash and wood-graining layers from the front or reverse of the panels, since any potential benefits would not outweigh the risks to the fragile medieval paint layers. The original stencilled decorative scheme is already clearly perceptible on the fronts as a result of previous cleaning campaigns, and little would be gained from the difficult task of removing the still highly intact wood-graining paint layers from the reverses, which were simply painted red and green. Retaining the non-original layers on parts of the panels will serve as a visible record of the screen fragments' physical history.

Panel A's contact with water in December 2021 resulted in local increases in saturation of the original red paint where the water had made contact, along with an increase in staining and tidelines at the surface, as tannins from insect frass, rust and the oak itself migrated to the surfaces of both exposed wood and paint during the drying process. During consolidation of the paint layer, aqueous clearance of consolidant using a swab was noted to locally reduce the impact of stains in some smaller areas (especially the tannin staining from frass). Various methods were therefore tested for overall reduction of the visual impact of these stains and tidelines. However, due both to the vulnerability of the original paint and the extensive insect channelling, overall surface cleaning using a swab was not felt to be a safe or appropriate method of reducing tidelines and stains and therefore gelled methods were explored.

Agar sheets at various concentrations (ranging from 2 to 4%) were tested at different thicknesses and for different exposure times, as well as with/without blotters applied on top. Tests were also carried out to experiment with brushing liquid agar (cooled to just above its gelling point) directly onto the surface, as this enabled very precise local application. As agar alone was sufficient to effectively reduce the visual impact of staining, it was not considered appropriate to load the agar with chelating or other cleaning agents.

Cleaning of tidelines and stains was undertaken using 4% agar (made up in deionised water, heated and cooled twice) applied with a brush directly onto the surface while the agar was just above its gelling point (figure 19).[17] The agar was left in place for 1–2 minutes (depending on the area) and then peeled away, using either fingers or a blunted swab stick. Any agar residues were removed with a soft brush. The process was repeated a few days later in areas where it was felt that further stain reduction could be achieved. This method reduced the visual impact of tidelines in both the original red and green paints and in the whitewash layers, although it could not mitigate them entirely (especially where whitewash had migrated outwards during the water ingress). It was also effective at removing stains from both rust and insect frass from paint and wood (figures 17a and b).

Figure 19. Detail of panel A during treatment in normal light showing agar applied locally to areas of staining. Photographed by Alice Limb © Hamilton Kerr Institute, University of Cambridge.

Reduction of staining caused by water damage enabled the original scheme to be read against the partial layers of additions, without further obfuscation. The levels of water damage were adjusted to be as even as possible across the three panels, thereby allowing the varying extent of the whitewash layers and historic abrasive cleaning across the panels to be understood without distraction (see figures 2d–f). However, an interpretative element will be an important aspect of the panels' redisplay, acknowledging and explaining the varying levels of finish across the screen fragments. As with all other surviving rood screens, the Wighton rood screen should be regarded as a fragment of fifteenth-century polychrome church furnishing rather than a unified image, as we traditionally encounter in the context of easel paintings.

Modern methods for medieval surfaces: cleaning the tracery heads

Cleaning the polychrome and gilded surfaces of the tracery heads was an evolving process: as different conservators joined the treatment, and more technical analysis was carried out, ideas developed, which resulted in a changing approach over time. Throughout the evolution of the cleaning methodology, treatment of the tracery heads remained focused on removal of the late twentieth-century overpaint campaign, aiming to reveal what survived of the remaining original scheme (post-historic cleaning) on tracery heads III and IIII. Upon discovery of the largely intact original medieval scheme present beneath whitewash layers on tracery head II, this aim was coupled with a desire to reveal the original scheme present on this fragment in the most legible way possible (explained further below). Due to the irregularity of the carved, uneven and wood-grained surfaces, it was not possible to remove every trace of the modern overpaints (or, in the case of tracery head II, every trace of the whitewash layers and the modern overpaints). However, the cleaning has been taken to a level that is considered to reduce the visual confusion of multiple, partial layers, while being safe for the original surfaces of the tracery heads. As a result, the surviving original gilding and paint schemes on tracery heads III and IIII can be appreciated once again, while the original scheme on tracery head II is now visible for the first time since the Reformation.

Modern overpaint was applied directly on top of the sensitive medieval surface and directly to bare wood and surviving whitewash layers on the

tracery heads. Tracery head IIII was selected for initial cleaning tests by Kate Waldron in 2019 – the methods developed were subsequently adapted following further testing by Alice Limb in 2022 to finish cleaning tracery head IIII and to clean tracery head II. Cleaning of tracery head III was undertaken by Camille Polkownik using the 2022 methodology.

Tracery head II: a special case

In the course of testing in 2022, it was discovered that tracery head II had thicker, complete layers of historic whitewash in polychrome areas and especially over the carvings, in addition to an extra layer of gilding beneath the upper gold paint layers. Ethically, the decision to remove or retain the three intact layers of whitewash below the modern overpaint was complex. While the earliest whitewash was most likely to have been applied during the sixteenth century (as it covered some damages to the carvings, probably incurred during an early instance of iconoclasm during the Reformation) and the layers subsequently held much information about the physical history of the rood screen as a whole, the fact that tracery head II had escaped the historical cleaning campaigns meant that its appearance was drastically different to the other two surviving tracery heads, and its place within the overall medieval paint scheme could not be appreciated. The decision was ultimately made to remove all of the non-original layers on tracery head II, thereby prioritising the comparatively well-preserved medieval polychromy and gilding discovered below. This was done with the acknowledgment that removal of the three whitewash layers (and associated bronze-toned gilding) from tracery head II would mean this fragment was cleaned to a different level than the other two equivalent fragments: however, the outcome of treatment has brought this fragment into closer visual alignment with the others, due to the partial nature of whitewash across the other two tracery heads (see figures 2a–c).

Removal of gold overpaint

The two layers of modern gold overpaint – applied to the carved motifs in the tracery head spandrels – were removed on all tracery heads. Both layers of the gold overpaint on tracery head IIII were removed using a 1:1 mixture of acetone and IDA (industrial denatured alcohol – 99% ethanol) as a free solvent with swabs. For these layers on tracery heads II and III, removal took place using acetone – either as a free solvent with swabs (for tracery head II and in less vulnerable areas of tracery head III), or as a poultice (on areas of tracery head III judged to be more vulnerable to mechanical action).[18]

Removal of whitewash layers

The whitewash layers, revealed from underneath the overpaint on the spandrel carvings of tracery heads III and IIII, were almost identical in nature. Consistent with the panels, there were three layers of whitewash which had previously been partially removed, with islands of surviving whitewash sitting in losses to the original paint and gilding, as well as in damages to the timber. Over most of the carvings, it was found that the original paint and gilding scheme had been almost completely abraded down to the wood, although both whitewash and paint remained intact in the interstices of the spandrel carvings. This created a confusing, patchy surface, especially on the areas in the original polychromy scheme painted in multiple colours. Tracery head II also had a campaign of bronze-toned gold leaf beneath the two modern gold overpaint layers (figure 15). This was associated with the uppermost whitewash layer. All three layers of whitewash were found to be intact, over the largely surviving, original polychromy and gilding scheme. The bronze-toned gilded layer was not susceptible to solvent action and was removed mechanically using a small scalpel blade under magnification.

Tests for removal of the whitewash layers were undertaken using the mixture developed by Alice for cleaning the red areas of overpaint (described further below): the mixture had been noted to slowly affect the whitewash present in these areas. Small cleaning windows indicated that the original medieval paint on tracery head II was in far better condition than equivalent areas of spandrel polychromy on tracery heads III and IIII, with original layers remaining mostly intact and pigments well preserved from fading (having been protected from light by whitewash layers for the majority of their existence). As a result, the decision was made to remove the whitewash layers from the spandrel carvings on tracery head II, to reveal the original medieval surface and bring this object closer in line visually with the other two tracery heads, which had a patchy appearance comprising both original and whitewash fragments. Cleaning was not possible in all areas, as the whitewash had been thoroughly applied into all crevices of the complex carving of the foliate heads, some of which were inaccessible with a scalpel. Additionally, the whitewash layers were retained on the flat lobes of tracery head II (which appeared to be white in the medieval scheme).

The whitewash layers were thinned using the cleaning mixture developed for the red overpaint, before remaining whitewash was mechanically removed under the microscope with a small scalpel. This was successful over the original gilded areas and on the polychromy of the foliate heads. Over original gilding, the whitewash was not especially well adhered to the gold leaf. Nonetheless, great care had to be taken, as in some areas the gold leaf was not well adhered to the underlying mordant, and small flakes of gilding could come away with the whitewash.

Removal of modern overpaints: red

Tests to remove the modern, dark red overpaint were initially carried out on tracery head IIII by

Kate Waldron, in the 1–2 cm-wide margins where overpaint was applied directly to the originally unpainted wood. The overpaint was found to be much harder, tougher and thicker than the thin, fragile and sensitive original passages, which had – like the panels – been partially cleaned in the past, rendering them particularly vulnerable and leached. Sporadic abrasions in the red overpaint made it possible to see that whitewash was not present throughout the original red paint on any tracery head (even tracery head II), although patches of whitewash were present on all three. As the overpaint had shown sensitivity to polar solvents, solvent tests were initiated which indicated that the overpaint could only be removed with a combination of medium-leaching and pigment removal: the overpaint also displayed some water sensitivity, so various aqueous cleaning solutions were also tested with added chelators and raised pH. The results of all these tests were partially successful, but not satisfactory on their own.

Therefore, caustic alcohol was tested to see whether this could break down and dissolve the paint more efficiently. On an area covering unpainted wood in tracery head IIII, small tests were conducted with caustic alcohol (thickened with Klucel G) and cautiously repeated on an area of overpaint covering original paint. The method selected was to use thickened caustic alcohol, applied to a small area of the surface (no larger than 2 cm^2), and left for 45 seconds to 1 minute before the cleaning mixture and overpaint was removed with a fresh small dry cotton swab. This first picked up the bulk of the thickened caustic alcohol cleaning mixture, and a transparent purple material, probably an organic colorant in the overpaint. At the end of the swab roll it picked up deep red, which was the main pigment constituent of the overpaint. The area was cleared with a solution of IDA and Shellsol T (1:4) and then with deionised water, each applied via a fresh cotton swab before the area was left for a day or more for all the solvent to evaporate. In the meantime, these steps were carried out across adjacent areas, resulting in a larger overall area of patchy overpaint remains. After a break of several days, the remains were targeted with the same method, using a shorter exposure time. Any trace remnants of overpaint that were left – mostly in the interstices of the original paint layer – remained slightly softened, and were gently scraped away with a sharp scalpel. It was not safely possible to mechanically remove overpaint residues once they had hardened again. The whitewash layers were found to be unaffected by this technique and were left in place. Prior to cleaning an area, the bronze/gold-coloured outlines were first removed with a mixture of acetone and IDA (1:1), thickened with Klucel G. This was important because otherwise the bronze paint obstructed access of the caustic alcohol mixture to the red overpaint, resulting in an uneven clean and necessitating further applications of the caustic alcohol mixture. The same method was also initially used for removing the green overpaint.

While this approach mitigated some risk of damage to the original paint surface and meant that the thickness of the overpaint and condition of the original beneath could be assessed as the cleaning process was carried out, there were some areas where the original paint appeared to be affected by the cleaning procedure and took on a patchy surface finish that was variously matte and slightly burnished. The original red paint also seemed a little sensitive to the polar clearance solutions, since the swabs continued to take on a pinkish tinge during clearance even when all visible traces of the overpaint had been removed.

Further testing was therefore carried out by Alice Limb on tracery head II in 2022, using the principles of the modular cleaning programme (MCP).[19] Earlier tests had shown that the pigment component of the red overpaint was sensitive to chelating agents, especially at raised pH, while also demonstrating that the binding media of the overpaint was affected by polar solvents, notably benzyl alcohol. Through testing different combinations systematically, a different cleaning system was developed. The mixture used was:

- 2 parts adjusted water at pH 8.5 buffered with sodium hydroxide (NaOH) and bicine
- 2 parts EDTA (chelating agent) solution at pH 8.5 with sodium hydroxide (NaOH)
- 2 parts 10% Xanthan gum (10% w/v in water)
- 4 parts deionised water
- 1 part benzyl alcohol (added dropwise once the other components had gelled)

This was agitated on the surface of the overpaint with a soft brush (the time used was dependent on the thickness of the overpaint but varied between 30 and 90 seconds initial exposure), before being removed with a dry swab. The area was cleared three times using Shellsol D40 (to remove the polar benzyl alcohol) and then three times using a pH-adjusted water, at pH 8.5 (to clear the chelating agent). As with the previous method, timing was crucial: either mixture, if left on the surface for too long, did soften the original red paint as well as the overpaint. With the new method, it was found that undertaking the initial clearance phase with solvent Shellsol D40 (instead of the 1:4 IDA: Shellsol T mixture used with the previous method) significantly reduced pickup and burnishing of the original paint. Clearance with Shellsol D40 before the aqueous clearance was also found to mitigate impacts on the original surface, relative to aqueous clearance first. This overpaint removal method slowly affected the whitewash layers (probably due to chelating agents acting on their lead constituents) although removal of the whitewash from areas of original red was not actively pursued on tracery

heads. As with tracery head IIII, modern gold overpaint was removed first, enabling the cleaning mixture to access the surface, and small areas (*c.*1–2 cm^2) were cleaned using this method. Any residues were either removed mechanically using a small scalpel blade under the microscope or, if thick enough, targeted using the same method again with a smaller brush and swabs. It was not possible to remove all the overpaint from the wood grain and other highly textured areas; however, overall the removal of the overpaint was a success. This method was used to remove red overpaint on tracery heads II and III and to finish cleaning tracery head IIII.

Removal of modern overpaints: green

Before continuing the removal of the green overpaint when treatment recommenced in 2022, further testing was carried out by Alice Limb in conjunction with the retesting phase for the red overpaint. Alice found that the green overpaint was sensitive to acetone, applied with a free swab. When the original green paint was saturated with acetone for a sustained period it began to soften and some colour pickup was observed: however, this could be avoided by working quickly and addressing residues after several days had elapsed. Some residues of green overpaint (particularly in the corners/interstices of the spandrels and carving) were mechanically removed using a scalpel under the microscope, especially on tracery head II during the whitewash removal from spandrel carvings (see below). Removal of the green overpaint on tracery head II revealed more significant areas of whitewash over the green original: this helped clarify which green layers were original (beneath the whitewash level) and which were later (above), and improved confidence with the free acetone removal method. Acetone was therefore used to remove the green overpaint from tracery heads II and III and to address residues remaining on tracery head IIII.

Structural treatment: seeking security in a light, flexible approach

The battens attached to the fronts of panels B and C were removed (see figures 1e–f and 2e–f). This decision was made once thorough examination of all three panels, their associated battens and their paint/whitewash layers had proved conclusively that these battens were non-original, later additions. The front battens were sawn away between attachment points and then removed in sections: the nails holding them in place were removed, or (where this was not possible) trimmed flush with the surface of the panels. The battens attached to the reverses now form an integral part of the structure of the panels: as such, they were retained despite their non-original status. They will not be visible once the panels are on display.

Following front batten removal and the consolidation of both paint layers and wood, a design for the auxiliary support system for the panels was developed. This was considered key to the longevity of the panels, given that it would impact future housing, display and transportation. The auxiliary support design was inspired by a display solution devised for a medieval panel painting held in the Fitzwilliam Museum's collection (PD.2-2012: see figure 20) where small L-shaped sections were glued to the reverse of each board, and these then hooked onto an auxiliary frame, allowing the painting to be handled and displayed using the auxiliary frame. This concept was adapted to account for the varying depths of each panel and each batten on the reverse, with each individual panel having a custom-made support, tailored to its individual measurements and fragility requirements. The decision was made not to rejoin splits or to fill gaps between boards: this was done to prevent potential infestations of pests/mould attacking new materials (especially adhesives) and to allow the panels to move unrestrained in the unstable humidity of the church environment.

Figure 20. Detail of the reverse of Fitzwilliam Museum cat. no. PD.2-2012 (British School, *Kiss of Judas*, oil and gilding on panel, *c.*1460), treated by Lucy Wrapson and Simon Bobak in 2012. Photographed by Alice Limb © Fitzwilliam Museum, University of Cambridge.

To facilitate a better understanding of the environment in which the panels would be displayed and to ensure the precise panel work was undertaken at an RH (relative humidity) as close to the display conditions as possible, a large humidity chamber was constructed, and the RH raised gradually to *c.*85% once the panels were installed (see figure 21). This enabled the panels to slowly acclimatise

Figure 21. Humidity chamber constructed in the HKI studio, June–July 2023. Constructed and photographed by Alice Limb © Hamilton Kerr Institute, University of Cambridge.

prior to treatment, for the paint consolidation to be double-checked in damp conditions, and for testing of materials to be used in the construction of the auxiliary support system to be carried out at a realistic RH.

The auxiliary frames were constructed from obeche, joined with brass screws and toned dark using acrylic paint. Each had horizontal cross-battens (three for panels A and C, two for panel B, see figure 3), with two vertical battens. The overall sizes were made slightly smaller than the panels, so that when viewed from the front the auxiliary supports would be invisible, allowing the panels to 'float' within the permanent display frame. To ensure that the L-sections cannot slip off the auxiliary support, one nail was hammered in at the end of each horizontal batten as a 'stopper'.

Small 'L' sections were cut from obeche and the gluing surface of each piece was backed with balsa wood (to enable easier removal should it ever be required in future). The balsa wood spacers were individually cut to custom depths/cambers, allowing the auxiliary frames to sit parallel with the front of the panels. The balsa was adhered to L-sections using a marine-grade epoxy to ensure that the adhesive should not fail in the damp church environment. Placement of the L-sections was as minimal as possible, while still providing adequate support to the panels: each board/split had a minimum of one L-section contact along each horizontal of the auxiliary frame. The gluing sites on the reverse of each panel were isolated using layers of Paraloid B72 in acetone, applied at increasing concentrations (up to 35%). These were deliberately made slightly larger than the L-section's gluing surfaces to enable precise adjustment of the placement of the L-sections. The balsa-backed L-sections were glued into their individual positions using the same marine-grade epoxy as used within the L-sections. Two spacer blocks were added to the non-original reverse battens on each panel: these were likewise glued in place using marine-grade epoxy (see figures 22 and 23). Once the glue had cured, the auxiliary supports were placed into position and then screwed through these blocks, with the screws continuing into the non-original battens (but not into the panels). Long brass strips were attached to each auxiliary prior to their attachment to the panels: these enable the auxiliary supports to be mounted into crates for transit, and will eventually be used as the attachment point to the display frame backboard (see figure 3).

After completion of the structural work, each panel was screwed onto the backboard of a solid crate using the brass strips. Each crate was lined with polythene to protect it from water ingress and the front sealed with polythene (spaced from the panels' surfaces using cotton tape) before a rigid

Figure 22. Reverse of panel A, during treatment in the HKI studio showing isolating Paraloid B72 patches with placement and gluing of balsa-backed obeche L-sections under way. Photographed by Alice Limb, July 2023 © Hamilton Kerr Institute, University of Cambridge.

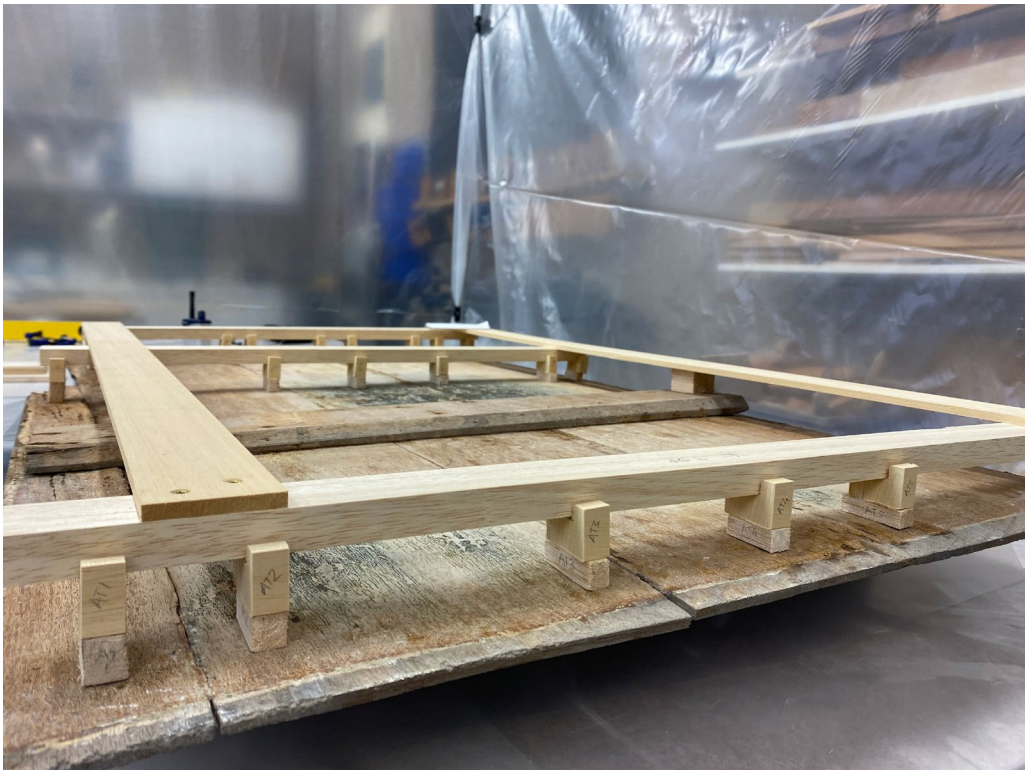

Figure 23. Reverse of panel A during treatment in the HKI studio showing balsa-backed obeche L-sections and the auxiliary support frame being fitted to the reverse of the panel. Photographed by Alice Limb, July 2023 © Hamilton Kerr Institute, University of Cambridge.

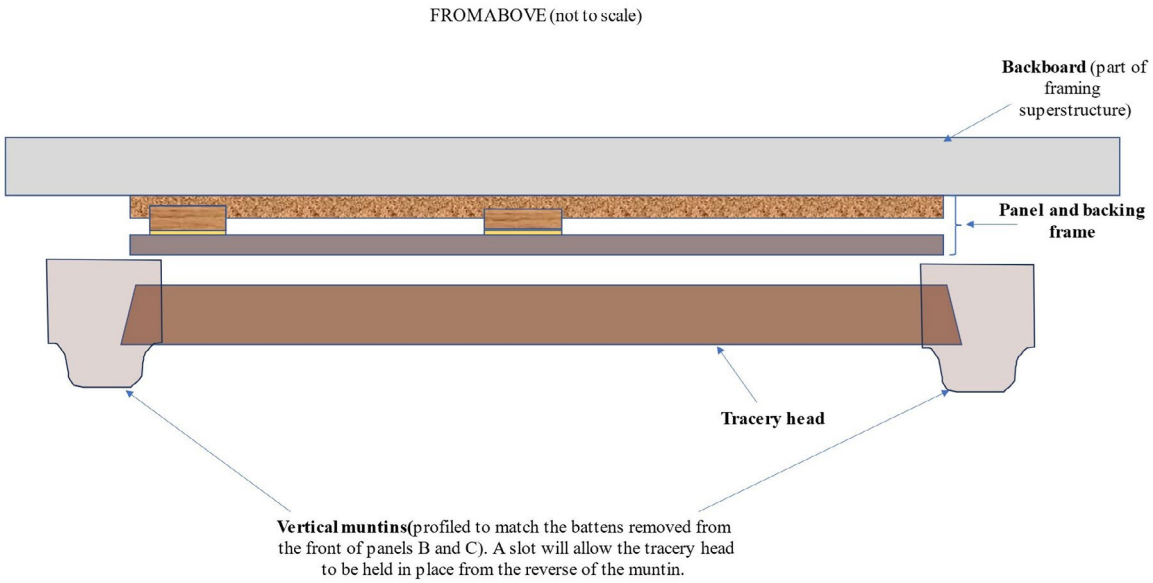

Figure 24 Design detail of the overall framing concept for the Wighton rood screen (exact design to be finalised upon construction). Graphic by Alice Limb.

front was screwed on. It is not known exactly how long the panels will have to remain in these crates, but it is highly recommended that they are checked periodically after their return to the church to ensure that there has been no degradation by mould growth or physical impact. The panels will be stored vertically within their crates.

The framing design (figure 24) will be finalised at the point of making, but it is envisaged that all three panels will be secured to one backboard using the brass strips attached to their auxiliary supports. This backboard will be secured within a frame, which will protrude forward of the panels and tracery heads, protecting them from physical impacts and bat/bird droppings. In front of the panels, tracery will be installed into the frame: this will have vertical muntins (with profiles based on those taken from the battens removed from the front of the panels) situated between each panel – slightly proud of the surface of the actual panels. At the reverse, each muntin will have a small recess at the appropriate height, enabling the corresponding tracery head to be slotted in and held from the reverse using a felt tape-lined mirror plate. This will allow the tracery heads to 'float' slightly away from the surface of the panels, while enabling the viewer to conceptualise their original relationship to the panels. This framework will be made by a craftsperson drawn from the church community.

This display should enable the remaining components of the Wighton rood screen to be viewed once more as a cohesive entity, allowing the viewer to understand the relationship between surviving parts and how the tracery heads and panels originally interacted. However, it was agreed with the churchwardens that the fragments' physical vulnerability, and the requirement of current and future parishioners to access and use all parts of the church interior, ruled out displaying them in their original location between the nave and chancel. A more appropriate solution would be to situate the screen in an unobtrusive area of the church, but one that will still acknowledge the screen's original function. The location chosen is against the south wall of the chancel, which also seems – from discussion with the churchwardens and environmental monitoring – to be one of the less damp areas of the church. The structural condition of the panels and the retention of the false wood graining and whitewash on the reverse informed the decision to privilege the front, more decorative, side of the screen. While this does remove aspects of the original context that are central to understanding the object – particularly the original double-sided nature of the screen – it also takes into account the fact that the vast majority of the original screen is lost and already demands considerable imaginative reconstruction. Furthermore, the decision to privilege the decorative side of the screen reflects the fact that this side would have faced the nave and been visible to the congregation, few of whom are likely to have had regular access to the chancel and the screen's plainer side. It is anticipated that a QR code (leading to a website with information) or other didactic material may be displayed alongside the rood screen to enable some of the technical findings, physical history of the rood screen, photographs of the reverse and some of the treatment decisions, to be presented and explained.

Conclusion

A core tenet of the approach to treating these six fragments was minimalism within the scope of intervention. We wanted these complex yet fragmentary objects to be viewed as just that: fragments of a wider object that no longer exists within All

Saints church, and to be faithful to the range of physical histories that these six components have experienced. The aim was to clarify, rather than deny, the stories these objects can tell through their physical history. An 'archaeological' approach (our own terminology) – rather than the more conventional approach aiming at the reunification of a pictorial image, which so often drives conservation treatments of easel paintings – was central to our careful consideration of the various stages of treatment. The other core principle was the long-term stabilisation of these objects within the uncontrolled church environment. Legibility – of the original intentions of Robert Grey's workshop, as well as of the various sequential campaigns tied to major historical and religious events – was a major driving force behind acts taken to mitigate damages and cleaning decisions.

Technical analysis and treatment were essential to each other throughout this process: a thorough understanding of the physical history of the rood screen was initially made possible through close looking and paint sample analysis. However, the discoveries made through practical treatment expanded our understanding of this complex object far beyond analytical techniques. Tacit knowledge gained through testing and observing material behaviours in treatment furthered our understanding of the original and non-original components of these fragments.

Walking a tightrope between preserving the fragments' physical history and making the original intentions of the medieval makers visible required flexibility and adaptation of our conventional conservation methods and materials. Support and collaboration from a wide variety of specialists – scientists, other conservators, the church community and craftspeople – was essential throughout. We acknowledge that ours was an imperfect approach: it was also one that evolved over time due to the disruptions of the Covid-19 pandemic and the catastrophic roof leak at the HKI, as well as new information from technical discoveries and treatment coming to light. A protracted project such as this, with unforeseen hurdles, has witnessed many hands come together, just as screens were often the result of multiple bequests and the work of multiple craftspeople and workshops over a period of many years or decades. It has been a lesson in how different conservators work in varying ways, but also routinely review, build on and refine the work of their predecessors as a project progresses.

Finding a solution that reconciled the variable conditions and physical histories of the different components was a huge challenge, but one that we hope has been executed with some degree of success – although of course, there are always multiple potential options and only one road can be chosen for the treatment itself. Treating the Wighton rood screen fragments has helped to further our understanding of the workshop of Robert Grey and informs the wider context of research into medieval church furniture, as well as reinstating the remaining parts of an object made for, and in, Wighton, back to Wighton. The hope is that such study and treatment provides future impetus to care for the rood screen, so that its rich history can be shared for generations to come.

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Notes

1. English rood screens have a sizable historic literature. Key texts include Vallance 1936, Bond 1908, Bligh Bond and Bede Camm 1909. For more recent work see Bucklow *et al.* 2017 and Baker 2011 for East Anglia.
2. It is possible that carvers were responsible for the rood and other sculptures, but this physical evidence has been lost through their near-complete destruction at the Reformation.
3. SEM-EDS analysis was carried out using an Oxford Instruments Silicon Lithium EDX spectrometer with INCA software and a Quanta-650F Field Emission Gun Scanning Electron Microscope (FEG-SEM). The Quanta-650F is equipped with BSE, SE, GSED, LFD, EBSD, CL and two EDS detectors.
4. The fact that the surviving panels are numbers II, III and IIII of the screen suggests that this dado was unlikely to have contained any figures, as to have figures on only the two outermost panels is unprecedented among surviving screens. Rood screen dados that combine figures and decorative/plain dado panels are comparatively uncommon, but an example can be seen at North Tuddenham (Norfolk). At Elsing (Norfolk) the first two panels on the north side had decorative stencil paintings for some time before saints were applied over the top. English medieval painters left reserves for their figures, and here the figures lie over stencils, so it is evident that the saints formed a later scheme. There are some instances where decorative screens were reworked by being painted over with figures, for example at Edingthorpe, Dersingham and Weston Longville (all in Norfolk). However, there is no evidence of a layer of this nature having been removed from the Wighton panels. It is possible that Keyser was referring to loose figurative panels from a parclose screen, since lost. It may even be possible, although perhaps unlikely, that figure panels came from elsewhere in the rood loft arrangement, such as from nave altars or the loft.
5. Our thanks to Nick Trend for providing the photograph.
6. Ian Tyers, personal communication, 6 March 2020.
7. *Ibid.*
8. For an example of a lead white priming on a screen see Wrapson 2014: 379.
9. For the dating of the screen at Attleborough see Cotton 1987: 46.
10. With thanks to Kiffy Stainer-Hutchins and Hugo Platt for revealing this hidden, painted piece of screenwork which now forms part of the backing of the Royal Arms.

11. For Robert Grey see L'Estrange 1888: 64 and Harvey 1975: 165. His name and those of Attleborough donors also occur in Court of Common Plea Rolls 1422, 1432, 1442, 1444, 1446 and 1458.
12. For example, analysis of wall paintings at Farleigh Hungerford Castle (Somerset) included one sample featuring a complex layer structure for silver leaf: two red lead mordant layers; a lead white and chalk layer; silver leaf; yellow mordant containing lead driers; silver leaf; green glaze. See Howard 1998: 60.
13. For identification of water gilding at Worstead, Yaxley and Burl St Andrew see Wrapson 2014: 360.
14. For further information on historic whitewashes and other surface coatings, see Henry and Stewart 2011.
15. Sophie Trend, personal communication, 27 February 2023.
16. *Ibid*.
17. For literature on preparation and use of agar gels as cleaning agents, see Angelova *et al*. 2017: 11–156.
18. See Limb *et al*. 2023.
19. The Modular Cleaning Program is a schematic approach to cleaning and a materials database, which draws on research undertaken at Winterthur/University of Delaware and by the Getty Conservation Institute. The current form of this methodology was devised and continues to be developed by conservator Christopher Stavroudis.

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An investigation of *Portrait of a Young Man* by Hans Maler

CAMILLE TURNER-HEHLEN, CHRISTINE SLOTTVED KIMBRIEL AND NATHAN DALY

Abstract The conservation process of *Portrait of a Young Man* by the German Renaissance painter Hans Maler revealed sketchy red underdrawings under the previously heavily overcleaned face of the sitter. This so far unique finding in Maler's oeuvre piqued interest for further investigation. This article discusses the painting's provenance and conservation history, as well as attempts to further characterise the sitter, considering the possibility that the painting is a self-portrait. Finally, technical investigation was conducted regarding the panel, ground and pigments used by the artist and compared, where possible, with other known works by Maler.

Introduction

Hans Maler (*c.*1475/80–1526/29), a Swabian artist from Ulm, settled in the Tyrolean city of Schwaz (now Austria) to pursue his career. Maler is recorded as having had his own workshop in Schwaz by 1508 at the latest (Morath-Fromm 2016: 126). Here he received commissions from the growing wealthy middle class in this mining city known for its silver and copper production. Most notably, he painted many portraits of the Fugger family, as well as nobles such as the young Ferdinand I (1503–1564) and Anne of Bohemia and Hungary (1503–1547). While still in Swabia he is thought to have worked under artists such as Bartholomäus Zeitblom (*c.*1455–*c.*1518) and Bernhard Strigel (1460–1528) (Morath-Fromm 2016: 21).

Long forgotten to the art world, Hans Maler was only rediscovered as an artist in the late nineteenth century, first by Robert Vischer in 1885 and, independently, by Ludwig Scheibler in 1887 (Friedländer 1895: 411). They had each identified similarities in a number of portraits previously attributed to a range of contemporary Germanic artists. In 1891, Theodor von Frimmel added four more paintings (one of which was later found to be misattributed) to the growing list of works now

Figure 1. Hans Maler, *Portrait of a Young Man*, 1523, oil on panel, 27.6 × 23.4 × 0.8 cm, private collection: before treatment. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 2. Hans Maler, *Portrait of a Young Man* (Figure 1): after treatment. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

Figure 3. Hans Maler, *Anton Fugger (1493–1560)*, 1524: (a) front and (b) back. Castle Dêčín, Czechia, from the collection of the National Heritage Institute, The Regional Historic Sites Management in Ústí nad Labem, Veltrusy Castle.

associated with Hans Maler (Friedländer 1895: 411). These reattributed paintings had previously been thought to be by among others Hans Holbein the Younger (1497/8–1543), Lucas Cranach the Elder (*c.*1475–1553) and Hans Schäufelin (1480/85–1538/40) (Krause 2012: 69–70). In 1895, Max Friedländer was the first to associate the painting discussed in this article, *Portrait of a Young Man* (as well as further portraits) with the previously unknown artist recognised by Vischer, Scheibler and Frimmel (figures 1 and 2) (Friedländer 1895: 413). Friedländer also accurately identified Maler's first name as Hans (Friedländer 1895: 420). The confirmation of the existence of a painter named Hans Maler was made more difficult due to his common first name and a surname which, translated from German, means 'painter': a generic term often used in contemporary sources to refer to men in that profession. The last piece of the puzzle was discovered by Gustav Gluck at the turn of the century with the help of the inscription on the reverse of Maler's 1524 painting of Anton Fugger (figure 3), which reads 'HANS MALER VON VLM MALER ZVO SCHWATZ' (translated here as 'Hans Maler from Ulm painter to Schwaz'), thereby establishing the full name, place of origin and work of the artist (Gluck 1905: 246).

Due to its monogram, unique among Hans Maler's surviving works, *Portrait of a Young Man* played a key role in the history of Hans Maler's rediscovery but had never undergone a more thorough investigation. As first noted by Friedländer, Maler has a propensity for depicting the eyeline of his sitters slightly askew, 'Der Augenstern steht nämlich im Halbprofil zu schräg' (Friedländer 1895: 421),[1] giving the appearance of drooping eyelids; this was one of the identifying characteristics used when first establishing a body of works attributable to him (Morath-Fromm 2016: 14). A similar stylistic signature can be found in the works by contemporary artist Bartholomäus Zeitblom, and is one reason why Maler is thought to have worked under him while training in Ulm (Morath-Fromm 2016: 14). Stylistic similarities with Maler's possible teacher Bernard Strigel are exemplified in the Rehlinger-Diptychon depicting Konrad Rehlinger, held at the Alte Pinakothek in Munich. There is a strong resemblance in the way the two artists shape their sitters' heads. Especially striking are the similarities in their depiction of clothing. The ruffles in Rehlinger's shirt are indicated in a very similar manner as that seen in many paintings by Maler. Both artists paint the shirts with a wet-in-wet technique, giving the fabrics a soft and subtle ruffled texture. The delicate designs in Rehlinger's hem are also reminiscent of the detailing found in collars painted by Hans Maler. Another key characteristic, seen throughout Maler's career as a portraitist, is the delicate and precise brushstrokes used to create his sitters' hair (Morath-Fromm 2016: 29). This cannot be found in Strigel's work: his hair is fuzzier in character while Maler's is more closely linked to the consistently articulated brushstrokes seen in Zeitblom's works. Gradated blue backgrounds are another common feature of his portrait work. All but two of Maler's known portraits depict the sitter in a three-quarter portrait facing either left or right and either in a bust or half-length format (Krause 2016b: 168).[2] Weizinger-München, in 1914 describes, like Friedländer before him, Maler's

sitters unflatteringly as having an 'ausdrucksloser ins Leere gerichteter Blick': an empty, expressionless stare (Weizinger-München 1914: 136).

The painting discussed in this article is in private ownership and came to the Hamilton Kerr Institute (HKI) in 2021 for treatment, which offered an invaluable opportunity as it had not undergone any technical analysis in the past, nor had it been available to the public on more than a few occasions.[3] This article expands on limited previous research offering, for the first time, a closer, technical investigation of the painting. The study aims to situate an important and, in some ways, unique portrait within Maler's oeuvre in relation to the catalogue raisonné of his portraiture published by Stefan Krause in 2016, which also presents the limited technical information available on the artist's other attributed works (Krause 2016a). The 42 portraits included in Krause's catalogue were all created in just over a decade during Maler's late career as an artist, and they therefore provide a general overview of the artist's mature working methods. Due to the subject matter and the relatively late execution date of *Portrait of a Young Man* within the span of Maler's career, the comparative focus of the present study is on Maler's oeuvre in portraiture. Maler's wider oeuvre, insofar as it can be established, consists predominantly of religious paintings, which were executed as collaborations with other local artists and for which the attribution to Maler remains tentative in some cases. His entire career was however discussed at length by Anna Morath-Fromm (2016). Today, she and Krause can be regarded as the leading researchers on Hans Maler.

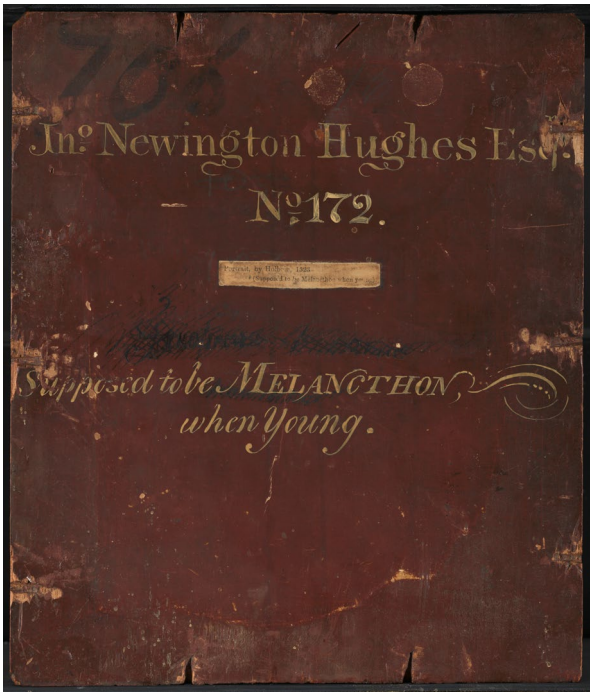

Figure 4. Hans Maler, *Portrait of a Young Man* (Figure 1): reverse. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

Figure 5. Photograph (at latest 1884) of Hans Maler, *Portrait of a Young Man* (Figure 1). Reproduced by kind permission of the Syndics of Cambridge University Library.

Attribution and provenance

The panel painting *Portrait of a Young Man* has a label on the reverse attributing it to Hans Holbein the Younger and naming the sitter as Philipp Melanchthon (1497–1560), a German Lutheran reformer. Neither can be corroborated based on other portraits of Melanchthon or more recent scholarship on the oeuvre of Holbein (figure 4) (Morath-Fromm 2016: 178). There is a further inscription that reads 'In.o Newington Hughes Esq.' executed in yellow paint on the reverse. This relates to the previous owner, John Newington Hughes (1776–1847) (Massing 1961: 34). The painting appears to have been in his possession until his death in 1847 and was auctioned by Christie and Manson on 14 April 1848 as lot 37 'Portrait of a Noble–1523' with no attribution given (Peel 1848: 7). This indicates that the Holbein attribution may have already fallen out of favour by then. It is unknown who purchased the painting, but it seems likely that this is when it came to the 2nd Earl of Ellesmere (1823–1862) and stayed in that family henceforth. It is next recorded at Bridgewater House in 1884 as reported by Lord Ronald Gower in *The Great Historic Galleries of England*, which is also where the earliest known photograph of the painting originates (figure 5) (Gower 1884: No. 1). The painting is reported as belonging to the 5th Earl of Ellesmere (1915–2000) in 1961, when it was loaned to an exhibition at the City of Manchester Art Gallery (Massing 1961: 34). Although *Portrait of a Young Man* is not specifically mentioned, an article in *Country Life* from 1966 discussed the

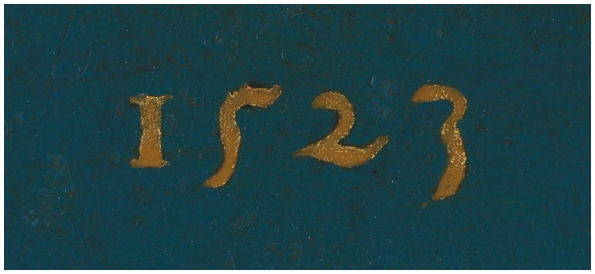

Figure 6. Hans Maler, *Portrait of a Young Man* (Figure 1): detail. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

Figure 7. Hans Maler, *Portrait of a Young Man* (Figure 1): detail. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

move of the majority of the family's collection from Bridgewater House in London to Mertoun House in Scotland (Cornforth 1966: 1470–75). After this point the painting appears to have remained in private ownership in Scotland (Morath-Fromm 2016: 178).

The monogram

Unlike most portraits by Maler, the one discussed here does not include the age or name of the sitter. However, there is the creation date of 1523 recorded in gold leaf over an ochre-coloured, bodied mordant in light relief situated in the top right corner of the gradated blue sky (figure 6). In addition – and uniquely in Hans Maler's painted oeuvre – the artist's monogram, 'HM; MZS', is written in fine lines with shell gold in the top left of the sky (figure 7).[4] This monogram was pivotal in the early stages of identifying the artist.[5] The first suggestion of the artist's first name came from payment records, noted by Friedländer, to an artist, 'Hans, Maler von Schwaz',[6] associated with a now-lost portrait of Maximilian I (1459–1519), which had been delivered by the artist (Friedländer 1895: 420). Friedländer considered Schwaz a likely working region for the artist as the sitters of his various portraits placed him in the region of

Figure 8. Hans Maler, *Portrait of a Young Man* (Figure 1): after cleaning. Photograph © Camille Turner-Hehlen, Hamilton Kerr Institute, University of Cambridge.

Innsbruck (Friedländer 1895: 419). The wealthy nearby city of Schwaz, with its 20,000 inhabitants recorded in 1515, was the site of rich silver and copper mines owned by the Fugger family (Egg *et al.* 1986: 129), who were regularly portrayed by the artist (Friedländer 1895: 419). Friedländer suggested that the letters 'MZS' stand for 'Maler zu Schwaz'.[7] This hypothesis was confirmed by the discovery of the portrait of Anton Fugger and its inscription, referred to above (figure 3b), which was painted one year later and now resides in Czechia.

Physical condition

The distribution of historical damage in *Portrait of a Young Man* revealed through the varnish and overpaint removal was unexpected (figure 8). Typically, in a 500-year-old painting, one might expect to find areas of significant damage within the darker paint sections, where slow-drying pigments and glazes were employed, while the passages with a higher lead content, such as the flesh tones, typically survive better. However, in this case, the opposite is true. The dark robe, hat and most of the hair of the young man were in near-pristine condition and did not exhibit vulnerability, whereas the face had been severely abraded during a previous cleaning campaign. A significant portion of the top layer of paint had been lost, and there were distinct scratch marks evident on the remaining scheme (figure 9). Other passages displayed a more common type of wear, for example, the remnants of gold, visible under the microscope in the decorations of the man's shirt, as well as on his chain, indicating that these were likely originally embellished with gold

Figure 9. Hans Maler, *Portrait of a Young Man* (Figure 1): after cleaning in raking light. Photograph © Camille Turner-Hehlen, Hamilton Kerr Institute, University of Cambridge.

Figure 11. Hans Maler, *Sebastian Andorfer (1469–1537) with Beard*, 1517, oil on panel, © New York, The Metropolitan Museum of Art.

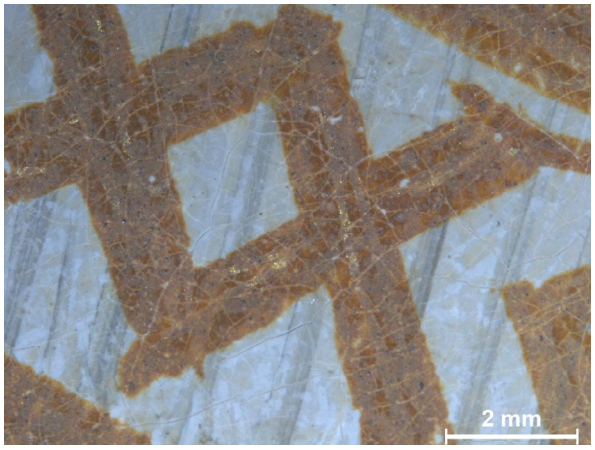

Figure 10. Hans Maler, *Portrait of a Young Man* (Figure 1): detail. Photograph © Camille Turner-Hehlen, Hamilton Kerr Institute, University of Cambridge.

Figure 12. Hans Maler, *Portrait of a Young Man* (Figure 1): detail during conversation. Photograph © Camille Turner-Hehlen, Hamilton Kerr Institute, University of Cambridge.

highlights (figure 10). This type of embellishment survives, for instance, in the portrait of Sebastian Andorfer (figure 11), where Hans Maler used gold to indicate gold thread in the sitter's hat. The raking light examination of the painting after varnish and overpaint removal clearly showed that the young man's shirt, like the face, had been heavily abraded during past cleaning. Although it is plausible that some finer details have been lost, there are multiple examples of comparable shirts in Maler's oeuvre, indicating that the shirt is likely similar to its original appearance despite the surface damage. Close examination of the cleaned painting revealed the presence of what appeared to be a thin, well-preserved protective coating over the intact areas of the painting, including the blacks, which had not discoloured perceptibly; as this coating was not visually disturbing and was not readily soluble, it was left in place.[8] Several other paintings by Maler appear to display patchy coatings, perhaps as a

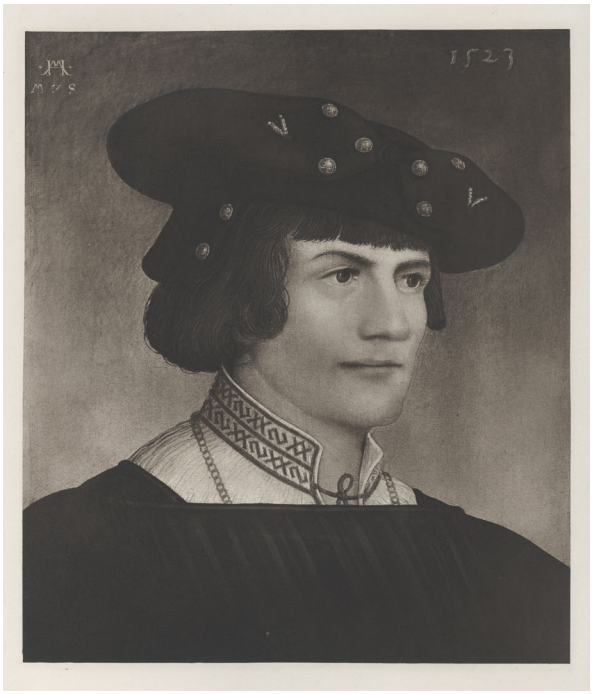

Figure 13. Photograph (at latest 1903) of Hans Maler, *Portrait of a Young Man* (Figure 1). Reproduced by kind permission of the Syndics of Cambridge University Library.

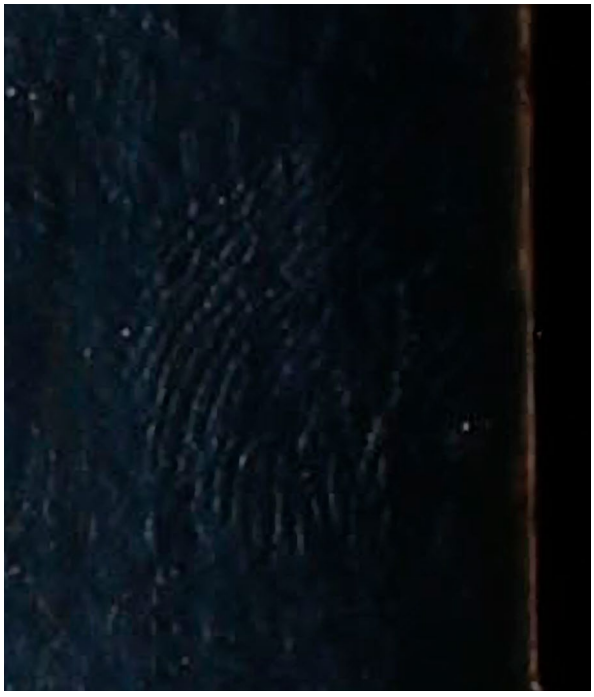

Figure 14. Hans Maler, *Portrait of a Young Man* (Figure 1): detail in raking light. Photograph © Camille Turner-Hehlen, Hamilton Kerr Institute, University of Cambridge.

consequence of only partially successful past cleaning. An example is the portrait of *Anna of Bohemia and Hungary (1503–1547)* in the Museo Thyssen-Bornemisza in Madrid. Certain areas of the sitter's face were thinned so extensively as to reveal a free-hand, loose red underdrawing in the nose, mouth and jaw (figure 12).

Although little is known about the restoration campaign which caused damage to the *Portrait of a Young Man* in the past, photographic evidence has shown that a significant portion was present by 1884 (figure 5) (Gower 1884: No. 1). Photographic evidence suggests that by 1903, the restoration had occurred with which it arrived at HKI more than a century later (figure 13) (Bourke and Cust 1903: No. 42). The image from 1884 records an already patchy surface across the entirety of the face. It is unclear from the black and white photograph how much of the surface is original and how much has been retouched, however some areas appear to show hints of the scratches revealed during the most recent treatment. From the 1903 visual evidence, the restoration campaign that took place between 1884 and 1903 consisted primarily of adjustments to the existing restoration, as the main features in both photographs correspond more closely with each other than either campaign does with the remnants of the original beneath. This treatment also addressed the streaky pattern, which can be seen across the background and immediately surrounding the figure in the 1884 photograph. During treatment at the HKI it was discovered that this pattern consists of old, discoloured varnish trapped within the paint ridges, which had not been fully removed in the past, but could successfully be addressed with modern conservation methods. This pattern is also partly due to the texture in the paint. Lastly, it should also be mentioned that during this conservation treatment, a fingerprint was discovered in the original paint layer in the top right corner of the panel, which most likely belongs to Maler (figure 14).

The sitter and his social status

While the sitters of most of Hans Maler's portraits have been identified through either inscriptions or other documentation, the identity of this painting's subject remains unknown. There are no documented self-portraits by the artist, however in 1909, Émile Picot suggested that two different paintings could be self-portraits, as the sitter remained unidentified and appeared to be of the same man, but created two years apart.[9] This theory has fallen out of favour, however, as Hans Maler would have been older than the man represented in these paintings (Morath-Fromm 2016: 169). Picot based his suggestion that they were self-portraits on the fact that these paintings did not display inscribed names; however, these are not the only paintings which do not provide any indication of the sitter's identity. Disregarding portraits that could be identified by means other than inscriptions, and including the two mentioned by Picot and the *Portrait of a Young Man* discussed here, there are six portraits that depict unknown sitters, all of whom are men.[10] Picot offers no further argumentation for his choice

of the two works, which he proposes could be self-portraits. In 2008, Krause wrote that he believed that the sitters in *Portrait of a Young Man* and four further paintings were most likely rich members of the Schwaz community (Krause 2008: 65).[11] He suspects the unidentified portraits to be of members of either the local nobility or the wealthy sphere of people surrounding the Fuggers, since this is the case for many of the identifiable portraits in Hans Maler's oeuvre (Krause 2016b: 159). Although it is not possible to confirm who the painting portrays, it does uniquely have the artist's monogram prominently displayed, which is not seen in any other portrait associated with Hans Maler.

Although Krause's 2008 dissertation on Hans Maler only briefly discusses the clothes worn by the sitter in *Portrait of a Young Man*, his findings on clothing of the time more generally have been used here to delve deeper into the sitter's dress, which was an important indicator of status. The sitter is not wearing a *Schaube* (a precursor of the tabard), which is seen in many of Maler's portraits and was commonly worn by men and women of the upper middle class, and occasionally the nobility, during the early sixteenth century (Krause 2008: 97–8). In contrast, and following the German fashion of the time, he is wearing a black doublet (*Wams*). Around 1520, doublets started displaying tight, regular folds in the front section, which may be what the black and grey stripes are indicating in this painting, although in other portraits this feature is more prominent (Krause 2008: 101). It is also noteworthy that the man's shirt has a standing collar, which at this time was gaining in popularity over the previously lower cut style (Krause 2008: 103). It is conceivable that replacing a shirt to follow the fashion was more affordable than having a new doublet made. In keeping with the fashion of the time, the sitter presents himself wearing a version of a beret (*Barett*), worn slightly askew and dipping towards the sitter's proper left (Krause 2008: 104). Berets came in many different forms: some were more practical in nature such as the *Ohrenklappenbarett*, which served as a warmer alternative to the traditional beret, often lined with fur, with flaps that could be lowered to cover the wearer's ears (Krause 2008: 104). A more fashionable derivation of this practical garment can be seen in both the portrait of *Anna of Bohemia and Hungary (1503–1547)* from 1525 and the portrait of *Maria Welzer, born Tänzl (born 1506)* from 1524 (Krause 2008: 104). Both of these show the same elements found in *Portrait of a Young Man*: small flaps that reach to the ears and a button in the front centre which holds another set of larger flaps; these, however, do not appear designed for functionality. The beret is decorated with aglets and round, gilded studs or buttons. The sitter's hair is also in keeping with the contemporary fashion of the first half of the sixteenth century of a relatively short, straight haircut (*Kolbe*) reminiscent of a short bob, cut to end mid-cheek and with a straight fringe (Krause 2008: 105–6). Although beards came back into fashion around 1520, a clean-shaven face was preferred with the *Kolbe* (Krause 2008: 106). Finally, he is wearing a simple gold chain consisting of modestly sized links.

Across Germany, local regulations on dress existed, with transgressions being punishable by law. In reality, controlling dress was not easily achieved. Based on surviving paintings of the period, regulations were not always obeyed, although in the private sphere, in which portraiture was becoming more frequent, regulations were evidently more lax. Despite this, it is nevertheless worth considering the status of the sitter in *Portrait of a Young Man* through the lens of contemporary, local *Kleiderordnungen* (sumptuary laws). Draft regulations drawn up by Maximilian I in 1518, the year before his death, have survived (Krause 2008: 102). It is unclear if these were ever formalised, but regardless, they can offer an indication as to which restrictions different classes were subjected in the years immediately preceding the creation of Hans Maler's portrait.

> *Perlen, goldene Ketten und goldene Ringe um den Hals sollen jene, so nicht Ritter oder Doctoren sind, öffentlich nicht tragen; auch soll keiner einen Federbusch führen, der über zehn Gulden werth ist; aber Rosse und Harnische mag Feder haben wie gut er will, nach seinem Vermögen* (Anon. 1836: 411).
>
> [Pearls, gold chains and golden rings around the neck shall not be worn publicly by those who are not knights or doctors; also no one shall wear a plume worth more than ten guilders; but horses and armour may have as many feathers desired, according to one's wealth.]

The preceding passage establishes that persons of lower rank than knights or doctors are forbidden from wearing pearls and gold chains in public. The portrait of Maria Welzer, from 1524, is a clear example of the luxury some could afford, as evidenced by her large gold chains and numerous pearls on her beret. The Tänzl family were ennobled in 1502, giving Maria the right to present herself in this manner (Egg *et al.* 1986: 144). However, even a cursory glance through Maler's catalogue reveals that these rules were broken by many of the sitters. If this sitter is indeed a citizen from the circle of the Fuggers, then his golden chain – although neatly tucked behind his doublet – would technically be breaching the regulations. The following passage outlines the laws regarding the dress required for craftspeople, among whom Hans Maler would have been counted:

> *Die Handwerksleute und ihre Knechte und Jungen, auch der Bürger und Kaufleute Diener sollen kein Tuch von dem eine Elle über drei Ort*

einen Gulden kostet, tragen, auch weder Gold, Perlen, Silber, Sammet, Marder, Seiden noch Schamlot tragen. Dasselbe soll auch von der Handwerksleute Frauen, Kindern und Maiden verstanden werden, sich mit ihrer Kleidung also zu halten (Anon. 1836: 411).

[The craftspeople and their servants and apprentices, as well as servants of citizens and merchants shall not wear a cloth of which one ell costs more than three ort and a guilder, neither shall they wear gold, pearls, silver, velvet, marten, silk or Schamlot [a dense tapestry weight cloth made from goat and camel hair]. The same should be understood of the wives, children and maids of craftspeople, to hold themselves to these rules regarding clothing.]

The ban on wearing gold as a craftsperson would exclude the portraits brought forward by Picot, as well as *Portrait of a Young Man*, from being considered self-portraits. However, the level to which these laws can be taken as definitive remains unclear. It is feasible that the Fuggers and their entourage were able to disregard the regulations to some degree. Further research into the enforcement of the regulations at the time is required. Overall, it is clear that our sitter is afforded some luxuries, such as a gold chain, but does not show any of the same displays of wealth associated with the highest echelons of society as seen in the portrait of Maria Tänzl. This leaves the societal position held by the sitter inconclusive, but his outfit most consistently points to that of a nobleman, perhaps of middling rank.

The panel support

Unfortunately, the timber used for the panel could not be identified conclusively due to a painted reverse. However, from the end-grain and localised damages caused by nails from the fixing of the panel in a frame, it appears to be lime wood, which has been confirmed in several other Hans Maler portraits (Krause 2016a). It consists of a nearly radial section of wood, with the pith of the tree situated centrally just beyond the face of the panel. In terms of size, the painting is one of the smaller works attributed to this artist. Generally, the smaller formats in Maler's oeuvre appear to be used for the frequently reproduced, serialised paintings of members of the noble class, but there are no other known versions of *Portrait of a Young Man*. The reverse of this panel was painted with a red-brown paint, which is consistent with the presence of similar paint layers on one-third of the backs of the 42 portraits discussed by Krause in his catalogue raisonné. The back has been lightly bevelled towards the four edges, which has also been found consistently in other works (Krause 2016a), although no information regarding the reverse is available for one-third of the portraits in the catalogue raisonné. Several of the surviving paintings

Figure 15. Hans Maler, *Portrait of a Young Man* (Figure 1): detail. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

have been thinned and cradled or otherwise no longer retain their original reverse surfaces; two of the cradled examples still show signs of red paint,[12] and one has documentation recording that there used to be a family crest displayed on the reverse.[13] A few examples of more elaborate designs on the backs are known, and like the previously mentioned portrait, display the respective family crests of the sitters.[14] Historically, paintings were not always displayed hung on a wall in the same way as today, and the backs would probably have been accessible to the viewer, who could pick up and handle the painting to observe it more closely (Krause 2016b: 164). In other works by Maler, where the panel is too large to be handled easily, a heraldic, painted design on the reverse might be a sign that this painting once belonged to a diptych (Krause 2016b: 165). The paintings with the altered backs and missing information likely once also had either simple red paint on the reverse or a coat of arms design. The significant loss of information in these cases inhibits a comprehensive assessment of the overall distribution of painted backs and the frequency of coats of arms, but the portrait of *Anna of Bohemia and Hungary (1503–1547)* from 1525 displays a simple red backing, indicating that this was not reserved for customers with fewer means.

Evidence of the original frame (no longer extant)

Examining the front reveals an interrupted line of bright red vermilion paint along the edges of the painting, which appears to be the remnant of a paint scheme associated with the now-lost original frame (figure 15). Indeed, two paintings by Maler have survived with likely original frames: *Anna of Bohemia and Hungary (1503–1547)* from 1521 in Innsbruck (figure 16) and *Archduchess Mary (1505–1558), Later Queen of Bohemia and Hungary* from 1520 in London (figure 17) (Krause 2016b: 163–64). Although in-person examination would be required to confirm the original colour scheme of the frames, in their current state, both retain bright red paint on the innermost section of the frame. Krause has suggested that some of the paintings without inscriptions, or with information missing from their inscriptions, might have

Figure 16. Hans Maler, *Anna of Bohemia and Hungary (1503–1547)*, 1521, oil on panel. Innsbruck, Tiroler Landesmuseen, Ältere kunstgeschichtliche Sammlung, inv. no. Gem 1919 © TLM.

Figure 17. Hans Maler, *Archduchess Mary (1505–1558), Later Queen of Bohemia and Hungary*, 1520, oil on parchment on panel. London, Society of Antiquaries of London, © Bridgeman Images.

had supplementary information regarding the sitter or creation of the painting on the frame itself. He proposes this as the explanation for the awkward layout seen in the 1517 paintings of Sebastian Andorfer (1469–1537) (figure 11). Krause suggests that when the painting was removed from its original frame, probably still during the sixteenth century, the name of the sitter was transcribed onto the painting itself (Krause 2016b: 164). Using the same logic, it is plausible, therefore, that *Portrait of a Young Man* was once identifiable in its original form of display, but that information was not retained once the original frame was lost. It was also common in paintings of the time to have a sliding cover (*Schiebedeckel*), which would have protected the painting while not on display (Krause 2016b: 164). If this was the case for *Portrait of a Young Man* it may also originally have been a source of more information regarding the sitter, which has now been lost.

The inscriptions

As mentioned above, it is noteworthy that *Portrait of a Young Man* has very few inscriptions compared to most of the other portraits attributed to Maler. Overall, Maler's portraits can be separated into two distinct categories: those with inscriptions in German and those with inscriptions in Latin. The general trend was for portraits of the aristocracy to be inscribed in Latin, while those depicting members of the growing wealthy middle class (*Bürger*) were inscribed in the vernacular. There are three exceptions to this rule, where non-royalty portraits have inscriptions in Latin, and notably they depict members of the Fugger family.[15] As Latin was a language only understood by educated people, its use may indicate a distinction in status. The Fugger dynasty's high status through their commercial success and wide reach across the Holy Roman Empire at the time, as well as their close commercial ties with the Habsburgs, may explain the choice to have Latin inscriptions on the portraits they commissioned. The reverse is true for the pendant portraits of the ennobled Welzer couple.[16] The motivation for this apparent lowering of status is less clear.

A further distinction between the paintings can be found in the varying uses of Roman and Arabic numerals. Although Roman numerals had long been used, the adoption of Arabic numerals occurred in the late Middle Ages throughout the Germanic region. These were still used interchangeably in the fifteenth century so the appearance of both in Hans Maler's work is not unusual (Schneider 2014: 97). It is noteworthy, however, that in his surviving paintings, Roman numerals are used only in portraits from 1524 onwards. Additionally, the script used in his paintings deserves some attention. Almost all of the paintings' inscriptions are written in capital letters which resemble Roman lettering, but with a Gothic flair reminiscent of that introduced by Johann Froben in his Basel printing business.[17] The

script in Maler's earlier paintings, such as the one depicting Sebastian Andorfer (1517) (figure 11), is more heavily Gothicised than the later, simpler lettering employed by the artist. There is one notable exception, however, in one of Hans Maler's earliest known portraits (*Unknown Man*, 1519), where the script is distinctly Gothic in character, possibly a form of Texturalis.[18] This could be seen as an earlier stage in Maler's stylistic development, but equally, the script may have been requested by the sitter.

This is not the only instance of more embellished scripts, as some of the paintings of royalty also have a second inscription line with the date in rounder, more historicising script. Three of the artist's earlier paintings had a dedicated field reserved for the inscription, whereas later in his career, due to the inscriptions' placement and size, they sometimes appear as an afterthought therefore it cannot be ruled out that they were added later by a different hand. Barring those with no inscriptions at all (ten in total according to Krause's catalogue), the *Portrait of a Young Man* is the painting with the least information.[19] It is noteworthy that six of the paintings which do not bear any inscriptions are paintings of which there are multiple versions. These versions may have served a different purpose than the primary portrait, which might explain the differences in treatment. However, more technical research would be required to identify the creation process of these different versions. On this basis, it is worth considering whether another version of the *Portrait of a Young Man* was finished by Maler, which included more information about the sitter. However, if that were the case, the monogram remains puzzling, as it constitutes only one of two instances where Maler 'signed' his painted works, the two 'signatures' being completely different in style (see above for the inscription on the portrait of Anton Fugger and figure 3b).

Figure 18. Hans Maler, *Portrait of a Young Man* (Figure 1): near-infrared photograph. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

The underdrawing

During conservation treatment, extensive old retouching over the face and neck was removed revealing a red underdrawing that did not register in near-infrared photography, indicating that it is not carbon-containing (figure 18).[20] The strokes are sketchy and free in nature, roughly setting out the placement of the nose, chin and lips, as well as the shape of the jawline (figure 12). There is no indication that a pattern transfer technique was employed, therefore the underdrawing was probably executed freehand, possibly directly from life. This approach contrasts strongly with the precise paintwork in the artist's depiction of the hair and outlines in the figure. The underdrawing was done in a dry medium with a fine point, likely a sharpened red chalk. To date, no other example of such an underdrawing has been identified in the known portraits, although this may be due to the fact that traditional analytical techniques cannot typically visualise red underdrawing. Nine paintings are reported by Krause to have underdrawings consisting of a carbon-based black pigment identified through infrared reflectography (IRR). Krause's descriptions are too brief to infer whether the underdrawings are indicative of the use of a pattern, but he did note differing degrees of elaboration in the underdrawings imaged. The painting of Ulrich Fugger from 1525 at the Metropolitan Museum of Art in New York – another version of which can be found in Augsburg – serves as an example in which Hans Maler not only reused an existing composition in his work, but also used a pattern to do so. Portraits of Ferdinand I are the most numerous, with two different portrait compositions by Maler surviving: one with four versions (1521) and a later portrait composition represented by three versions (1524/5). Evidence of direct copying from a pattern is visible in the pair of portraits of Ulrich Fugger, which can be found in the Schäzlerpalais in Augsburg and the Metropolitan Museum, respectively. Infrared reflectography of the Augsburg portrait does not reveal any carbon-based underdrawing, but some hints of underdrawing have been identified visually (Krause 2016b: 114). As these underdrawings could not be seen in the photographic material available to the authors, it was not possible to confirm whether these may also be red, but the fact that they do not appear with IRR warrants further investigation. In contrast, the version from the Metropolitan Museum has an underdrawing that is visible with IRR and includes outlines made up of discontinuous lines indicative of transferral from a pattern (figure 19).[21] These two panels are of approximately the same dimensions and when digitally overlaid, their features align almost perfectly. The main difference

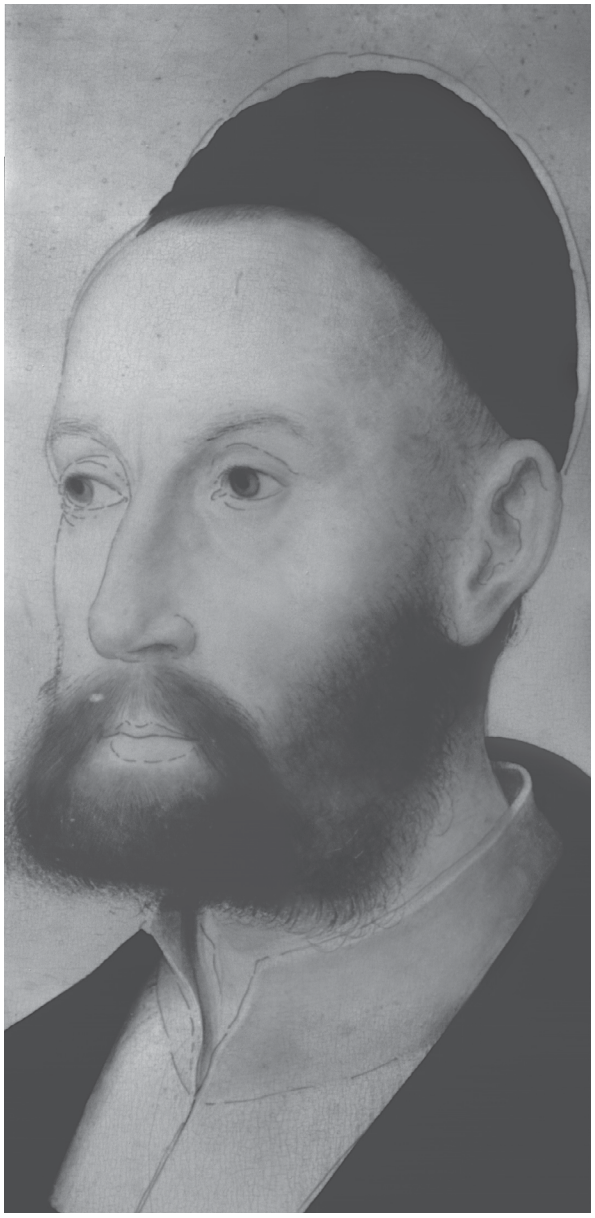

Figure 19. Hans Maler, *Ulrich Fugger (1490–1525)* 1525, oil on panel: detail of IRR. © New York, The Metropolitan Museum of Art.

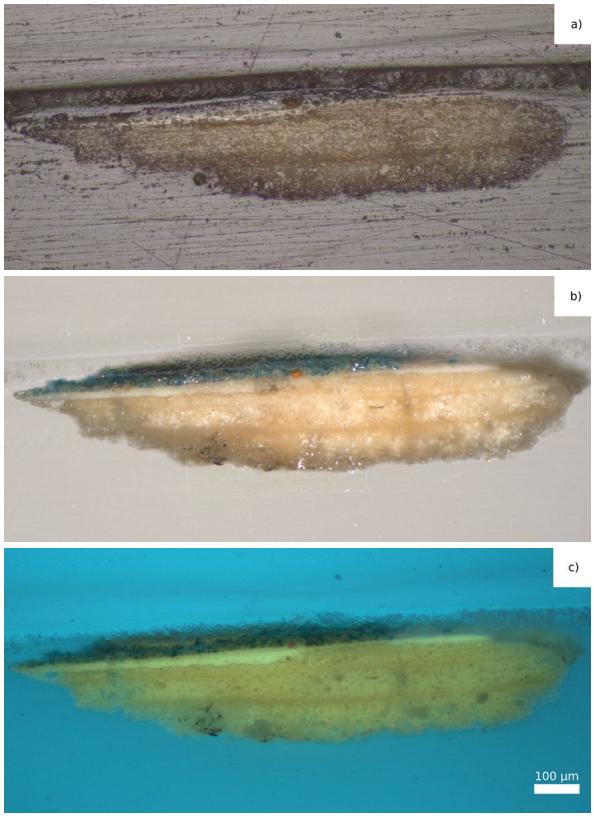

Figure 20. Hans Maler, *Portrait of a Young Man* (Figure 1): paint sample mounted in cross-section from the top right corner (a) in bright field, (b) in dark field and (c) in ultraviolet light. Photograph © Camille Turner-Hehlen, Hamilton Kerr Institute, University of Cambridge.

consists in a slight lengthening of the face in the New York version, with an associated slight lengthening of the nose. Additionally, the outline of the hat seen in the New York version underdrawing does not correspond with either painted version.

This, and other minor discrepancies evident through the digital overlay, might be explained by slight distortions introduced in the imaging itself, by slight shifting of the pattern during the pattern transfer, or possibly by the existence of a third version no longer extant, from which both portraits were copied. Additionally, this could be an indication that the pattern was used to transfer the scheme from a drawing to the various panels. It should also be noted that for more than half of the known portraits by Hans Maler, Krause's catalogue provides no information about underdrawings. This is probably due to the limited technical analysis undertaken on paintings by Maler, but might also be an indication of more portraits in his surviving oeuvre without evidence of a carbon-based underdrawing. It is also noteworthy that where carbon-based underdrawings have been found (nine portraits to date), these vary significantly. While most of Hans Maler's paintings have minimal underdrawing, some examples, such as the portrait of *Anna of Bohemia and Hungary (1503–1547)* in the Museo Thyssen-Bornemisza in Madrid, display more elaborate, precise underdrawing (Krause 2016b: 63). This is in stark contrast with the material and stylistic character of the underdrawing found in *Portrait of a Young Man*. To date, this painting's underdrawing remains unique within Maler's repertoire.

The palette

The overall palette was analysed using macro X-ray fluorescence (MA-XRF) scanning at the Hamilton Kerr Institute,[22] and a paint sample was taken from the top right corner of the blue background (figure 20) for additional analysis by scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDX). The three ground layers observed in the cross-section of the paint sample were confirmed as chalk by SEM-EDX, which is consistent with typical grounds in paintings from that region and time period (Stols-Witlox 2020: 164). The three

Figure 21. Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF maps of (a) lead (Pb-Lα) and (b) lead (Pb-Mα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

ground layers are clearly distinct from each other due to medium migration, which has left the upper part of the respective layers darker. Above the ground layer is a thin, uneven lead white priming layer confirmed by both SEM-EDX and MA-XRF scanning (figure 21a). The exposed priming visible along the edges is a light biscuit colour; this might explain the single red particle which is clearly visible above the priming layer in the paint sample.[23] In the top layer, tightly packed blue particles are found which protrude out of the medium along the top, resulting in a slightly grainy texture visible on the paint surface at close inspection. The copper content detected in this layer of blue particles is a clear indicator that the background was painted using azurite, which is unsurprising when considering that Schwaz itself was home to a copper mine operated by the Fugger family. SEM-EDX and MA-XRF have shown that in addition to the copper signal in the azurite paint layer, there were also consistent readings of zinc and arsenic. Association of these elements with antimony, which is found in trace amounts in the azurite-containing layer of the paint sample, constitutes an elemental fingerprint, which has been associated with the mines in Schwaz in *The Story of Patient Griselda* painted by an unknown artist *c.*1493–94 investigated by the National Gallery, London (Dunkerton *et al.* 2006: 63, n. 41).[24]

Despite a chalk ground having been confirmed through SEM-EDX, the MA-XRF scans only show calcium in the areas of loss within the paint surface (figure 22) due to the shielding effect of the lead priming layer observed in the Pb-Lα lead distribution map (figure 21a). The Pb-Mα lead distribution map reveals a more surface-level lead signal, such as the subtle use of lead white mixed into the black pigment to create the grey highlights in both the sitter's robe and hat. It also becomes apparent that the paint barb, which runs along the edges around most of the panel, was originally wider towards the bottom of the panel (figure 21b). Hans Maler appears to have reworked the painting after removing it from its temporary painting frame, but he did not use this opportunity to consistently add paint where it was missing along the edges. One of the more striking maps is that of iron which clearly displays the very fine brushwork used by the artist in the sitter's hair (figure 23). Iron is found not only in the hair, but also within the embroidery in the man's shirt as well as aglets and buttons on his hat. The date was inscribed in an iron-containing, bodied paint, which was then gilded with gold leaf. Iron is also found in the dull red paint deposits around the edges of the panel, which likely originate from a later frame. MA-XRF analysis also showed a subtle iron signal from the shading of the sitter's face, indicating that one or more earth pigments were employed to create the modelling of the flesh tones. The zinc readings are highly correlated with those of iron. Due to the age of the painting, a zinc pigment is unlikely, leading to the possible explanation that a zinc-containing earth may be present (figure 24a). The zinc signal is stronger in the mid-tones of the earth brown passages and strongest in the highlights of the hair, while only faint in the date. There is also the possibility that zinc vitriol was added to the paint to act as a drier. This was not an uncommon practice in the region, and evidence of zinc vitriol has been found in a 1524 painting by Lucas Cranach the

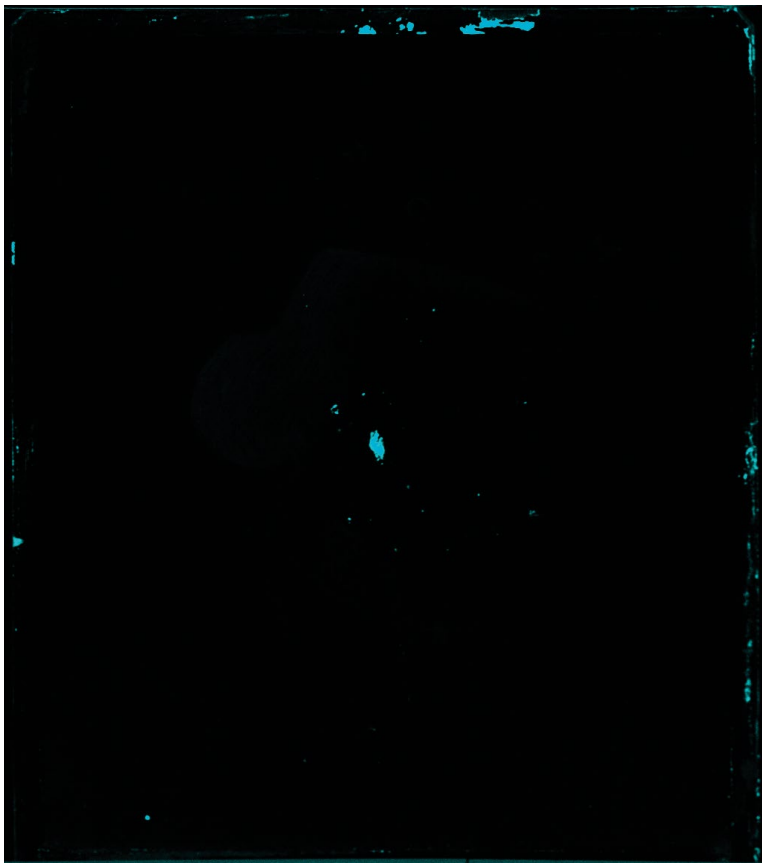

Figure 22. Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF map of calcium (Ca-Kα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

Figure 23. Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF map of iron (Fe-Kα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

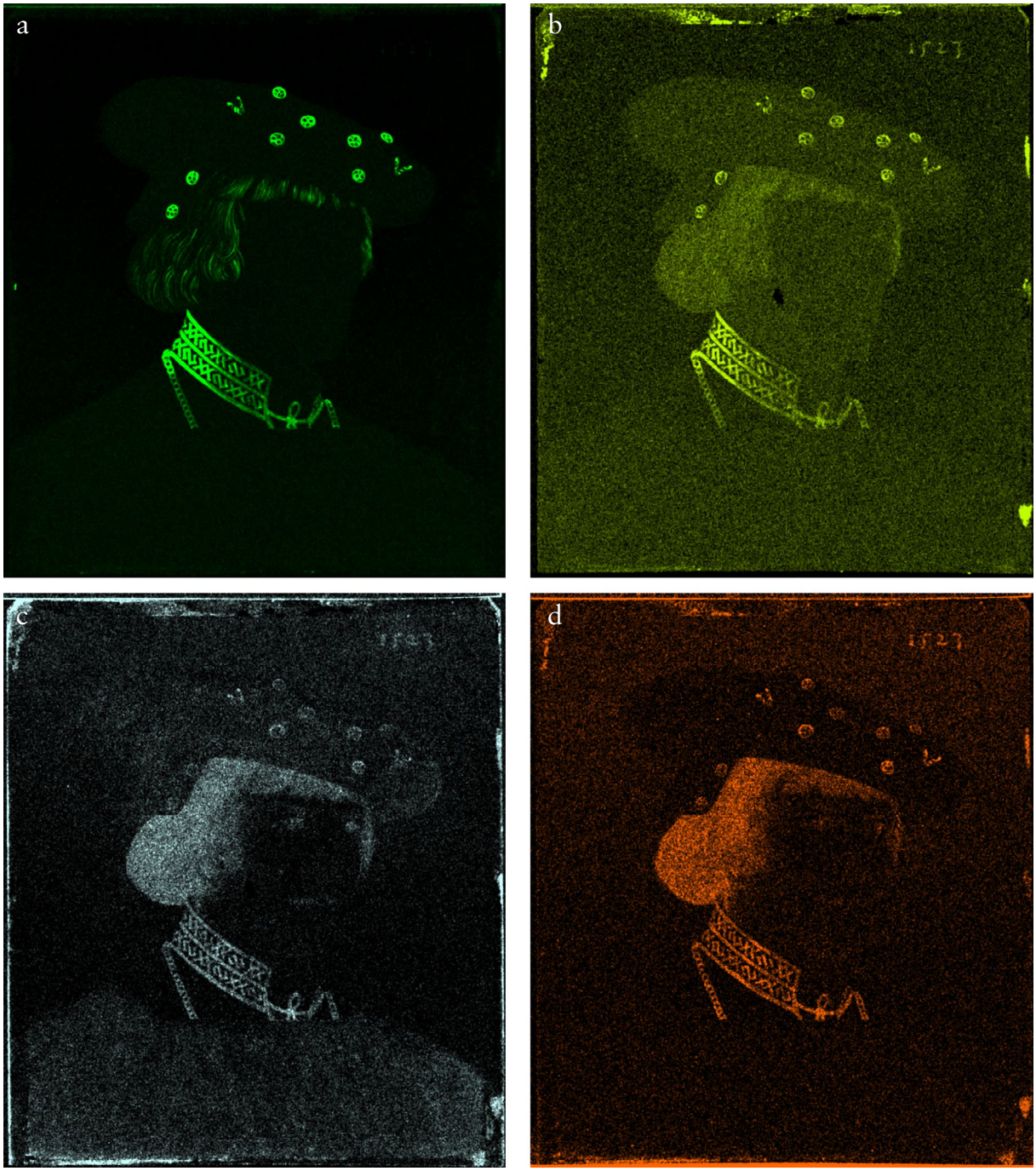

Figure 24 Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF maps of (a) zinc (Zn-Kα), (b) manganese (Mn-Kα), (c) potassium (K-Kα) and (d) titanium (Ti-Kα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

Elder (Zumbühl and Zindel 2022: 30). Manganese signals are also generally correlated with the iron signal, and on that basis, both umber and sienna were considered likely to be present (figure 24b). While sienna seems a probable origin for the manganese signal in the warm earth-yellow pigment employed for the embroidery and the hat jewels, it can clearly be seen that a stronger manganese signal is emitted from the darker brown brushstrokes in the hair. In addition, a faint manganese signal is also notable in the shaded areas of the face. This signal distribution points towards the use of umber for the final shading and finishing touches, which display a slightly grey tinge.

A similar colour scheme in the shading of the flesh tones is evident in other Maler portraits, such as *Unknown Man* from 1521 and the portraits of Ulrich Fugger. Potassium and titanium were also found to correlate with the presence of earth pigments (figure 24c and d); potassium is also found within the black garments of the sitter. The copper map confirms the SEM-EDX identification of azurite as the pigment used throughout the gradated sky (figure 25). The clear outline of the figure in the negative space of the copper signal shows that the artist employed a reserve when laying down the background. Close inspection reveals a copper signal coming from within the white of

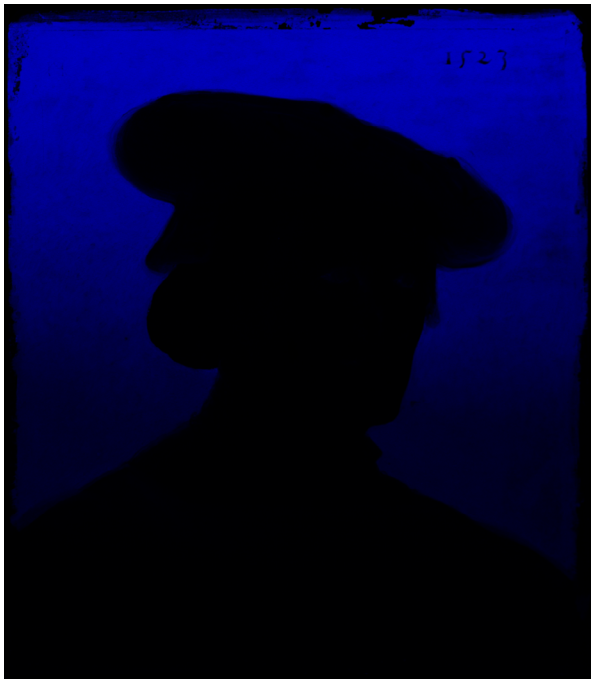

Figure 25. Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF map of copper (Cu-Kα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

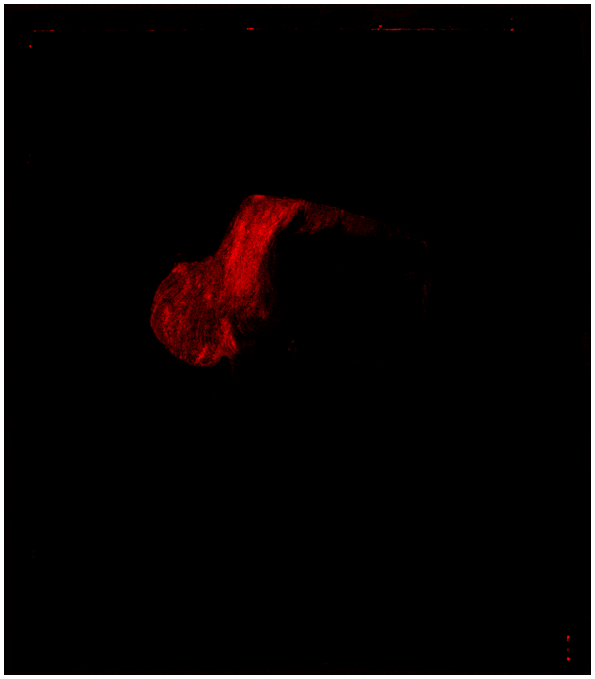

Figure 26. Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF map of mercury (Hg-Lα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

the eyes. Blue particles, assumed to be azurite, are visible under the microscope in these passages and throughout the rest of the face, where it constitutes a small admixture to the flesh paint. A mercury signal is evident intermittently along the edges and corresponds with the bright red lines painted with vermilion, likely associated with the paint scheme of the original frame (figure 26). Unexpectedly,

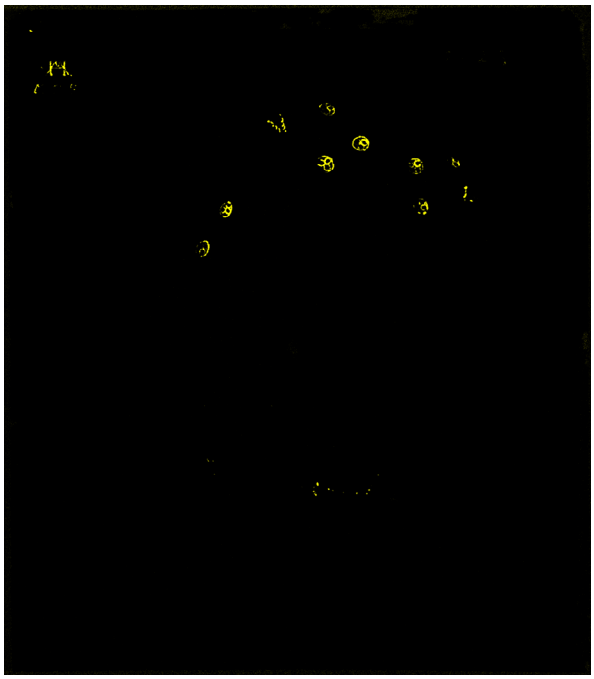

Figure 27. Hans Maler, *Portrait of a Young Man* (Figure 1): MA-XRF map of gold (Au-Lα). © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

the mercury map reveals a notable presence of mercury, presumed to be associated with the use of vermilion, throughout the passage reserved for the hair. However, unlike the distinct strokes relating to the depiction of the hair visible in the iron map, the mercury signal is patchier in nature and does not conform clearly to the visible paint application. Since close examination of the hair under magnification did not indicate the presence of vermilion in the brown paint itself, the mercury signal is therefore suspected to originate from a localised underlayer, perhaps employed by the artist to give the hair a warmer tone overall. Finally, the MA-XRF analysis also confirmed the presence of gold in the inscriptions, hat ornaments and remnants in the orange embroidery and string of the shirt (figure 27). These were all probably applied with a brush as shell gold.

Conclusion

While this article has demonstrated that many questions about Hans Maler remain to be answered in full, the authors hope that the research presented above, on an important work in this German artist's oeuvre, can form a starting point for further technical analysis into Hans Maler's methods and techniques. For the time being, *Portrait of a Young Man* remains singular in many ways. To date, no other publication has reported findings of red or highly sketchy underdrawings. The free manner of the underdrawing in this example indicates that the artist was likely drawing from life, unlike the approach taken in other known portraits, where the use of a pattern is evident. The monogram is a unique occurrence in Hans Maler's surviving oeuvre and could, tentatively, indicate that this work might

be a self-portrait. However, the analysis of the sitter's clothing within the context of contemporary and local conventions on dress points towards a lesser nobleman, rather than a painter, however successful. Although further research on the extent to which *Kleiderordnungen* were enforced at the time and on the status of painters such as Hans Maler may tip the scales in future, at this stage, the evidence makes it unlikely that the sitter is Hans Maler himself. In addition, his age should be considered. While his exact date of birth is unknown, he would have been at least 43 in 1523, and arguably therefore no longer a 'young man' by any standard, although the significant losses to the face, eradicating the finer details such as indications of wrinkles or sagging skin, make it impossible to conclusively identify the age of the sitter. Instead of a self-portrait, the smaller format and relative lack of inscriptions compared to other portraits might indicate that this portrait is one in a series.

Beyond the question of the sitter's identity, further technical investigation of other paintings would be needed to determine just how unique the various features of this 1523 portrait presented above are. A next step in the research of Hans Maler's portraits would be more in-depth investigation of his underdrawing technique, since only a few works have been investigated so far, to reveal more about this important preparatory aspect. This could help to establish whether the artist's use in this example of a sketchy, red underdrawing is indeed exceptional or not. A good starting point would be the painting of Ulrich Fugger held in Augsburg, as this work has in fact been assessed using IRR, which did not reveal the underdrawings that were visible to Krause with the naked eye.

Finally, more research could be done on the sourcing of Hans Maler's pigments. In particular – and given that he enjoyed the patronage of the Fugger family and worked in physical proximity to their copper mines – it would be of value to uncover more about the production and processing of azurite for painting purposes in the area, which Maler proceeded to make good use of in order to create his signature gradated blue backgrounds.

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Notes

1. Translated by the author as 'The pupil sits crookedly in the half profile.'
2. One exception is the portrait of Ferdinand I, Holy Roman Emperor, who is depicted in profile as on coinage, likely to increase his recognition. The only other known exception is the portrait of Jakob Fugger from around 1525, the whereabouts of which is unknown.
3. The painting was exhibited in 1906 by the Burlington Fine Arts Club and again in 1961 by the City of Manchester Art Gallery.
4. This stands for 'Hans Maler; Maler zu Schwaz'.
5. The monogram was first proposed by Gower as an indication of the artist's lost name. Gower 1884: No. 1
6. Translated by the author as 'Hans, painter of Schwaz'.
7. Translated by Nicholas Charles (friend of the author) as 'painter at Schwaz'.
8. No technical analysis was undertaken to identify the nature of this coating.
9. The paintings thought by Picot to be self-portraits are *Unknown Man*, 1521, Vienna, Kunsthistorisches Museum, Gemäldegalerie and *Unknown Man*, 1523, whereabouts unknown, previously in the collection of Émile Picot.
10. In addition to *Portrait of a Young Man* these are *Unknown Man*, 1519, Dresden, Staatliche Kunstsammlungen Dresden, Gemäldegalerie Alte Meister; *Unknown Man*, 1521, Vienna, Kunsthistorisches Museum, Gemäldegalerie; *Unknown Man*, 1523, whereabouts unknown, previously in the collection of Émile Picot; *Unknown Man*, 1524, whereabouts unknown, 1936 in Munich, Kunsthandlung A.S. Drey; and the painting sometimes identified as Hans Nesslinger: *Unknown Man (Hans Nesslinger)*, *c.*1524, private collection.
11. In his dissertation Stefan Krause follows the identification of one of the paintings as Hans Nesslinger (see note 9), but in his catalogue raisonné he is no longer certain.
12. *Joachim Rehle*, 1524, Dresden, Staatliche Kunstsammlungen Dresden, Gemäldegalerie Alte Meister and *Anton Fugger*, 1526, Philadelphia, Philadelphia Museum of Art, John G. Johnson Collection.
13. *Ulrich Fugger (1490–1525)*, 1525, New York, The Metropolitan Museum of Art, Bequest of Benjamin Altman.
14. *Anton Fugger (1493–1560)*, 1524, Děčín Castle, Czechia; *Anna Klammer von Weydach (1467–1527)*, 1524/5, Rotterdam, Museum Boijmans Van Beuningen; *Anton Fugger*, 1525, Allentown (USA), Allentown Art Museum, Samuel H. Kress Collection.
15. *Anton Fugger (1493–1560)*, 1524, Děčín Castle, Czechia; *Ulrich Fugger (1490–1525)*, 1525, New York, The Metropolitan Museum of Art, Bequest of Benjamin Altman; *Jakob Fugger, Gen. „Der Reiche" (1459–1525)*, 1525, whereabouts unknown, formerly Hemstede castles/The Netherlands, Catalina von Pannwitz collection.
16. *Moritz Welzer von Eberstain*, 1524, Vienna, Gemäldegalerie der Akademie der bildenden Künste and *Maria Welzer, born Tänzl (born 1506)*, 1524, Vienna, Gemäldegalerie der Akademie der bildenden Künste.
17. See Figure 1 in Sebastiani and Ricketts 2014: 226.
18. See Figure 11 in Schneider 2014: 54.
19. *Siegmund von Dietrichstein (1480–1533)*, *c.*1515, Weimar, Klassik Stiftung Weimar, Schlossmuseum

was not counted as there are horizontal lines which indicate an inscription had been planned.

20. Image captured using a Canon 100D camera fitted with a filter blocking wavelengths below 760 nm. NIR range: 760–1000 nm.
21. Image available online at: The Metropolitan Museum, n.d., *Ulrich Fugger (1490–1525)*. Available at: https://www.metmuseum.org/art/collection/search/436942 (accessed 31 March 2024).
22. MA-XRF scanning was undertaken using a Bruker M6 Jetstream macro-XRF scanner. The measuring head consists of a 30 W rhodium-target microfocus X-ray tube, with a maximum voltage of 50 kV and a maximum current of 600 μA, fitted with poly-capillary optics which allow a variable beam size (*c*.50–580 μm depending on the working distance used). The instrument is equipped with two 60 mm^2 silicon drift X-ray detectors with an energy resolution < 145 eV for Mn Kα. The data shown were acquired using both detectors set to a 275 kcps threshold with the X-ray tube set at 50 kV and 600 μA. The dwell time at each pixel was 13 ms and a pixel spacing of 235 μm was used along with a 220 μm beam size. The images shown are coloured 8-bit MA-XRF element distribution maps that were generated using the deconvolution feature within the Bruker ESPRIT software, with additional pixel binning and element map subtraction applied when appropriate and as noted.
23. This pigment may equally be a contaminant, as it does not appear to sit within the layer, but more likely above. It cannot be determined conclusively what pigment it consists of, as SEM-EDX has registered signals of both iron and lead. However, the other reading from that pigment particle – aluminium, potassium, oxygen, zinc and silicon – are more indicative of an earth pigment.
24. Although the National Gallery's study only looks at one painting, there is further promising work being done researching the origins of azurite pigments (see Aru *et al*. 2014 and Capriotti *et al*. 2023).

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From Adoration to Resurrection: the reconstruction of Sebastiano del Piombo's *Adoration of the Shepherds*

YOUJIN NOH AND RUPERT FEATHERSTONE

Abstract This paper describes the conservation treatment of a major, but extremely damaged, work by Sebastiano del Piombo, belonging to the Fitzwilliam Museum, which had been considered beyond redemption. A transfer from panel to canvas in France in the eighteenth century had caused extensive paint loss, and multiple subsequent campaigns of restoration and repainting had further compromised its legibility and attribution. The nature of the losses, multiple large lacunae and extensive fine-scale abrasion, required the development of a specific approach to the reconstruction of missing areas of the composition and process of inpainting. Analysis of the remaining paint was a crucial part in understanding Sebastiano's technique, coupled with the study of his other paintings and those of his contemporaries. The reconstruction was aided by study of an early and accurate copy, on loan to the Hamilton Kerr Institute from the Musée du Louvre, but which itself was also obscured by extensive old overpaint in many places.

Introduction

The conservation treatment of the Fitzwilliam Museum's *Adoration of the Shepherds* by Sebastiano del Piombo (figure 1) has been one of the largest, longest and most involved projects undertaken at the Hamilton Kerr Institute. Heavily and crudely overpainted in almost every part, it was known that the original surface had suffered extensive paint loss at an early date, and its compromised appearance had consigned it to the stores for many decades. It was one of the first paintings from the Fitzwilliam Museum to arrive at the recently founded Hamilton Kerr Institute in October 1977, but it was unclear whether treatment would be either possible or worthwhile. The directors of the Fitzwilliam Museum and the Hamilton Kerr Institute at that time, Michael Jaffe and Herbert Lank respectively, were initially reluctant to contemplate committing what could be a huge amount of time and resources to a project with such an uncertain outcome, but were persuaded by Ann Massing (assistant to the director and a senior conservator at the Institute) that this was far too important a painting to languish in limbo. She undertook the first cleaning tests in 1979. These, and the examination of X-radiographs and infrared reflectographs unavailable to previous restorers, allowed a better appreciation of the magnitude of the task ahead, but also provided reassurance that some significant passages of the original had survived, most obviously the well-preserved figure of the Christ Child, which was freed of overpaint thereby demonstrating without doubt the high quality of the painting. But it was not until almost three decades later that the resources to proceed with a full treatment became available. The decision to proceed with the treatment was taken by the late David Scrase, Keeper of the Paintings at the Fitzwilliam Museum, in close consultation with Ian McClure, then director of the Hamilton Kerr Institute and with the late Renate Woudhuysen-Keller as the lead conservator. The impetus was in part a response to the widespread perception that the painting was beyond redemption. The entry on the *Adoration of the Shepherds* in the 2008 Vienna Sebastiano exhibition catalogue reads: 'However much it may be painful to say this, the painting must at present be considered lost' (Strinati 2008: 128) (figure 2).

One of the most daunting tasks facing any conservator is the reintegration of large losses of original material, especially where these lacunae have fundamentally undermined the meaning of the work of art. In many fields of conservation, such an act of restoration is no longer considered appropriate: the principal aim of treatment and care is to slow down the processes of decay and ageing without any attempt to replace lost material. The fragments are allowed to speak for themselves, although structural reconstruction to enhance the stability and allow the physical display of these objects may be undertaken, with the lacunae left blank. However, in this case, the need to preserve the illusion of the picture space dictated how integration and retouching was approached. Traditional painting conservation involves retouching or overpainting the losses in a damaged painting and reconstructing the image completely. If not finely judged, this approach risks distorting the artist's intention and negating the historical truth of its condition, and may leave the observer unclear about what exactly they are seeing.

Conservators and intellectuals have long debated the question of balancing an appreciation of the authenticity of a work of art against the extent of

Figure 1. Sebastiano del Piombo, *The Adoration of the Shepherds*, *c.*1512, oil on panel (transferred to canvas), 163 × 126 cm, The Fitzwilliam Museum, Cambridge. Photo *c.*1977 on its arrival at the HKI. Before cleaning. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

any reconstruction, and the solutions that have been put into practice have sometimes proved controversial. Because the retouching materials used by the conservator nowadays are reversible, any restoration can be removed safely and will not pose a risk to the long-term safety of the painting. However, the ethical and aesthetic decisions and the technical challenges of successfully imitating the aged surface appearance of the work are complex and demanding, and have important implications for our understanding of the painting and its context.

Previous history of the painting

The Adoration of the Shepherds was a case study in the traditional approach of full-scale restoration of losses. Attributed to Sebastiano del Piombo by Lionello Venturi just over a hundred years ago for formal reasons (since all evidence of colour and technique was hidden under extensive later overpaint) the picture, as it then stood, was the result of layers of confused visual miscommunication. Restorer after restorer had applied layer upon layer of opaque overpaint to correct the perceived inadequacies of earlier restorations thereby recreating the painting to conform to their own conceptions and moving further away from the original in the process. Perhaps with good reason, they were hesitant or unable to undo the work of earlier generations to try to uncover what might survive below. Although with hindsight we can criticise those who have gone before, we may be generous and assume that their efforts were, for the most part, well-intentioned. But the final result of their endeavours was only a faint shadow of a work believed to be by one of the greatest masters of the Italian High Renaissance.

The most significant result of the technical examination of 1979 was the revelation that the picture was originally painted on panel. The paint layers had been transferred onto canvas at some point, which must have been the prime cause of such a ruined state. This raised the question of when this had taken place and what was the chronology of the subsequent restorations which had cumulatively resulted in the present appearance of the painting?

The *Adoration* had long been part of the collection of the Duc d'Orléans, with an attribution to Giorgione, and according to *The Description of the Paintings of the Palais Royal*, published in 1727, the *Adoration* was then on panel. When the Orléans collection was sold in London after the French Revolution, the dealer Buchanan recorded that this painting was estimated at only 300 guineas, a very low price for a work by Giorgione of such a respectable size (Goodison and Robinson 1967: 151–52). Despite the low estimate, the painting was left unsold at the first sales in 1798–99 but was later bought by Viscount Fitzwilliam in 1800 for only half the price. This seems to indicate that the painting was already considered significantly damaged at the time of the sale.[1]

In the eighteenth century, the transfer of a painting from one support to another became fashionable in France, and was much practised by some restorers as a way of showing off their skill. Transfers were executed for a number of practical

Figure 2. Sebastiano del Piombo, *The Adoration of the Shepherds*. After cleaning. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

reasons including: to flatten a painting on a panel which had warped; to alleviate recurrent paint loss and flaking; simply for aesthetic reasons; or sometimes to facilitate transport, since a canvas is much lighter than a wood panel, especially in the case of large-sized paintings. During the conservation of the *Raising of Lazarus* at the National Gallery, London, also from the Orléans collection and sold at the same time as the *Adoration*, it was discovered that the transfer had been executed in 1771, apparently by Jean Louis Hacquin as indicated by the inscription on the reverse (Dunkerton and Howard 2009).[2] It has therefore been suggested that the *Adoration* could have been transferred by the same restorer and possibly at the same time as this painting while it was still in the Orléans collection. This suggestion is supported by Richard Payne Knight's claim that the Venetian pictures in the Orléans collection 'all had been more or less injured – many of them utterly ruined by the French cleaners, first employed to repair, or rather destroy them, about the year 1778' (Clarke and Penny 1982: 102).

Comparing recorded transfer techniques available in the eighteenth century (Massing 2012), it appears that the *Adoration* was most likely transferred at least once by the technique used by Robert Picault, which aimed to preserve the support so that the transferred painting could be exhibited next to the undamaged support for the sake of showmanship.[3] This often resulted in serious damage to the painting from the use of nitric acid to separate the paint layer from the support and may explain the grave nature of the damage to the *Adoration*. However, there is other evidence that points to Hacquin's method, such as the occasional presence of a pale grey gesso underneath the paint, and the use of newspaper as part of the lining materials.[4] By whom the *Adoration* could have been transferred remains uncertain, although further evidence supporting the Hacquin theory was the discovery of a piece of very old gauze under the paint layers after the recent cleaning, clearly from the first transfer.

As a consequence of the damage caused by the transfer, many restorations were undertaken in the following years to cover and repair both the damage and the subsequent problems of flaking paint. The multiple changes in the appearance of the painting can be seen by reviewing the published images over the last century, However, few of the restorations have been documented. The painting was consolidated in 1863 with restorers remarking that the previous cleaning had been carried out in an abusive way.[5] In 1879, the painting was cleaned but no detailed record is available. Another consolidation is recorded in 1930, and around the same time a second transfer was carried out in order to resolve the constant flaking problem, but no detailed record is available.[6]

The altered appearance of the *Adoration* was probably responsible for the confusion in the attribution of the painting, which had been given to a number of Venetian artists. When Lionello Venturi (1913) attributed it for the first time to Sebastiano, Berenson believed that it might either be an old copy of a work by him or an original work 'poorly touched up' (Strinati 2008: 128). The crudely applied overpaint covering the original painting was not only aesthetically difficult to appreciate,

but was also misleading to both professionals and the public, leading to misinterpretation of the quality of its execution.

There is not much detailed information available on the condition of the painting prior to its arrival at the Hamilton Kerr Institute except for the remarks made by the former director of the Fitzwilliam Museum, J.W. Goodison, after the X-radiograph taken in 1964:

> The X-rays show very extensive damage indeed. The whole area of the painting is covered with patches of damage, many of them complete loss of paint, ranging from quite small areas to large ones as much as 18 inches in length. There can hardly be a place on the canvas where there is more than half an inch between two adjacent areas of damage. … almost entirely the work of restorers of the past.[7]

Cleaning

Having been re-transferred around 1930, the painting was now structurally stable. However, the paint layers, including the *imprimitura* and ground layers, were severely damaged with about 40% of the surface area of the painting lost.

In certain areas, such as the Virgin's drapery, where only very little original material remained, at least six layers of overpaint could be observed in the paint sample cross-sections. The colour of the Virgin's drapery had been modified to green, covering the few surviving fragments of original paint, which was revealed to be blue. The only places in the entire painting where original paint was visible were some parts of the landscape on the left and the Virgin's sleeve.

Prior to the first cleaning tests in 1978/79, X-radiography and infrared reflectography (IRR) were undertaken, which revealed the extent of the losses of original paint, although these methods could not quantify the extent of any fine-scale abrasion or how much of the upper paint layers had survived in good condition. Therefore it was decided that the only way to fully appraise the condition of the painting was to completely remove all the old restorations – the multiple layers of overpaint, varnishes and fillers present on the surface of the painting – which masked what was left of the original paint, providing this could be achieved safely. After this, the lacunae and the overall condition of the remaining paint layers could be evaluated properly before deciding on the next steps.

The multiple layers of overpaint appeared to be oil-based paint with resinous varnish layers in between. The degree of ageing of the layers from different periods varied, making the cleaning process even more complex.[8] The cleaning revealed many severely abraded remnants of original paint, and in some passages, such as the background behind the Virgin, only a few traces remained of the upper paint layers. In other areas, broken paint particles within an area of damage had been glued back together without any order, giving a mosaic-like effect of small tesserae. In some places the paint surface was wrinkled, sometimes leaving deep indentations. It retained the marks of the old lining canvas, probably the result of the pressure, heat and moisture applied during the transfer process.

About ten different types of fillers – wax-, oil- and water-based in different colours – were found across the surface of the painting. Filling material was applied all along a wide strip running across the bottom edge to enlarge the size of the image,[9] fill the lacunae and indentations caused by wrinkles across the surface, and to cover older fillers. Most had spread over the edges of the lacunae and covered the original paint but occasionally overpaint was applied directly onto the lining canvas without a filling.[10]

The approach to reconstruction

After the long and complicated process of removing all the layers of overpaint and filling the losses, it was necessary to address the thorny question of how to reconstruct the areas of paint loss, if at all. At this point, the existence of a copy in the Musée du Louvre (figure 3), which had not previously surfaced in the literature, became known.[11] This well-painted work is early in date (certainly predating the transfer of the Fitzwilliam painting) and apparently reliable in detail, albeit heavily overpainted in many passages. This made the full reconstruction a possibility, especially as there were no other engravings or reproductions of the composition known at that point. The contours of the composition of the Louvre painting were traced and found to be very accurate in the parts which were visible and not obscured by overpaint. Unfortunately, the copy was also covered by a severely discoloured varnish and widespread repainting in many passages, notably all of the top edge, the head of the shepherd on the left, and much of the lower right corner of the painting.[12] It also appeared likely that the copy had itself been transferred from canvas to canvas due to an unusual paint layer structure and the presence of a diffuse and obscuring lead layer under the ground layer, which might have been used as an adhesive for a transfer. This was dense enough to prevent successful X-radiography. This hypothesis was confirmed recently when the Louvre version underwent treatment: after the removal of the old overpaint, evidence of the original canvas weave was found as an impression in the ground layer applied to the back as part of the transfer process.

Some of the ambiguous information provided by the remnants of paint in the *Adoration* could be understood by simply comparing them to the equivalent area in the Louvre copy. But because of the thick overpaint in some other areas of the copy, and the lack of a usable X-radiograph, it was at first difficult to decipher the original forms in two very critical passages of the copy, unfortunately corresponding to the two large lacunae in the lower

Figure 3. After Sebastiano del Piombo, *The Adoration of the Shepherds*, 16th century, oil on canvas, 104 × 161 cm. INV 825; MR 196 From C2RMF, Musée du Louvre © 2010 R.M.N./Thierry Le Mage.

section of the original. Macro-X-ray fluorescence (MA-XRF) scanning, developed by Koen Janssens and his colleagues at the universities of Antwerp and Delft, was vital in unveiling the composition under the dark varnish and retouching layers of the Virgin's drapery and the left foreground in the Louvre copy.

There are a number of options open to the conservator when treating a paint surface which has lost a significant amount of its integrity. One is a minimal approach, leaving the damaged paint surface and lacunae as they are, or toning the losses down with a neutral colour. This is often appropriate when treating an archaeological object in which a fragmentary state is generally considered more acceptable. This had previously been proposed for the *Adoration* because the painting was considered too damaged to attempt to find within it a credible integrity. After much deliberation and consultation, the decision was taken to reconstruct the missing sections of the composition mimetically, to return the painting to a state close to its original appearance and restore its aesthetic unity so it could be appreciated once more as a work of art.[13] There were enough remnants of original paint in and around the lacunae to allow reconstruction of the composition with a reasonable degree of certainty, and, with the added confidence afforded by the long-term loan of the version from the Louvre to the Hamilton Kerr Institute, for the larger lacunae.

The evidence provided by the remaining paint is always the prime starting point for compositional reconstruction. To support this, research on the painting technique of the *Adoration* was vital (Kimbriel and Noh 2012), aided by imaging analysis using IRR and X-radiography to confirm certain details. Research on similar figures in other paintings by Sebastiano and his contemporaries was very informative, and a lay figure was used to study the behaviour of draperies in different fabrics, as was the practice in the Renaissance. Studying a live model was essential in order to understand the play of the light on the different elements, such as muscle on the face or body. MA-XRF scanning provided images of the areas hidden under the overpaint of the Louvre copy; this clarified many of the questions posed by the two biggest areas of loss in the *Adoration*. Photography and Photoshop were also extremely useful tools for visualising all the information more clearly.

The aim of reintegration of the losses is not to try to replicate the exact state of the painting when it left the artist's hands. Although a significant amount of information is held by the remnants of the paint, there is too much loss to be absolutely certain of its original appearance, which in any case can never be regained. The important principles are not to falsify and mislead the viewer by completely effacing any trace of the past or creating a new painting according to the restorer's own personal interpretation of the original state. With this in mind, it was decided that a retouching method which would be illusionistic at normal viewing distance, but distinguishable from the original paint at closer quarters, would be the best approach for the *Adoration*; it also needed to successfully mimic the aged surface character of the surrounding surviving paint surface.

Some widely used retouching techniques to achieve this purpose are pointillism and *tratteggio*. However, rather than simply choosing one of the currently known retouching methods, it seemed more sensible to approach the *Adoration* taking into account its particular state and technique. The line-layering retouching method (see below)

developed was based on the painting technique of the *Adoration* itself – its use of glazing and its abraded condition – and made much use of preparatory drawings. It seemed the most appropriate way of progressively reconstructing such extensive lacunae and achieving the desired 'semi-illusionistic' result.

Materials and methods

Choosing stable and reversible materials is a fundamental principle in conservation, and the considerable amount of retouching needed for the restoration of the *Adoration* demanded very careful and reasoned decisions to be taken on the choice of materials employed. The first consideration was to keep each layer as simple as possible in terms of its materials; minimising the number of different materials within a paint layer is advantageous to reduce the risk of various different ageing properties causing a colour change or otherwise adversely affecting its long-term behaviour.

The second consideration was to ensure that each layer possessed a different solubility. In the case of retouching large lacunae, it might at times prove necessary to remove the last layer of retouching for modification, therefore ensuring that each layer had a different solubility was vital as it would allow for the removal of individual layers without disturbing the underlying ones. There were many abraded areas in the original paint layer which required retouching, although ideally this needed to be kept as minimal as possible. The resin had to be soluble and removable in a non-polar solvent that would not affect the aged original paint layer at any stage. The medium for retouching the abraded areas on the original remnants of paint would also be used as the final layer throughout the painting, thus ensuring a homogeneity of appearance and ageing over the whole surface. In addition, it was necessary for the medium to have a similar refractive index to the oil in order to imitate the transparency of the original colour. Importantly, a non-toxic medium would be required for health and safety reasons: the conservator would need to spend a large amount of time retouching this painting. Taking all this into consideration, a small number of appropriate materials were also tested for their practicality in handling and suitability for the conservator of the *Adoration*. MS2A, a poly-cyclohexanone resin dissolved in mineral spirits, was chosen as the isolating varnish as it possesses the right qualities of handling, visual appearance and reversibility.

Prior to retouching, a suitable filling material had to be selected that could not only cover large losses but also be textured to mimic the surface of canvas. The considerable size of the lacunae – such as the 30 × 50 cm loss in the Virgin's drapery – required a filler with good bonding properties as well as plasticity to allow effective imitation of the texture. A mixture of chalk, animal glue and stand oil as a plasticiser was found to be an appropriate material. This filler is water-based and easily reversible, and its solubility differs from the resin-based retouching medium. Texturing took place with the aid of raking light, which was projected from several different angles successively to ensure continuity in the texture of the surface from original paint to the retouched areas.

Texturing the surface of the lacunae after the initial filling is a crucial stage for successful retouching: uneven texture can disturb the final appearance despite a perfect colour match. In addition, in the case of extensive lacunae, imitating the texture and directional brushwork of the surrounding area helped to interpolate elements of the possible original composition such as the Virgin's drapery. Raking light revealed that the drapery was painted with a large brush, giving a clue to the direction of the folds. The brushstrokes truncated by the losses were reconstructed, helping to clarify the possible disposition of the major folds (figure 4).

The line-layering retouching method was developed taking into consideration the three different types of losses: the fine-scale micro-losses due to abrasion on the paint surface; relatively small paint losses; and large-scale lacunae. The biggest of these, measuring approximately 50 × 30 cm, presented the most challenging task in finding the right approach and method of retouching. In this technique, a group of lines is applied to imitate a wider brushstroke of an original thin paint layer. These series of layers made of lines are then built up by varying the number of layers to create colour and shape, and thus volume. It is important to change the direction slightly of the group of lines when juxtaposing layers in order to melt or blend the appearance of the lines. This process is repeated until it resembles a solid shape with a convincing composition, with the depth of colour obtained through the blending of the lines. This method also follows the idea and practice of the Venetian painting technique used by Sebastiano in the *Adoration*: the final colour is obtained through the use of multiple thin glaze layers of paint, and the colour is created on the paint surface rather than mixed on the palette. This retouching method, which recreated the transparent appearance of the original upper paint layers, was highly successful, especially for retouching the Virgin's drapery. The first paint layer, imitating the pink *imprimitura*,[14] was executed in Paraloid B72 in methoxy-propanol, which did not affect the texturing in the filler beneath. The upper layers of retouching were carried out with MS2A in Shellsol D40, which has a different solubility from the underlying layer of Paraloid B72.

Making the painting more legible through judicious retouching of the smaller losses was necessary before beginning the process to delineate the lost details within the larger lacunae. The minimal retouching process left the original paint remnants untouched and filled the lacunae, imitating the abrasion of the surrounding areas in

order to try to avoid any misinterpretation while retouching the gaps caused by the abrasion. The micro-abrasions had left the paint surface with the illusion of strong horizontal hatching, following the wide brushstrokes of the *imprimatura* layer. The relatively small losses were therefore retouched in horizontal hatching to imitate the abrasion. Once the losses had continuity with the appearance of the adjacent original areas of paint, the details of the composition became much more legible. This also revealed how much information was still present in the remnants of paint which, combined with thorough research and the analysis of the Louvre copy, allowed reconstruction of the composition in most of the missing areas.

Despite the improved clarity of the painting and the presence of the copy, determining how to reconstruct the two largest lacunae was still difficult. A starting point was needed on which to build up the shapes and volumes and allow correction at any point of the retouching process. To achieve this, preliminary drawings, an essential practice for Renaissance artists, were made based on the remnants of the paint and other related images. These provided a better understanding of the painting and resulted in surprising discoveries from the scrutiny of every single fragment of surviving paint. It must be emphasised that the drawings were utilised as a means of investigation (in the same way as artists use them), and to provide information on the possible original composition, but they were not used to dictate the exact details of the final reconstruction.

As in any other reintegration or reconstruction, it was essential to understand the painting in context in terms of style and technique. In the *Adoration*, most of the figures are not exact imitations of nature. For example, the outstretched arm of the shepherd behind the Virgin is too long, and the hands of the shepherds are oversized. The long outstretched arm helps to break what otherwise would have been a division of the painting into two halves, and the exaggerated size of hands is an element frequently observed in other works by Sebastiano.

Attempting to determine the artist's intention in the larger losses involved an almost constant process of reflective practice. Assumptions had to be questioned at all stages and the conservator had to remain open-minded in terms of other possible interpretations during the course of the restoration.

The Virgin

The Virgin, the principal figure in the *Adoration*, demonstrates the exceptional skill of the artist. However, the blue drapery had lost almost 90% of its paint layers, leaving only a few small islands of original paint in which – despite its poor condition – the expertly executed and jewel-like colour could still be appreciated. In order to determine an appropriate reconstruction process for such a large lacuna with very limited primary information, thorough research on several fronts was necessary.

Figure 4. Detail of *The Adoration of the Shepherds* showing the filling on the paint losses. The textures were created, following the artist's brushstrokes, which were visible under raking light. Texturing the filling was one of the major steps in retracing the original composition of the drapery. The raking light revealed that the drapery was painted with a large brush which followed the direction of the folds. The brushstrokes were reconstructed and clarified the possible disposition of the drapery such as the angles of the major folds. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

First, Sebastiano's style and technique in the drapery in the *Adoration* were analysed, based on the better-preserved parts of other figures and the copy from the Louvre, and drawing upon the cross-sections of paint samples. A separate reconstruction was made to recreate his technique (for more information see Kimbriel and Noh 2012). The study provided fascinating and comprehensive information about Sebastiano's Venetian colouring technique, which was essential to determining an appropriate retouching material and method. Finally, the potential design for the lost part of the drapery was suggested by stepping back into the creative process that Sebastiano himself might have used, and by researching the drapery painting practice of contemporaneous artists before making technical reconstructions to finalise an appropriate design for the lost drapery.

The key to the liveliness of the colour of the surviving paint in the Virgin's garment was found to be the use of precious pigments of high quality and the artist's sophistication in the Venetian glazing technique, which is based on the optical mixing of colour (Kimbriel and Noh 2012). The paint sample analysis revealed that only three pigments were used in the Virgin's garment: ultramarine, red lake and lead white, with a small amount of black added in the darkest red lake areas. There was no mixing of pigments in any layer other than with lead white: the result of the artist's carefully predetermined plan for the build-up of the paint layers. The undermodelling was planned in red lake and lead white, its tone and intensity determining the final hue of the blue and hence defining the modelling of the folds. A final thin glaze of

Figure 5. Reconstruction to study the technique used for the drapery of the *Adoration*. Undermodelling of the drapery in red lake. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Figure 6. Reconstruction to study the technique used for the drapery of the *Adoraion*. Glazing with French ultramarine over the red lake. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Figure 7. A lay figure was made of clay and clothed with different fabrics and compared to the painting under the same fall of light in order to identify the probable fabrics intended by the artist. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Figure 8. Drapery study after the lay figure, oil on canvas. The folds were drawn in black and white in oil, as a means of studying and practising the painting of drapery. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

pure ultramarine was then applied to finalise the shape of the drapery. Each paint layer was thinly applied as a glaze and allowed to dry prior to the application of the next layer, thus avoiding any unwanted admixture of pigments (figures 5 and 6).

Sebastiano was clearly aware of the different nature of fabrics while painting the *Adoration*.[15] He was renowned for his great skill in depicting the exact nature of fabric, as is shown in Vasari's praise of the *Portrait of Pietro Aretino* (1534–35, Palazzo Comunale, Arezzo):

> The picture is wonderful, if it were only for the difference which the painter has made so clearly obvious in the various kinds of blacks, not less than five or six, to be seen therein; velvet, satin, silk of Mantua, damask and cloth namely all black, with a very black beard, finely distinguished on this sable clothing, and all so well executed that life itself could scarcely be more life-like (Vasari 1998: 68).

The Virgin's clothing seems to be composed of three different fabrics. The red garment has the appearance of a moderately thick fabric with stiff folds on the sleeve, possibly a type of heavy woollen fabric with a white lining. The remnants of the blue drapery reveal that those folds are much smoother than the red garment, with lower contrasts between the highlights and shadows. This blue drapery could be silk, with a light pink or green lining, but this colour is not clear since this section of her costume is now very indistinct. The third fabric is the apparently thinner and lightweight cloth of her white mantle, which falls in delicate folds towards the Christ Child.

It is important to note that throughout Renaissance Europe, textiles were considered precious goods, such as the exquisite silk fabrics and magnificent wool carpets from the East, and the naturalistic depiction of drapery in art had begun (Hollander 2012: 15–16, 28). Cennino Cennini gave importance in his book *Il libro dell'arte* (1390)

to the practical aspects of painting drapery, and Leon Battista Alberti in *Della pictura* (1435) also discussed how to paint draped figures in terms of proportion and harmony. Leonardo da Vinci points out the importance of observing the materials of the drapery in life, and studies the different physical characters of different materials (Leonardo da Vinci 2005: 161).[16]

The use of lay figures was a common practice in the Renaissance, and Vasari emphasises its importance in painting in *Vasari on Technique*. Using a lay figure has several advantages; it stands perfectly still, is convenient, and considerably less expensive than using a live model (Doy 2002: 30). Michelangelo used a clay or wax figure (Vasari 1998: 109–218), as did Leonardo: 'draping them with soft rags dipped in plaster', he then drew them in black and white with the point of a brush (Cadogan 1983: 27). There is also a surviving lay figure in the Victoria and Albert Museum in London, made by Sansovino in 1508–11[17] and constructed of poplar with stiffened draperies of sized fine linen (Monnas 2009: 63).

For the restoration of the *Adoration*, a lay figure was made of clay and clothed with different fabrics. It was compared to the painting under the same light direction to explore the potential fabrics that might have been intended by the artist (figure 7). The folds of the various fabrics not only behaved differently in their contours, but also in the way they reflected light internally. The folds were then drawn in black and white as a means of studying and practising the painting of drapery (figure 8). Such research was enormously helpful in understanding the materials depicted in the *Adoration* by the artist, as well defining the possible configuration of the folds.

Finally, the details of the Virgin's drapery in the Louvre copy, which were then obscured by overpaint but substantially revealed by the MA-XRF analysis, were used to finalise the probable design of the drapery. The distribution of cobalt and lead from the smalt and lead white used to paint the blue drapery of the copy were mapped separately, the differing amounts indicating the intensity of each pigment. This information was overlapped on the *Adoration* using Photoshop, allowing the final details to be built up.

The technique of obtaining similar hues to those in the *Adoration* using a glazing technique was first studied in a mockup panel prior to the actual retouching. The undermodelling was prepared with red lake, based on the provisional design derived from the drapery study using the lay figure. For the blue layer, many different genuine ultramarine pigments were tested, including home-ground ultramarine from a lapis lazuli stone, in order to gain a better understanding of the quality of the pigment required to achieve the depth and transparency of the colour seen in the *Adoration*. The high purity of the very high-quality ultramarine pigment was found to be the key property of the colour, but

Figure 9. Detail of the *Adoration* during retouching. The red layer was slowly built up around the remnants of the original paint, using alizarin crimson and carbon black when it was necessary to obtain a darker hue, imitating the intensity seen through the damage. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Figure 10. Detail of the *Adoration* during retouching. The blue layer was added in a similar manner until it had enough solidity, but leaving the hatching clearly visible when the painting is seen closely. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

such a pigment was economically unviable. French ultramarine was therefore tested but the result was unsatisfactory. The problem of finding the right blue pigment was resolved by the abovementioned line-layering retouching technique. French ultramarine is opaque when used with a large brush but can be made transparent when utilised in hatching, leaving the underlayers showing through and successfully imitating true ultramarine.

The red layer was slowly built up around the remnants of the original paint using alizarin crimson and carbon black when it was necessary to obtain a darker hue[18] thereby imitating the intensity seen through the damage: shadow areas in deep red and the highlights in pink, the red lake mixed with white (figure 9). In the retouching, no additional white pigment was mixed in, but fewer layers of lines were applied, leaving the white ground layer more visible, lightening the colour and reducing the saturation. The blue layer was added in a similar manner until it achieved sufficient solidity, but

Figure 11. A live model was photographed imitating the position and direction of the fall of light to understand the anatomy and the play of the light within the shadow in such a position. The photographs of the model and the Virgin were then overlapped using Photoshop to find a natural outline for the female figure. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 12. Study drawing. The potential composition was guided by the drawing to help in reconstruction. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

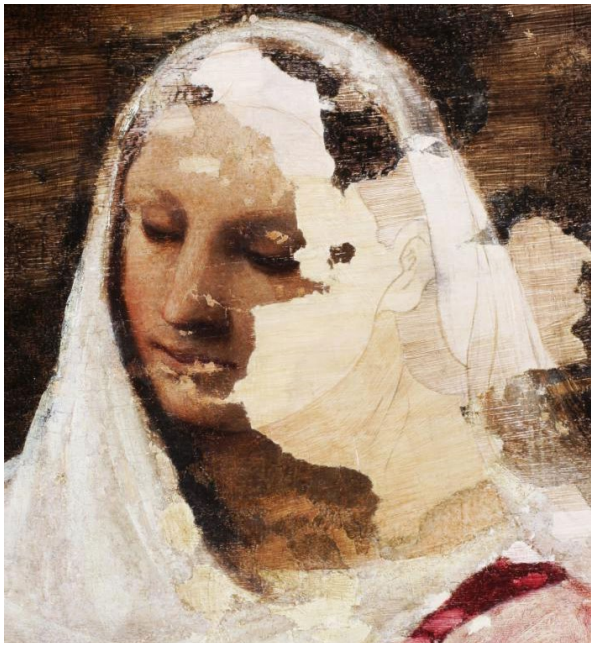

Figure 13. Detail of the *Adoration* during retouching. The underdawing was transferred to the lacuna and then the composition was slowly built up with a line layering technique. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

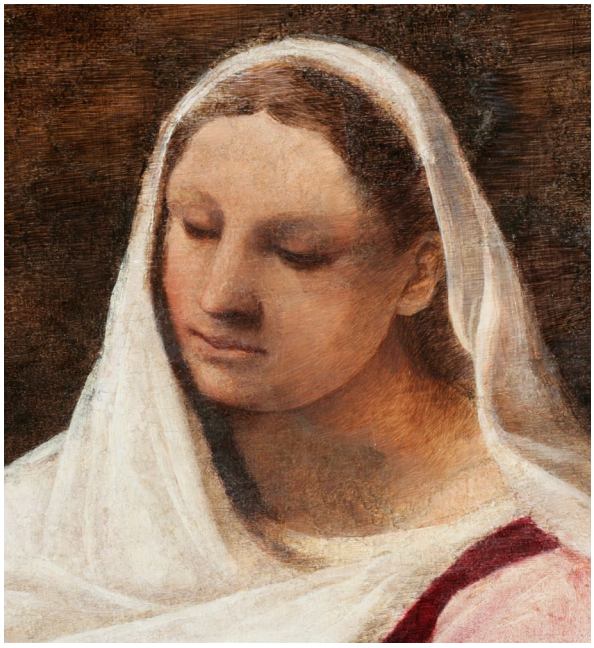

Figure 14. Detail of the *Adoration* during retouching. The ear was retouched discreetly, just to suggest its presence. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

leaving the hatching clearly visible to the viewer on close inspection (figure 10). Fortunately, the outlines were well preserved in some parts, such as the gold embroidery at the edge of the blue drapery, and a tiny island of dark blue was preserved in a critical location, giving a clue as to the limit of the blue drapery where it turned behind the Virgin. Through the first step of retouching and other supporting studies, a basic shape for the drapery was traced. The most ambiguous area was the train of the drapery at the right, where many different options appeared viable. However, this was satisfactorily reconstructed after the MA-XRF images of the Louvre copy were studied; these provided sufficient information to be able to plausibly reconstruct this passage.

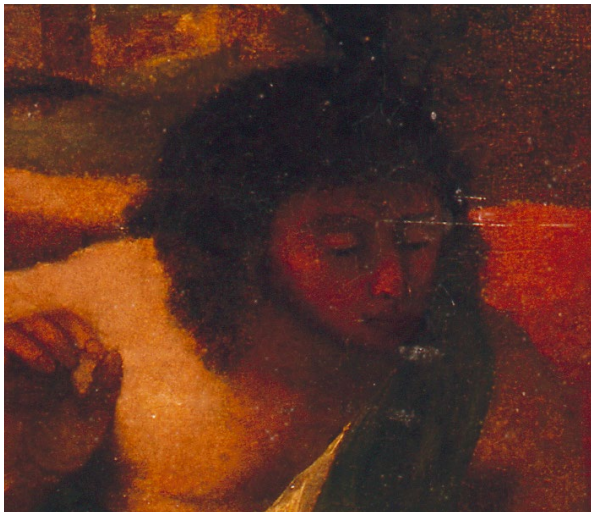

Figure 15. Detail of the shepherd kneeling in the centre before cleaning. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Figure 16. Detail of the shepherd's face after cleaning. Photograph © Chris Titmus Hamilton Kerr Institute, University of Cambridge.

Figure 17. A live model study to understand the face of the shepherd against the light. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Figure 18. Study drawing. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

Turning to the faces, reconstructing and retouching was an extremely delicate process as a slight change of angle or length of line in the facial features would dramatically change the expression. It was therefore fundamental to understand the story and expressions typical of the Nativity and Adoration, as well as scrutinise each remnant of paint before joining the fragmentary details. Much of the Virgin's face was very well preserved, such as the eyes, nose, lips and the outline of the face including the glazing layer, therefore this section served as a touchstone for restoring the faces in the *Adoration*. However the shadowed side of the face on the right, including the jawline, ear and neck, were totally lost, as well as the top section of the hairline along the forehead. Sebastiano's female figures are typically presented in three-quarter view inclined away from the viewer, with a straight nose, closed lips and a particular-shaped and well-described ear. The *Holy Family* (1526, Burgos Cathedral) and *Portrait of a Young Roman Woman* (*c.*1512, Gemäldegalerie, Berlin) were particularly useful as references for the forms of the lost hairline, ear and edge of the eye, and the way the light falling on the skin is depicted. However, the Virgin's face in the *Adoration* has a softer shape compared

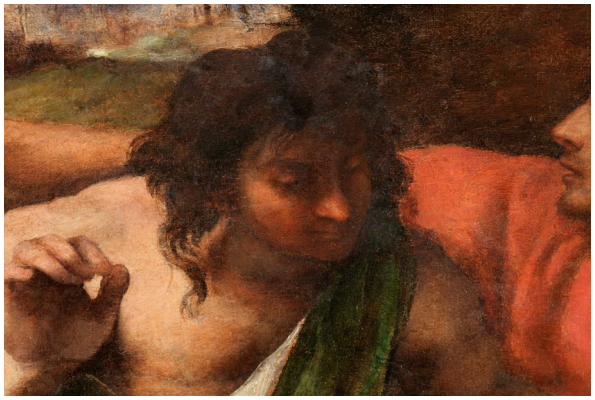

Figure 19. Detail of the *Adoration* showing the shepherd after retouching. We can now appreciate the sophisticated composition of the *Adoration*: the face is in shadow with light coming from behind and glancing onto the most prominent features of the face, such as the cheek and the tip of the nose. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

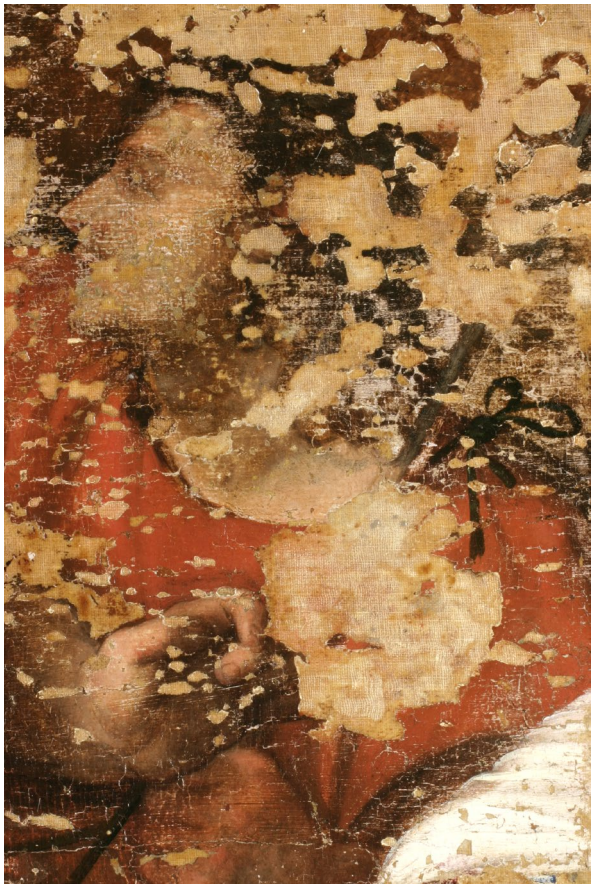

Figure 20. Detail of the *Adoration* after cleaning. The face of the shepherd behind the Virgin had almost completely lost all the upper modelling layers due to severe micro-losses and abrasion. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

to Sebastiano's typical female figures, as seen in the two paintings mentioned above.

A live model was photographed imitating the position and direction of light to understand the anatomy and play of the light within the shadow.

Figure 21. Live model to study the face facing direct light. The shepherd's face, which is in profile without any inclination and facing directly towards the source of light, required skilful modelling as it could easily be rendered two dimensional. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

The photographs of the model and the Virgin were then overlapped using Photoshop in order to find a natural convergence, followed by a study drawing to finalise the reconstruction (figures 11 and 12). The ear which had been completely lost had not been imitated in the old overpaint, and appeared proportionally very small in the Louvre copy. Despite Sebastiano's typical female ears being of a rather pronounced and detailed shape, the ear was retouched discreetly to suggest its presence; it was accurately proportioned and the top was covered slightly by the hair as was probably intended in the Louvre copy (figures 13 and 14).

Other figures

The face of the shepherd kneeling in the centre (figure 15) was very fragmented and the surface much abraded, making him largely illegible (figure 16). Initially the small lacunae were retouched to make sense of the remnants of original paint. The IRR of the Louvre copy gave a much clearer idea of the original appearance of this part of the Fitzwilliam composition, but this image could not be directly transferred to the *Adoration* as the outlines were not a precise match. A live model was again studied to understand the face against the light (figure 17). The lost lock of hair on the left of the face was reconstructed utilising information from the falling curly hair of Christ in *Jesus Carrying the Cross* (1516, Museo Nacional del Prado, Madrid). Another sophisticated feature of

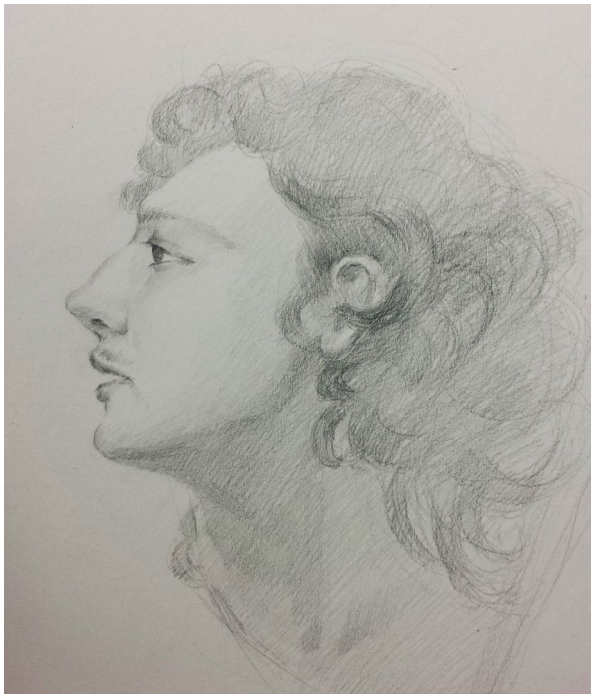

Figure 22. Study drawing. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

the composition can now be appreciated: most of the face is in shadow with light emanating from behind and just falling onto the most prominent features – the cheek and the tip of the nose (figures 18 and 19).

The face of the shepherd behind the Virgin had almost completely lost all its upper modelling layers through severe micro-losses and abrasion (figure 20). His face, in profile looking directly towards the source of light, required skilful treatment to avoid rendering it two dimensional; the Louvre copy was the main reference despite a significant amount of old retouching. The figures in Giorgione's *Three Philosophers* (*c.*1505–09, Kunsthistorisches Museum, Vienna), Sebastiano's *Saint John Chrysostom and Saints* (1510–11, San Giovanni Grisostomo, Venice), and the *Raising of Lazarus* (1517–19, National Gallery, London) served as comparative material. Finally, a live model was studied to understand the natural appearance in such a position (figures 21 and 22). The retouching was mostly composed of very short and delicate lines filling both the micro-losses and glazing lost through abrasions (figure 23).

Joseph's face was mostly complete and at least broadly legible despite severe abrasion, but it lacked detail and definition. The Louvre copy was very helpful in confirming a peaceful facial expression, and the head of Joseph in Michelangelo's *Doni Tondo* (*c.*1507, Uffizi, Florence) was used as the basis for a study drawing (figure 24) to avoid any misjudgement in the bridging of the large number of very small lacunae when depicting the subtle and complex surface features of his bald head (figure

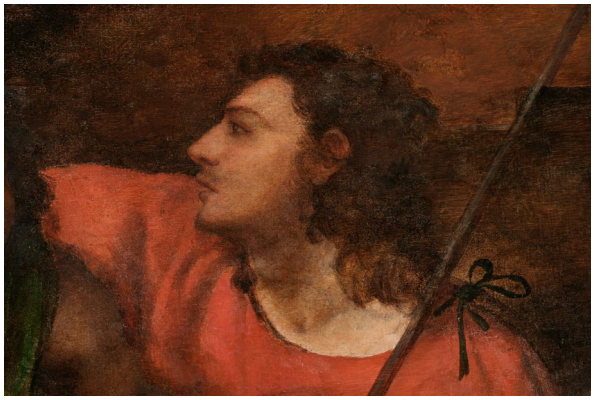

Figure 23. Face of the shepherd behind the Virgin after retouching. The retouching was principally composed of very short and delicate lines filling the micro-losses resulting from abrasion. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

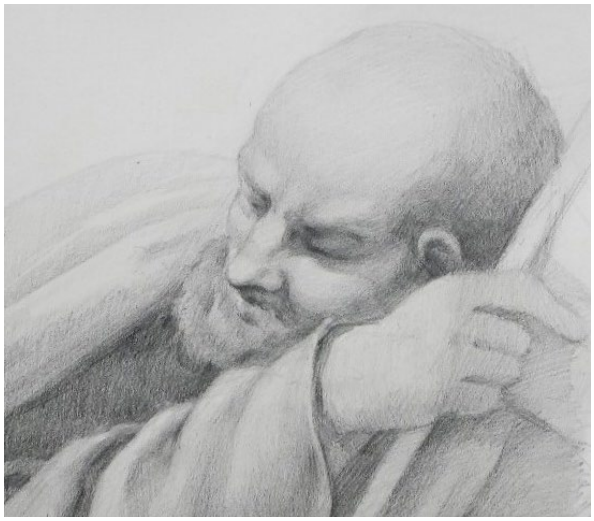

Figure 24. A study drawing was made based on the Musée du Louvre copy and the *Doni Tondo*'s Joseph by Michelangelo. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

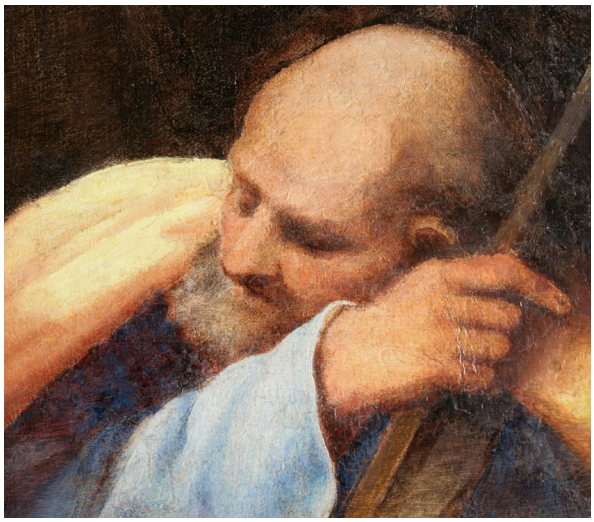

Figure 25. Detail of the *Adoration* after retouching. The study drawing was essential to depict the subtle and complex features of a bald head. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 26. Detail of the *Adoration* after cleaning. The shadowy area under the sleeve of Joseph was initially believed to be part of the blue garment in the shadow. However, no blue pigment could be detected while retouching the abrasions under high magnification. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 27. Detail from the IR image of the *Adoration*. An (upside down) U-shape was very distinctively visible. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 28. This study drawing was based on the IRR image of the *Adoration*, the false-colour IR image of the Musée du Louvre copy and iconographic research. However, this suggestion was not executed in the retouching process, as the evidence is not conclusive, although it is an interesting hypothesis. Photograph © Youjin Noh, Hamilton Kerr Institute, University of Cambridge.

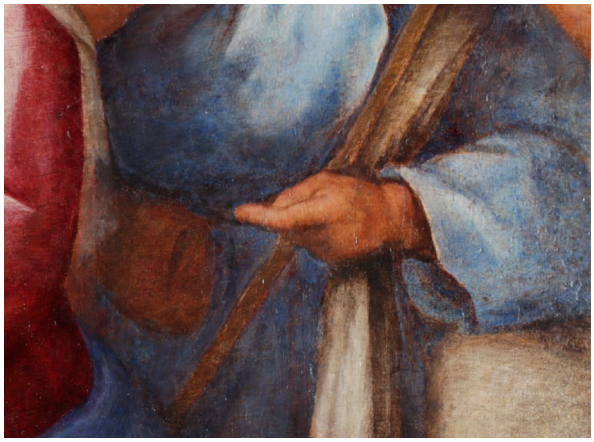

Figure 29. Detail of the *Adoration* after retouching. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

25). The shadowy area under Joseph's sleeve was examined under high magnification to detect any details lost as a consequence of abrasion, but no trace of blue paint could be found, leaving an unexplained shape (figure 26). In the IRR image of the Fitzwilliam *Adoration* (figure 27), an inverted U-shape was very distinctly visible; in the Louvre copy the lower part of this area was covered by overpaint, but the upper part has remained unretouched; the false-colour IRR image of the copy showed details resembling buttons. It was then suggested that this could be a pouch or bag with buttons, and the U-shape seen in the IRR image of the *Adoration* might be part of the shadow of the flap (figure 28). Iconographic research supports this suggestion, as Joseph is frequently shown with a bag in Nativity scenes, but it was not possible to confidently reconstruct this as the evidence was too minimal, despite it being a plausible hypothesis (figure 29).

The landscape

The function of the foreground in the lower left, where the second largest lacuna was situated, is to maintain the natural illusion of perspective and keep the landscape balanced. Unfortunately, as is often the case, this relatively featureless area was neglected in previous restoration campaigns and repainted in an unmodulated brown tone. Ironically, this lack of detail attracted the eye and destroyed the balance of the composition. The Louvre copy also features a broad area of shadow, with a fence and a tree trunk placed between the two shepherds. As this is also a heavily repainted area, the details could not be considered reliable. The remnants of paint in this area of the Fitzwilliam painting contain a few important details such as the tips of the two fence posts, the top

Figure 30. Detail of the *Adoration* during retouching. Building up layers by a line layering retouching technique. The lacuna was retouched, slowly building up solidity and suggesting forms in a very subtle way. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 31. Detail of the *Adoration* after retouching. Although the IRR image of the Musée du Louvre copy was of great help in suggesting the possible elements present, there was still not enough information to make a full reconstruction in this area with any degree of confidence. The reconstruction here was therefore left incompletely defined, but visually in balance with the rest of the landscape. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

of a tree trunk, and some very dark lines along the edge of the lacuna. Some interesting forms began to take shape after the first stage of retouching (toning down and inpainting the micro-losses), such as a rounded form in the bottom left corner and more solidly defined forms. These elements could also be found in the Louvre copy, visible in the IRR image and most plausibly read as pebbles and rocks. In his other paintings, Sebastiano had placed small fences and tree trunks with rocks in the landscape, as did Giorgione as seen in the *Holy Family with Two Angels in a Landscape* (1526, Burgos Cathedral) and the *Pietà* (1516–17, Museo Civico, Viterbo).

A drawing from life was not useful for reconstructing the foreground, and, as part of the larger landscape area, the plausibility of any reconstruction could not be judged without seeing it in this larger context. The method used involved working

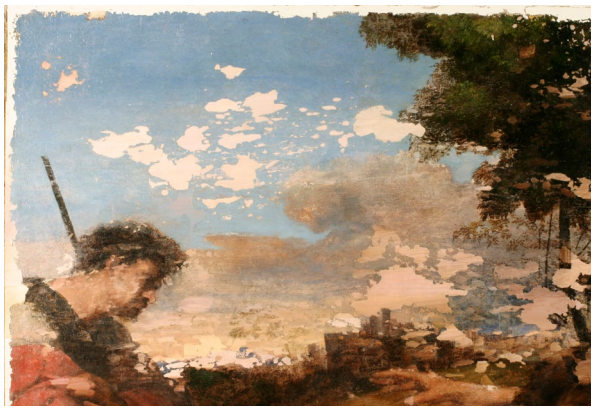

Figure 32. Detail of the landscape during retouching. The *imprimatura* colour on the top half area is pink and affects the final colour of the sun-setting landscape. This pink layer was therefore inpainted in Paraloid B72 as a base colour prior to the line layering retouching. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 33. Detail of the landscape after retouching. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

in from the edges towards the centre, building up solidity and suggesting forms step-by-step (figure 30). Although the IRR image of the Louvre copy was of great help in providing information as to the possible features present, there was still not enough confidence to be certain of the reconstruction in this area, so fine details were left unresolved in a way that did not distract from the rest of the landscape (figure 31).

One of most interesting aspects of restoring the landscape was learning how our conventional idea of a realistic representation of an object can easily lead us to misinterpret the artist's intentions, and the reliability of the image. One of the surviving parts of the landscape was the curved outline of a building that seemed to be drawn incorrectly (figures 32 and 33). Initially, this feature was puzzling, but a passage in the *Treatise on Painting* by Leonardo indicated that it was the artist's intention to depict it like this in an attempt to recreate the way that our eyes perceive an object in the distance: 'Those in the distance must be unfinished, and confused in their out-lines' (Leonardo da Vinci 2005: 127).

Figure 34 *The Adoration of the Shepherds*, after treatment. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Despite the poor condition of much of the landscape, it is still obvious how much attention Sebastiano paid to this area, using precious ultramarine for the blue tones. The cityscape shows that he was aware of the rules laid out by Leonardo in his treatise, which circulated widely and were also incorporated in Giorgione and Titian's practice. Below is an example of the precept applied to the landscape of the *Adoration*:

> You will then paint the first building behind that wall of its proper colour; the next in point of distance, less distinct in the outline, and participating, in a greater degree, of the bluish colour of the air; another, which you wish to send off as much farther, should be painted as much bluer (Leonardo da Vinci 2005: 125).

The *imprimatura* in the upper half of the sky is pink and affects the final colour of the evening landscape, enhancing the intensity of the blue. For the reconstruction, this pink layer was inpainted with Paraloid B72 as a base layer before the line-layering retouching which was used to build up the sky and clouds. The 10 cm wide additional strip all along the bottom edge was not retouched, as evidence from the Louvre copy and examination of the original paint edge at this juncture made clear that the original composition had never extended into this area.

Conclusion

Following completion in 2016 of the conservation treatment of the *Adoration of the Shepherds* (figure 34), it was placed on public show once more as part of the Bicentennial celebrations of the Fitzwilliam Museum. This was especially appropriate since it was one of the most important paintings that had belonged to the museum's founder, Viscount Fitzwilliam. It was reframed in a seventeenth-century carved and gilded frame as a tribute to its Orléans heritage, replacing a nineteenth-century frame which no longer fitted the composition because the spurious lower section was not reinstated.

Central to the treatment of the *Adoration* was a fundamental question: what is the role of such a damaged painting and is it only an archaeological relic or can restoration help re-establish it as a functioning work of art? A project such as the conservation treatment of the *Adoration* needs to be undertaken with great humility: there is no way of bringing the painting 'back to its original splendour' because regardless of how detailed and careful the analysis, the artist's intention or how the painting originally looked cannot be known for certain. The objective of the conservator faced with such a damaged artwork must be to do the minimum necessary to allow the viewer to appreciate the object as a legible work of art and permit the surviving parts to be read coherently. First and foremost the conservation treatment needs to be a research project on the technique of the artist, which must be started even before cleaning begins. As for retouching or reconstruction, the conservator should be guided by both the analysis and the art historical context (iconographic analysis, study of the artist's work or copies) with the aim of recreating the missing parts in the most plausible way. Any retouching should always be reversible and the viewer – if examining the painting at close range

– should be able to clearly differentiate original parts from reconstructed and retouched areas.

From the very beginning, the approach to the *Adoration*'s conservation has been a collaborative effort, involving conservators, curators and art historians in the decision-making process and practical work. Teamwork on this scale is not very common in the treatment of a painting of this size, but the complexity, length of the treatment and the finely balanced decisions that were required throughout the project necessitated that collective wisdom. This is an approach that the Hamilton Kerr Institute fosters naturally through its postgraduate teaching and research. Generations of postgraduate students and interns were also able to see the work in progress and take part in the discussions at the easel. The conservation treatment of the *Adoration* has allowed us to see the painting properly for the first time in several centuries and understand the reasons for its appearance today.

Acknowledgements
This article is dedicated to the memory of Renate Woudhuysen-Keller, whose knowledge and passion was the driving force in the first phase of the treatment of the painting – the removal of the old restorations and the revelation of the remaining original surface – but who tragically did not live to see the reintegration of the losses and completion of the project. Without her dedication, this work would not have been possible. Youjin Noh, who had assisted her in the initial stages, then took the project forward. The authors wish to express their thanks to the Advisory Panel who met to discuss and advise on the methodology for reintegrating the losses: Piers Baker-Bates, Spike Bucklow, Vincent Delieuvin, Jill Dunkerton, Paul Joannides, Tim Knox and David Scrase.

The project benefited significantly from the Musée du Louvre's generous decision to allow the loan of its copy of the *Adoration* to the Hamilton Kerr Institute for a significant period. We are grateful to David Scrase for having located the work and Vincent Delieuvin for agreeing to the loan. The MA-XRF scanning was carried out by Stijn Legrand from the University of Antwerp using the equipment and methodology developed by Koen Janssens and his colleagues.

Thanks are also due to the many staff and students at the Hamilton Kerr Institute and curatorial colleagues at the Fitzwilliam Museum, who contributed to discussions and evaluations throughout the project, and to Christine Kimbriel for her work on the technical examination. Special thanks are extended to Ann Massing, who began the process of cleaning alongside Renate Woudhuysen-Keller; to Ian McClure who oversaw the first phase of the project; and to Mary Kempski who assisted Youjin in the final stages of inpainting and completed the varnishing.

Youjin would like to thank Ian McClure and Rupert Featherstone for entrusting her with this project, Piers Baker-Bates for always being available to share his extensive knowledge of Sebastiano; Anna Cook, Radoslaw Chocha, Lidwien Dekkers-Wosten and Aalia Kamal for agreeing to pose as models; and Francesco Forte for accompanying her on travels around Europe in search of Sebastiano's paintings. Youjin's greatest debt of gratitude is to Renate Woudhuysen-Keller for her mentorship and trust. Completing the restoration of the *Adoration of the Shepherds* was also an act of love for Renate.

Notes

1. The valuation in 1727 of 800 livres was also relatively low (see the article by Paul Joannides, in this volume, note 1, p. 120).
2. Letter dated 16 January 1968 from Michael Levey, Director of National Gallery, to J.W. Goodison, Director of the Fitzwilliam Museum.
3. Picault's technique was kept secret therefore the following is a hypothesis suggested by Emile Male: nitric acid vapour is passed through the reverse of the panel allowing acid to destroy organic components. Once the gesso layer has been destroyed, the paint layer is removed from the panel and the paint rolled up with the help of the facing paper. The detached paint layer is lined onto a new support with a calcium resinate (Massing 2012: 36). Such an aggressive method – hydrolysation of organic substances in the painting materials and the rolling process of the paint layer – must have caused extreme damage to the painting.
4. The destructive technique for the original support by Jean Louise Hacquin: the panel and preparation layer are mechanically removed from the reverse then two layers of gauze are laid on the reverse of the paint layer with a glue paste. Layers of paper and canvas are then glued. Some paintings transferred by Hacquin show a thin layer of grey-green gesso (see Emile-Male 1991).
5. 'The picture had been extremely and most ignorantly cleaned! which had been done in the most crude and violent way, and so interfering with the harmony of this (once) fine work': letter from Robert Roe to an unknown recipient in the Fitzwilliam Museum papers, in the Cambridge University Registry, 12 October 1863.
6. Fitzwilliam Museum Syndicate 1964. *Meeting Minutes*, 24 April 1964.
7. *Ibid*.
8. Various mixtures of organic solvents were used. A Carbopol gel with a mixture of butanone (methyl ethyl ketone) and propanone was particularly useful when the substances were not reacting to free organic solvents.
9. This 10 cm wide strip may have been added to fit a specific frame, but there is no evidence to suggest the original composition had extended down this far before the transfer.
10. The fillers were softened with water-based or solvent gel, and then removed mechanically.
11. INV. 825, *L'Adoration des bergers*, 104 × 161 cm.
12. The extent of the overpaint was clearly shown in the false-colour IRR image supplied by the Centre de recherche et restauration des musées de France (C2RMF).
13. David Scrase, Renate Woodhuysen, Rupert Featherstone, Paul Johannides, Piers Baker Bates and Mary Kempski were consulted for decision making.
14. The *imprimitura* layer was applied differentially with a strong pink in the upper part of the painting, grading to white in the lower part.
15. Sebastiano's interest and skill in rendering different fabrics in his works can be observed throughout his oeuvre. *The Saint Bartholomew and Saint Sebastian; Saint Ludovico of Toulouse and Saint Sinibald* (Venice, Galleria del Academia), painted in Venice, is a good example of his interest in depicting different fabrics. *The Portrait of a Young Roman Woman* (Berlin, Staatliche Museum, Gemaldegalerie), painted in Rome, presents five different textiles: linen, multi-layered silk, gold decorated silk, velvet and fur.

16. During the last half of the Quattrocento, there were increasing ideas of naturalism, especially in painting. During this time, research into the appearance of reality, in particular the structure of the human form at rest and in motion, nude and draped, was particularly intense. Undeniably drapery studies were part of these trends toward ever more precise description and dramatic efficacy in painting of the late Quattrocento although drapery studies exist from the earlier fifteenth century (Cadogan 1983: 29).
17. Lucretia 1511–1518, Museum no.A.2-1962.
18. Through paint sample analysis in cross-section, a small amount of carbon black was found to be mixed into the red lake in the shadows of the red garment in order to increase their depth of tone.

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Sebastiano del Piombo's *Adoration of the Shepherd* in context

PIERS BAKER-BATES

Abstract The Fitzwilliam's *Adoration of the Shepherds* falls within one of the two problematic periods, those with numerous lacunae in our information, bookending Sebastiano del Piombo's Roman career. His first five or six years in Rome represent a sunburst of productive energy, but precise knowledge of this period is scant in the extreme. The restoration of the *Adoration of the Shepherds* represents an important landmark as it is one of Sebastiano's earliest Roman works. There are other, highly significant, commissions in these early years, but a lack of evidence, or their poor condition, has meant they are often ignored. The range of Sebastiano's work in type and media from this period is unusually eclectic, although the majority consists of portraits, and while there is some agreement nowadays as to what he painted in these five years, there is little certainty about chronology. Using the *Adoration* and the Uffizi *Sick Man* as *points d'appui*, the aim here is to give some order to a confusing body of work that on the one hand highlights the development of Sebastiano's style in these crucial years for the High Renaissance, the transition between the pontificates of Julius II and Leo X, and on the other hand returns the *Adoration of the Shepherds* to the significant role that it played in Sebastiano's Roman career.

Introduction

The restoration of the *Adoration of the Shepherds* (figure 1), as well as returning a painting previously scarcely visible to its rightful place in Sebastiano del Piombo's oeuvre, has a significant historical dimension. As an early – if not the earliest – Roman picture by Sebastiano, the *Adoration* falls within a period that contains numerous *lacunae*. The years 1511–1516 present a sunburst of productive energy in terms of the number of paintings Sebastiano produced, but within this period there are very few dates on which a chronology can be built. Knowledge of Sebastiano's early Roman work remains scant, and no recent attempt has been made to consolidate what is known. In these five years, Sebastiano may well have laid many of the foundations for what was to come but his development remains elusive.[1]

This period is further significant because it was then that Sebastiano encountered the very different artists who set his art on the course it would subsequently follow, Michelangelo and Leonardo, whose impact on Sebastiano's art will be referred to

Figure 1. Sebastiano del Piombo, *Adoration of the Shepherds*, *c*.1511–12, oil on canvas, 124.2 × 161.3 cm. Cambridge, Fitzwilliam Museum. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

Figure 2. Sebastiano del Piombo, *Venus and the Graces informed by Cupid of the Death of Adonis*, *c.*1511–12, oil on canvas, 189 × 285.5 cm. Florence, Uffizi. Photograph: Scala, Florence.

throughout. At the same time, Sebastiano was also being shaped by an intense rivalry with Raphael, a rivalry whose impact on both their stylistic developments was profound (Nesselrath 2021).

Sebastiano's very first work in Rome, 1511–1512 was the frescoes in the Loggia di Galatea of the Farnesina, Agostino Chigi's suburban villa (Barbieri 2023). In addition, the large-scale Uffizi *Venus and the Graces informed by Cupid of the death of Adonis* (figure 2) was almost certainly a commission from Agostino Chigi and is probably the painting recorded in his December 1520 inventory (Bartalini 1992: 18–19; Joannides 2009: 12–15; Barbieri 2014: 71–75; Barbieri 2017: 42–43). The broad and open weave canvas on which it is painted seems to be Venetian in origin, and in style and subject this painting is emblematic of Sebastiano's transition between Venice and Rome. I believe therefore that the *Adoration of the Shepherds* is among the very first Roman commissions originating from the immediate circle of Agostino.

Sebastiano's next major commission, probably his first in Rome for an ecclesiastical setting, was the *Pietà* (figure 3) for the Chamber Clerk, Giovanni Botonti. It may have been awarded as early as 1513, and work continued until about 1516 (Barbieri 2004). The Viterbo *Pietà* overlapped two commissions from Don Jerónimo de Vich y Valterra, ambassador at Rome first for King Ferdinand of Aragon then for Charles V: the *Christ Carrying the Cross* (now in the Prado) and a triptych, now subdivided and in part lost, whose central panel, the *Lamentation* (now in the Hermitage) is dated 1516 (Baker-Bates 2016; Wivel and Billinge 2021). Major commissions both, but for Viterbo and Valencia respectively, neither had any impact within Rome.

Vich's *Christ Carrying the Cross* is also painted on the same fine weave canvas that Sebastiano continued to use in Rome for certain commissions, for example the *Descent into Limbo*, one of the wings of the ambassador's triptych.[2] Besides practical questions of transport in both the Vich commissions, this use of oils on canvas afforded Sebastiano the best means to play with the effects of light (Mena Marqués 1995: 95–96). A stark illustration of the problems concerning Sebastiano's chronology, however, is that during the twentieth century the Vich *Christ Carrying the Cross* was almost unanimously placed between 1525 and 1530 (D'Achiardi 1908: 236; Düssler 1942: 134–36; Pallucchini 1944: 168–69; Benito Doménech 1988): only Hirst had the insight to date it to 'early in the third decade' (Hirst 1981: 80).

Now that it can be dated even earlier, it helps to establish a consistent thread in Sebastiano's early Roman career, his gradual departure from his Venetian roots and adaptation to the new realities of Rome. This led to what has been referred to as a 'tightening' of Sebastiano's style around 1514. Although Sebastiano ceased to work directly for Agostino Chigi after about 1512, thanks to Chigi's range of contacts at Rome, he became a kind of meta-patron to Sebastiano, introducing him to various influential figures who were to sustain him throughout his career (Baker-Bates 2016: 35–37).

Figure 3. Sebastiano del Piombo, *Pietà*, *c.*1513–16, oil on panel, 247.5 × 168.5 cm. Viterbo, Museo Civico. Photograph: Scala, Florence.

These men, in turn, not only gave him commissions but further recommended him to their own clients and friends. That members of Agostino's circle provided almost all of Sebastiano's known early Roman patrons was noted by, among others, Roberto Bartalini (1992: 19) who remarked that in his first five years in the city, Sebastiano: 'altro non fu che un protetto di Agostino, uno dei suoi *familiares*'.[3] Bartalini may exaggerate a little but among Sebastiano's early patrons linked to Chigi he rightly included Botonti and Vich. Furthermore, both were men of significance in their own right: Botonti as a Chamber Clerk played a major role in papal administration as well as holding an important position in his order, the Augustinians (Signorelli 1928, 1929), while Vich was the ambassador for the coming power on the Italian Peninsula, Spain (Terrateig 1944, 1963).

Botonti's and Vich's commissions establish a broad framework on which to hang Sebastiano's development between 1511 and 1516, but for other paintings – mostly portraits or portrait types rather than subject pictures – there remain many problems. Furthermore, several have suffered considerable damage which makes firm conclusions about dating still harder to draw. Although widely accepted as his work, they have attracted little recent scholarly research and not much is known of their origins, dating or even, on occasion, precise subject matter. And while Vasari claims Sebastiano painted portraits in Venice, few attributable ones survive to explain the apparent maturity of his early Roman production (Vasari 1550 and 1568: 5.85). Deciding which works should be attributed to Sebastiano in Rome was an exercise that occupied scholars for much of the past century and, an irony that Sebastiano would certainly not have appreciated: a number of the paintings now agreed to be by him were, for several centuries, assumed to be by Raphael.

Figure 4. Sebastiano del Piombo, *Portrait of Ferry Carondolet with his Secretaries*, *c.*1511–12, oil on panel, 112.5 × 87 cm. Madrid, Museo Nacional Thyssen-Bornemisza.

Figure 6. Sebastiano del Piombo, *Portrait of a Young Lady with a Basket of Fruit*, *c.*1511–12, oil on panel, 78 × 61 cm. Berlin, Gemäldegalerie.

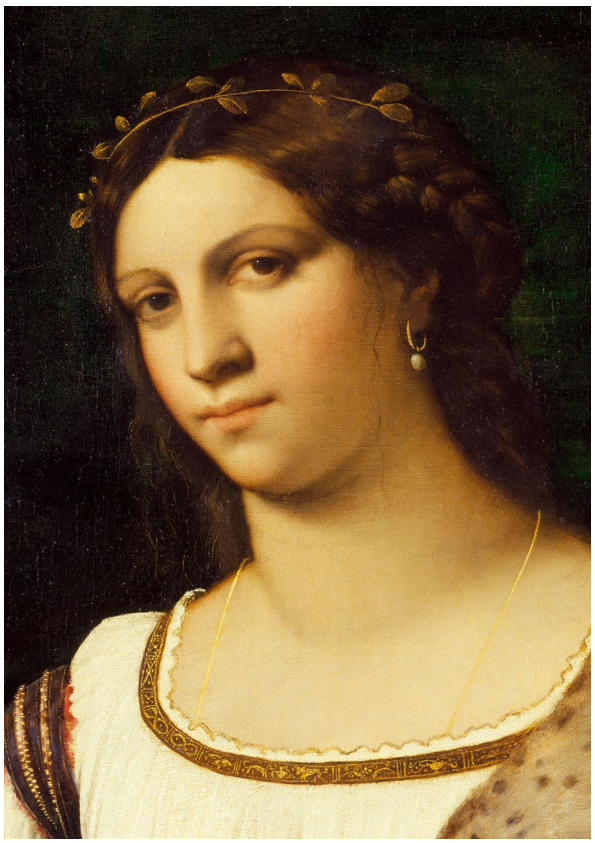

Figure 5 Sebastiano del Piombo, *Fornarina*, 1512, oil on panel, 68 × 55 cm. Florence, Uffizi. Photograph: Scala, Florence.

Figure 7. Sebastiano del Piombo, *Cardinal Antonio Ciocchi del Monte (1461–1533)*, *c.*1512–14, oil on canvas (originally on wood), 88 × 69 cm. Bequeathed, Sir Hugh Lane, 1918, National Gallery of Ireland Collection, NGI.783. Dublin. Photograph: National Gallery of Ireland.

Figure 8. Sebastiano del Piombo, *Portrait of a Man*, *c.*1514–15, oil on panel, 115 × 94 cm. Budapest, Szepmuveszeti Museum. Photograph: Szépművészeti Múzeum/ Museum of Fine Arts, Budapest, 2024.

Figure 9. Sebastiano del Piombo, *Portrait of a Man*, *c.*1516, oil on panel, 36.5 × 25.9 cm. Photograph: Austin TX, Blanton Museum of Art.

A reasonable consensus has been reached that Sebastiano's early Roman portraits (or portrait types) on panel are, in presumed chronological order: *Portrait of Ferry Carondolet with his Secretaries* (figure 4) in the Thyssen–Bornemisza, the so-called *Fornarina* (figure 5) (more accurately a *Portrait of a Young Woman*) in the Uffizi, the *Portrait of a Young Lady with a Basket* (figure 6) in Berlin, the so-called *Portrait of Antonio Ciocchi del Monte* (figure 7) in Dublin, the *Portrait of a Man* (figure 8) in Budapest, the *Violin Player* in a private collection in Paris, the cut-down *Portrait of a Man* (figure 9) in Austin TX, and finally the group portrait of *Cardinal Bandinello Sauli, His Secretary and Two Geographers* (figure 10) which is dated 1516. Two other portraits sometimes placed in these years, but which are painted on canvas, are the *Portrait of a Man* in the San Diego Museum of Art and the *Portrait of a Man in Armour* in the Wadsworth Athenaeum.[4]

If all these portraits date from these five years, they represent an extraordinary output in terms of quality for a young artist in a new environment – juggling several commissions. Furthermore, few doubtful works remain to be ascribed to him in these early Roman years and in this the situation differs from Sebastiano's Venetian period where the informational black hole encourages unlikely attempts at attribution (Lüdemann 2010). Jonathan Unglaub (2015) has even speculated that *Concert Champêtre* is not only by Sebastiano, but could also be a Chigi commission! There may still be genuine works by Sebastiano dating to these years to be rediscovered: more than half of those listed above returned to his oeuvre only relatively recently.

There is, for example, a portrait of uncertain attribution which, if it is by Sebastiano, could be of crucial importance for our argument as it bears a date: the so-called *Sick Man* (figure 11) in the Uffizi which is on canvas.[5] This is a painting of high quality and reputation although compromised by badly discoloured varnish. An inscription runs along the top, 'MDXIIII An Etatis XXII'. The *Sick Man* is unusual in that while it was firmly attributed to Sebastiano between 1897 and 1944, there has been no agreement since.[6] Its recent reattribution to Titian is unsatisfactory, and not widely accepted, but at least recognises its Venetian element. If the *Sick Man* is in fact by Sebastiano, the date would be pivotal in the transition between his 'Venetian' and 'Roman' manners.

Prestigious portraits

The two group portraits of these years are identifiable and their dating can be established. The *Ferry Carondolet* must have been painted in the months between Sebastiano's arrival in Rome in the autumn of 1511 and Ferry's departure for Viterbo in May 1512; it is therefore contemporaneous with Sebastiano's work for Agostino Chigi

Figure 10. Sebastiano del Piombo, *Cardinal Bandinello Sauli, His Secretary and Two Geographers*, 1516, oil on panel transferred to canvas, 121.8 × 150.4 cm. Photograph: Washington DC, National Gallery of Art.

at the Farnesina. The *Bandinello Sauli* is dated 1516. Carondolet and Sauli both knew Agostino Chigi, and their portraits demonstrate that Sebastiano's clientele was already being drawn from the highest social echelons (Barbieri 2012: 45–64). In their different ways both portraits show Sebastiano's vaulting artistic ambition; if the *Adoration* and other Chigi commissions remain strongly reminiscent of Venice, these two represent a new departure.

Ferry holds a letter in his hand addressed to: 'Honaribili devoto nobis dilecto Ferrico Carondolet Archdiacono Bisuntino Consiliario et Comisario n.ro in Urbe'. He had been in Rome since about 1508 and from 1510 was an important presence as the Procurator for the Regent of the Netherlands, Margaret of Austria. His portrait is an astonishing achievement: it is one of the first portraits to show an official, not statically but conducting his daily business in a way that emphasises the public role over the private man. In style, the Carondolet portrait is characteristic of that union of intense Venetian *colorito* and sculptural solidity in Sebastiano's art that begins with the San Bartolomeo organ shutters and continues into the beginning of his relationship with Michelangelo.

The structure of the Carondolet portrait sets the scene for other early Roman works. In a format much employed by Sebastiano at this time, Ferry occupies the foreground of an enclosed space, which opens at the rear onto the landscape. The carpet on the table before the two figures is the first appearance of a motif much associated with Sebastiano's portraiture; it recurs in the Sauli portrait (Mills 1983: 16). Sebastiano often used props; here, the documents scattered in front of Ferry as well as the secretary (who is subtly diminished in size) indicate the sitter's high status and intellectual heft. Sebastiano also used the entablature above the door to the rear to display Ferry's personal motto, 'Nosce Opportunitatem'. Ferry wears a rich, fur-trimmed mantle (ermine?) from which red sleeves project; Vasari describing Sebastiano's portrait of Pietro Aretino of around 1524–25 dilates on the detail and skill of the stuffs, but those qualities were already present in Sebastiano's art at the outset of his Roman career (Vasari 5.94–95).

The classical colonnade behind is a reflection, not only of Ferry's attraction to Rome's classical past, but also to Sebastiano's own developing interest. The arcades of the *Judgement of Solomon* of 1506–08, carried further in the San Giovanni

Figure 11. Sebastiano del Piombo (?), *Sick Man* (?), 1515, oil on canvas, 81 × 60 cm. Florence, Uffizi. Photograph: Scala, Florence.

Crisostomo altarpiece, demonstrate that Sebastiano at Venice had already developed a knowledge of classical architecture. The columns behind Ferry contain accurately rendered elements such as the Corinthian capitals, for example, that were being rediscovered contemporaneously by architects of the High Renaissance, while their veined marble is a transcription in paint of *pavonazzetto*, a marble from Turkey still common in Renaissance Rome, both in ancient ruins and reused in churches. These columns form a striking contrast to the view onto the landscape to the right that is still pregnant with the lyrical mood of Sebastiano's Venetian training.

Sebastiano's group portrait of the Genoese Cardinal Bandinello Sauli, which remained in Genoa until 1823, is far larger than any of his previous portraits, measuring 121 cm × 150 m. Sebastiano's earliest known signed portrait, it reveals the importance of the commission: the *cartellino* affixed to the bottom right of the carpet, although now only partially legible, reads '1516', 'S' and 'faciebat'. The cardinal was identified as Sauli, however, only when the painting was cleaned in 1951 and a further inscription, 'Bendinellus de Saulis Cardinalis' was found on the bell (Suida 1951: 104). Recent research has narrowed the date of the commission still further – the Sauli archive contains a payment record for 6 June 1516: 'videlicet ducatus 30 sebastiano veneto pictori pro residuo laborum' (Hyde 2009: 120–21) so the portrait was presumably begun before Sauli's departure for Bologna in November 1515.[7]

Bandinello Sauli was created a cardinal by Julius II when aged only about 17; however, as a Genoese compatriot and the scion of a wealthy banking family

with interests in Rome, he had long been a papal favourite. The pope failed to have Bandinello created cardinal as early as December 1505, but succeeded in March 1511; by 1515, he had progressed seamlessly as one of those younger cardinals whose careers flourished under Leo X (Burchard 1483–1506: 2.498–99; Hyde 2009: 27–28). He sits at a table, while a messenger, as in the *Ferry Carondolet*, enters from the left behind him; two other men sit at the table to his right, on which rests a large book. The figures are set against a green backdrop; a notable shift in the years 1511–1516 is Sebastiano's gradual adoption of a single field backdrop. The most immediately striking – but unfortunate feature – is the infelicity of the composition. Comparison with Raphael's *Portrait of Pope Leo X with Cardinals Giulio de'Medici and Luigi de'Rossi*, painted two years later, is not to Sebastiano's benefit (Kempers 2001: 15; Henry and Joannides 2012: 63–64). Nonetheless the Bandinello Sauli is a natural development of the *Ferry Carondolet* as the first surviving portrait to show a cardinal in his official role among his *familiares* (Tostmann 2011).

The two men to the right of the cardinal are static and their interaction is wooden. Moreover, they are out of scale with the seated prelate and do not interact with him. The pointing gesture of the figure on the far right is, as Hirst noted, taken from Leonardo's *Last Supper* and infrared reflectography (IRR) has further revealed that Sebastiano reworked the fingers (Hyde 2009: 117). The two seated men were first tentatively identified by Michael Hirst (1981: 99–100); that on the far right is none other than a young Paolo Giovio while on the cardinal's immediate right is Giovanni Maria Cattaneo, his secretary.[8] Sauli is being celebrated through those men of letters – both of whom by 1516 enjoyed reputations as humanist scholars – that he was able to attract to his household. The messenger behind Sauli, who remains unidentified, was presumably included to show the cardinal's position at the heart of affairs.

In 1515 all was still set fair for Sauli: in 1514 he had been celebrated in Cattaneo's laudatory poem, *Genua*, and the next year he moved his household into the prestigious site of what is now Palazzo Doria Pamphili (Bertolotto 1891); Sebastiano's group portrait is the culmination of this sequence of events. To represent Sauli, Sebastiano looked to Raphael; both the pose of the cardinal and his chair recall the *Portrait of Julius II*, a deliberate reference reflecting the high hopes held by Sauli of his own success. The variety of props deployed is unprecedented; Sauli holds a glove, on the table there is a bell which refers to his priestly ministry and the book that recalls his literary interests. As in the *Ferry Carondolet*, the table is covered with a rug but here it is very specific: it represents the first appearance in Italian painting of the Ushak rug, which became increasingly popular as the century progressed (Mills 1983: 16).

Idealised images

These two group portraits provide firm chronological termini, but they are also exceptions in Sebastiano's first half-decade in Rome. His abilities were exploited less in grandiose, identifiable portraits than in mysterious, idealised images that, owing a great deal to Giorgione and to Leonardo (as does the *Adoration of Shepherds*), were new to Rome (Ferino Pagden 2006). These paintings, all relatively small, also showcase Sebastiano's ability to imitate the feeling of his Venetian canvas painting but now on panel. In this group can be placed the so-called *Fornarina*, the *Portrait of a Young Lady with a Basket* and the *Violin Player*.[9] Despite earlier efforts at identification, it is now agreed that none of these, apart perhaps from the last, are actual portraits.

The *Fornarina* and the *Violin Player* measure 68 × 53 cm while the *Young Lady* is slightly larger at 78 × 61 cm. Only the *Fornarina* is dated, 1512, in gold figures, placed on the background to the left; the *Violin Player* has the year, MDXVIII, on the parapet but this appears – at least in part – to be a later addition. Both the *Fornarina* and the *Young Lady* have been considered to be Chigi commissions, although without any firm evidence (Bartalini 1996: 67–68; Barbieri 2014: 73). The former (first mentioned in the 1589 inventory of the Uffizi), which must be contemporary with the *Ferry Carondolet*, is a mature and developed painting that shows a young woman with a swan neck set against a deep black background. Her pose develops from the Washington, *Wise Virgin*, that Sebastiano painted at Venice in about 1510. She is elegantly and lavishly dressed and wears golden jewellery depicted with real gold; this rich costume would have struck viewers as nothing like it could be seen in contemporary Rome.

A second example of such idealised portraiture is the *Portrait of a Young Lady with a Basket*, which presumably dates a little later than the *Fornarina*; her figure type also derives from Sebastiano's Venetian training, although the execution is now recognisably Roman. She sits side-on to the viewer, turning her head outwards and holds a basket of fruit; a crepuscular landscape opens at the left. Even if a Chigi provenance for this painting is unprovable, it is at least probable that it is the 'femmina con abito romano, che è in casa di Luca Torrigiani', described by Vasari (1550 and 1568: 5.93).[10] As with the *Fornarina*, the extravagance of the costume is striking: the contrasting red and pink of her dress and cloak – like her sleeves and the fur trim of that cloak – are masterly. What differentiates the Berlin painting from that in Florence is the head type; whereas the former is still Venetian, here the head and the band that covers it are Roman.

Nevertheless, the Venetian sources of the Berlin painting remain obvious and when it was X-radiographed, it revealed that there was

originally a laurel hedge behind the sitter exactly as in Giorgione's *Laura* (Contini 2008). There is, however, a new monumentality about the figure: she fills the picture space and reveals the developing influence of Michelangelo. In addition, Sebastiano also looked to Leonardo, who was in Rome between September 1513 and his departure for France in 1516. The turn of the sitter's head is derived from the angel on the right in the *Madonna of the Rocks* (Ferino Pagden 2006: 228–29). Indeed, Sebastiano deploys Leonardo's inventions both in his portraiture and his religious paintings throughout his years in Rome, one sign of the immediate impact of direct experience of the Florentine's art (Ferino Pagden 2006: 228–29; Contini 2008: 144).

A slightly later member of this sequence of idealised portraits is the *Violin Player* – which bears a compromised date, MDXVII – in fact it antedates the invention of the violin (Blackburn 2012: 190ff). This portrait too has strong reminiscences of Venice, but remains the least known of Sebastiano's works, not seen in public since its 1895 sale in Paris from the Roman Colonna di Sciarra collection.[11] A young man in a green costume is outlined against a blank backdrop and set behind a parapet similar to those in paintings by Titian such as *La Schiavona*. He holds the bow for a stringed instrument and a bunch of bay leaves in one hand, with his back to the viewer but his head turned outwards; the *ritratto di spalla*, a pose favoured by Sebastiano throughout his career (Oakes 2008). The young man is elegantly dressed: his cloak has a rich fur collar and he wears his cap at a jaunty angle.

This picture is an example of a particular type, portraits of musicians, that became popular in north Italy in the early sixteenth century; of these Sebastiano had already produced an example at Venice, the well-known *Man with a Flute* of which several contending examples survive.[12] Vasari records Sebastiano's own delight in music in Venice, indeed that it was his 'prima professione', and one of his attractions for Agostino Chigi, who shared this love (Vasari 1550 and 1568: 5.85–86; Blackburn 2012: 173). The austerity of the *Violin Player's* setting, when compared to the Uffizi and Berlin paintings, also makes for a more plausible date of a couple of years earlier, *c.*1514–1515. The *Violin Player* also raises the question of what influence these idealised portraits by Sebastiano had on Raphael – a relationship that could help in their dating. Raphael, ever a sponge, was absorbing as much from Sebastiano as vice versa. A striking example is his *Bindo Altoviti*, which is plausibly dated 1516–1518 and therefore contemporaneous with the *Violin Player*. Here the deep green background, the *ritratto di spalla*, besides the beautiful young man himself, all insistently recall Sebastiano and Venetian painting (Brown 2003; Brown and Van Nimmen 2005: 23; Henry and Joannides 2012: 279–84).

The great and the good

In the interstices between idealised images and portraits of public figures of consequence like Ferry Carondolet are a handful of other male portraits that plausibly represent individuals who, clearly, were once important but are no longer identifiable: the *Portrait of a Man* in Austin TX, the *Portrait of a Man* in Budapest, the so-called *Portrait of Antonio Ciocchi del Monte* in Dublin and, perhaps, the *Portrait of a Man* in San Diego. Little can be said about the Austin portrait, given its damaged and fragmentary state cut down on all sides; it was first noted by Bernard Berenson only in 1957 and, although rarely discussed since, is dated unanimously to between 1512 and 1516.[13] The Dublin portrait is also very damaged: transferred to canvas and badly abraded, it appears flat and lifeless. It would seem, however, to also date from 1512–1514 and is the same size as the Berlin, *Young Lady with a Basket*. Here an ecclesiastic, whose identity is debatable (not only Cardinal Ciocchi del Monte but also Cardinal Farnese have been proposed),[14] is seated at a table with the background divided between an interior and an exterior view onto a recognisably Venetian landscape (Garas 1994–1995; Lucco 2008: 156–57). In support of the usual dating, the Dublin portrait is a simplified version of the *Ferry Carondolet*, whose pose the male figure imitates exactly even to holding a document in the same manner.

The Budapest portrait, however, despite severe damage to the paint surface, is an extraordinary achievement. The lack of a date and our ignorance of the sitter's identity cannot detract from the monumentality and power of this full-frontal image. The sitter is almost life-size and the scale is unlike any other of Sebastiano's portraits of these years: it is the only early Roman portrait that depicts the sitter at between half and three-quarter length. The elegantly and richly dressed young man wearing a cap stands facing the viewer; his hands rest lightly on a stone parapet like those that appear in several other early paintings by Sebastiano. In his left hand, he holds what appears to be a document but whether this was once inscribed or was always merely a prop is now impossible to discern.

The background is less elaborate than the *Ferry Carondolet*: to the right classical architecture and to the left a view onto the landscape. In that light, the traditional date of 1514–1515 would appear to be accurate as it illustrates the new movement in Sebastiano's art in the direction of austerity and monumentality. Christoph Frommel (2010: 20–21) has speculated that the Budapest painting could be a portrait of Metello Vari, the patron of Michelangelo's Minerva, *Risen Christ*, and Susan Nalezyty (2017: 86–97) that it could be the lost portrait of Jacopo Sannazaro painted for Pietro Bembo – but both of these ideas remain wishful thinking. Recent research by Momesso (2007), however, has shown that this portrait was in the

Este collection by at least 1663 when it was considered to be by Raphael and even as his self-portrait; it was acquired as such by Budapest. The mass here does indeed show some reaction to Raphael's Naples *Cardinal Alessandro Farnese* of 1509–1511 (Fornari Schianchi and Spinosa 1995: 168–69).

The San Diego painting, by contrast, discovered only in 1908 when it was in the collection of a Baron Tucher in Nuremburg, is among the smallest of Sebastiano's portraits (62 × 52 cm) and, unusually, is painted on canvas. Often ignored, it was omitted from the catalogue of the 2008 exhibition but was included in the National Gallery exhibition of 2017 (Goudie 2017: 134–35). Although it is also heavily abraded, it was once a work of high quality. The sitter adopts a three-quarters pose similar to that of the *Dorotea*, but the dimensions are much reduced; he fills the frame, set against the same grey background as the *Violin Player*. Exhibiting that monumentality that enters Sebastiano's portraiture after about 1514 with his deepening relationship with Michelangelo, it was dated 1516 by Pallucchini. I would place it slightly earlier, around the time of the *Violin Player*. On the basis of the similarity of features between the sitter here and the donor in the National Gallery's *Madonna and Child with Saints and a Donor*, it was further speculated by Michael Hirst (1981: 82–83), that the sitter is none other than Pier Francesco Borgherini. The San Diego portrait could therefore also be datable to 1516–1517, although Carlo Piga (2018: 213–19), while accepting the identification, would date this portrait somewhat later, towards the end of the decade.[15]

This returns the argument to the *Sick Man*, also on canvas, as it was dated by D'Achiardi (1908: 110–12) contemporaneously with the San Diego portrait, which he was the first to publish. In this portrait, a pallid young (22 if the inscription is correct) bearded man is set against a grey background; he is richly dressed in an enveloping robe with fur linings, with a beret on his head, while his gloved left hand rests on a book. The muted colours in which he is painted are a symphony of brown and grey. If this portrait is indeed by Sebastiano, the date of 1514 would represent a key moment of transition in his career from the Venetian reminiscences of his early Roman years to a fully-fledged austerity that only developed the longer he spent in the city.

Sebastiano's early years in Rome, beginning with the *Adoration of the Shepherds*, were of great significance not only for his own development but also for the impact his art had on contemporaries. From 1511, Sebastiano worked for a prestigious clientele, producing for them a group of ambitious and innovative paintings. His public Roman debut with the commission of the *Raising of Lazarus* was not an anomaly but the affirmation of a position already established. Over these years Sebastiano's style changed from the Venetian-inflected *Adoration* to become that Roman manner that remained with him, taking different forms, for the rest of his career. A reattribution of the dated *Sick Man* to Sebastiano would confirm that assessment of his development as well as providing a firmer chronological basis for the other portraits of these early years.

Notes

1. An early, if often erroneous, attempt to correct this was made in Propping 1892: 22ff.
2. Sebastiano's use of a canvas support continued well into his Roman years. Besides these examples, there is the puzzling portrait of Cardinal Pompeo Colonna still in the Colonna collection which, if it is by Sebastiano, cannot date from earlier than 1517, but the recent restoration has revealed the use of this same support. See Baker-Bates 2008; Piergiovanni 2015: 241–42.
3. 'He was none other than a protegy of Agostino's, one of his familiars'.
4. There is another painting that is often placed in these years, the tondo *Madonna and Child*, also in the Fitzwilliam Museum, Cambridge. First published by Federico Zeri, this painting is dated more plausibly to *c*.1517: Christie's, Friday, 2 May 1947, lot 117; Zeri 1957: 23. Hirst (1981: 38) dates it to 1513 while Goudie (2017: 140–41) dates it to 1517.
5. For an expansionist reconstruction of Sebastiano's brief Venetian career, contrasting with Michael Hirst's contractionist view: Volpe and Lucco 1980. For the persistence of doubtful attributions to Sebastiano in Venice see the catalogue of the recent Royal Academy exhibition (Facchinetti *et al*. 2016).
6. For arguments for an attribution to Sebastiano: Galante 1901 and Venturi 1913: 167; the first doubts were raised in Pallucchini 1944: 183. For a summary of the painting's complex history, see *Tiziano nelle Gallerie Fiorentine* 1978: 240–44.
7. 'to wit 30 ducats to the painter Sebastiano the Venetian for the remainder of his work'.
8. Hirst's tentative opinion was reinforced by the discovery of further images of these two men (Davis 1982: 384).
9. I leave aside the *Man in Armour* here as both date and subject remain particularly contentious and the dating alone has veered between the early 1510s and 1530; Richter 1936: 88–90; Hirst 1981: 97; Lucco 2008: 148–49; Barbieri 2013; Eclercy 2018.
10. 'a woman in Roman dress, which is in the house of Luca Torrigiani'.
11. Propping (1892: 39–40) remains the last scholar to see this painting in the flesh.
12. There are many versions of this composition. In my opinion, if Sebastiano's original does survive it is the painting at Wilton House, but it is so badly damaged that it is difficult to form an accurate opinion. Pembroke (1968: 88), however, attributed it to Savoldo; Hirst 1981: 29–30. For a list of variants see Volpe and Lucco (1981: 93–94) who argue strongly instead that the original is the painting now at Bowood.
13. Berenson 1957: 163: 'Il ritratto Suida-Manning rappresenta lo stadio di sviluppo tra la *Fornarina* e il *Violinista*'; Bober 2001: 102–103; Lucco (2008: 140–41) summarises the discussion.
14. Both incorrectly in my opinion – and the sitter's dress is not even entirely consistent with that of a cardinal.
15. This portrait also serves as the cover of Piga's 2018 book on Borgherini as patron.

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Sebastiano del Piombo's *Adoration of the Shepherds*: attribution and dating

PAUL JOANNIDES

Abstract This essay considers the visual evidence for the attribution and dating of Sebastiano del Piombo's Fitzwilliam *Adoration of the Shepherds* and seeks to situate it within the artist's oeuvre.

Our earliest written record of Sebastiano's *Adoration of the Shepherds*, referred to simply as a *Nativity*, is in the 1724 inventory of the collection of the Duc d'Orléans.[1] This inventory provides no artists' names but, three years later, when the painting was included in the collection catalogue (Saint-Gelais 1727), it was as a Giorgione, presumably its traditional attribution.[2] It was not, apparently, among those paintings formerly owned by Queen Christina acquired by Philippe from the Odescalchi collection in 1723 and we have no knowledge of its earlier whereabouts.[3] While written record is absent, a competent near-size (104 ×158 cm versus 124.5 × 161.3 cm) copy of it, on canvas, provides a minimal visual history. The copy entered the collection of Louis XIV from that of Everard Jabach in 1671 and it is recorded as by Palma Vecchio, not Giorgione, in Charles Le Brun's inventory of 1683 (Brejon de Lavergnée 1987).[4] This copy's date is uncertain but it is probably of the late sixteenth century or early seventeenth century, perhaps part of that wave of copying and pastiching of early-to-mid Cinquecento Venetian painting associated with Padovanino and Pietro della Vecchia. The copy implies that Sebastiano's original was then still in Italy and that it had some reputation. Whether or not that was in France by 1671 is conjectural; if so, it can have been little known, for it is otherwise doubtful that Jabach's version would have passed muster.

The *Adoration of the Shepherds* remained in the Orléans collection until the sales of the 1790s. It was acquired by Earl Fitzwilliam at Bryan's Sale of the residue in 1800 and was presented by him to the museum that bears his name (Goodison and Robertson 1967). The *Adoration* remained as a Giorgione in the Fitzwilliam Museum until, in 1871, it was subtracted from his oeuvre and transferred, uncertainly, to Savoldo's – an inexplicable reattribution and one without following (Crowe and Cavalcaselle 1871).[5] In 1894 it was assigned to Francesco Becaruzzi (Berenson 1894), again inexplicably, and this attribution was repeated in successive editions of Berenson's lists.[6] Only in 1913, some four centuries after its creation, was the painting finally recognised as by Sebastiano (Lionello Venturi 1913).[7] His attribution postdated the publication of the two earliest monographs devoted to Sebastiano, both of which appeared in the same year (Bernardini 1908; D'Achiardi 1908) and virtually all later writers on the artist, Berenson included, followed him. An exception was Lionello's father (Adolfo Venturi 1928) whose misunderstanding of Sebastiano was profound; he gave it to the young Pordenone, a view which, although indefensible, and isolated, does register something of the painting's energy.[8] Venturi Jr. dated the painting *c.*1520, thus well into Sebastiano's Roman period, but although it is now clear that this was too late, it was not entirely eccentric, for around 1520 as Venturi acutely noted, Sebastiano reconsidered certain aspects of his Venetian formation – his *Martyrdom of Saint Agatha* of 1519 actually quotes a figure by Giorgione. All later monographs on the artist have dated the *Adoration of the Shepherds* between 1510 and 1512. Luitpold Düssler (1943), describing its Venetian and Roman characteristics, left it on the cusp of Venice and Rome; Rodolfo Pallucchini (1945) and Michael Hirst (1971) placed it firmly among the first paintings produced by Sebastiano in the metropolis, following his transfer there in autumn 1511. Mauro Lucco (1971), however, who initially accepted this view, later suggested that it was Sebastiano's final Venetian painting.[9]

Once in Rome, Sebastiano worked primarily for Agostino Chigi, who had brought him there, and with some intensity, especially in the Sala di Galatea of Chigi's villa, today known as the Farnesina where, within a year or so, he had frescoed the Ovidian subjects in the lunettes and begun the never-completed wall cycle with *Polyphemus*. Contemporary with these murals he painted the large, magnificent and innovative mythology of *Venus and the Graces informed by Cupid of the Death of Adonis*, which seems to be recorded in Chigi's posthumous inventory in 1522 (Bartalini 1992). Executed on a broad-weave herringbone Venetian canvas, it includes a view of the Piazza San Marco as seen from the Giudecca and it is likely that, although executed in Rome, it fulfilled a commission planned in Venice shortly after Chigi and Sebastiano were introduced.[10] The same might well be true of the *Adoration of the Shepherds*. After a year or two in Rome, probably around 1512, Sebastiano's relations with Chigi seem to have collapsed and Chigi switched his

patronage to Raphael; but whatever the reasons for the breakup, and whatever degree of rancour it involved, Sebastiano retained his erstwhile patron's respect sufficiently for Chigi, in the few days that separated Raphael's premature death from his own, to transfer to Sebastiano the cherished projects of his chapels in the churches of Santa Maria della Pace and Santa Maria del Popolo.

There is no record of the *Adoration of the Shepherds* in Chigi's own collection but a full inventory of his paintings has yet to be found. Nor do we know what paintings his Venetian mistress – later wife – Francesca Ordeaschi might have owned. The *Adoration of the Shepherds* is a subject that could well have been commissioned to celebrate the birth of a male child, either by a parent – which would exclude Agostino at the relevant date – or by a generous friend wishing to make a christening present, which might readmit him. But even while working for Chigi, Sebastiano was no doubt active for other clients: we do not know for whom he painted his *belle*, the so-called *Fornarina* in the Uffizi, which bears the date 1512, and the approximately contemporary so-called *Dorothea* in Berlin, and it cannot be ruled out that Chigi was the recipient of one or other or both; but the portrait of Jean Carondolet was executed for the sitter, as was, presumably, the *Young Man* in Budapest, which may be as early as 1513. All four paintings are very Venetian in appearance and antedate the tightening of manner that becomes evident in Sebastiano's work from around 1514, in part due to Michelangelo's influence, and in part to his competition with Raphael.

The fact that the *Adoration of the Shepherds* was painted on wood is neutral with regard to its origin. At this period in Rome, wood was a more usual support for a painting of this size than canvas, but canvas was sometimes employed, as in Raphael's *Sistine Madonna*.[11] And while Sebastiano seems to have been ahead of his contemporaries in his appreciation of the textural possibilities of canvas (the support used for his larger paintings in Venice, the *Judgement of Solomon*, the altarpiece of San Giovanni Crisostomo and the San Bartolommeo *Organ Shutters*), he could well, like Titian, also have produced substantial paintings on wood.[12]

One material argument for a Roman origin for the *Adoration* was provided by Hirst, who suggested that the child sketched on the recto of Sebastiano's sheet of chalk drawings in the Ambrosiana – which is overlapped by a study for the figure of Venus in Sebastiano's *Venus and the Graces informed by Cupid of the Death of Adonis* – was made for the Child in the *Adoration*, and although the correspondence is by no means exact, it is sufficiently close to be plausible.[13] Whether the *Adoration of the Shepherds* was painted in Venice or Rome can only be assessed visually. Most scholars have agreed – the most sustained analysis is by Sydney Freedberg – that the figures imply a Roman origin and although Sebastiano, like Titian, could have known some central Italian novelties even in Venice, the number and range of the associations that can be adduced is telling (Freedberg 1961: 143–44). The lifting of the veil from the child is obviously related to the action in Raphael's so-called *Madonna di Loreto*, probably of 1510 and hardly later than 1511.[14] It was a motif, although less dramatically employed, found in northern Italy as early as the 1460s, and it can be seen in a particularly refined form, for example, in a *Madonna* by Bergognone, of which there are versions in the Brera and in a private collection. However, Bergognone's panels are usually dated in the second decade, so they may not have priority over Raphael and Sebastiano.[15] In any case, the similarity between Raphael's painting and the Virgin and Child in Sebastiano's *Adoration* is sufficiently close to make it probable that one depends directly from the other, and not from some putative common source; if so, Sebastiano was surely debtor, not creditor. He returned to Raphael's model twice thereafter, in the versions of the *Holy Family* at Olomouc (1524) and, unfinished, at Naples, *c.*1533. The *Madonna di Loreto*, although usually considered to have been painted for Julius II, was perhaps commissioned by Agostino Chigi, and Chigi enjoyed having motifs from works of art that he owned echoed in others that he owned.[16]

St Joseph leads us in another direction. Although no specific source is known, both in his characterisation and in his complex but forceful pose, he has something of the compact introversion of the later Prophets on the Sistine ceiling and of the Ancestors of Christ, and it is not beyond the bounds of possibility that he is based on some sketch by Michelangelo, who specialised in powerful realisations of the Virgin's consort and was partly responsible for the elevation of Joseph's status – at least artistically.[17] Sebastiano looked closely at Michelangelo soon after his arrival in Rome; *Polyphemus* – whose head is very like that of the shepherd on the left of the *Adoration* – is hardly conceivable in its present form without awareness of the *ignudi* on the Sistine ceiling. And that the two artists were in direct contact by 1512 or 1513 at the latest is demonstrated by the drawings on the back of the Viterbo *Pietà*. These are generically Michelangelesque but at least two of them display specific knowledge of Michelangelo's visual ideas. Whether these are by an assistant of Michelangelo or by Sebastiano himself, they imply that the panel was for a time in Michelangelo's studio and that the draughtsman had to hand some of the loose black chalk drawings that Michelangelo made for the lunettes and spandrels at the altar end in the last phase of the ceiling.[18]

In the gesture of the shepherd who looks out to his right to beckon his companion forward, there may be a further trace of Michelangelo's influence: Sydney Freedberg (1961) thought it derived from the pointing figure in the *Battle of Cascina* and while the nature of the action is different, and the

similarity not strong, there may be something in his idea.[19] It should also be noted that the pose of the kneeling shepherd at the left is similar to that of Leonardo's unfinished *St Jerome* now in the Vatican. That painting's date is disputed, with most scholars placing it around 1480, while others put it as late as 1510. It might also have been begun early and tinkered with on and off over several decades. The kneeling pose was certainly well known, and Sebastiano could already have been aware of it in Venice, for the leg position was employed by one of Leonardo's Milanese followers in a drawing in the Royal Collection as well as by the 'Prospettivo Milanese', who used it in a woodcut published in 1500.[20]

Identifying central Italian sources in Sebastiano's painting is useful but what is important is their contribution to the action. The Virgin lifts her white drapery to reveal the Child to the shepherds, while Joseph points towards Him with his left hand. The kneeling shepherd at the left, whose garb and characterisation evoke – presumably deliberately – John the Baptist, gazes down intently and raises his right forearm and fist in astonishment.[21] His companion, clad in red, who kneels next to the Virgin, glances across to his right and beckons the third shepherd, standing uncertainly at the left edge, to advance to observe the miraculous Child. These pastoralists differ greatly from those in Giorgione's Allendale *Nativity* and its derivative, the Houston *Nativity* – begun by Titian but finished by his brother Francesco – in both of which they incline reverently over the Child in a distant echo of Mantegna.[22] In those paintings figures are posed as in a *tableau vivant*, although Titian increases animation by transforming Giorgione's shadowy cave into a rustic stable, whence the Virgin and Joseph have emerged in response to the shepherds' arrival – an idea adopted and developed by Sebastiano. But in Sebastiano's picture, in contrast to those by Giorgione and Titian, the shepherds respond actively to the discovery of the Child; they are individualised, animated and their responses are varied. The conception is Roman, not Venetian, Raphaelesque not Giorgionesque, and it is tempting to wonder whether Sebastiano had seen the 'teaching' group at the lower right of the *School of Athens*, a masterclass in staging the reactions of different personalities and divergent intelligences to a common idea. In comparison with Venetian models, Sebastiano has replaced reverence with revelation.

Although the figure composition is very largely Roman, Venice remains palpable in the background landscape, hilltop town and rustic setting (Sebastiano was not yet attuned to the majesty and mystery of ruins, or their thematic reverberations). The foreground, with its low wicket fence, its rivulet and small dyke, is emphatically Giorgionesque and its components remained constants with Sebastiano for some years.[23] Also Venetian is the type of the Madonna: with her oval head and dark hair she recalls Titian's *Gypsy Madonna* which Sebastiano might just have seen before he left Venice (or maybe both painters used the same woman as a model). Such features suggest that, as in *Venus and the Graces informed by Cupid of the Death of Adonis*, Sebastiano was seeking to synthesise his more specifically Venetian skills of textural evocation, lambent flesh painting and the representation of landscape with central Italian figure design. This ambition was never entirely to leave him and even his latest surviving extensive landscape, that in the Burgos *Holy Family* of around 1523, still contains Venetian elements; but the proportions within the mixture change and become steadily more Roman.[24]

The composition of the Fitzwilliam *Adoration* is noteworthy in the placing of a rather compact group on one side of the picture field and scholars have made much of its relation to Giorgione's Allendale *Nativity*, in which the main group is also placed well off-centre. But Sebastiano's employment of asymmetry differs greatly from Giorgione's. In Giorgione's painting the left side of the field offers little more than a beautifully realised landscape and a pleasurably anecdotal supplement to the main event; in Sebastiano's painting space becomes drama. The large standing man at the left edge, in part cropped by it, looks contemplatively towards the group he is invited to join; as the most mature of the three, his imminent advance, and his acceptance of the Child's divinity, will carry all the more weight. Movement or gesture across and diagonally into space was a device of staging developed and exploited by Sebastiano in his Venetian period and it was, it seems, unique to him. It is found in the *Judgement of Solomon*, in the woman who runs inwards from the left, her ungainly movement dramatising her anger or anguish.[25] It is seen also, more calmly, in the engraving by Giulio Campagnola of *Christ and the Woman of Samaria*, which must record a design by Sebastiano.[26] In this, the standing Christ is also partly cropped by the left edge of the visual field and His admonition to the seated Samaritan is targeted all the more forcefully by being angled downwards into depth.[27] A residue of this kind of arrangement is found in *Venus and the Graces informed by Cupid of the Death of Adonis*, where the direction of the diagonal is reversed, with the body of Adonis in the middle ground impacting upon the women in the foreground; but it does not recur in Sebastiano's later work in Rome.

Sebastiano's *Adoration of the Shepherds* marks a step beyond Bellini and Giorgione in drama. It is a new statement of that ceremonious stateliness which was always one of Sebastiano's great strengths as a monumental artist. Although the subject, which is largely northern in origin and was taken up by Mantegna, was used for altarpieces in Florence and Umbria by Ghirlandaio, Lorenzo di Credi and Perugino among others, it was treated as a narrative in central Italy only in predellas, sometimes as an episode separate from that of the Adoration of

the Magi, sometimes fused with it, as in Raphael's predella panel of 1503. None of the major central Italian painters addressed it in a form comparable to Sebastiano's painting. Although the subject is not uncommon in early Cinquecento Venice, Sebastiano's scheme is not seen in works by Titian, although certain similarities can be found with ones by Palma Vecchio and, of course, Sebastiano's friend Vincenzo Catena. But perhaps the painting that most effectively exploited Sebastiano's scheme is the *Adoration of the Shepherds* by Tintoretto, also, coincidentally, in the Fitzwilliam Museum, in which the Virgin lifts a veil from the radiant Child, and in which a subsidiary figure enters from the left-hand side.

What was the function of Sebastiano's *Adoration of the Shepherds*? Small altars were sometimes surmounted by horizontal paintings and this might have been the case with the Fitzwilliam picture. A little later in the century, a painting of this subject and dimensions might have found a place on the side wall of a chapel, facing a thematically complementary scene such as an Adoration of the Magi or a Presentation in the Temple, among other possibilities. But we have no evidence of such a scheme in Rome or, I think, Venice, dating from this moment. So, the function of Sebastiano's painting must also be left undetermined.

Sebastiano's *Adoration of the Shepherds* does not seem to have been known in Rome or, if it was, had no influence there. Raphael made a drawing of the subject *c.*1513, in which St John and other figures are introduced, and around 1520 this was developed by Tommaso Vincidor in a design for a tapestry for Leo's *letto da paramento*; but neither image resembles Sebastiano's painting. There is nothing similar in the work of Sodoma or Peruzzi – save for a possible echo of the Child's pose in the latter's ex-Pouncey *Holy Family* (now in the Ulster Museum) of *c.*1514 – nor is there any influence on the treatment of the subject in Raphael's loggia.[28] Such a lack of Roman afterlife, and the echo in Tintoretto, might encourage us to reconsider Lucco's suggestion of a Venetian origin for *The Adoration of the Shepherds*. But this confronts the central Italian figural sources and staging evoked above. Perhaps the answer is that, although executed in Rome, the painting was made to fulfil a commission contracted by Sebastiano before he left Venice and later dispatched there; or, alternatively, that it was sent to the Serenissima by a Venetian resident in Rome – Francesca Ordeaschi would be an obvious candidate – as a gift or in fulfilment of some promise. If indeed the painting first came to light in Venice, this might explain why the attribution to Giorgione was readily accepted – less likely had it been known to originate in Rome – and its presence in the lagoon would account for its effect on Tintoretto. But we shall remain in the dark until something is discovered of its history.

Notes

1. Although one might have expected the painting to be described as 'Une adoration des bergers' – as Saint-Gelais does – it is no doubt to be recognised in the 1724 Inventory of the Orléans collection as no. 1669 'un autre tableau quarré peint sur bois representant une nativité dans sa bordure de bois sculpté doré numerotté 188, prisés hui cens livres'. It was hanging near Titian's *Diana and Callisto*, estimated at 6,400 livres, which implies it was Venetian, and the relatively low estimate probably reflects its already poor condition. In the 1786 inventory, in which it was no. 39, it was described as: 'une nativité par le Giorgion, prisé comme très gaté quarante huit livres'; the support is not given in 1786 but had no doubt been transferred to canvas by then.
2. Saint-Gelais 1727: 170; his description deserves quotation: 'L'Enfant Jesus est à terre sur un bout de la draperie de la Vierge qui est à genoux. Cette draperie est blanche, & elle semblre la reliever pour faire voire le Sauveur aux Bergers. S. Joseph est à côté de la Vierge, & les regarde. Il y a deux Bergers à genoux, celuis qui est sur le devant, a une expression d'admirations, l'autre est tourné & paroît apeler quelqu'un qu'on ne voit pas, & tout à gauche on aperçoit un troisième Berger qui arrive. Le fond du Tableau est un Paisage.'
3. Saint-Gelais often gives provenance information, but he says nothing about that of the *Adoration*.
4. Brejon de Lavergnée 1987: no. 203, 253; the provenance prior to Jabach is unknown. The attribution of this copy to Palma registers something of the bulk and amplitude of Sebastiano's figures, as well as the fact that Palma was the primary exponent of the theme of the Adoration of the Shepherds in early Cinquecento Venice. It is of interest that a drawing by Sebastiano (the attribution is due to Françoise Viatte) was long believed to be by Palma: see Joannides, no.1, 24–27 in Descamps and Brugerolles 2012.
5. Crowe and Cavalacaselle 1871, II: 162: 'in the realism and boldness of the figures very like Savoldo; very dashing in treatment, the colours full of vehicle and copiously laid on, the surface not free from injury'; unchanged in later editions.
6. Berenson 1894: 87, as Becaruzzi; in Berenson 1913, I: 117, he accepted that the Fitzwilliam painting was either a copy of, or a repainted original by, Sebastiano, and this attribution was retained in subsequent editions of the lists.
7. L. Venturi 1913: 167: 'Un quadro che dimostra il combaciarsi dell'elemento romano e del Veneziano, e che però credo debba attribuirsi a Sebastiano del Piombo, è l'Adorazione de' Pastori, del Fitzwilliam Museum (n.183) de Cambridge. In tutte le figure vediamo la grandiosità e l'angolosità di movimenti, tipiche per la scuola romana; nel Gesù sono i carattari prettamente michelangioleschi; ma nella colorazione rossa intense delle carni, nel giuoco della luce sui volti, nell'asimmetrico paesaggio, nell'intensità fiammante dei colori delle vesti sono invece tutti i caratterri tipici della Scuola di Giorgione. La presenza dei due caratteri, e la grandezza monumentale dell'effetto individuano Sebastiano del Piombo, e in lui già arrivato, verso il 1520, a una magistrale assimiliazione della forme michelangiolesche, mostrano un momentaneo desiderio di ritornare alla prima fonte dell'arte sua, della sua giovanile attività.'
8. A. Venturi 1928: 713; Pallucchini 1944: 29, also felt that it anticipated certain aspects of Pordenone.

9. Düssler 1942: 28–29, 129–30; Pallucchini 1944: 29, 157; Hirst 1981: 38–39; Lucco 1980: no. 32, 101; Lucco 1987: 4–11; Lucco in Strinati 2008: no. 15, 128–29.
10. A view of Piazza San Marco is famously seen in the Tallard Madonna by Giorgione? (Oxford, Ashmolean Museum), but not elsewhere; perhaps it was included only in paintings destined for export from Venice.
11. The only substantial subject paintings on canvas executed by Sebastiano in Rome were the wings – *Christ's Descent into Limbo*, in the Museo Nacional del Prado, and the lost *Communion of the Apostles* – of Jeronimo Vich's *Pietà*, which is signed and dated 1516, and was originally on wood. This very unusual combination is hard to explain unless it was to reduce the weight of the ensemble for transport.
12. Apart from the Berlin *Ceres*, sometimes thought to be a transfer from wood but which seems to have originated on canvas, the surviving panel paintings made by Sebastiano in Venice are small: the *Woman in Profile* in the Farringdon collection of *c.*1509, the busts of *Judith* dated 1510 in London, the so-called *Wise Virgin* in Washington, dated 1511 (perhaps a pair), and the Anton Fugger, probably also of 1511, in Munich. The Accademia's *Virgin and Child with Saints John and Catherine* does not seem to me to fit into Sebastiano's early development and I find it very hard to accept as his. The *Holy Family with Saints Catherine, Sebastian and a Donor* in the Musée du Louvre can hardly date from much before 1515 and is probably by a follower.
13. Hirst 1981: 39. For this sheet, Milan, Biblioteca Ambrosiana, F.290, Inf no.22, see also Barbieri and Joannides in Strinati 2008: no. 67, 256–57.
14. This motif had been employed by Michelangelo – although in a different form – in a drawing now in the Musée du Louvre (RF 4112 recto; Joannides 2003: no. 17, 113–17) of about 1506, and Raphael may have derived the action from that, or from a related study for he knew some of Michelangelo's drawings.
15. See Sciolla 1998: no. 77, 362–63 (entry by Barbara Casavecchia).
16. As Hirst (1981: 37) pointed out.
17. Youjin Noh points to a kinship with the Borgherini Chapel's equally Michelangelesque *St Peter*.
18. See Barbieri 2004. I am deeply grateful to Costanza for guiding me through these drawings and discussing them with me on a visit to Viterbo.
19. Sebastiano found the gesture resonant and recalled it in the *Pietà* painted for Jeronimo Vich in 1516, in which Joseph of Arimathea at the lower left raises his arm towards the men preparing Christ's tomb.
20. No. 12571 recto; Clark and Pedretti 1968: 110; Pedretti 1973: 53–54, and figs 45, 46 and pl. X.
21. On the verso of Ambrosiana F.290 Inf no. 22, is the upper part of a muscular figure – perhaps the torso of a centaur – sketched in red chalk, whose raised left forearm and half-opened hand closely resembles that of this shepherd; see Hirst 1981: figs 47 and 48.
22. For a slightly divergent interpretation of this picture, whose importance is recognised by both, see Joannides 2001: 165–70 and Lucco 2012: no. 11, 82–87.
23. Another observation owed to Youjin Noh.
24. I cannot accept Mauro Lucco's redating of this painting to *c.*1516–19 in Strinati 2008: no. 28, 158–61; it seems to me to come from the enamel surface daylight phase that follows 1520; nor does its patronage suggest so early a date.
25. There is disagreement over which is the true and which the false mother (and who is the third woman to the left of the throne, ushered forward by a solicitous guard?); but the ungainly action and distorted face of the woman running inwards evoke the distress and fear a true mother might feel (see Raphael's treatment of the same subject in the vault of the Stanza della Segnatura) whereas the graceful mother to the right of Solomon's throne projects the calm acquiescence of deceit. Of course, as Hirst reminds us (1981: 23), George Gordon, Lord Byron, thought that the right-hand woman was the true mother – but Byron was always susceptible to a pretty face.
26. Although it may never have been executed as a painting, I suspect that Sebastiano's *Christ and the Woman of Samaria* was planned as a pendant to Titian's *Christ and the Adulteress*, whose proportions it shares.
27. Generally, in treatments of this subject, Christ is seated and the Samaritan Woman standing.
28. Sebastiano praised Peruzzi's integrity in a letter to Michelangelo.

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Double take: Rembrandt's *c.*1631 *Old Man with a Gold Chain* and its highly exacting copy

CHRISTINE SLOTTVED KIMBRIEL AND LOUIS NEWMAN,

WITH CONTRIBUTIONS FROM KAMILA GORA

Abstract This article presents recent provenance and technical analytical research into a copy after Rembrandt's (1606–1669) panel painting, *Old Man with a Gold Chain*, *c.*1631, in the collection of the Art Institute of Chicago. It traces the work back to the eighteenth century, when it is thought to have come into the possession of the Hope family, and considers the changing understanding of the identity of the sitter through the centuries until the recent discovery that the sitter was the *Rentmeester* of the Sint Catharina Gasthuys in Leiden in 1629–31. The article then discusses the relationship between the execution of the copy and the original, as expressed through the technical imaging and elemental analysis, and argues that the copy was executed within Rembrandt's workshop between 1631 and 1634, possibly by Gerrit Dou. Finally, it is argued that the existence of this copy points to the use of canvas supports in Rembrandt's Leiden workshop slightly earlier than previously suggested.

Introduction

In the sixth and final volume of the Rembrandt *Corpus*: *Rembrandt's Paintings Revisited* (Van de Wetering 2015), the youngest and last surviving member of the Rembrandt Research Project (RRP) team, Ernst van de Wetering, takes stock. He makes many addenda and adjustments to the content of the first five volumes in response to new knowledge and general insights shifting across the decades since the beginning of the RRP in 1968. His second chapter is dedicated to the question: 'What is a non-Rembrandt?', and here, he states how 'It would be a research project in itself to bring order into the mass of large and small *tronies* and satellites by pupils' (Van de Wetering 2015: 58). Whether any scale of research project dedicated to this ambitious

Figure 1. Studio of Rembrandt, *Old Man with a Gold Chain*, oil on canvas, *c.*1632–33, 76 × 65.5 cm. Photograph © Elaine Holder, Hamilton Kerr Institute, University of Cambridge, reproduced with kind permission of the owner.

Figure 2. Rembrandt, *Old Man with a Gold Chain*, *c.*1631, oil on panel, 83.1 × 75.7 cm, Mr. and Mrs. W.W. Kimball Collection (1922.4467). 2024 © The Art Institute of Chicago/Art Resource, NY/ Scala, Florence.

end would be successful remains to be seen. In the meantime, this article aims to make a small contribution towards that goal by reassessing *one* such tronie portrait in light of existing technical and documentary evidence, and by taking into account the most recent thinking on Rembrandt's movements in the early 1630s (figures 1 and 2).

Until 1912, the quality of the execution of this tronie portrait had earned it the status of an original work by Rembrandt. When a slightly larger version on panel of the same composition came to light at auction in December 1911 and was subsequently cleaned, *it* became known as the original (Bode 1912: 210–12). The canvas version has since then led a quiet existence in private ownership until, in early 2020, it was brought to the Hamilton Kerr Institute for a comprehensive technical examination and a reassessment of its likely origin and authorship.

In this article, what is known today about the provenance of the canvas version, which can be traced back as far as the early-eighteenth century, is set out. This provenance history also serves to illustrate how the understanding of the trope of the head study, or tronie, in Rembrandt's oeuvre has developed until this day, when the actual model has finally been convincingly identified and named. His characteristic features lend interest and character to the figure in this and numerous other early tronie paintings by Rembrandt and his Leiden workshop. In itself, this recent insight does not place the canvas version of this particular Rembrandt composition securely within Rembrandt's studio production. Without documentary evidence to prove otherwise, an unassociated contemporary or later copyist could, in principle, be the author of the work. Prior to 2020, no further progress had been made on this question since its status became that of the non-original version more than 100 years prior.

The vast body of technical research into Rembrandt's oeuvre that has taken place over the past half a century has provided a comprehensive body of published information against which it is possible to compare technical features of paintings such as this one. On this basis, it will be argued here that the canvas version is indeed an original from Rembrandt's workshop, and that it was executed during the transitional period of 1631–33, when Rembrandt was in the process of moving his increasingly successful practice from his hometown of Leiden to Amsterdam. While the technical evidence does not allow for a secure attribution beyond placing the work firmly within Rembrandt's workshop, this significant narrowing down of the context for its creation lends licence to a renewed consideration of its authorship. This falls to a small number of known individuals, whose artistic abilities and roles within Rembrandt's studio output make them highly likely candidates.

Provenance

In connection with the recent treatment and technical investigation of the canvas version of this tronie composition, further documentary research was undertaken, extending the previously known provenance back to the eighteenth century. In 1897, the painting, described as a 'Canvas. H.0m,75; w. 0m, 62', featured in the catalogue for the Paris-based Sedelmeyer Gallery with the title *Rembrandt's Father in a Broad-brimmed Hat* (Bode and Hofstede de Groot 1897: 92, cat. no. 29). According to this catalogue, it had been in the famous Beresford Hope collection until 1886, at that time belonging to the British author and politician, Sir Alexander James Beresford Hope (1820–1887), but passed through Sedelmeyer in 1887 (the year of Alexander's death) to a new owner, Mr. W.A. Beers of New York. Just a year later, the 1898 Sedelmeyer catalogue recorded it as belonging to *Mrs*. W.H. Beers of New York (Sedelmeyer 1898: 128). That same year, it was sold to Sir Sigismund Neumann and has remained in the Newman family's collection since.

Alexander Beresford Hope was a direct descendant of the Dutch Hope family, whose founding father, the merchant Archibald Hope the Elder (1664–1743), was born to Scottish parents in Rotterdam and had 11 children (Niemeijer 1981: 131). The Bisschop brothers were fellow Mennonites and close friends and business associates of the Hope family. In late 1770, Jan Bisschop wrote a will in which he made special provision for the sale of his collection of about 230 paintings; these were to be sold to Adriaan Hope (1708–1781) and his nephew John (Jan) Hope jointly for the total sum of 65,000 guilders. Adriaan was unmarried and resided at the time in the house of John's parents. On his death a decade later, John became the sole owner of the large Bisschop collection of mainly Dutch and Flemish master paintings, and – in consequence – the founder of what later became known as the Hope-Beresford collection (Niemeijer 1978: 185). The inventory of Jan Bisschop's paintings collection was drawn up only a few weeks after his death, on 13 April 1771, and was published with a commentary by E. Wiersum in 1910. Surprisingly, it does not list any works by Rembrandt. The only item that could, conceivably, be the tronie in question is a work listed as 'Een Portreet': this work, as is the case for numerous other paintings, is not given an attribution in the inventory (Wiersum 1910: 184). Wiersum suggests that this portrait may be identical to a portrait listed in an earlier and shorter inventory of the Bisschop brothers' painting collection, compiled by Gerard Hoet around 1752 (Wiersum 1910: 184). Hoet also does not list any works attributed to Rembrandt, although he cites 'Een stuk, zynde het Pourtrait van Govert Flink. H.9 en een half d., br.7 en een half d.' (Hoet 1752: 535).[1] While Flink, one of Rembrandt's earliest

Figure 3. Jan Stolker, *Portrait of a Man after Rembrandt, possibly Rembrandt's Father, Harmen Gerritsz. van Rijn*, 1734–85, print on paper, 28.1 × 20. 3 cm (RP-P-1909-184). Photograph © Rijksmuseum, Amsterdam.

pupils in Amsterdam, is known to have executed portraits strongly influenced by Rembrandt, the measurements Hout gives indicate a much smaller work than the Newman collection tronie. Wiersum, in his commentary on the discrepancies between the 1752 and the 1772 inventories, proposes that works are likely to have come and gone throughout the active years of collecting by the Bisschop brothers (Wiersum 1910: 163).

That the Newman collection canvas painting may once have been in the Bisschop collection is made more likely by the existence of a mezzotint of the composition by the artist Jan Stolker (1724–1785) (figure 3). Stolker, who moved from his hometown of Amsterdam to settle in Rotterdam in 1757, specialised in copying compositions by Rembrandt (Wuestman 1995: 84), and in the version of his mezzotint composition illustrated here, an inscription in the background to the sitter's right reads 'Remb: Pinx: J.Stolker Fecit.', suggesting that Stolker believed the picture he was copying to have been painted by Rembrandt. While it cannot be ruled out that his copy was done from the panel version of this composition, it is noteworthy that Jan Stolker – like the painter of the canvas version – reduced the length of the sitter's torso compared with Rembrandt's original, making it more probable that the canvas version was the basis for his mezzotint. A receipt from 1759, preserved in the Rotterdam Mennonite Parish archives, shows that Stolker was commissioned to paint a double portrait of the Bisschop brothers. This may in

part have been a posthumous portrait, since Pieter Bisschop had died the previous year (Niemeijer 1978: 184). The brothers had previously (in *c.*1736 and 1753) commissioned Aert Schouman to paint their portraits on two separate occasions, and in both they posed amidst a selection of objects from their collection in the setting of their home or their larger house on the Leuvehaven, hung with their paintings collection (Niemeijer 1978). Although Stolker's double portrait of the brothers does not appear to have survived, it is tempting to surmise that he also would have been instructed to depict the avid collectors among their treasures, and under those circumstances, he would almost certainly have had the opportunity to see the paintings in Jan Bisschop's ownership at that time. It follows that if the collection at this point in time – seven years after Hoet's 1752 inventory – had expanded to include the Newman collection tronie, this would have provided Stolker with the opportunity to copy it.

It must nevertheless be considered whether the Hopes acquired the tronie elsewhere. John Hope has been the subject of extensive research by Niemeijer, and it is evident that together with his uncle, Adriaan, he quickly sold a considerable number of less valuable works from the original Bisschop collection of 230 paintings (Niemeijer 1981). The two Hopes then proceeded to expand and improve the collection by acquiring important works at auction, including 11 paintings from the Braamcamp collection, bought only a few months after their acquisition of the Bisschop collection. The Brammcamp works were largely by well-known Dutch masters, including Rembrandt's *Christ in the Storm on the Sea of Galilee*, and the total cost of these 11 pieces was 22,500 guilders: just over a third of the price they paid for the entire Bisschop paintings collection (Niemeijer 1981: 148). John Hope continued to expand the collection, making significant acquisitions throughout the 1770s, and still with a primary focus on Dutch and Flemish masters. He drew up a catalogue of the collection – now totalling 306 works, of which 172 derive from the Bisschop collection – after the death of his uncle Adriaan in 1781, but this catalogue does not include a work that could be the tronie. His records show that he employed Jan Wubbels (*c.*1728–1791), an artist specialising in seascapes, as collections overseer and gave him the task of undertaking conservation work on the collection. In February 1772, he makes a payment of 665 guilders 'Aan Jan Wubbels, voor schoonmaken en verspannen van alle de schilderyen van het Cabinet'[2] (Niemeijer 1981: 148). A second payment is made to Wubbels in 1774 'Aan Jan Wubbels voor schoon- maken, onder houden, op- en afhangen van diverse schilderyen gedurende 't Jaer 1773',[3] and others in 1775 and 1776 (Niemeijer 1981: 148). John Hope's care for the collection and its presentation is also evident from the comments of one of the many distinguished visitors attracted by its increasing renown. A high-ranking French official, Louis Charles Desjoubert, noted its wealth of Dutch works and that – for the convenience of the ill-informed visitor – the names of the artists were written on cards in the order of the hang (Niemeijer 1981: 149).

John Hope died aged only 47 in 1784, and a decade later, in 1794, his son, Thomas, and his older cousin, Henry W. Hope (1735–1811), fled Amsterdam during the occupation by French revolutionary troops.[4] According to the 1795 inventory taken by Henry Hope for insurance purposes, they had arrived in London with 372 paintings: a considerable expansion to the original Bisschop collection (Hope 1795). This inventory lists five Rembrandt paintings: a *Saviour & Mary Magdalene*, with an insurance value of £50; a *Landscape* (Oval), valued at £100; a *Sea Piece*, valued at £500; and two entitled *Family piece*, valued at £300 and £500, respectively. While the current whereabouts of the *Saviour & Mary Magdalene* and the *Landscape* (Oval) are not known, *Sea Piece* refers to the famous *Christ in the Storm on the Sea of Galilee*, a canvas painting measuring 160 × 128 cm, signed and dated 1633. This, as we already know, was bought by John Hope in the Brammcamp sale in 1771 and was never part of the Bisschop collection. It was bought, along with the oval landscape, by Asher Wertheimer at the Hope collection sale in 1898 and eventually ended up in the Isabella Stuart Gardner Museum.[5] The *Family piece*, now known as *A Lady and Gentleman in Black*, was also bought by Asher Wertheimer and subsequently by Isabella Stewart Gardener (Isabella Stewart Gardener Museum 2024a) through Bernard Berenson. It is also a canvas painting with dimensions of 131.6 × 109 cm, signed and dated 1633. The provenance of this work stretches back to Henry W. Hope.[6]

The remaining *Family piece* listed by Henry W. Hope in his 1795 inventory, by inference, is the only work listed and attributed to Rembrandt that could plausibly be the tronie on canvas now in the Newman collection. The term 'family piece' is not the most obvious one to choose to describe this composition and would in other contexts typically be associated with two or more sitters arranged to suggest a portrayal of a family, often in a setting suggestive of domestic intimacy. Henry Hope did not employ the term 'family piece' for any other painting among the 372 listed. Under his entry for Velázquez, he uses the term *Family portraits*, and *Holy Family* compositions are listed under a number of the represented artists. For Jan Steen, he lists a *Flemish family*, and there are numerous uses of the term *Portret*, sometimes qualified further with the terms 'half-length' or 'full length'. Could the reason for Henry Hope's choice of the term *Family piece* be taken to indicate his understanding that the man and woman in *A Lady and Gentleman in Black* are in fact Rembrandt and his wife? Their physiognomies are not in fact that far removed from Rembrandt's self-portraits and portraits of Saskia

of the early 1630s. Might Hope also have thought the tronie a family portrait of Rembrandt's father?

The fact that each of the two large canvases, the *Sea Piece* and the double portrait *Family piece* are both valued at £500 implies that their scale influenced the monetary value set by Henry Hope, and by that logic, we may infer that the oval *Landscape* and the *Saviour & Mary Magdalene* compositions, valued at £100 and £50 respectively, are significantly smaller. The remaining *Family piece*, valued at £300, would, by the same logic, be of medium size. This is arguably the case for the Newman collection painting, since its dimensions of 76 × 65.5 cm are almost exactly half those of the *Christ in the Storm on the Sea of Galilee*.

The identity of the sitter

From the provenance trail set out above, it is evident that the subject of Rembrandt's original composition, closely repeated in the Newman collection version, has shifted over time. The provenance of the panel version, now in Chicago, takes us back to a similar moment in history, when its sale in Amsterdam in 1767 out of the estate of Jacob Alewijn and his widow, Margaretha Helena Graafland, was documented. The sales entry is comprehensively descriptive:

> Rembrandt. Het Hoofd van een Oud Man, zynde een Kniestuk, Levensgroote, met een donkere Mantel om, en een gouden Keten met een Medaille om den hals. Het hoofd is van vooren en op zyde te zien; gekeerd naar den linker Schouder, en gedekt met een Fluweelen Muts, voorzien met een groote Pluim. Zynde zeer helder, krachtig en uitvoerig op Paneel geschilderd. Hoog 35, breed 30 duim (Bruyn *et al.* 1986: 397).[7]

It is evident that the description is generic in that *Het Hoofd van een Oud Man* does not suggest a family relation to Rembrandt himself nor does it identify a specific sitter. But with Henry W. Hope's *Family piece* inventory title for the canvas painting, we may be moving towards the conception that a family member of the artist had served as the model, and certainly by the late nineteenth century, the composition was considered a portrait of Rembrandt's father. A similar trajectory is evident for Rembrandt's portrait of Aechje Claesdr, the 84-year-old widow of Rotterdam brewer Jan Pesser, now in the National Gallery, London (NG775): it too was copied by Jan Stolker around 1770, and beneath his mezzotint, the inscription reads 'Rembt. Pinx. | Avia | J: Stolker Fec. et Excud.S: Cruys Excud:'.[8] The term 'Avia' can be translated as 'grandmother' but has also been interpreted as meaning 'old woman' (Bruyn *et al.* 1986: 576–77). The painting's provenance dates back to a sale in 1791, Rotterdam, where its description reads 'Rembrand. Een oude Dames Portrait, hebbende een witte Kraag on den hals en een witte Muts op het hoofd, in `t zwart geklees op een ligte agtergrond, op paneel oval, hoog 29 en breed 24 duim, 1634'[9] (Bruyn *et al.* 1986: 577). Here, again, no indication of a family relation to Rembrandt is stated, and while it is described as a 'portrait', the sitter is unidentified. By 1801, a print version of the portrait by Johannes Pieter de Frey was listed as depicting Rembrandt's mother in a German lexicon of artists, and this identification persisted throughout the nineteenth century (Bruyn *et al.* 1986: 577).[10] At a later point, a misinterpretation of a label led to the claim that the sitter was Rembrandt's grandmother but it was not until 1992 that her true identity was discovered.[11] However, while the documentary evidence presented here points to a later adoption of the idea that Rembrandt employed his family members as models, there is also evidence to show that significantly earlier, during Rembrandt's actual lifetime, this conception had already been made. Intriguingly, an item listed in a 1644 Leiden inventory was described as 'An old man's *tronie*, which is the likeness of the father of mr Rembrandt'.[12] There is, however, no evidence to suggest that this was either of the paintings investigated in this article.

Figure 4. Jan Lievens, *Head of an Old Man*, *c.*1629, oil on panel, 59.7 × 48 cm, unframed (NGI.607). Photograph © National Gallery of Ireland.

The face of the elderly man in the two paintings discussed here is distinctive, and it evidently appealed to both Rembrandt and Jan Lievens, as his features are clearly recognisable in numerous etchings and oil studies (tronies) from both artists' Leiden studios of the late 1620s and early 1630s (figure 4). Van de Wetering suggested that this group of tronies, painted *c.*1629–31, potentially constituted studies

Figure 5. Hendrick Goltzius, *Jan van Heussen at the Age of 27*, *c.*1581, engraving on paper, 4.8 × 3.5 cm (P.7329-R). Photograph © The Fitzwilliam Museum, Cambridge.

Figure 6. Gerrit Dou, *Bust of an Old Man with Feather Baret and Gorget*, *c.*1630–31, oval 24 ×18 cm, Gemäldegalerie Alte Meister, Kassel. Photograph © bpk / Hessen Kassel Heritage.

done in anticipation of Rembrandt's Amsterdam portrait painting activities, which did not however commence until very late in 1631 or early 1632 (Van de Wetering 2015: 69 and 118). The legacy of these oil studies is evident in history pieces by Rembrandt such as *Belshazzar's Feast* of 1635, where the features of this specific model are echoed in Belshazzar's profile. Henriette Rahusen has argued convincingly that the model was a local Leiden man, Jan van Heussen, who would have been 77 years old in 1631, when Rembrandt is believed to have painted the panel version of this tronie composition. Jan van Heussen is documented as being the *Rentmeester* of the Sint Catharina Gasthuys in Leiden in 1629 and 1631 and he may have had a particular interest in commissioning portraits of himself since 50 years prior, in 1581, he was the subject of a portrait engraving by Hendrick Goltzius (figure 5) (Rahusen 2017). Rembrandt's pupil, Gerrit Dou, also produced head studies of Jan van Heussen (figure 6) and some of his later independent works, like Rembrandt's, echo his distinctive features in the depiction of old men (figure 7).

The current dimensions of the oak panel support for the Chicago *Old Man with a Gold Chain* panel painting have previously prompted the realisation that it must have been reduced by approximately 70 mm since its sale in 1767 (Bruyn *et al.* 1986: 391). While the second volume of the RRP *Corpus* asserts that the painting was 'probably produced in Amsterdam' (Bruyn *et al.* 1986: 397), the original dimensions fit with one of the standard panel sizes used by Rembrandt during his Leiden period (Van de Wetering 1997: 13). A schematic overlay of the Newman collection canvas painting onto the Chicago panel shows how, despite the canvas being smaller than the panel therefore cropping the figure's bust at the bottom, a greater space above the feathers has been retained than is retained in the panel composition. This indicates that the canvas painting was executed prior to the panel being shortened at the top (figure 8). This fact, in addition to the recent identification of the sitter as a Leiden resident, lends credence to an argument that would seek to place the panel version's creation in Leiden as opposed to Amsterdam, just as a systematic assessment of the changes in Rembrandt's signatures over his career also places this work, with its 'RHL' monogram, in 1631/32 (Van de Wetering 2015: 66).

The oak panel support has been linked through dendrochronology to another panel included by the RRP in Rembrandt's oeuvre. The *Portrait of a Woman in the* Herzog Anton Ulrich Museum, Braunschweig (Bruyn *et al.* 1986: 768–72), signed and dated 1633, contains a board from the same tree as a board used for the Chicago panel. It is the pendant to a male portrait signed and dated 1632, the support of which is not linked to either (Bruyn *et al.* 1986: 760–67). Rather than fitting neatly within Rembrandt's production during his very first period in Amsterdam, the fact that the panel support for the female portrait is linked to the Chicago panel and, by extension, almost certainly to Rembrandt's continued studio activity

Figure 7. Gerrit Dou, *Scholar Sharpening His Quill*, *c.*1632–35, oil on panel, 26.3 × 21.2 cm, (GD-104). Image courtesy of The Leiden Collection, New York.

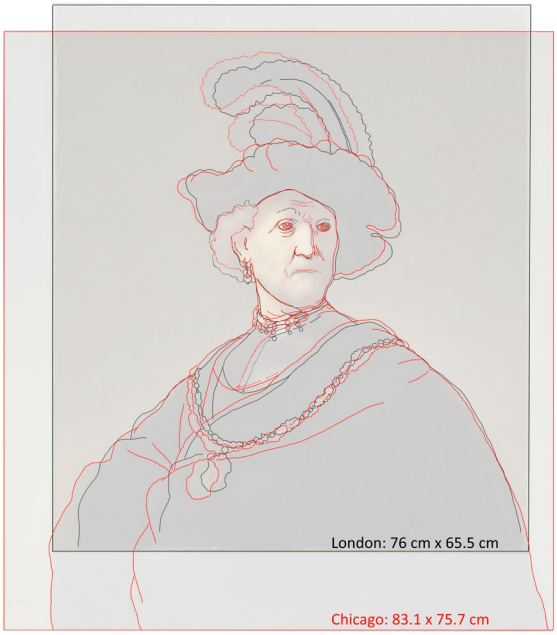

Figure 8. Schematic overlay to illustrate the compositional relationship between the two versions of *Old Man with a Gold Chain*. Diagram © Kamila Gora, Hamilton Kerr Institute, University of Cambridge.

in Leiden, has, until recently, sat a little uncomfortably on the established timeline of his move to Amsterdam. Scholarship has traditionally assumed Rembrandt's departure from Leiden in late 1631 to have been rather abrupt. However, there is growing acceptance of the idea that the transfer of Rembrandt's studio activities was more gradual and not fully completed until sometime during 1634 (Dudok van Heel 2006: 197; Bijl 2017: 181). The authorship of the Braunschweig 1632–33 pendant portraits has shifted over the years of the Rembrandt Research Project, and in *Corpus VI*, Van de Wetering includes them in his list of works on which he offers his final set of addenda on authorship. While the smooth, detailed execution of this pendant portrait pair was considered incompatible with the 'manner' that the RRP team attributed to Rembrandt at the time of the pendant portraits' inclusion in *Corpus II*, in *Corpus VI*, Van de Wetering reattributes them to Rembrandt. His justification is based, first, on his evolving understanding of Rembrandt's distinct execution of lace and ruffs to which both portraits conform; second, on the acceptance of an expanded range within Rembrandt's autograph 'manner' that includes a smoother, more highly finished execution; and third, on the link of the panel support to the Chicago panel (Van de Wetering 2015: 524). This is despite the fact that he also considers the date and signature of the female portrait to be later. The case of the Braunschweig portraits, mentioned due to their link to the Chicago version of the composition under investigation here, also serves to illustrate the considerable uncertainty surrounding Rembrandt's production at this moment of transition, when his focus on, and physical presence in, Leiden was dwindling, while his attention pivoted towards his establishment in Amsterdam.

Technical analytical results and comparisons

The 1631 *Old Man with a Gold Chain* panel painting now in Chicago is considered one of Rembrandt's first successful, large-scale half-figure compositions: the existence of what is by the RRP authors deemed to be 'probably old copies and imitations' – significantly the Newman collection version is introduced in the *Corpus* as a 'fairly old and very faithful copy' – suggested to them that this painting 'enjoyed a certain reputation' (Bruyn *et al.* 1986: 397). The fact that the copy *is* so exacting may indeed be a sign of the painter's admiration for the original, whether they were direct associates of Rembrandt or came into contact with the original work at a later point. Its creation may equally have been prompted by Rembrandt's own requirement of a talented student, although few such exacting copies survive. Instead, what Van de Wetering has dubbed 'satellites' – studio works that closely imitate Rembrandt's works and manner without directly copying them – are much more numerous. As intimated in the Introduction, it is also these early studies that still prove particularly challenging to attribute to either Rembrandt or his workshop associates.

Figure 9. Leiden School, *Elderly Man (modelled on Jan van Heussen)*, *c.*1630, oil on panel, 50.9 × 40.6 cm (GD-109). Image courtesy of The Leiden Collection, New York.

To supplement the purely visual comparison between the Chicago panel and its faithful canvas copy, an analytical protocol was followed that offered further technical evidence on which to base the comparison.[13] The X-radiography of the Newman canvas version shows no evidence of hidden compositions beneath the visible paint layer, nor any indication of notable *pentimenti* or changes during the painting process. This confirms that the composition is likely to have been fully established before it was executed, and that the painter did not deviate from this during its execution. In Rembrandt's paintings, such as in the Chicago panel painting, there are often minor adjustments evident in the form of slight modifications, for example to the outline of the figure. While the lack of such modifications is not in itself solid evidence against Rembrandt's authorship, it does provide further grounds for asserting that the canvas version of this composition was executed as an exact copy of the panel version.

In *Corpus IV*, Karin Groen contributes a chapter on the character and composition of Rembrandt's ground layers, including the grounds on a total of 153 canvas paintings (Groen 2005: 318–34). Half of these paintings present with a double ground. Groen identifies clusters of canvases with ground compositions so similar that 'they may be assumed to come from a single batch of primed canvases' (Groen 2005: 324), even though the canvases do not appear to derive from the same bolt of cloth. One such cluster consists of eight canvases, all datable to 1632–33, with oil-bound double grounds: an initial red ground over which is a pale, greenish-grey layer of predominantly lead white with a few yellow and brown particles. The greenish tinge is caused by the admixture of soot (lampblack), and Groen notes that the marked translucency of the layer is not caused by an admixture of chalk as might be expected, which is absent or only present in trace amounts. The lead white content is visually distinctive through its marked tendency to form

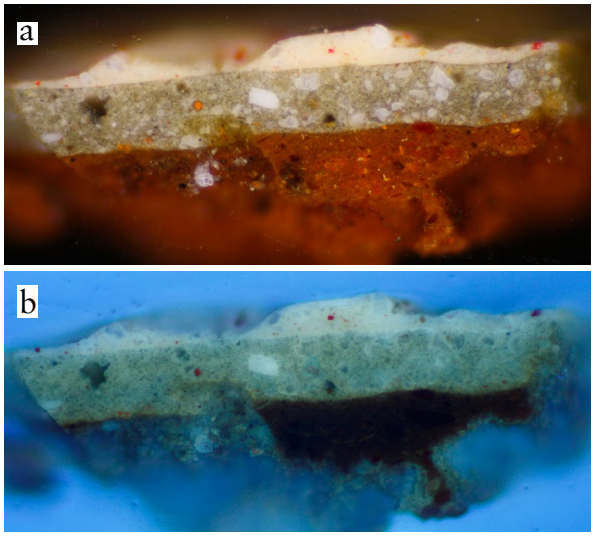

Figure 10. Studio of Rembrandt, *Old Man with a Gold Chain* (Figure 1). (a) Paint sample 3355.2 (face), in normal light and (b) in UV light. Micrographs © Kamila Gora, Hamilton Kerr Institute, University of Cambridge.

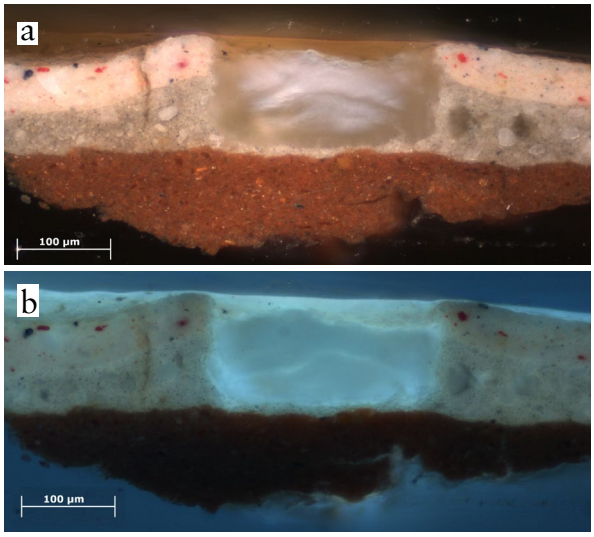

Figure 11. Rembrandt, *The Anatomy Lesson of Dr Nicolaes Tulp*. Paint sample MH0146_xB15 from a carnation paint passage (a) in normal light and (b) in UV light. Micrographs © Koninklijk Kabinet van Schilderijen Mauritshuis), The Hague.

conglomerates appearing as larger white particles within the pale grey matrix. Detailed analysis of the *Anatomy Lesson of Dr Nicolaes Tulp*, one of the eight paintings in the cluster with virtually identical grounds, revealed extensive lead-soap formations with red lead particles within the inclusion, as well as the compound Fiedlerite; a lead hydroxide chloride possibly formed from the introduction of sodium chloride during a water-based purification process of the oil binding medium (Noble *et al.* 2000). Groen includes micrographs of paint samples in cross-section showing the presence of such lead soap inclusions in samples from other paintings within this group (Groen 2005: 326).

Three paint samples were taken from the Newman tronie portrait: in all three, an identical double-ground composition to that found in the cluster of eight canvas paintings identified by Groen was evident (figures 10 and 11). Close examination of the Newman version also reveals extensive lead-soap formation across the surface (figure 12). In addition, one paint sample contains a visible lead-soap inclusion with red lead particles at the centre (figure 13). The comparison between the double ground on the Newman canvas and the eight other works was made on the basis of both visual and elemental analysis, and this evidence establishes that the canvas version of the *Old Man with a Gold Chain* composition was created within Rembrandt's studio, and that the timeframe for its creation almost certainly aligns with that of the eight other works in this cluster, all of which can be dated to 1632–33. This canvas thus constitutes the ninth member of the cluster identified by Groen.

The paint sample analysis was supplemented by non-invasive technical analysis employing macro X-ray fluorescence (MA-XRF) scanning. The analytical findings were compared with a thorough

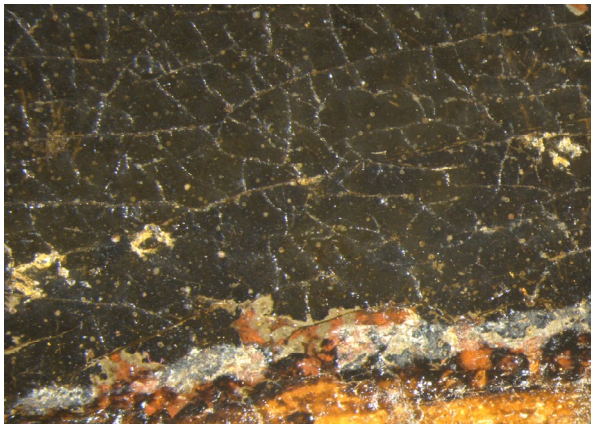

Figure 12. Micrograph of the black costume (wet out) showing extensive lead soap formation. Micrograph © Kamila Gora, Hamilton Kerr Institute, University of Cambridge.

Figure 13. Studio of Rembrandt, *Old Man with a Gold Chain* (Figure 1). Paint sample 3355.2 (background) in normal light. Micrograph © Kamila Gora, Hamilton Kerr Institute, University of Cambridge.

analytical report by conservation microscopist Inge Fiedler, who in 1974 analysed paint scrapings from 36 locations across the surface of the Chicago version using polarised light microscopy (PLM), supplemented with two instances of microprobe

analysis in 2004 (Fiedler 1974/2004). While the analytical methods differ, it was nevertheless possible to establish that the basic palette for both paintings is highly comparable. On both paintings, lead white, a variety of earths, vermilion, azurite, chalk and quartz were identified. While the PLM analysis of the Chicago paint scheme allowed for the positive identification of lead-tin yellow (problematic to identify in small quantities with MA-XRF), it could not confirm the black pigment used. The predominant black used in the canvas version is bone black, which is known to be the black pigment preferred by Rembrandt for black garments due to its warmer, deeper tone (Bomford *et al.* 1988: 24), and it is highly likely that further analysis would also reveal the use of bone black in the Chicago version. Furthermore, it is noteworthy that vermilion – a bright red pigment – has been used for the underpainting of the undergarment (beneath the gorget), as well as in the gold chain, in both versions. These two uses are more idiosyncratic and not a choice that can be readily gleaned purely through visual observation. It strengthens the argument that the painter of the canvas version was highly conscious of Rembrandt's own technique and material choices in the Chicago version.

Figure 14. Isack de Jouderville (signed), *Self-portrait, c.*1631, oil on panel, 48 × 37 cm. Photograph © National Gallery of Ireland, Dublin.

Possible authors of the Newman canvas version

By virtue of the technical evidence, we can now place the Newman version of the *Old Man with a Gold Chain* composition securely within the studio production of Rembrandt, by a highly capable painter with a detailed knowledge of, and ability to closely imitate, Rembrandt's material choices and, to the extent close copying permits, his methods. We also have a 1632–33 date range for the eight other paintings; it would therefore seem very unlikely that the Newman painting was executed earlier than late 1631, or later than 1634. We are then left with the question: who, at this transitional point in Rembrandt's career and workshop constellation, could be its author?

In 1625, when Rembrandt returned to Leiden after six months in Pieter Lastman's studio in Amsterdam, he is likely to have set up his first studio in his parents' house on the Weedesteeg (Dudok van Heel 2006: 194). His studio space could not have been large, and he would have had limited space to accommodate students or associates. To this day, only two Leiden pupils can be named: Isaac de Jouderville and Gerrit Dou. Yet, because of the difficulty of attributing other works (e.g. figure 9) thought to be produced in Rembrandt's studio at this period, it has been postulated that other pupils, who will likely always remain unidentified, authored these (Van de Wetering 2015: 69). Rembrandt almost exclusively painted on panel during his Leiden period, and his formats remained modest with fewer than a handful exceeding one metre in length or height (Van de Wetering 1997: 13). It was not until he secured commissions in Amsterdam, helped by the art dealer Hendrick van Uylenburgh, in whose spacious studio on Sint Antoniesbreestraat he initially worked, that his compositions grew in size, and a number of canvas paintings were produced in the years 1632–33. In fact, Rembrandt had already received the commission for *The Anatomy Lesson of Dr Nicolaes Tulp*, executed at considerable speed over a few months in early 1632, in the autumn of 1631 (Dudok van Heel 2017: 21). Two documented one-way trips to Amsterdam were made by Isaac de Jouderville shortly after November 1631, when payments for his tutelage under Rembrandt had officially ended. The evidence of a studio hand in Rembrandt's early Amsterdam works, including in the 1632 *Jean Pelicorne with his Son Jasper*, one of the eight canvas paintings clustered together through Groen's analysis of preparation layers, has lent credence to the claim that Jouderville undertook work for Rembrandt in a journeyman capacity during Rembrandt's first busy period in Uylenburgh's studio (Bijl 2017: 175 and 185). Documentary evidence also shows that Jouderville remained settled in Leiden in the 1630s, where his artistic production after his direct work with Rembrandt did not, however, leave a lasting legacy. His artistic ability, inasmuch as it can be assessed through works thought to be by his hand, is generally considered weak: he had evident difficulty in placing heads on bodies in an anatomically convincing way and in rendering drapery and placing highlights and impasto effectively (Van de Wetering in Bruyn

Figure 15. Gerrit Dou (attr.), *Self-portrait (?) at an Easel*, *c.*1628–29, oil on panel, 66.6 × 50.9 cm (GD-112). Image courtesy of The Leiden Collection, New York.

1986: 76–90). There are no examples of exacting copies after Rembrandt attributable to Jouderville and only one surviving signed work, a self-portrait of *c.*1631, in which his tendency to render faces quite pallid and somewhat mask-like, with features floating without secure connection to one another, is evident. This work does not display any connection with the paint handling in the Newman canvas version of *Old Man with a Gold Chain* (figure 14).

Unlike Jouderville, documentary evidence for Gerrit Dou's activities after completing his three-year apprenticeship with Rembrandt in 1631 has not survived, and it is therefore unclear what his role might have been in the continuation of Rembrandt's studio. Ronni Baer has suggested that Dou never painted on canvas, as no examples of surviving canvas paintings from his independent career have been identified (Baer 2000), and as already stated, panels were Rembrandt's preferred supports during his Leiden years. In contradiction of this assumption, the existence of a likely self-portrait of Dou (figure 15), peering out from behind a large, stretched canvas on the easel in front of him with a somewhat sullen expression, could indicate that he was nevertheless involved in the production of larger canvas paintings. The panel support for Dou's self-portrait is linked through dendrochronology to a signed but undated Rembrandt tronie, believed to have been produced around 1630 (Surh 2017). Did Dou's self-portrait perhaps capture the young artist in late 1631, when he may have been engaged working on the preparations for Rembrandt's upcoming Amsterdam work? It has been conjectured that Dou continued to work on compositions with Rembrandt, such as the *Young Scholar and his Tutor*,[14] another unsigned canvas painting variously

Figure 16. Rembrandt, *Old Man with a Gold Chain* (Figure 2). Infrared reflectograph (1.0–1.1 μm) © Art Institute of Chicago, Mr. and Mrs. W.W. Kimball Collection (1922.4467).

Figure 17. Studio of Rembrandt, *Old Man with a Gold Chain* (Figure 1). Infrared reflectograph (1.0–1.7 μm) © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

Figure 18. Gerrit Dou, *Old Woman Reading*, *c.*1631–32, oil on panel, 71.2 × 55.2 cm (SK-A-2627) A.H. Hoekwater Bequest, The Hague. Photograph © Rijksmuseum, Amsterdam.

dated between 1629 and 1633 (Dudok van Heel 2006: 197). Could Dou have painted the Newman canvas version?

Several scholars have considered Dou's oeuvre during his time as Rembrandt's student, with some (e.g. Wadum 2002) leaning towards a narrower definition that centres around Dou's propensity towards the use of fine, parallel brushstrokes evident in his later independent oeuvre, and picked up during his first apprenticeship under Pieter Couwenhorn in his stained glass workshop. Others (e.g. Van de Wetering 2001) allow for greater variety of execution and painting style during his time in Rembrandt's studio, as Dou honed his skills by mimicking the breadth of Rembrandt's technical range, before subsequently settling on one that can be more easily distinguished as characteristic of him. Technical studies of Dou's paintings (Wadum 2002; Surh *et al.* 2014) by necessity focus on works from his oeuvre post-Rembrandt's immediate influence while still his pupil, and his mature works, all on panel, tend to be quite small. The more recent 2014 study noted two things in particular; the use of pigments that are prone to change colour over time, and the frequently occurring compositional changes evident in near-infrared imaging (NIR) and infrared reflectography (IRR) (Surh *et al.* 2014: 3). In addition, sketchy underdrawing and vigorous underpainting is found in a number of works. When it comes to comparing these characteristics with the Newman canvas version in the context of considering Dou as a possible author, a comparison is rendered somewhat challenging by the different aims informing their execution. In this case, the highly exacting and skilled copyist carefully mimicked the appearance of the original, and we therefore cannot expect to find the freedom of expression and pigment choices evident in Dou's more colourful, mature works.

The IRR images of the two versions display a marked difference, influenced by the different preparations, but in the two faces also due in part to the more laboured execution of the canvas version, where the artist has spent longer and applied the paint more thickly than in the original (figures 16[15] and 17[16]). This would have been necessary because he did not include the earth yellow preparation layer over a white chalk ground that Rembrandt utilised as a mid-tone in the panel version. The spontaneity of Rembrandt's execution of the hat is replaced in the canvas version by controlled, parallel hatching, now only visible in the IRR image. Additionally, the canvas background appears dense and rather lifeless in comparison with the erratic, lively brushwork in the original, accentuated by the way in which the warm earth yellow can be seen through the paint to varying degrees. The brushwork in the canvas background does in fact imitate that of the original, but due to the pale grey upper ground layer, this is less evident, and the lampblack in the ground renders the background entirely lifeless in the IRR image, with none of the extant brushwork showing.

Conclusion

Rembrandt became an independent master of the Amsterdam Guild of St Luke in 1634, the year he married Hendrick van Uylenburgh's niece, Saskia, and with his newly gained right to operate as an independent master, it is generally agreed that his workshop activity in Leiden would have come to a close at this time (Dudok van Heel 2006: 197). While the scholarship to date agrees that Rembrandt's paintings executed in Uylenburgh's studio show evidence of more than one set of studio hands, it is not until Govart Flinck's arrival in late 1634 that any name can be securely given to an individual contributing to Rembrandt's studio production (Van der Veen 2006: 160). Of his named associates therefore, we must consider the more likely authors, Jouderville and Dou, while freely admitting to the added complication of an execution highly affected by the unusual aim of creating a visually exacting copy, rather than another loosely inspired composition based on Rembrandt's various tronie studies. Of the two, Dou's early work (e.g. figure 18) shows significantly greater similarity in the paint handling and evident ability. While we may never know the precise context for the creation of the canvas copy, nor the undisputable identity of its painter, the technical investigation and its contextualisation within the vast body of research – technical, documentary and stylistic – undertaken on Rembrandt and his close circle has at the very least allowed us to exclude the idea that the canvas painting is a much later copy undertaken outside of the artist's workshop. Should this article succeed in convincing scholars of the likelihood of Dou's authorship, then it adds another element to what has been to date established about the output from Rembrandt's workshop during his transition from Leiden to Amsterdam. It introduces the use of canvas earlier than previously suspected, and it opens up scope for further consideration of Dou's continued contribution to Rembrandt's Leiden studio output at the end of, and perhaps immediately following, completion of his training as Rembrandt's highly skilled, and soon after independently successful, pupil.

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Notes

1. 'A piece, which is the portrait by Govert Flink. H.9 and a half d., width 7 and a half d.' It is worth noting that Hout frequently uses the terms 'Trony' and 'Tronitje', but not for any of the works in the Bisschop collection.
2. 'For Jan Wubbels, for beautifying and tensioning all the paintings from the cabinet.'
3. 'For Jan Wubbels, for beautifying, maintaining and hanging various paintings during the year 1773'
4. RKD Research, *Henry Hope*. Available at: https://rkd.nl/artists/374209 (accessed 10 February 2024).
5. Provenance information given on the Isabella Stewart Gardner Museum website: https://www.gardnermuseum.org/experience/collection/10953 (accessed 12 July 2024).
6. Provenance information can be found on the Isabella Stewart Gardner Museum website, although it is not specified whether this is based purely on the 1795 inventory or another piece of documentary evidence: https://www.gardnermuseum.org/experience/collection/10954 (accessed 13 February 2024).
7. 'Rembrandt. The head of an old man, a knee-length, life size, with a dark mantel on, and a golden chain with a medallion around the neck. The head is seen from the front and side, turned towards the left shoulder, and covered by a velvet hat, fitted with a large feather. It is painted very clearly, powerfully and detailed. Height 35, width 30 "thumbs"'. The measurement units are Amsterdam feet, which makes the panel 90 × 77.1 cm in 1767. It is 83.1 × 75.5 cm today.
8. The mezzotint is in the collection of the British Museum (1880.0214.12). See also RKD Research, *Portrait of Aechje Claesdr, dated 1634*. Available at: https://research.rkd.nl/en/detail/https%3A%2F%2Fdata.rkd.nl%2Fimages%2F35007 (accessed 19 February 2024).
9. 'Rembrand. An old lady's portrait, having a white collar around the neck and a white cap on the head, dressed in black against a light background, on an oval panel, height 29 and width 24 "thumbs", 1634.'
10. Considering that Rembrandt was only 28 when he painted this portrait, the persistence of the notion that the 83-year-old sitter could be his mother is somewhat surprising.
11. https://research.rkd.nl/en/detail/https%3A%2F%2Fdata.rkd.nl%2Fimages%2F35007 (accessed 19 February 2024).
12. 'Een out mans tronie, sijnde 't conterfeytsel van de vader van mr. Rembrant' in the Inventory of the estate of Sybout can Caedercamp: Oud Notarieel Archief, no. LXI. Willen Pieterz van Leeuwen, ONA 785, f.13, 23 February 1644. Erfgoed Leiden: https://

www.erfgoedleiden.nl/collecties/archieven/archieveoverzicht/details/0506/path/61.1.1/withscans/1/file/785/start/0/limit/10/flimit/5/filters:ead.eadheader.eadid/0506 (accessed 28 July 2024).

13. X-radiography, IRR (1000–1700 nm), MA-XRF scanning and paint sampling.
14. Workshop of Rembrandt Harmenszoon van Rijn (Dutch, 1606–1669), *A Young Scholar and his Tutor*, about 1629–1630, oil on canvas, 104.6 × 88.9 cm (41 3/16 × 35 in.), The J. Paul Getty Museum, Los Angeles, 84.PA.570.
15. Captured using a Fujifilm S5 Pro D-SLR camera with X-Nite 1000B/2mm filter (1.0–1.1 µm).
16. IRR was performed using an Apollo camera (Opus Instruments) with 26 Mpixel resolution and an InGaAs sensor to allow for imaging further into the infrared (1000–1700 nm) where paint is more transparent for improved visualisation of underdrawing. Using the f/8 aperture setting and 50 ms exposure time, two 16-bit tiff images with approximately 140 µm pixel resolution were collected and subsequently stitched together using Nip2, a software GUI that uses the libvips image processing library.

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Through the looking glass: tinted varnish in England *c.*1750–1900

JOANNA NEVILLE

Abstract This article explores the historical practice of applying an overall tinted varnish layer. Section I traces core aspects of eighteenth-century connoisseurship, identifying in particular the cultural forces that shaped the expectation of a dark 'Old Master' tonality. Examining key aesthetic treatises, as well as the theory of the picturesque, reveals how the interconnection between beauty and a dark tone was developed. Section II explores the backlash against these aesthetic ideals, focusing on the ways in which critics attempt to align the taste for dark varnishes with the dilettante, and not the connoisseur. In so doing, the relationship between tinted varnish and the art market becomes evident, with the art dealer emerging as a key figure in the application of tinted varnish. Section III takes a material focus, using reconstructions of liquorice- and asphaltum-based tinted varnishes to investigate questions left unanswered by the historical record.

Introduction

> That fine patina of a many a dear bought old master, is very often no more than some thin solution of asphalt or liquorice, rubbed over a tolerable copy, with some varnish or oil. It is not the slow working pencil of time, which has lowered and harmonized the tone of the brisker florid colours; it is the hand of the cunning imposter (Raspe 1781: 28).

The application of tinted varnish is, at its core, an imitation of the aged appearance of Old Master paintings. As a result of oxidative degradation (De La Rie 1988; Dietemann *et al.* 2009), the natural resin varnishes of these paintings develop an overall yellow or brown tone, an optical effect that suppresses atmospheric perspective and narrows tonal variation. Although much has been written on the potential original application of tinted varnishes by the Old Masters (Brandi 1949; Gombrich 1962; Kurz 1962; Plesters 1962), this paper focuses on the use of non-original tinted varnishes in England in the period *c.*1750–1900. This time span includes both the heyday of tinted varnish and the moralisation of this practice as a symbol of poor taste.

Existing scholarship on the use of non-original tinted varnishes is sparse, typically briefly mentioned in the context of a wider survey of varnishing practices (Von der Goltz *et al.* 2013; Carlyle 2001: 248–49). As the term 'tinted varnish' does not refer to a particular material, precise definition of the term is essential. A tinted varnish is a form of artificial patination, often achieved by the addition of pigment to a natural resin varnish. However, the term 'pigmented varnish' may not be appropriate, as non-particulate colorants have also been recorded.[1] The term 'coloured varnish' can be similarly misleading, as the possibility of completely colourless and non-yellowing picture varnishes only emerged during the twentieth century. Prior to this, all picture varnishes had a colour *in the bottle*, ranging from straw yellow to red-brown. However, when spread thinly on the surface of the painting, the resulting tone is barely perceptible (Diamantopoulos 1989; Dunkerton *et al.* 1990: 67–68; Carlyle 2005). Additionally, a tinted varnish can be distinguished from a glaze, in that the former designates an overall coating, and the latter a local application.[2]

Although the application of tinted varnish is now a very rare conservation practice, it can still be encountered by conservators, particularly if they are treating paintings that were last restored in the nineteenth century. Today, a very dark varnish would commonly be described as 'obscuring'; its removal is therefore commonplace as part of conservation treatment in Britain.[3] In order to establish that a varnish is tinted, rather than solely discoloured, analysis of paint samples in cross-section may be performed in order to identify the presence of pigment particles.[4] Organic analysis, which could identify the oils or resins in a suspected tinted varnish, has been performed on certain historical varnishes (White and Kirby 2001: 81–84), but is generally not a feasible option for most conservators.

As a result, scientific evidence of the composition of tinted varnishes is elusive. Thus far, artists' handbooks, treatises and manuals have been the central focus of study for varnishes in the eighteenth and nineteenth centuries (Carlyle 2001). In the recipes provided by these texts, definitive evidence of tinted varnish for use on paintings is sparse. The majority of varnish recipes are unpigmented, with authors commonly expressing the desire to make a varnish with as little coloration as possible. Where tinted varnishes are listed, some caution is advisable in interpreting their use. As it is not uncommon for varnish to be used in the paint medium – and oil in the varnish layer – pigmented 'varnish' recipes

may have been intended for painting or glazing (Gombrich 1962). Additionally, many handbooks collate varnish recipes for various applications, so the pigmented varnishes listed may have been intended for use on musical instruments, carriages or furniture. While these practical treatises are a valuable starting point, they provide only a partial view, as the materials listed reflect wider cultural practices.

This paper aims to expand on the information presented by the treatises and handbooks by adopting a broader perspective, charting the cultural currents that propelled the taste for tinted varnish, and the eventual backlash against it. As others have noted, much of what we know about the popularity and practice of applying tinted varnish comes from the criticism it received (Carlyle 2001: 248; Talley 1997). Underappreciated, however, is the value of this backlash as a historical, and occasionally technical, source. Although a portion of this material takes the form of formal written critique, the genre of satire, both visual and written, also serves as a significant source. The eighteenth century saw a marked expansion in the genre of satire (Bullard 2019), with dark varnishes offering a ripe target for visual, theatrical and literary mockery.

Section I: Connoisseurship and the taste for dark pictures

During the eighteenth century, the question of good taste was paramount. Indeed, it has been described as 'the age of the connoisseur', marked by the formalising of desirable aesthetic qualities (Robinson 2017). The connoisseur is said to have supplanted the English *virtuosi* of the previous century, who collected an eclectic range of objects, as exemplified by the *Wunderkammer* (Houghton 1942). While the *virtuosi* are said to have 'looked at painting in the same way that they looked at coins' (Houghton 1942: 205), the connoisseur was particularly concerned with the appreciation of paintings (Mount 2006). For the connoisseur, a more critical approach was taken, guided by the aesthetic principles laid out in manuals of connoisseurship (Brewer 2013: 256). The connoisseurs' attempts to define the boundaries of taste were, however, not open to all; participation in these discussions operated to distinguish the upper classes as a distinct social group (Pears 1988: 3–5). As public art galleries were not established until the nineteenth century, the opportunity to see Old Master paintings firsthand was limited to those with either the necessary social acumen needed to access private collections, or the financial means to participate in the Grand Tour (*c.*1660–1820) (Robinson 2017). The Grand Tour offered not only an opportunity to see Old Masters, but also to import these paintings into British collections. Armed with increasingly formalised preferences, the newly emerged gentleman-connoisseur could exert considerable power in the purchase and patronage of art.

The taste of the connoisseurs was guided by an abundance of aesthetic treatises, of which the most influential was *A Philosophical Inquiry into the Origin of Our Ideas of The Sublime and Beautiful* (Burke 1757). This seminal treatise by Edmund Burke (1729–1797) concerns itself with defining the difference between the poles of the 'beautiful' and the 'sublime', and identifies darkness and obscurity as constituents of the latter. Burke propagated the view that obscurity and darkness stir up the imagination. According to his framework, the very indistinctness of a painting counts as a positive attribute, associated with mystery and wonder:

> a judicious obscurity in some things contributes to the effect of a picture; because the images in a painting are exactly similar to those in nature; and in nature, dark, confused, uncertain images have a greater power on the fancy to form the grander passions, than those have which are more clear and determinate (Burke 1757: 49).

In Burke's era, paintings that demonstrated the obscurity he cherished would have been plentiful. As noted previously, the ageing process of natural resin varnishes can impart an overall yellow or brown tone. Further to this, the oil medium of the paint itself can yellow, shifting the painting's tonality. Individual pigments can also undergo chemical changes that cause local darkening, such as verdigris in landscape elements (Santoro *et al.* 2014). Additionally, surface dirt may possibly obscure the surface, whether the source is dust, or smoke from lamps and fireplaces (Saunders 2000).

The idealisation of dark pictures was further supported by the more populist 'picturesque' movement, which emerged in the last quarter of the eighteenth century. This movement complemented Burke's concepts of the 'sublime' and 'beautiful', but was distinct in its ability to generate a far more widespread audience than treatises read by the upper classes. It thus formed not only a fashionable topic of discussion, but had significant and lasting ramifications on tourism and artistic practice.

The aesthetic ideal of the 'picturesque' arose in the late eighteenth century, sparked by the writings of William Gilpin (1724–1804), an English clergyman, writer and amateur artist. True to its name, the picturesque (from the Italian *pittoresco* 'in the manner of painters') was a way of looking at and representing the English landscape through the lens of art. In particular, through the lens of prized seventeenth-century Old Masters such as Salvator Rosa (1615–1673), Nicolas Poussin (1594–1665) and Claude Lorrain (1600–1682). Gilpin established several tenets that were to hold sway for decades to come. Namely, he prescribed set viewing locations in the English countryside, and outlined principles for composing a

picturesque landscape. These guidelines included framing with foreground trees, grouping animals in particular numbers, and an overall mellow tone (Gilpin 1782).

Within the picturesque aesthetic, signs of decay were prized. Indeed, ruins have been described as the exemplary subject of the picturesque (Rosenblum 1967: 113–15). Gilpin famously noted that gables of Tintern Abbey would be improved by a 'mallet judiciously used' (1782: 33), so as to break up the regularity of its forms. In this way, a picturesque artist seeks not to reflect the native landscape, but to antiquate it, adjusting colour and forms to suit expectations of painterly beauty. As a result of Gilpin's work, England witnessed a boom in domestic picturesque travel (a 'picturesque tour') in the 1780s and 1790s (Andrews 1989). This rise in domestic tourism was given further impetus by the disruption to European travel brought about by the French Revolution, lasting from 1790 until at least 1815 (Buzzard 2002: 38), and further helped by the building of public railways from the 1830s. Whereas the Grand Tour had been an aristocratic pursuit, picturesque travel was pursued by wider audiences.

The importance of tonal suppression in the picturesque found physical embodiment in the Claude Glass. The Claude Glass was a tinted convex mirror popular with artists, tourists and poets alike, only falling out of favour in the mid-nineteenth century (Maillet 2009). If viewers stood with their backs to the desired vista and held the mirror at shoulder height, they could see the landscape that was both darkened by the mirror's colour and miniaturised by its convexity. This was a 'backward' manner of looking, both for its artificial antiquating of the scene, and for the reversed position of the viewer relative to the vista. An essential companion to the picturesque tour, the Claude Glass put the aesthetic ideal of a darkened Old Master landscape into the hands of the masses, in this way representing the commodification and dissemination of the picturesque perceptual framework. The association between beauty and obscurity in paintings was initially a concern of the aristocratic connoisseur, as formalised in the mid-century by thinkers such as Burke. This aspect of visual culture then took a populist turn, with wider audiences coming to participate in the aesthetic ideal.

Section II: Dark pictures and poor taste

While the taste for dark paintings had clear advocates in publications on aesthetics and artistic practice, there is a comparative silence when it comes to restoration practice. Tinted varnish is absent from the great majority of technical handbooks of the eighteenth century (Carlyle 2001), including a leading publication, Robert Dossie's (1717–1777) *The Handmaid to the Arts* (1758), which in fact recommends the removal of yellowed varnish.[5] The absence of tinted varnish from the handbooks does not indicate that it was not used; rather, it suggests that its application may have occurred informally or without official documentation. A large proportion of conservation treatments were left unrecorded, a state of affairs that persisted into the nineteenth and twentieth centuries (Brajer 2013: ix). Based on the paintings for which detailed records do exist, it is estimated that a period of 20 to 50 years in the eighteenth or nineteenth centuries is sufficient time for two cycles of varnish removal and re-varnishing to have occurred (Townsend 2010: 150). The practitioner responsible for the application of varnish (tinted or otherwise) is likely to have held other occupations. Divisions between the roles of picture cleaner, painter and art dealer were less distinct than in today's professionalised conservation practice: one individual may have participated in all three roles (Laing 1998: 101). Moreover, these multiskilled individuals did not necessarily practise in a fixed location, as in the case of the itinerant eighteenth-century portraitists who doubled as picture cleaners (Talley 1997: 39).

As captivated as connoisseurs and collectors were by the fashion for dark pictures, the prevailing taste was not without backlash. Several groups critiqued the association of beauty and obscurity. Among the critics were members of the native British school of painters, who saw the preference for dark Old Masters as a threat to their own livelihoods. Satirists also joined the debate, as they saw the fashion for dark vanishes as an opportunity for mockery. Although neither of these groups succeeded in eliminating the popular preference for dark varnishes, their arguments provide insight into why the application of tinted varnish might be carried out covertly.

Many British artists were at pains to distinguish the darkened state of paintings from the original intention of the artist. The English artist and satirist William Hogarth (1697–1764) waged a decades-long campaign against popular taste, highlighting the ignorance and affectation of the Grand Tourists who 'bring wonderfull copies of bad originals Ador'd for their names only' (Kitson 1966: 104). Hogarth further attacked the 'brown masters' and the valorisation of age, focusing on the gulf that 'time the destroyer' can create between the artist's intention and the deteriorated state of their paintings. These themes are captured in his well-known satirical engraving *Time Smoking a Picture*, in which the personification of Time slices a dark painting with a scythe and obscures it with a puff of smoke. A pot labelled 'VARNISH' sits at his feet, implied to be a further weapon of Time's destruction (figure 1).

Other artists focused on the detrimental effect of dark varnishes on artistic training. In a direct address to fellow artists in his *Second Discourse* at the Royal Academy, Sir Joshua Reynolds

Figure 1. William Hogarth, *Time Smoking a Picture*, *c.*1761, etching and aquatint, 25.1 × 20.8 cm. The Metropolitan Museum of Art, New York, Harris Brisbane Dick Fund, 1917.

(1723–1792) stressed the importance of distinguishing the Old Masters' colouring from overlying dirt and varnish.[6] He encouraged students to see beyond dark tonalities of a varnish and consider the original colour palette, 'what the picture once was, [rather] than what it is at present' (Reynolds 1891), warning artists against making exact copies of dark Old Masters. Should they imitate the deteriorated state of the painting, artists would risk becoming poor colourists. A more vociferous tone is adopted by John Ruskin (1819–1900) in his denunciation of the Claude Glass as 'the black convex mirror, one of the most pestilent inventions for falsifying Nature and degrading art which was ever put into an artist's hand' (Ruskin 1912: 184).

Much to the dismay of British artists, their works were compared to those of the Old Masters well into the nineteenth century. The establishment of the British Institution for Promoting the Fine Arts in the United Kingdom (1805–67), set up by collectors and connoisseurs, had ostensibly aimed to foster native artistic talent. However, by alternating exhibitions of living British artists with exhibitions of Old Masters (Smith 1860: 47–131, 139–213), it elicited the anger of many British artists, who felt that the British Institution entrenched old ideas and served as a vehicle for its founders to exhibit their own personal collections. This anger culminated in the publication of satirical catalogue raisonnés by an anonymous author,[7] which ridiculed the Institute's recently staged Old Master exhibitions, lambasting the 'false and senseless infatuation for the Black Masters' (Anon. 1816: 7). Given contemporary British artists' interest in the public reception of their own 'un-aged' work, it is perhaps understandable that within this satirical text, dark varnishes are a recurrent target, presented as a symbol of poor taste. The dark varnishes are mocked for being deceptive insofar as they disguise inferior paintings, as well as disenchanting, insofar as they obscure those of high quality. The satirical catalogue features the oft-repeated trope of a

Figure 2. Thomas Rowlandson, *Italian Picture Dealers Humbugging My Lord Anglaise*, 1812, hand-coloured etching, 34.8 × 24.8 cm. The Metropolitan Museum of Art, New York, The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 1959.

painting that has been transformed into a night scene by a dark varnish, and further equates the colour brown with insanitary connotations.[8]

> Who does not see, from the same cause, the Landscapes by the same Master, are converted into brown studies, and that Rembrandt's ladies and gentlemen of fashion look as if they had been on duty for the whole of last week in the Prince Regent's new Sewer? (Anon. 1816: 10).

Satirists also contributed to this critical discourse by associating dark varnish with fraudulence. Samuel Foote's (1720–1777) play *Taste*, a satire of the burgeoning art market, acts as an early example of this association, in which unscrupulous dealers make and sell copies of Old Masters and use grime, 'Lumber-Room dirt', and tinted varnish, 'the salutary Application of the 'sphaltam [asphaltum] Pot', to patinate their paintings (Foote 1752: 4).[9] These dark coatings serve as a means both to conceal the fraudulence of the copies and to appeal to a clientele that prized signs of age.[10] The clients, namely the affluent connoisseurs, are equally ridiculed for their gullibility. This premise closely mirrors the 'duplicitous' work of the 'cunning imposter' described in this paper's opening quotation from Raspe's (1736–1794) *Critical Essay on Oil-painting*: 'a thin solution of asphalt or liquorice, rubbed over a tolerable copy' (1781: 28). In this instance, it seems that satire is not far removed from actual practice.

Figure 3. Anon., *A Connoisseur Admiring a Dark Night Piece* (satire on Francis Grose), 1771, etching, 22.4 × 13.8 cm. The Metropolitan Museum of Art, New York, The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 2011.

Ridicule of dealers and connoisseurs became so prevalent that it emerged as a recurring motif in a broad spectrum of subsequent satirical literature. In visual satire, the ignorant connoisseur and the rapacious dealer are frequently paired together, as exemplified by the dynamic of the characters depicted in figure 2. Also of interest in this etching is the eyepiece held by both dealer and client. As Mount has noted (2006: 171–76), ocular aids were commonplace in eighteenth-century depictions of connoisseurs, art critics and antiquarians, gesturing toward the inadequacy of their own naked vision, and aiming to insult their judgement. Another caricature, *A Connoisseur Admiring a Dark Night Piece* (figure 3), depicts a connoisseur using a magnifying glass to examine a painting that sits on the floor, as in an auction house or dealer's shop. The joke rests in the connoisseur 'admiring' a painting that is uniformly black – a visual metaphor for the 'Black Masters'.

In addition to these examples of visual and theatrical satire, literature also lampooned the prevailing aesthetic taste. Among the most widely read examples is William Combe's (1747–1823) *The Tour of Doctor Syntax In Search Of The Picturesque,* published in 1812. Dr Syntax is portrayed as a pompous and ill-informed tourist, whose quest for the picturesque generates constant comedic

mishaps; Dr Syntax is quite literally led astray by his fixation for Gilpin's aesthetic guidelines. Far from the lofty ideal of the enlightened aesthete, the picturesque is presented as a crass touristic ambition, to be conjured artificially in Dr Syntax's sketches: 'I on the *picturesque* am bent. That is my game: I must pursue it, And make it where I cannot view it' (Combe 1812: 108).

Taken as a whole, the derision by artists and satirists served to problematise the connoisseurs' monopoly on 'good taste'. As their taste was a key driver of the art market, a strong predilection for dark Old Master paintings was seen as troublesome by a number of groups. From the perspective of native artists, this predilection could hinder the progress and patronage of British art. Satirists could then further home in on this preference as a symbol of blind adherence to popular trends, and the moral laxity of dealers.

As the application of tinted varnish faced growing ridicule from these parties, figures within the art establishment began to distance themselves from the practice. Richard Redgrave (1804–1888), Surveyor of the Queen's Pictures, associated the application of tinted varnish with second-rate restorers, who make use of it to cover up their errors:

> To hide these wholesale restorations, a dark brown varnish is resorted to, and what is hence called 'the fine golden tone' of a picture – a golden tone neither the work of the original artist, nor of the gradual mellowing influence of time, but really a false incrustation – becomes one of the sources of its estimation (Redgrave and Redgrave 1866: 606).

Redgrave further condemns the 'folly of the would-be connoisseurs of the last age' (1866: 606) – locating the taste for dark varnish in the past, but suggesting that the use of tinted varnish is kept alive by restorers as an expedient tool for concealing substandard work.

Another telling anecdote comes from the recollection of Thomas Unwins (1782–1857), Keeper of the National Gallery from 1847 until 1855. When questioned on the dark appearance of one of the gallery's Veronese paintings, Unwins attributes the darkness to remnants of tinted varnish, purportedly applied by the dealer from whom the painting was purchased, Alexis De La Hante (1767–1837) (Select Committee 1850: 7–9). Unwins gives a firsthand account of De La Hante's practice of applying a temporary tinted liquorice varnish, seen at the dealer's shop in Pall Mall:

> [He] used to take a quantity of ox-gall in a cup, and mix it with Spanish liquorice, which he passed all over the surface of his pictures, to present them in a proper state to the amateurs of that particular tone of colour; and I must say, to the credit of De La Hante, the moment those persons were gone, he washed it off again, with as much earnestness as he had employed in putting it on; to him it was the greatest horror, but he did it from the necessity of selling his pictures (Select Committee 1850: 8).

De La Hante was a renowned French dealer in London, selling significant quantities of furniture, paintings and curiosities to a primarily aristocratic clientele (Haskell 1976: 26; Cordier 2014). His method of a temporary aqueous liquorice varnish seems to be a wily commercial tactic, allowing him to make quick changes to the tonality of his paintings. Given the somewhat deceptive nature of this practice, it may not be surprising that surviving accounts come from third parties. It may also clarify why Unwins waited almost 15 years after De La Hante's death to share his account of the liquorice varnish publicly, considering that a professional relationship existed between the two men. Furthermore, the reluctance with which De La Hante is said to have applied this layer represents a notable shift in the discourse: unlike the satirical sources, this personal account softens the criticism of tinted varnish by highlighting the commercial imperatives faced by the dealer.

Similar imperatives can be identified in De La Hante's country of origin, suggesting that French clientele also prized dark paintings. In a letter to Claude Monet (1840–1926), the dealer Paul Durand Ruel (1831–1922) goes as far as to suggest that the artist's paintings were not saleable without the application of tinted varnish: 'Collectors find your canvases too plastery; to sell them, I am obliged to varnish them with bitumen' (Callen 1994: 739).[11] It is noteworthy that this firsthand account by a dealer conveys a sense of reluctance that echoes De La Hante's feeling of 'horror'. Although neither dealer seems to have shared the taste for tinted varnish, their financial dependence on the buyers' wishes may have made any meaningful resistance to the practice problematic.

Although documentary evidence of the actions of these dealers comprises only fragmentary evidence of a wider practice, these accounts are both consistent with the wider historical context of the increasingly competitive art market in Europe. By 1800, London had eclipsed Paris as Europe's foremost art market, exhibiting sharply increased demand for paintings from buyers and a related increase in the level of competition between sellers (Vermeylen 2019: 189). Contemporary dealers' approach to their goods has been described as 'stock portfolio', where profit can be maximised by the purchase and sale of 'stock' in a variety of geographic locations (De Marchi 2019: 16). The number of auctioneers increased (De Marchi 2019: 19), as did the range of middlemen (Vermeylen 2019: 189), all vying to appeal to London's wealthy buyers. The auction house had come to replace the dealer's shop as the primary organiser of public

sales. International dealers commonly purchased paintings more cheaply in Brussels or Amsterdam, to be resold in Paris or London (Van Migroet *et al.* 2019). In this crowded environment, dealers and auctioneers fashioned innovative profit-generating techniques to stay afloat. In this context, the use of tinted varnish may have offered a quick solution to appeal to the customer base.

The taste for dark pictures remained tenacious among the picture-buying elite, or connoisseurs, despite evident backlash from diverse audiences. Responding to the prevailing taste and the competitiveness of the art market, the art dealer emerged as a central propagator of tinted varnish, going so far as to apply it himself in those instances where this might facilitate a sale. Similarly, restorers are likely to have had clients with conflicting attitudes towards overall tone, as was the case for restorer Charles Buttery (1812–1878) (Simon 2015). As we have seen, one of his clients, Redgrave, saw tinted varnish as a 'false incrustation' (Redgrave and Redgrave 1866: 606), while another, Sir Charles Eastlake (1793–1865), actively instructed him to add 'tone' (Hayes 2017: 81–84). Both dealers and restorers faced an expectant client base, whose aesthetic preferences they could not ignore.

An adjunct to this commercial perspective is the role of tinted varnish within the context of public display. No longer simply reflective of a collector's individual taste, the opening of Britain's first public art galleries in the nineteenth century, the Dulwich Picture Gallery (1817) and the National Gallery (1824), brought the issue of varnish tonality into the public arena. The initial appearance of the publicly exhibited paintings, however, did not mark a change in expectations of tonality. In its early years, the National Gallery collection was comprised of gifts or purchases from private collectors, and these early acquisitions were a reflection of their prevailing taste (Thomas 1999: 67). This taste encompassed both the schools of painting represented and also the tonality of the pictures displayed. The first significant bequest was made by Sir George Beaumont (1753–1827), who also served on the National Gallery's first Board of Trustees (Constable 1924). Beaumont was well known for his taste for brown pictures, and said to have pithily summarised his opinion as: 'A good picture, like a good fiddle, should be brown' (Constable 1924: 164). At least one of the sixteen paintings from the Beaumont bequest was described in a conservation report as having a tinted varnish layer, possibly applied before the bequest to the nation.[12] In the initial decades of the National Gallery, an application of tinted varnish following cleaning would have harmonised a painting with the surrounding artworks, as the gallery's collection was notoriously brown-toned, occasionally even 'almost opaque' (Hendy 1947: xiii).

The tone of the National Gallery paintings was influenced by the application of 'Gallery varnish' by the picture dealers and picture cleaners, John (1785–1856) and William Seguier (1772–1843), applied to gallery paintings between 1824 and 1853 (Brommelle 1956). Comprised of boiled linseed oil and mastic in turpentine (Hendy 1947: xiii) the embrowning properties of this varnish were notorious. Although the varnish was not tinted, it was known to darken rapidly, altering the tone of paintings to which it was applied to a more yellow and darker colour. Reflecting an institutional shift away from darkened pictures being suitable for display, the use of 'Gallery varnish' was condemned by the 1853 Parliamentary Select Committee, and the use of mastic varnish alone was directed (Brommelle 1956: 181).

However, despite this directive, the taste for brown varnishes proved difficult to fully eradicate, even during the years of its decline. In the last quarter of the nineteenth century, under the directorship of Sir Frederick Burton (1874–94), tinted varnish continued to be applied to National Gallery paintings following cleaning (Hendy 1947: xvi). Subsequent to this period, the gallery emphasised that 'only the whitest possible spirit varnish should be applied' (Hendy 1947: xvii), and it would appear that tinted varnish has not since been applied at the National Gallery.

Section III: Materials

Turning towards the material, the following section considers the colorants of tinted varnish. Although, as emphasised by Darrow (1994), the restoration trade was a 'highly individualized' practice carried out by 'self-styled professionals and amateurs', two materials nonetheless garner repeat mention in the surviving evidence: liquorice and asphaltum. After surveying the historical record for instances of their use, the author's own reconstructions of tinted varnishes made with these two materials are used to explore unanswered questions that arise from the documentary evidence.

Asphaltum

Asphaltum is a brown-black pigment that is derived from natural oil deposits (Gettens and Stout 1966: 94), also referred to as 'bitumen' in eighteenth- and nineteenth-century painting treatises (Carlyle 2001: 479, 482). Asphaltum enjoyed widespread popularity as an artists' material in the late eighteenth and nineteenth centuries, with its use as a glaze said to have been popularised by Reynolds (Hendy 1947: xvii). Asphaltum was particularly praised for its warm glowing tone and transparency. According to Dossie, 'when the asphaltum is good, it ought to be perfectly transparent, but of a warm deep brown colour' (1758: 120–21). This transparency and warm brown tone is likely to have been similar to the golden glow of aged varnish, associated with Old Masters. Certain nineteenth-century writers even believed that asphaltum formed part of the original practice

of the Old Masters, as claimed by Mary Merrifield (1804–1889), who reported in her treatise that it was part of Titian's glazing technique (Merrifield 1849, 1: cxxx, ccxxiv). Others warned against asphaltum on the basis of potential drying problems (Redgrave and Redgrave 1866: 593).

In terms of its preparation, asphaltum was most commonly roasted or melted in the medium (Languri 2004: 116; Carlyle 2001: 404–5), with one source specifying that the heating should be carried out for one hour (Merrifield 1849, 1: ccxxv). As asphaltum is soluble in turpentine, and partly soluble in oil (Gettens and Stout 1966: 94), it may be possible to eliminate the heating stage. This 'cold' method was practised by later nineteenth-century artists by mulling fine asphalt powder into their oil or varnish (Bothe 2007: 117). Notably, it was not uncommon for colourmen to adulterate asphaltum with cheaper, more easily sourced materials, with substitutions including lampblack, pitch, coal tar, yellow lake and aniline black (Townsend *et al.* 1995: 67).

To pigment a tinted varnish, asphaltum could have been ground or melted in a variety of natural resins, including mastic, copal, amber, sandarac and rosin (Carlyle 2005). After the 1850s, dammar resin was also commonly used for varnishes in Britain (White and Kirby 2001). These resins were most often dissolved in a solvent, a 'spirit varnish', rather than heated in oil, an 'oil-resin varnish' (Phenix and Townsend 2014: 255–58) although oil could also be added to spirit varnishes in order to adjust handling properties and gloss.

To tint a varnish with asphaltum, a variety of approaches was possible, requiring varying amounts of labour. One approach would have been to prepare the 'base' varnish from its raw materials, and then combine this with asphaltum. Alternatively, a more straightforward approach might be the purchase of a readymade base varnish, as listed in the catalogues of nineteenth-century colourmen (Carlyle 2001: 355–57). It was also possible to purchase ready-made varnish in which asphaltum had already been added (Standage 1892), although it is not clear that these tinted varnishes were used for pictures. Asphaltum is listed as an ingredient in commercial varnishes for leather, coaches, boots and stoves, among other applications.

Varnish-making could be carried out as a specialist operation of a small shop: nineteenth-century merchant and trade directories list businesses designated solely as 'varnish-makers' (Post Office 1812). Varnish could also be produced industrially, at scale, as described by the varnish manufacturer John Wilson Neil (b.1833), who suggests in his paper that a 'profitable' scale begins at upwards of 4000 gallons of varnish per year (Neil 1833: 34). Neil provides recipes for manufactured varnishes designed for 'fine paintings' (1833: 58) – notably free of asphaltum or other pigments – as well as for carriages, brass and ironwork.

As well as the more conventional approach of toning a painting with asphaltum in an oil or resin, asphaltum could also be applied to a painting in an aqueous solution. This is the system preferred by Sir Charles Eastlake, who wrote instructions to his restorer asking for asphaltum to be ground into diluted beer as a 'thin brown watercolour tint', to be applied over five works by Romanino, which, when dry, were to be 'revarnished in the ordinary mode' (Hayes 2017: 81–84).

This method of applying an overall aqueous asphaltum toning, followed by a natural resin varnish, has thus far not received attention in the literature. It does not appear that the practice was particular to Eastlake, however, as it is echoed by Redgrave's account of a Constable painting that received the same treatment by a dealer: 'the blacking was laid on with water, and secured by a coat of mastic varnish' (Redgrave and Redgrave 1866: 385). The reasoning behind this two-step process is not given, although certain advantages could be surmised: until the natural resin was applied, the aqueous layer could be easily adjusted, permitting a greater degree of control over the desired tonality. It may also respond to a specific sign of age in paintings, separate to its overall tone, that is, local remnants of discoloured varnish sitting in paint hollows, having escaped previous cleanings. It is also possible that an aqueous application would offer a more convenient alternative to the processes of melting asphaltum into a natural resin varnish, which not only demands the requisite equipment, but also poses a notable fire hazard.

The ease with which asphaltum can be identified by the conservator varies depending on the method of preparation. According to Gettens and Stout, the pigment can be detected microscopically as 'tiny brown flakes without structure' (1966: 94). However, the feasibility of detecting particles microscopically, or indeed in paint samples, depends on the degree to which the asphaltum has dissolved in the medium. While an aqueous layer would display distinct particles, the same cannot necessarily be said of asphaltum melted into an oil or natural resin. A more definitive answer can be provided by gas chromatography-mass spectrometry (GC-MS), which has been used to identify asphaltum in paint films on the basis of characteristic marker compounds (Languri 2004: 118).

Liquorice

Liquorice is extracted from the root of the *Glycyrrhiza glabra* plant, and has, since medieval times, been used for flavouring and medicine in Britain. It could be purchased from a pharmacy and was added to water to make a 'liquorice juice' drink (Fiore *et al.* 2005: 320–21). Isabella Beeton's (1836–1865) *Book of Household Management* describes its use as part of a concoction to 'cure a cold'. In order to dissolve the raw liquorice 'stick' into the liquid, she specifies that it should be simmered over

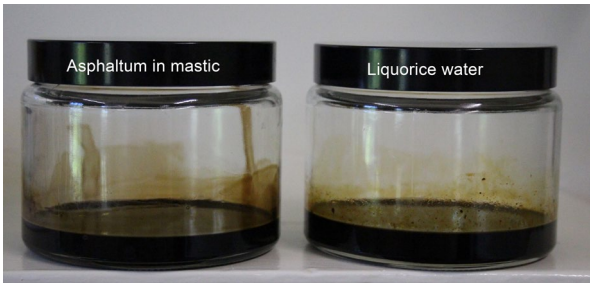

Figure 4 Asphaltum in mastic (*left*) and liquorice water (*right*). Photographs © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

Figure 5. At upper right, two test patches of asphaltum in mastic were applied. An application of liquorice varnish was applied to the lower half of the test piece. A damp sponge was used to remove the liquorice layer from section (a), and a damp cotton swab for section (b). Photograph © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

a gentle heat (Beeton 1861: 1074). The liquorice stick itself is traditionally made by shredding and boiling liquorice root, which, upon cooling, solidifies into a black stick. Unlike modern liquorice, no sugar is added: the root extract comprises the sole ingredient.

Documentary evidence for the use of liquorice with a tinted varnish (Raspe 1781: 28; Select Committee 1850: 8) describes an application in water, suggesting that a similar process of gentle simmering would be undertaken. Unwins' anecdote of De La Hante's practice provides the richest level of technical information, noting an addition of oxgall and the use of a sponge for both application and removal (Select Committee 1850: 7–9).[13] Redgrave specifies De La Hante's use of 'Spanish' liquorice, the same type used by the artist Richard Wilson (1714–1782), when adjusting the tone of fellow artists' paintings (Hargraves 2005: 69). In both of these cases, the liquorice layer provided

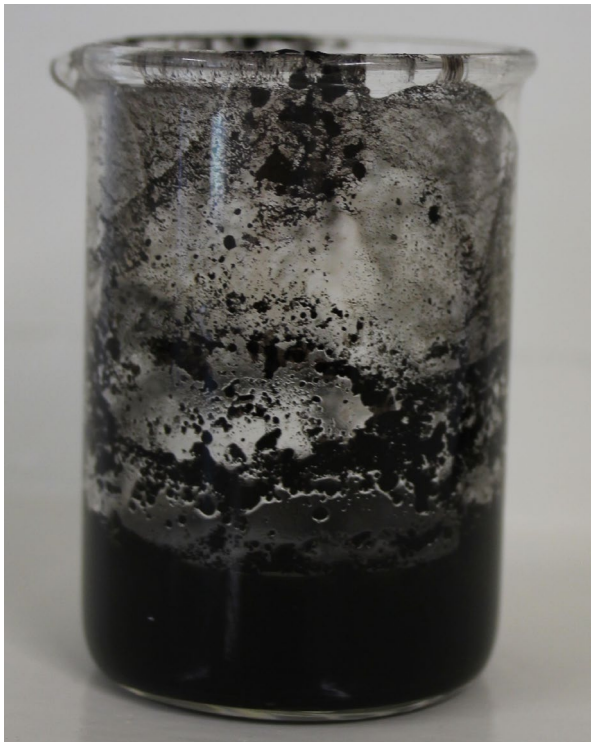

Figure 6. Asphaltum in diluted beer (1:1 water:beer), with visible aggregates. Photograph © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

aesthetic modification to paintings that had already been varnished. Due to its uppermost position within the layer structure, liquorice water offers more straightforward removability than the aforementioned aqueous layer containing asphaltum.

Reconstructions

Three types of tinted varnish were reconstructed and applied to test paintings. An initial account of the reconstructions is provided, accompanied by photographs. This is followed by an overall discussion of all three results.

Asphaltum in mastic

A base varnish was prepared of mastic resin in turpentine, according to an 1833 recipe for 'Fine Mastic or Picture Varnish' (Neil 1833: 81). The original recipe was scaled down to give 57 g dry mastic tears to 225 ml spirit of turpentine (25.3% w/v). Over the course of a week the solution was intermittently stirred to encourage dissolution of the mastic. The resulting solution was then strained to remove a fine layer of sediment.

Powdered asphaltum (Cornelissen) was then added, and the solution heated in a bain marie for an hour until the powder had fully dissolved. The quantity of asphaltum was adjusted according to the desired colour when spread in a thin layer on a white tile. In the container, the asphaltum in mastic varnish appeared almost black (figure 4).

Once cool, the tinted varnish was applied by brush to a section of an oil painting copy created by the author (figure 5).[14] The resulting effect was

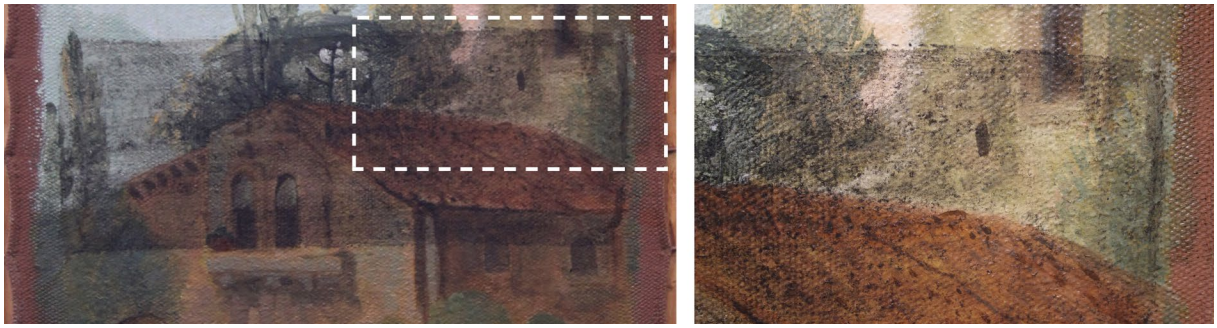

Figure 7. *Left*: A test painting with a local application of asphaltum in diluted beer. *Right*: Detail of the marked area showing the sooty, granular appearance of the applied layer. The underlying test painting is unvarnished. Photographs © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

a cool-brown tone. In strong light, the varnish appeared to have a slight yellow-green undertone, in contrast to written accounts of asphaltum's warm colouring. This detail notwithstanding, to the naked eye the tinted varnish resembled a discoloured varnish.

The test strip was subsequently examined under a microscope to see if this resemblance remained convincing under high magnification. At 40× magnification, individual particles were not visible within the tinted varnish layer. However, unlike aged varnish, small aggregates were detectable. These appeared to consist of pigment particles that had partially melted together, perhaps as a result of insufficient heating time or temperature during the preparation of the varnish.

Asphaltum in diluted beer

This reconstruction sought to investigate the aesthetic effect of the aqueous layer described by Eastlake:

> I wish Mr Buttery to apply a thin brown water-colour tint over each of the 5 Romaninos. … All I ask of you is to see that the toning is moderate, the tint used being of course transparent. The grain as well as tone which the pictures want will be secured by laying each picture flat, for the operation, & by allowing the aqueous tint to settle of itself into the inequalities – removing or softening reducing any spots produced by the accumulation of the tint in larger concavities. When this tinting is quite dry the whole should of course be revarnished in the ordinary mode. … The brown tint (very moderately used) should be about the tint of asphaltum, which, ground & used as a water colour, would I have no doubt be quite safe. But other browns if transparent & not too warm would do as well. The vehicle is diluted beer, water alone would leave the colour, when dry, in an almost dusty state (Hayes 2017: 81).

Fine asphaltum powder was ground on a glass slab with a solution of beer diluted 1:1 with water,[15] and transferred to a container. As asphaltum is a hydrophobic material, the powder resisted even dispersion within the aqueous medium. The asphaltum particles formed aggregates on the surface of the solution and edges of the beaker (figure 6). In water, the pigment had a black appearance, quite unlike the brown tone seen in the mastic reconstruction. Neither alterations in the proportions of beer nor the addition of several drops of oxgall succeeded in dispersing the powder evenly.

The solution was applied to an unvarnished test painting (figure 7). The granularity of the resulting surface may reflect an overly large particle size in the asphaltum powder or insufficient grinding, or may suggest the need for an additional unspecified ingredient. The granularity may, alternatively, bear some resemblance to soil deposited by urban pollution, noted as problematic during Eastlake's tenure at the National Gallery (Saunders 2000). Indeed, the visible particles of asphaltum could be said to closely resemble particles of soot.

Liquorice in water

Since no examples were found of a liquorice varnish surviving on known paintings, this reconstruction sought to investigate the aesthetic qualities of this varnish. Its tone was of particular interest, as was the ease of application, removability and potential staining of the underlying materials.

Two sticks of Spanish liquorice (16 g) were added to 225 ml water, and heated in a bain marie for 30 minutes, by which point the liquorice had dissolved (figure 8). The solution was then strained in order to remove small globules of undissolved material. Having been left to cool, eight drops of oxgall were added. A sponge was then used to apply the solution to the varnished test painting.

The liquorice sticks used were of a deep black colour.[16] When dissolved, the liquorice water turned a deep brown-black, similar in appearance to asphaltum in mastic (figure 4). However, when applied thinly, the liquorice water had an orange-brown hue (figure 9). Comparison to the test swatches of asphaltum in mastic, applied to the same test painting, highlights the comparative warmth of the liquorice layer: it offered a convincing patina, not only in its colour, but also in

Figure 8. The preparation of the liquorice varnish, using liquorice sticks, heated and stored in a glass container. *Left*: Liquorice sticks in water prior to dissolution. *Right*: After dissolution. Photographs © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

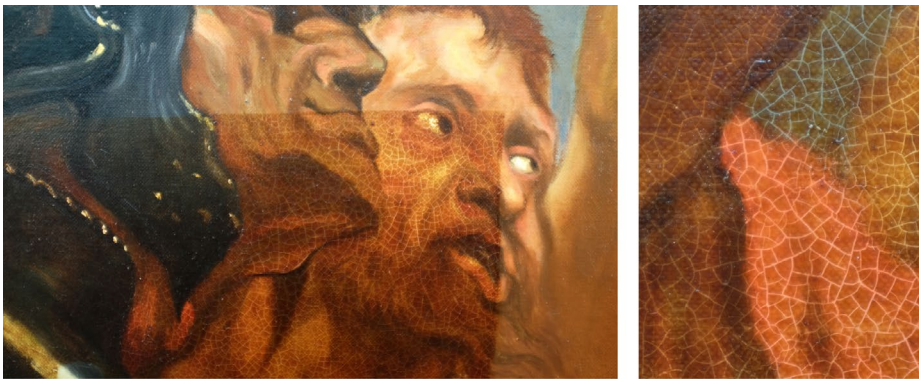

Figure 9. *Left*: Detail of the test painting with an area of liquorice varnish. *Right*: Close-up image of the craquelure that formed after two weeks. Photographs © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

its interaction with the texture of the painting, settling into the interstices of the brushstrokes in a manner that bears comparison to aged varnish. The liquorice test area exhibits an even satin sheen, of far lower gloss than asphaltum in mastic. The liquorice area also exhibits a very slight cloudiness when viewed from certain angles. Unexpectedly, two weeks subsequent to application, the liquorice layer started to form a craquelure.

Removability was tested after one day, one week and two years using deionised water. After one day, a large section was removed by sponge, which proved both quick and effective. When a damp cotton swab was subsequently rolled over this sponged area, only the faintest yellow was visible on the swab, suggesting that the sponge removal had left little material behind. The ease of removal persisted when a separate, smaller section was removed after one week, using a small, dampened swab, which turned a warm brown (figure 10). The liquorice layer readily released from the underlying varnish. A second swab of this area was required to remove the pale yellow remnants of the liquorice layer from the crevices between brushstrokes. In the bright whites, a very faint yellow tone remains visible. After two years, the liquorice layer remained removable with water. The sole difference was in the bright whites of the painting, where a faint, yellow-toned staining proved more noticeable, despite repeated swabbing (figure 11).

Discussion of reconstruction results

Fruitful comparison can be made between the reconstructions of asphaltum in mastic, Eastlake's asphaltum in diluted beer and De La Hante's liquorice in oxgall. While the first is a modification of commonly used varnish – thereby performing the function of saturation and protection of the paint layers – the latter two aqueous layers serve the exclusive function of patination. Both Eastlake and De La Hante's methods split the potential functions of a dark varnish into two layers: an aqueous

Figure 10. Removal of the liquorice layer after one week using a cotton swab dipped in water. Photograph © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

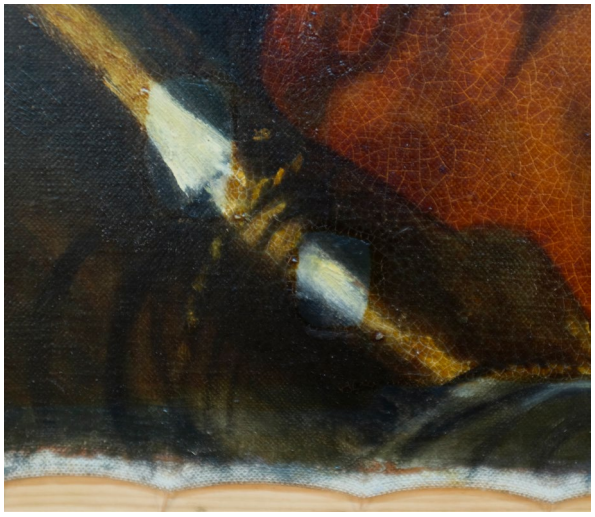

Figure 11. Two small removability tests within the liquorice layer. The first test was carried out one week after the application of the liquorice layer (leftmost test), and the other was carried out two years after (rightmost test). A greater degree of yellow staining is present in the removability test that was carried out after two years. Photograph © Joanna Neville, Hamilton Kerr Institute, University of Cambridge.

patination and a conventional natural resin varnish. Indeed, due to the 'grain' of Eastlake's layer (Hayes 2017: 81), it may not be appropriate to call it a varnish at all.

The possible appeal of Eastlake's method becomes clearer upon consideration of his artistic context. His specification that it should be performed after cleaning would suggest that it was intended as a form of replacement – not of the original artist's materials, but of the matter that had subsequently accrued on the painting, whether the remnants of old varnish in paint interstices or particulate material from the polluted air of Victorian London.

There was a balance to be struck with this practice, however, as too much of this 'dirt' was regarded as problematic. Eastlake himself was a member of a National Gallery Select Committee that considered moving the gallery from its location on Trafalgar Square to 'a site further removed from the dust and smoke of London' (Saunders 2000: 78), and in which the prevailing wind would not carry the fumes of coal-burning furnaces in its direction. A freshly cleaned paint surface may have appeared out of keeping with other paintings in urban collections whether displayed privately or publicly. That Eastlake would recommend that the cleaning stage be followed by an intentional 'dirtying', to be sealed with an overlying natural resin varnish, is a stark example of how conservation decision-making is shaped by the aesthetic expectations of the day.

De La Hante's liquorice method also offers a window into the contemporary cultural environment, driven in large part by the commercial pressures faced by dealers of the day. The speed of application, drying and removal offered flexibility in the context of the London art market, permitting the dealer to increase saleability by making rapid tonal adjustments to his stock. For this purpose, liquorice has distinct advantages as a colorant. Given its widespread use for other purposes, the liquorice water varnish could probably be prepared cheaply, straightforwardly and with a minimum of equipment. The craquelure effect, although not mentioned in historical records, is a fascinating development that invites further exploration. Further to this, the hue of the liquorice reconstruction was a rich, warm brown, which had a unifying effect on the tone of the underlying colours.

By contrast, the effect of the asphaltum in mastic reconstruction was significantly more obscuring. While the amount of asphaltum could have been lowered in order to reduce its opacity, it was notable that this reconstruction did not share the ability of the liquorice layer to unify the tones of the underlying paint. As a result of its cooler tone, the impact of the asphaltum might best be described as a darkening effect. Although further experimentation with different sources of asphaltum and alternative preparation methods might yield a different tone, it is clear in this case how asphaltum in mastic could have served as an effective means of concealment.

Conclusion

When considered from the perspective of modern-day conservation practice, many of the techniques of eighteenth- and nineteenth-century restorers raise ethical questions. The use of tinted varnish provides an unusual study within restoration history, as it is a practice that was contested even during its own heyday. Due to its potential to tarnish reputations, the story of tinted varnish is more readily told by satirists and critics than by its own users or traditional technical sources such as handbooks and treatises.

Emerging from a cultural context in which many buyers and collectors prized dark varnish as an aesthetic ideal, tinted varnish came to be linked strongly to the commercial imperatives of an expanding art market. The commercial

aspect is evident in the presence of the dealer in discussions critical of the practice: the figure of the dealer appears in these critiques as frequently as that of the restorer. Although they may have been criticised for perpetuating the practice of tinted varnish, the evidence examined here suggests that certain dealers and restorers may, in some cases, have acted out of reluctant acquiescence to the tastes of their clientele.

The reconstructions undertaken during this project are testament to the versatility of tinted varnishes prepared and applied using a range of methods. These methods demonstrate a wide spectrum of aesthetic effects that a tinted varnish could offer, including the establishment of unity of tone, the 'replacement' of surface particulates and the concealment of deficiencies in the restoration work or the painting itself.

Overall, tinted varnish might be seen as a material vestige of the aesthetic standards prevalent during the eighteenth and nineteenth centuries. The changes in cleaning and varnishing techniques since this time not only showcase progress in scientific knowledge, but also reflect the vagaries of taste, a reminder of the cultural contingency of conservation practice.

Suppliers

- Asphaltum powder (L. Cornelissen & Son)
- English distilled turpentine, mastic, oxgall liquid (Winsor & Newton)
- Spanish liquorice sticks (The Oldest Sweet Shop In The World)

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Notes

1. Non-particulate varnish colorants include melted liquorice and warm-toned resins. On the latter material, one handbook notes that 'Sometimes a little dragon's blood, or other warm-coloured resin, is added to the mastic varnish, in order to prevent the cold and raw look which a picture which has lost its old toned varnish frequently presents' (Church 1890: 278).
2. Non-original tinted glazes were used by a historical restorer to make local colour corrections to Bellini's *Virgin and Child* at the National Gallery, London (Hendy 1947: 30–31).
3. Approaches to varnish removal can vary widely by country, with Italian and French schools regularly leaving a thin layer of old varnish present, referred to as varnish reduction.
4. It may also be possible to identify pigment particles within the varnish at high magnification. However, as certain colorants are non-particulate, a lack of particulates cannot exclude the possibility that the varnish has been deliberately tinted.
5. Yellowness is given as one of the reasons to remove a varnish, 'where, as is very often found, the turbidness, or want of transparency or the yellow colour of the varnish, deprave the painting so as to destroy its value, such varnish must be taken off' (Dossie 1758: 226), as well as a reason for the decline in the use of varnishes containing linseed oil (Dossie 1758: 214–15).
6. Reynolds states: 'old pictures deservedly celebrated for their colouring, are often so changed by dirt and varnish, that we ought not to wonder if they do not appear equal to their reputation in the eyes of unexperienced painters, or young students. An artist whose judgment is matured by long observation, considers rather what the picture once was, than what it is at present. He has by habit acquired a power of seeing the brilliancy of tints through the cloud by which it is obscured' (Reynolds 1891: 70).
7. This text is variously attributed to Ramsay Reinagle (1775–1862) or Robert Smirke (1752–1845).
8. The link between picture cleaning and nineteenth-century sanitary reform has been explored by Cleere 2014.
9. Colourmen sold asphaltum both in tubes and in 'pots', with the latter likely to refer to a preparation of asphaltum in turpentine, to which varnish could be added. The earliest colourman's catalogue (*c.*1835) surveyed by Carlyle lists Asphaltum 'in pots' under the category of mediums and varnishes (Carlyle 2001: 482). A catalogue *c.*1841–53 from the colourman Charles Roberson & Co. lists asphaltum in 'cups' under 'varnishes, oils, etc.' (Roberson *c.*1841–53: 12).
10. These materials are identified conferring age to the picture: 'Sir, if I do now and then add some Tincts of Antiquity to my Pictures, I do it in Condescension to the Foible of the World; for, Sir, Age, Age, Sir, is all my Pictures want to render 'em as good Pieces as the Masters for whom they are taken; and, let me tell you, Sir, he that took my *Susannah* for a *Guido*' (Foote 1752: 5).
11. The dealer Ambroise Vollard (1866–1939) is also said to have used tinted varnish on Impressionist paintings (Callen 2000).
12. The painting *A Jewish Merchant* by Rembrandt, is described in a 1936 conservation report has having 'brown or black pigment' mixed with the old varnishes (Hendy 1947: 74).
13. As oxgall is a wetting agent, its use here would probably prevent the toning solution beading on the underlying varnish.
14. The test painting is a copy in oil paint after Van Dyck, undertaken by the author two years prior to testing. This copy had been varnished with 20% Paraloid B-72; the tinted varnish tests were applied atop this layer.
15. The beer, 'Fullers London Pride', has an alcohol content of 4.7%.
16. Sticks of pure liquorice extract were used, listed as 'Liquorice Juice Sticks (Spanish)' by the supplier 'The Oldest Sweet Shop In The World'. The volume of water was chosen as an approximation of De La Hante's 'cup' (Select Committee 1850: 8).

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Conservation through the media lens in 1920s and 1930s England: the case of Stanley Kennedy North (1887–1942)

CAMILLE POLKOWNIK

Abstract Stanley (Harry) Kennedy North (1887–1942) was known as a decorative artist, map maker, illustrator, art critic, expert examiner and picture restorer. This paper is an attempt to produce the first professional biography of this multiskilled and important restorer and examines North's career and practice in the context of Britain and art conservation in the 1920s and 30s.

Introduction

This research started after encountering the name of Stanley Kennedy North (1887–1942) in a memo in the curatorial files of the Courtauld Institute, London. In 1939, North was considered along with restorer George Morrill (1875–1964) to undertake the treatment of Édouard Manet's *A Bar at the Folies-Bergère*, which was then in Samuel Courtauld's private collection. Despite Morrill's experience and long-established studio, North was given the complex job. As this investigation started just before the Covid-19 pandemic, research avenues became rather limited and I was forced to rely on what was available online. Jacob Simon's British picture restorers online database hosted by the National Portrait Gallery provided a short biography, sketching the broad lines of North's life.[1] However, it was finding North's grandson, Richard D. North and his personal blog, which truly got the research up and running. Richard provided a few newspaper clippings, some of which had no source information, that launched an exploration of the archives of British newspapers, starting in the 1900s and ending in the 1970s.

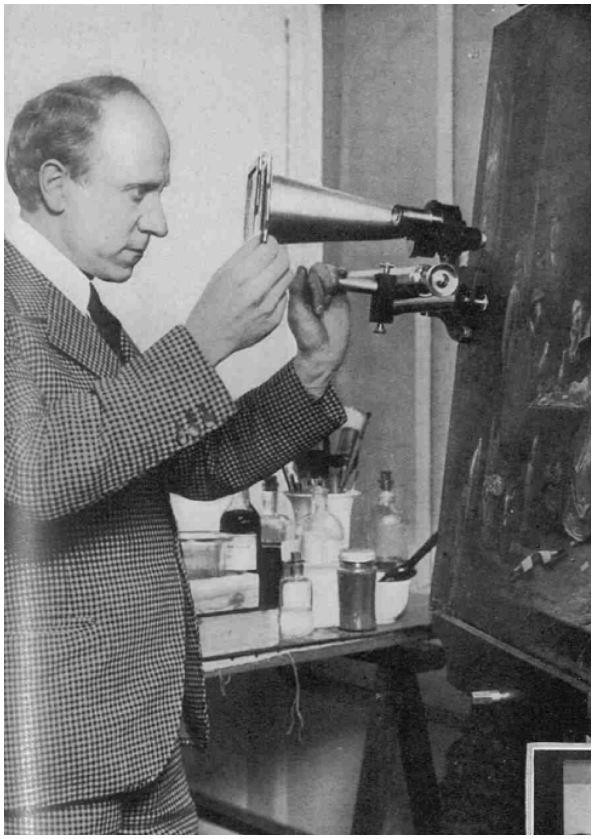

Figure 1. Portrait of Stanley Kennedy North carrying out microphotography in his Jermyn Street London studio, 16 March 1929. Photograph: *The Sphere*.

Figure 2. Portrait of Stanley Kennedy North, unknown photographer, unknown date. Photograph courtesy of Richard D. North.

Figure 3. Stanley Kennedy North, *Illuminated Testimonial to Tobias Matthay*, 1922, tempera, ink and gilding on parchment, 56 × 86 cm. Royal Academy of Music, London, bequeathed in 1948 by Tobias Matthay, acc. ni. 1922.1774. Photograph: Royal Academy of Music, London.

I discovered that Stanley Kennedy North regularly appeared in the papers, first as an author, and later as a public figure. This media presence, combined with more formal published papers, helped me gain a better understanding of his career and life, and by reading between the lines, a glimpse of his personality.

During his lifetime, North worked as a decorative artist craftsman, map maker, illustrator, art critic, technical analyst, painting restorer (figure 1) and agronomist. His interests were varied: he was a strong supporter of crafts, with a particular interest in folk dancing (North 1923: 6)(figure 2), and he was also a keen gardener, which led him to become a correspondent for the Royal Horticultural Society in the late 1930s (Kennedy North 1938b: 17) and develop a new variety of flax (*The Northern Whig and Belfast Post* 1937: 7). While the newspapers and published literature helped paint a clearer picture of his career, it probably did not tell the full story, and as in every research project, there are more questions than answers.

This paper is divided in two parts: a timeline of North's career, followed by selected elements from his conservation work, particularly those treatments which attest to his modern approach, discussed within the context of the conservation techniques and associated knowledge of the 1920s and 1930s.

Early life (1887–1911)

Harry Stanley North[2] was born on 11 April 1887 in Kilburn, London, to Charles North and Fanny North (née Arundel).[3] His father was a groom before becoming an employed omnibus driver and then a self-employed cab driver;[4] his mother was termed a 'homemaker'. North had three sisters, Annie (1882), Alice (1889) and Elsie (1890). The family moved around London: they were recorded in Kilburn in 1887, in Fulham in 1881 and Kensington in 1901.

His childhood and education are poorly documented. The 1901 census reports that his occupation at 14 years old was 'art student', living with another art student Francis John Spendlove, in Fulham. North studied design under Professor William Lethaby (1857–1931) at the Royal College of Art (RCA) in South Kensington; the precise dates are not known but are likely to be in the early 1900s. In its early days the RCA was dominated by a distinctive version of the Arts and Crafts philosophy.[5] Medieval English painted glass was of great interest to North, and he produced an extensive study on the subject in the form of drawings – 119 of which are owned by the Victoria and Albert Museum in London – as early as 1915 when he was only 26 (Studio: international art 1915: 136–38). North's obituary in *The Times* (1942: 6) stated that he had trained under William Morris but this is unlikely

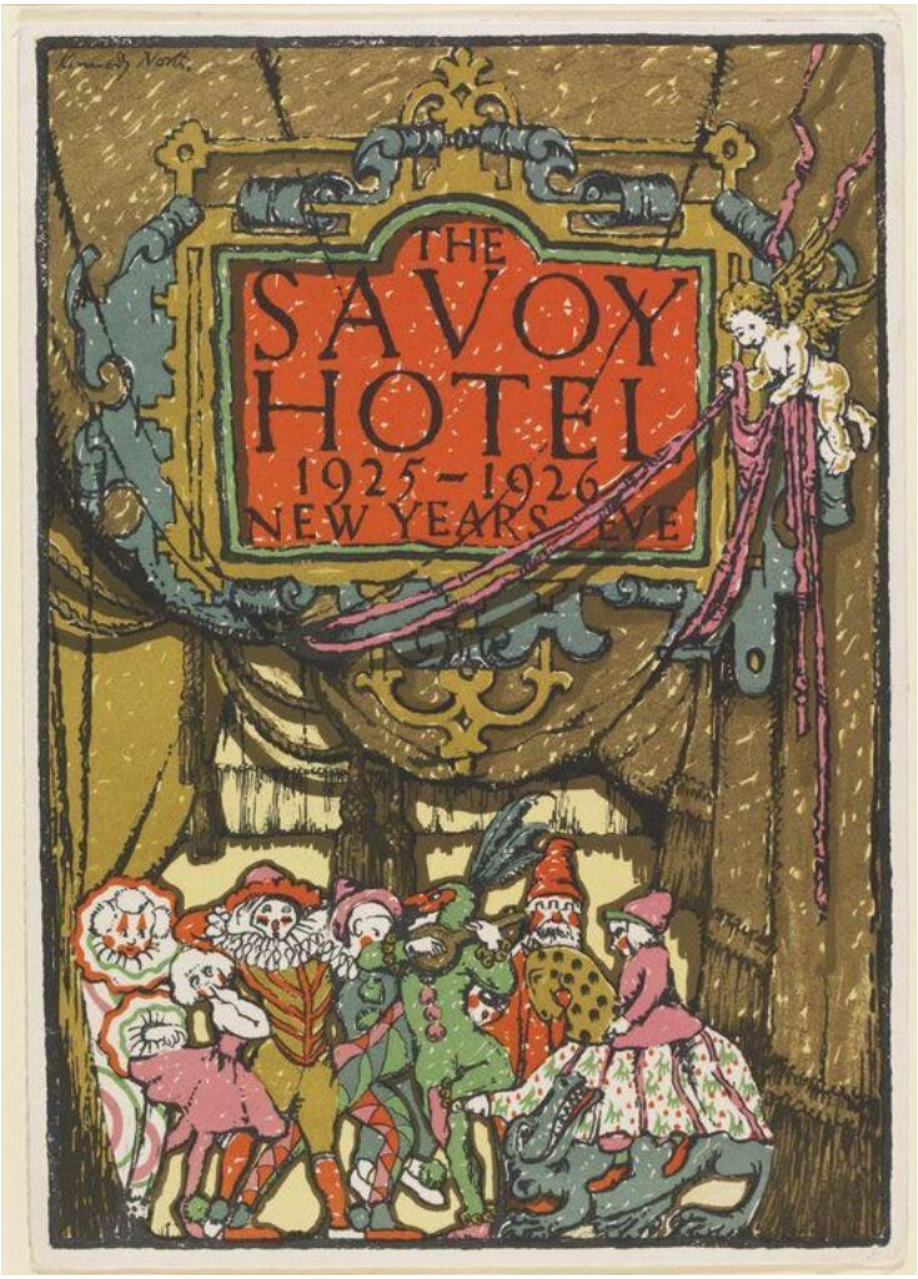

Figure 4. Stanley Kennedy North, menu card for the Savoy Hotel, 1925, colour lithograph, 29.21 × 20.32 cm. Victoria & Albert Museum, E.5162-1958. Photograph: Victoria and Albert Museum, London.

as Morris died in 1896 when North was only nine years old. A plausible scenario was that North had trained with Morris & Co, the brand founded by William Morris in 1861 as Morris, Marshall, Faulkner & Co. It is likely that North was greatly influenced by the Arts and Crafts movement, which itself is closely associated with Morris's designs and ideas.

North was a pacifist and peace campaigner; he held a socialist objection to the war (WWI) and was known as a conscientious objector. After he was granted a temporary exemption from war service from the Fulham Tribunal,[6] he absconded and remained in London throughout the war as a fugitive, often hosted by the Gardiner family in South Kensington and in the country (Gardiner 1988: 41).

North married his first wife Vera Rawnsley (1889–1974) in 1911. Following their divorce in 1918, he married his second wife Helen Dorothy Kennedy (1889–1975) in 1920, at this point changing his name from Stanley North to Stanley Kennedy North. He lived in Kensington from 1923 until his death in 1942 and occupied a studio in Jermyn Street near the Royal Academy (1929–38).

Decorative artist and art critic (1912 onwards)

North started his career as a decorative artist. When he was 25 years old, *The Times* (1912: 15) included mention of him winning an art competition for his decoration of the London County Council Board School at Cable Street, London. At the time, there was a movement to encourage mural decoration,

and the walls in London County Council schools were thought to be perfect 'training spaces for a school of fresco' (Collins Baker 1911). North was later reported to have been successful as a competitor for the Chelsea Town Hall competition, along with painter Mary Sargant Florence (1857–1954) and others (*The Times* 1942: 6).

North's work was diverse, ranging from drawings for a modern children's book (Whitworth *et al*. 1914) and a folk dance album (North 1921), medieval-inspired illustrations (figure 3), paintings and posters (*The Guardian* 1922: 11).[7] He also received more advertising commissions, including designs of a Christmas box (*The Gentlewoman* 1924: 779), carols for Pears soaps and menu cards for the Savoy Hotel (figure 4).[8] In addition, he was known for his map designs, in particular the map of the British Empire Exhibition and its transport links, which opened at Wembley Park in 1924, and a world map produced for Thomas Cook's travel agency in the same year (*The Guardian* 1924: 3). His work extended to the London stage when he produced a Christmas play and carol concert held at the Aeolian Hall, London (*The Times* 1921: 10).

In 1923, North was a regular art critic for *The Pall Mall Gazette* (Kennedy North 1923a: 9) and *The Observer* (Kennedy North 1923b: 10); he also wrote forewords for exhibition catalogues (Konody 1923: 10). As his reputation grew, he received more prestigious commissions: he was selected as a committee member for the Women's Exhibition (*The Manchester Guardian* 1923: 6) and the following year he went to Italy to supervise the hanging of the British Pavilion at the 1924 Venice Biennale (Kennedy North 1924: 15).

North received his first royal commission in 1921 through leading architect Sir Edwin Lutyens (1869–1944).[9] Lutyens was commissioned by Princess Marie Louise (1872–1956) to design and supervise the production of the perfect dolls' house as a gift to her cousin, King George V's consort and her childhood friend Queen Mary (1867–1953). The aim was not to produce a house for children to play with, but rather to showcase the finest British craftsmanship of the time (Ryu 2019) as well as a record of contemporary royal living quarters. For the room housing the dolls' house in Windsor Castle, North painted a frieze representing to inch-scale the 1911 Coronation of King George V and Queen Mary. The painting, an oil on a single piece of canvas and later marouflaged on mahogany, was 138 ft long (*The Times* 1923: 19; 1925: 9).[10] North's frieze was praised by newspapers as the first comprehensive depiction of the event (*The Times* 1929: 8). After completion of the frieze, North kept working alongside Lutyens and was involved in the architect's largest and longest commission: the design of New Delhi, a district within the city of Delhi, India (Wilhide 2000: 41). Lutyens made use of North's decorative skills and sent him abroad as the 'artist in charge' for the decoration of the Viceroy's House, where North carried out the scheme of decoration designed by Lutyens, aided by local Indian painters (*The Times* 1925b: 9).

Transition to conservator/restorer and scientist (1920s)

It is unclear what prompted the transition from artist and art critic to restorer, liner and scientist/technical analyst. It is important to consider the historical context of North's evolving career. The Great Depression of 1929–32 was Britain's largest and most profound economic depression of the twentieth century. World trade and output of heavy industries were severely affected, resulting in high rates of employment and devaluation of the currency (Worswick 1984: 85–86). While North's work on the examination of paintings began before the crash of 1929, it is possible that he had to swiftly diversify his services with fewer available commissions for a decorative artist, designer or X-radiographer of paintings.

No information could be found on North's mentor or master (if he had one), or how he trained and gained experience as a restorer. However, looking closely at his background and early life, a few possibilities emerge. Lethaby, who taught North at the RCA, was a strong advocate of Arts and Crafts and contributor to the field of medieval art history (Lethaby 1905) as well as a scholar in medieval art in the early twentieth century. Lethaby had a clear influence on North as a student, as supported by his extensive study on English painted glass in the form of meticulous watercolours and tempera copies; possibly pushing North to study and serve artists rather than producing his own creations. However, it is likely to be Lethaby's involvement with the Society for the Protection of Ancient Buildings (SPAB) that gave North his first taste of what conservation – meaning preservation and restoration – was about. The SPAB, founded in 1877 by Morris, is the largest conservation society in Britain today. The society's goal is to preserve the integrity of historic buildings by preventing unnecessary changes and additions, by proposing to 'repair' rather than 'restore' (Donovan 2007: 1; Morris and Webb 1877). At the time, the disdain of the SPAB for what was then considered 'restoration' – the 'practice of destroying or destroying part of a building or a whole building to rebuild it to resemble an architectural style that was frequently not the original style' – is well documented (Donovan 2007: 7). Another less polemical definition was suggested by Frank Baines, Director of Works at HM Office of Works, who explained in 1924, that restoration involves the 'replacement of what is gone', in contrast to preservation, which is 'a method involving the retention of the building or monument in a sound static condition, without any material addition thereto or subtraction therefrom, so that it can be handed down to futurity with all the evidences of

its character and age unimpaired' (Baines 1924: 120). Another element which reinforces the theory that the SPAB had a significant influence on North is the fact that he hated being called a 'restorer' and much preferred the term 'conservator' (*The Times* 1942: 6). For reference, the Association of British Picture Restorers (ABPR) founded in 1943, changed its name to the British Association of Painting Conservator-Restorers (BAPCR) only in 2002: North was ahead of his time in many respects (*The Times* 1930: 13).

Another potential mentor, or colleague, could be Ernest William Tristram (1882–1952), painter and art historian, who also went to the RCA and studied under Lethaby, although a few years before North.[11] Tristram went on to teach at RCA and practised wall painting restoration, although his techniques, especially the use of wax on murals, are now highly criticised.[12]

While it is likely Lethaby introduced North to conservation, he would not have been able to teach him the practical knowledge of paintings conservation or technical analysis. As Lethaby was an established scholar and member of the SPAB however, he would have had various contacts with restorers and was potentially North's bridge to the London art restoration community. More research is needed into London-based restorers active in the 1920s who could have taken on an apprentice such as North, as well as scientists who might have taught him the use and interpretation of X-radiographs, infrared and ultraviolet examination, and mycology (the study of fungi).

Another possibility is that North was partially or entirely self-taught. Research into available literature in the 1920s did not reveal an obvious manual for the conservation and restoration of paintings, such as those available today;[13] however there were older manuals dating from the sixteenth to the nineteenth century.[14] Knowledge in the 1910s and 20s appears to be mainly disseminated through specialist art periodicals and books (Pezzini 2013: 154) such as the *Journal of the Royal Society of Arts* (1908–87), *The Connoisseur* (1901–92), *The Burlington Magazine* (1903–present) and *The Burlington Gazette* (1903–4).[15] Pezzini states that the magazines had links to the art market, although the main role of *The Burlington Magazine*, according to artist and art critic Roger Fry (1866–1934) was to be 'a very powerful influence for the kind of serious and scholarly study of the subject which we have at heart and which is beset with many enemies, among the chief of which is the unscrupulous falsification of dealers' (Pezzini 2013: 163). The magazines included articles on varnishes (Holmes 1919; Trotter 1912a,b), cleaning (Holmes 1922a,b; Bell 1922), the ageing of artist materials (Laurie 1922; Heaton 1932) and conservation in museums (Perks 1910; Scott 1922). The fact that North's own work was published in *The Burlington Magazine* from 1928 onwards demonstrates that he was aware of the magazine(s) and active in his contributions, and in turn, the publications helped further establish his reputation as an expert (Kennedy North 1930a,b; 1931).

Scientist

In 1928, in an article in *The Observer*, North explained the workings of radiography – in particular its uses to detect forgeries and identify pigments based on their opacity – which brought a change in his career (Kennedy North 1928: 8). His article is surprisingly simple yet accurate, indicating that his understanding of the technique was sound, and that he had the opportunity to practise this method of examination on a variety of paintings. Art historian and critic Paul George Konody (1872–1933), stated that North had been 'devoting himself enthusiastically to picture radiography' (Konody 1929c: 14).

In 1929, no fewer than six newspaper articles were published (Konody 1929a: 12; 1929b: 14; 1929c: 14; *The Daily Mirror* 1929: 12; *The Sphere* 1929: 507; Rutter 1929: 7) (figures 1 and 5). North's demonstrations involved examinations of paintings whose attributions were in doubt (Konody 1929a: 12; 1929b: 14) or needed investigating (Konody 1929c: 14). While X-radiographs were being described by the newspapers as a new invention, praising North for his expertise, they had been used on paintings long before North adopted this technique (Konody 1929a: 12), the first being in 1896 in Frankfurt by Walter König (1859–1936) (König 1896).[16]

Figure 5. Portrait of Stanley Kennedy North examining an X-radiograph in his Jermyn Street London Studio, 16 March 1929. Photograph: *The Sphere*.

North seems to be an early adopter of this technology in Britain, possibly from the mid-1920s onwards, and was most likely one of the rare providers of this service in London, working for auction houses and galleries alike.[17] He was described as owning a 'specially constructed X-ray apparatus – the first of its kind' (Konody 1929b: 14). There was clearly an impetus to use science to examine and inform the treatment of artworks, which was translated through the creations of specialist institutions in Europe and the United States, as well as dedicated periodicals such as *Technical Studies in the Field of the Fine Arts* (Ruhemann 1968: 54). In London, lectures on the use of X-radiographs, including their applications to cultural heritage, were given as early as 1921 (Kaye 1921), but North's attendance at these lectures remains unknown.

Initially, North was not described by the newspapers as a restorer, but rather as 'an artist and critic with a particular knowledge of technical methods' (Rutter 1929: 7), or even 'an expert in microphotography and radiography' (Konody 1929a: 12), indicating this was still his transitional period to conservation and restoration of artworks. There are records of North having treated paintings before 1929, but there are very few mentions of this type of work in the newspapers, which could indicate he was only just starting out.

In addition to carrying out X-radiography, North undertook infrared and ultraviolet examinations, however, there is very little published by North himself or journalists about his use of these two techniques. North provided 'mycological' examinations, for institutions such as the Tate Gallery[18] and private collectors such as Charles Henry Wyndham, 3rd Baron Leconfield (1872–1952) of Petworth House (Kennedy North 1931). This latter 'service' could have been a way to gain access to and acquaintance with private collections, and subsequently offer targeted advice leading to analytical or conservation work. For instance, at Petworth House in the late 1920s, the analysis was followed up with a free diagnosis and treatment recommendations for over 20 paintings described as being in 'grave danger' (Collins Baker 1931: 1–2). Charles Henry Collins Baker (1880–1959) had produced a catalogue of the Petworth collection in 1920 when he was Keeper of the National Gallery London, and already knew North via the Royal Collection. He most likely trusted him enough to recommend him to Lord Leconfield, who subsequently agreed to the treatment of four paintings, three by J.M.W. Turner (1775–1851) and one by the Le Nain brothers (Blunt 1980: 119).

Technical examiner and picture restorer (1928–1942)

It is remiss to discuss North's scientific work without reviewing the conservation treatments. Indeed, he was using the scientific examination to gain a better understanding of the condition of the paintings, which would subsequently inform the conservation treatment, as in the case for a painting by Duccio (The Royal Collection Trust), whose attribution at the time was in doubt.[19] At the close of the *Exhibition of Italian Art 1200–1900*, held in 1930 at Burlington House (now the Royal Academy) (Balnial and Clark 1931), King George V allowed the picture to be unframed, closely examined and X-radiographed, which revealed it was almost completely overpainted. Subsequently, the king entrusted the cleaning of his painting to North, who subsequently published both the X-radiographs and a summary of the treatment in *The Burlington Magazine* (Kennedy North 1930b). North described the cleaning and his approach to retouching: 'no repainting of any kind whatever has been done by [him]', and that the picture was now 'exquisite and beautiful, as nearly in its original state as is possible' (Kennedy North 1930b: 205).

The term 'original state' was already in use in the 1920s to describe the cleaned state, the original paint applied by the artist visible and free of varnish and overpaint (Mayer 1926: 32). In his 1968 book, *The Cleaning of Paintings*, paintings conservator Helmut Ruhemann (1891–1973) explained pigmented varnishes were often applied after cleaning to mimic uncleaned and darkened Old Master paintings, skewing the perception of the viewers and implying that the artists always meant for their colours to be modified by a tinted coating (Ruhemann 1968: 236–37). Art critic Clive Bell (1881–1964) summarised the situation in a single sentence in 1922: 'It is not the tone of the master, but the tone of the museum' (Bell 1922: 128). The conscious choice not to revarnish with tinted varnish, but rather to use a clear varnish to show as closely as possible the original colours chosen by the artist, reflects a change in the practice of restorers – and some curators and museum directors – and a desire to show the paintings closer to their unadulterated state (Ruhemann 1968: 54, 88). However, this change in practice came with consequences for the restorer(s), as described by Charles Holmes (1868–1936), director of the National Gallery (1916–28): '[it] requires no little courage to do what was done with the *Blue Boy* [by Thomas Gainsborough], and replace an old, toned varnish with a new clear varnish. Time will, of course, vindicate the cleaner, but what critic in these days can afford to wait for time!' (Holmes 1922b: 173).[20]

Another modern approach taken up by North was minimal retouching, as demonstrated by his retouching of the Titians from the Bridgewater House collection.[21] In his report, North stated that both paintings (*Diana and Callisto* and *Diana and Actaeon*) remained unretouched (Fry and Kennedy North 1933: 15), while for the *Venus Anadyomene* he only retouched the 'fissures' in the paint: 'Except for these, no retouching has been done by me. Honourable scars I have left alone' (Kennedy North 1932a: 163). However, the condition and

subsequent treatment report produced by the National Gallery stated that 'very local and minimal areas of restoration [were] applied by North' (Ridge and Spring 2016: 122), indicating that North was not entirely truthful. Another group of paintings treated by North, Andrea Mantegna's *Triumphs of Caesar* (The Royal Collection Trust),[22] were also left unretouched: 'the aim was to conserve them intact, with honourable scars of time' (*The Times* 1934a: 12). This minimal approach started in the early twentieth century, when retouching was thought to be an 'illegitimate and presumptuous interference with the original master's work' (Ruhemann 1968: 255), echoing the 'original state' concept discussed earlier. This approach to retouching was possibly influenced by North's routine technical analyses, particularly the use of ultraviolet (UV) light to reveal the extent of the retouching. North's contemporary methods included documenting the examinations and treatments he performed; and by publishing these records, he allowed anyone with a UV light to scrutinise his work, thereby holding himself publicly accountable.

On the use of wax resin

In the 1920s, wax was a popular material used for consolidation and lining (Van Duijn and Te Malvelde 2016: 813). In 1930, North contributed to the groundbreaking *International Conference for the Study of Scientific Methods for the Examination and Preservation of Works of Art* held in Rome, 13–17 October 1930 (International Institute of Intellectual Co-operation 1940). The individual presentations were later anonymised, blended and presented together in a book published in French (1939) and in English (1940). Its publication sought to reflect the atmosphere in 1930, of 'peace and international cooperation' (Hill Stoner 2017: 630). While North's individual paper was not published in *Mouseion : revue internationale de muséographie*, it was reported that he 'exposed the pernicious use of glue in the restoration of paintings' while encouraging the use of wax, as well as showing X-radiographs of paintings and detailing their value for the restorers (*The Times* 1930: 13).[23] North held strong views on the use of animal glue, describing the material as 'the greatest enemy' (Sandilande 1930: 6).

The choice of wax in lining aimed to establish a moisture barrier and encapsulate the entire structure to protect it from 'atmospheric changes' (Ridge and Spring 2016: 121). Damage from atmospheric change included mould and fungus growths, which were found on the previously mentioned Titians as well as selected paintings by John Sell Cotman (1782–1842) from the Colman collection (now Norwich Castle Museum and Art Gallery and Norfolk Museum Servives). North described that the mould and fungus on the latter were possibly due to their 'natural glue mountings', meaning the glue-paste lining (*The Illustrated London News* 1936: 807). The Titians would have been glue-paste lined at least once by the time North treated them, and he attributed the mould to the presence of animal glue, although the flour present in the paste would have also been another contributing factor to support mould growth. After delining, the paintings were 'sterilised', although North does not provide any detail about this in his report (Kennedy North 1932c). Similarly, the Cotman watercolours were removed from their backing, then remounted using a 'sterile adhesive and aseptic support' (*The Times* 1936: 10), a 'freshly-invented mounting board free from animal substances' (*The Illustrated London News* 1936: 807), the treatment being praised after North 'brought the colours back' (Gordon 1936: 14).[24] Unfortunately, no further information could be uncovered about this particular aspect of North's practice, and it remains unclear what the sterile adhesive was (paraffin?) or the aseptic support. Presumably, if wax had been used, it would have 'brought the colours back' by saturating the paint layer, a theory that fits with North's ethos and his long use of wax.

The rejection of glue translated into North's practical conservation work, and he used wax, or rather paraffin wax, for almost every part of his treatments. On Pierre-Auguste Renoir's *La Loge,* he used paraffin wax to consolidate the paint layer, injecting the blisters from the reverse, directly through the canvas (*The Times* 1934c: 15).[25] The painting was then wax-lined, again with paraffin, as North believed the wax would 'feed' the canvas and strengthen it (Turner 1932). Lastly, the final varnish on this painting was not a varnish, but yet another layer of wax, and above it the retouching (*The Times* 1934c: 15).

Other paintings wax-lined by North include Édouard Manet's *A Bar at the Folies-Bergère*[26] (Gordon 1934: 5), Andrea Mantegna's *Triumphs of Caesar* (The Royal Collection Trust), paintings by Turner at the Tate (*Tamar*,[27] *Teignmouth*[28] and *Windsor*[29]) and the Titians. At the time, these treatments were considered successes, and the Mantegna series in particular was termed 'sensational': its treatment was covered by many newspapers both national (*The Times*, *The Observer, The Manchester Guardian*) and regional (*The Truth*, *The Illustrated London News*, *The Sphere*, *The Belfast Telegraph*, *Dundee Courier*, *Yorkshire Post*, *Leeds Intelligencer*). For example, *The Times* wrote that the wax '[enhanced] the quality of the tempera painting', and that 'what strikes one the most of all in looking at the pictures is the unity of effect which has been established in what was formerly a sequence of patches' (*The Times* 1934a: 12). North was praised for his 'usual carefulness' (*The Sunderland Daily Echo and Shipping Gazette* 1934: 6), and that 'no words ... can adequately pay tribute to all the hard work and skilful care that [he] has devoted to the enhancement of these masterpieces' (*The Yorkshire Post and Leeds Intelligencer* 1934: 10).

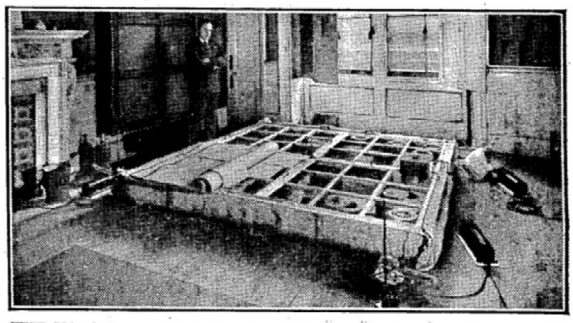
THE VAPOUR CHAMBER used by Mr. Kennedy North for the conservation of Titian's painting "Diana and Actaeon" at Bridgewater House. This new invention is described by our Art Critic on another page.

Figure 6. Newspaper clipping from *The Times*, 19 July 1932, page 18, showing Stanley Kennedy North standing next to 'The Vapour Chamber'. Photograph: *The Times*.

Unfortunately for North, paraffin was not a perfect coating. The surface of the Mantegnas became opaque after only a few years, as the wax was tacky at room temperature, trapping dust and further obscuring the paintings. The paintings were restored again in the 1960s, this time by painting conservator John Brealey (1925–2002), who was vocal about the low quality of North's restoration and choice of materials (*The Weekend Telegraph* 1965: 18–21) stating that: 'it's a sobering thought that as recently as this, such appalling brutality and ignorance were let loose on treasures as unique as the Mantegnas' (Tisdall 1975: 10). Brealey's comments suggest how quickly materials and ethics in conservation were evolving, in barely 30 years.

On cleaning methods

A popular technique for the cleaning or re-saturating of paint surfaces and varnishes was the *Regenerationsverfahren*, known now as the 'Pettenkofer process'. This technique was invented by Bavarian physicist and hygienist Professor Max von Pettenkofer (1818–1901) in 1863 and involved exposing copaiva balsam-impregnated paintings to alcohol vapours in an enclosed space, at room temperature, in order to regenerate the varnish layer(s) (Schmitt 1990: 81). It was used as early as 1865 by the National Gallery minus the copaiva balsam (Schmitt 1990: 82).[30] In 1928, chemist and artist Alexander Eibner (1862–1935) published on the advantages and disadvantages of the technique, and pointed out the damages caused by the restorer essentially working blind while the painting was in the box (Schmitt 1990: 82). It is possible to imagine that North read or heard about this particular book, and adjusted the technique accordingly. His modification consisted of a custom-made zinc box 'lagged' with asbestos wool and covered with a glass window to allow progress to be surveyed. The press dubbed this 'The Vapour Chamber' (figure 6) (*The Times* 1932: 18). A motor-operated fan moved the air within this hermetically sealed box and electric heaters helped raise the internal temperature. More electric heaters were used outside the box, this time to warm the solvents contained in silica flasks (Kennedy North 1932c: 7). Rather than regenerate the varnish layers, North waited until the layers were in a gel form and removed them with swabs. He used this technique in 1930–31 to remove the varnishes on the previously mentioned Titian paintings, *Diana and Actaeon* and *Diana and Callisto*.

On preventive conservation

North showed an interest in protecting paintings from their environment, whether fluctuations in humidity and temperature or exposure to fire or dust. To do so, he applied new materials to the practice of paintings conservation, experimented with different backing systems and designed new stretchers. Following lining with wax, North went a step further with the idea of creating a barrier to atmospheric changes. In 1931, Turner's *Teignmouth* and *Thames on Windsor* (Tate) were relined with wax (most likely paraffin) and the reverses were subsequently impregnated with Bakelite (possibly in varnish form) and painted with aluminium paint (Kennedy North 1931). Bakelite, also known as 'the world's first synthetic plastic' and 'the Material of a Thousand Uses', is a thermoset resin made with phenol and formaldehyde, invented in 1909 and popular in the 1920s and 30s (Ellis and Williams 1934: 5; Williams and Ellis 1934: 3). The polymers can be heated in order to set them into a shape; alternatively they can be made into a varnish-like solution. These Bakelite-type varnishes, made from phenol-formaldehyde resin dissolved in oil and solvent, were first introduced in 1912, and gradually improved to produce commercial resins such as Albertol and Amberol in the 1910s and 20s (Standeven 2011: 66). They were floor and interior varnishes, as well as exterior and marine varnishes, used for industrial and domestic purposes (Standeven 2011: 67). Bakelite varnish was used in conservation as early as 1925 for the consolidation of fossil bones (Case 1925; Nichols 1932) but the varnish eventually set into a brittle and irreversible layer that darkened with time and it was quickly abandoned by conservators (Ventikou 1999). Considering its availability and initial success in conservation, it is not surprising that North adopted Bakelite to seal the reverse of the paintings he lined in order to limit their response to humidity fluctuations. While Bakelite was commonly used for the conservation of fossils until the 1940s, there is no evidence of this material being utilised as a conservation material for paintings.[31] Sitwell (2021) draws attention to the weight of *Thames on Windsor*, which is considerable despite its small size of 91 × 122 cm. The aluminium paint applied on the reverse of the canvas (presumably before the restretching), was added as an isolating layer, a further protection

Figure 7 John Sell Cotman, *The Judgement of Midas*, *c.*1808–09, oil on canvas, 60.8 × 73.7 cm. Norfolk Museums Service, NWHCM: 1951.235.117: F. (a) Front before treatment and (b) reverse before treatment. Photographs © Hamilton Kerr Institute, University of Cambridge.

against fluctuations in relative humidity (RH) and temperature. Examples of this metallic layer were also visible on Renoir's *La Loge* and Le Nain's *A Peasant Family* (National Trust, Petworth House),[32] while Manet's *A Bar at the Folies-Bergère* displayed a gold metallic paint. In the 1930s, North upgraded to the use of metal leaf rather than paint, using aluminium leaf on the reverse of the newly relined Titians (*Diana and Callisto* and *Diana and Actaeon*) (Ridge and Spring 2016: 121) and gold metal leaf on Cotman's *The Judgement of Midas*.[33] The reverse of Cotman's *The Judgement*

of Midas, treated at the Hamilton Kerr Institute in 2013, exhibited a multitude of squares, indicating that the reverse had been gilded using gold leaf (Miller 2011: 1). It is unclear whether North thought this would provide superior protection and/or a superior aesthetic to paint perhaps as it would have reflected the light in a brighter manner as well as being more aesthetically pleasing.

North also used backings made of wide flax ribbons interlaced to create a lattice (Ridge and Spring 2016: 122), as seen on the two Titians (*Diana and Callisto* and *Diana and Actaeon*), presumably to protect from dust and mechanical shock from the reverse, and potentially to provide tension and act in a similar manner to a stretcher bar lining. This technique was also observed on Cotman's *The Beggar Boy*.[34]

On stretchers

Following the lining and relining of paintings, it appears that North tended to discard the original stretchers, replacing them with stronger ones made of teak wood (Ridge and Spring 2016: 121). Both Manet's *A Bar at the Folies-Bergère* and Renoir's *La Loge* received similar stretchers following their lining in the early 1930s. These stretchers were made from a hard and dark wood with heavy tenon and mortise joints, members and cross-bars.

Towards the end of his career, North developed metal stretchers which are claimed as patented. Cotman's *The Judgement of Midas* bears an engraved inscription on the stretcher chosen by North after the 1930s structural treatment (Miller 2011), although no official patent has yet been found by the author.[35] This stretcher had springs in the corners to enable expansion of the joints, and the canvas was secured to metal rods that ran along all sides of the painting, via webbing, which were wrapped around the rods and sewn onto the edges of the lining canvas (figure 7). The rods were then held at intervals with metal clamps, retaining the (incredibly high) tension throughout in the painting via springs and bolts encased in the chrome-plated metal 'stretcher' (Miller 2011: 1). This stretcher has been used on other paintings in the Colman collection, including *The Silent Stream* in 1935; *Moreton Hall Cheshire*, and *The Waterfall,* both treated between 1936 and 1937.[36]

On specialist framing

North's conservation work in the 1930s can be described as holistic; he was concerned about the ongoing preservation implications of framing, which would influence the longevity and safety of the artwork. He designed frames from which the paintings could be easily and quickly taken out in case of an emergency; 'fire, flood, or act of God' (Kennedy North 1932b: 12). The lower edge of the frame was modified and put on sliding bolts for smooth removal, allowing the painting to slide out while the frame remained on the wall.

North rejected the way the paintings were secured in frames using nails that created damage, preferring metal plates, a method commonly used by paintings conservators today. The metal plates used by North were made from Duralumin, a metal alloy created in 1909 in Germany by metallurgist engineer Alfred Wilm (1869–1937). This metal was made from aluminium with small proportions of copper, manganese and magnesium (Duparc 2005: 399). North advised on the best wood to use when making a frame, recommending teak – particularly Rangoon teak from Burma – for its fire-resistant and insect-repellent properties, concluding that it is an 'almost everlasting' species (Kennedy North 1932b: 13). Along with advice on framing, North warned against the glazing of paintings. While recognising that it protected the paint surface from large dust particles, he stated that smaller particles still penetrated the framed enclosure, producing 'a peculiar fan-shaped blurring of surface not unlike the large areas of carbon particles collected over common radiators' on the inside of the glass (Kennedy North 1932b: 13). Moreover, when glazing was combined with 'pasting' (referring to enclosing the reverse of the frame and the painting with paper and glue), North commented that it created an 'almost stagnant pocket of air'. It is interesting to note that while these enclosures were rejected or deemed unsuitable in the 1930s, microclimate frames are now commonly recommended and used on fragile and/or responsive panels to slow exchanges and fluctuations in RH within the enclosure.

North's experiments with framing were not always published in specialised magazines as in the case with the frame for Manet's *A Bar at the Folies-Bergère* (Turner 1932). North created a modern frame, which was described as containing 'oil pockets to absorb humidity' (*The Times* 1933: 6). The 2021 examination of the current frame for this painting did not reveal such pockets, and no further information has been found about this particular experiment. The lack of climate control at the time, especially in national institutions such as the National Gallery in London, was of particular concern to North, who drew attention to the matter in a letter to the editor of *The Times* (Kennedy North 1938: 8), in which he described the control of the temperature and humidity in the National Gallery as 'primitive'.

On flax

Starting in 1936, North investigated the cultivation of flax in Britain, with the aim of encouraging the production of a high-quality flax fibre to make canvases. This project stemmed from his work with the Colman family, North's patron and owner of the Cotman watercolours which he restored in 1936. It is very likely that North's knowledge originated from his work on paintings whose primary supports were of poor quality, and thus required structural treatment (*The Northern Whig and Belfast Post*

1937: 7). Working from his suggestions, the Linen Industry Research Association was able to produce a canvas 'superior to any from the Continent' (Kennedy North 1937a: 8), avoiding short fibres and variations in weft and warp thread counts. North's experiments began in Norfolk, where he worked on the hybridisation of linen and continued in Belfast where a special canvas was woven according to his specifications and subsequently used for the restoration of the Cotman watercolours (Kennedy North 1937a: 17; 1937b: 15). North's research in agriculture and plants seems to have been the focus of his later life, as attested by his death certificate which reads 'Occupation: Agricultural Research Scientist'. Additionally, North wanted to draw attention to the decline in British production and, with the support from the British company, Wigglesworth (est. 1895), issued a warning that Britain might face shortages of linen in the event of future war (Wigglesworth 1930; 1937: 13).


MAN with a GOLDEN TOUCH

to recognition once more after several centuries!

Surrounded by strange apparatus of all kinds, the Jermyn-street doctor of masterpieces diagnosed the diseases of pictures, their cause and cure.

He produced a couple of glass jars filled with perforated wood-chips.

Expensive Tastes

"The beetles and worms in these splinters have most expensive tastes. They feed on Old Masters. In many cases their meals are worth thousands of pounds. In fact, in one case it was about £10 an inch."

The study of the health of paintings is a comparatively new science. In this medical profession, as in all others, there have been ignorant remedies. A great deal of old-fashioned restoration has done more harm than good.

"Glue is one of the greatest enemies of our masterpieces. The trouble is that glue is not a standard product. It is always a culture-ground for bacteria and

Mr. S. Kennedy North "obviously has the Midas touch."

Figure 8. Newspaper clipping from *The Daily Herald*, 2 December 1930, page 6, showing Stanley Kennedy North working in his studio. Photograph: *The Daily Herald*.

On the media

North's relationship with the media was a double-edged sword. On the one hand, it was a useful tool to publicise his research and conservation, as well as convey his views on the wider conservation landscape. North was vocal about the safeguarding of paintings and often drew the public's attention to the lack of infrastructure and budget to properly care for the artworks in public collections such as the Tate Gallery. In 1937, he stressed that the 'precarious state of several pictures [should be of] grave concern to many people' (Kennedy North 1937b: 17). As an 'expert in the scientific examination and preservation of pictures' (Gordon 1937: 11), he received support from other journalists and art critics, such as Jan Gordon (1882–1944), who highlighted the need for a 'hospital for paintings'. This had already been raised in 1931 in a letter to *The Times*, in which the author – 'A Lover of Pictures', could it be North himself? – advocated for a 'clinical centre' to examine and treat artworks as well as the need for a multidisciplinary team, a 'corporate body of qualified experts' (*The Times* 1931: 15).

Among the experts recommended for membership of such a body were Alexander Scott (1853–1947), scientist and engineer at the British Museum, Arthur Pillans Laurie (1861–1949) chemist and scientist in private practice and the Royal Academy of Art, and North who was described as a 'craftsman [who] combines research and examination with technical skill of the most cautious kind' (*The Times* 1931: 15). The lack of funding and proper facilities to care for artworks was again raised in 1937 by Labour politician William Thomas Kelly (1874–1944) and discussed in the House of Commons. However, the Trustees of the Tate Gallery did not have the budget necessary to restore the paintings, estimated at £40,000 (the equivalent of £3,414,786.20 today) (Kennedy North 1937b: 17), and the proposal was shelved. North appealed again, this time to request that a government department be created in order to take care of the Nation's pictures (Kennedy North 1937b: 17; Gordon 1937: 11). The earliest national conservation studio in England had been established at the National Gallery in London in 1946, more than 10 years after North started appealing for a national conservation studio (Bomford 1978: 3).

North seemed to be highly respected by journalists, who described him as the 'world-famous London art expert and restorer of Old Masters' (*The Belfast Telegraph* 1939: 5), 'the man with a golden touch' (figure 8) and even the 'doctor of masterpieces' (Sandilande 1930: 6). On the other hand, North's media coverage became detrimental as it was used by others to criticise the results of his work in a very public manner. A few examples include the restoration of the abovementioned Mantegna series after which some accused him of removing earlier restorations while others criticised him for not removing them (*The Times* 1934b: 15). The criticism continued after his death, when in 1952, the art historian and art critic Paul Oppe (1878–1957) denounced his work, claiming that 'his results are by no means generally accepted'. Oppe firmly criticised the cleaning of paintings, suggesting pictures 'should be shown together in harsh daylight and without glass' and that all cleaning must be stopped in the meantime (Oppe 1946: 5). Around the same time, the National Gallery in London was the subject of controversy after its exhibition *Cleaned Pictures* which showed paintings cleaned during WWII (Gombrich 1962), and ultimately created the Weaver Committee to review the conservation and restoration of its painting collection (Weaver *et al.* 1950).

Fortunately for North, not all his detractors published their discontent in the newspapers. Collins Baker was initially supportive of him (Millar 1977: 209), as was the director of the National Gallery

(1929–33) Augustus Moore Daniel (1866–1950), who selected North to undertake the restoration of the Mantegna series and whose opinion of North rapidly changed: as attested in his diary, he did not think highly of North and his work.[37] King George V, also initially pleased with the work on the Mantegna series, was later said to be 'sceptical about North's methods, which to him smacked of the charlatan, and [was] aghast at the expense'. Shortly after, the king decided that no pictures were to be moved and no restoration undertaken without his express approval (Millar 1977: 209). Likewise, the results from the restoration of the Turners at Petworth House (now Tate) were reported to be so disastrous that a shocked Charles Wyndham decreed that no other paintings in his house were to be touched by restorers in his lifetime (Blunt 1980: 119). North died on 16 June 1942 at the age of 55 in his Kensington home (*The Times* 1942: 6; Hillier 1978: 8).

Conclusion

Even as his conservation career flourished, there are mentions of North's artistic works in the newspapers: praise for his lithographs for the Quick Starting Series for Shell Oil (*The Sheffield Daily Telegraph* 1932: 7), and for his stained glass window for the staircase at the Norwich Hospital, commissioned by the Colman family in 1937 as a memorial to their son Captain Geoffrey Colman (*The Journal* 1938: VI). This shows that North continued his career as an artist, either by choice or necessity, and that he experienced a certain degree of success or perhaps marketed himself effectively. North regularly published his writings throughout his career, from short articles for local and national newspapers, to longer pieces in *The Burlington Magazine*, prefaces for catalogues (*The Times* 1938: 14; Gordon 1938: 21), and 'think pieces' for specialist art magazines (Kennedy North 1937c).

The early stages of his career as an examiner and paintings conservator – as previously mentioned, he disliked being called a restorer, preferring the term conservator – remain unknown. It is possible he was self-taught, gaining knowledge from specialist publications with which he was familiar. His early career was, after all, dedicated to the study of fine art, collectibles and antiques through historical reconstruction and scientific investigation which connected him with art dealers, collectors, scholars, museum professionals and artists (Pezzini 2013: 156). His teacher Professor Lethaby, closely connected to the Arts and Crafts movement, may have introduced North to various members of the conservation community.

Thanks to the many newspaper articles published both by and about North, it has been possible to gain a better understanding of his practice, as well as how his work was perceived and received. North's own personality most likely contributed to the development of his fame: the 'air of secrecy' and 'portentous voice' combined with his 'mystery man' persona intrigued the press and drew them in (*The Times* 1942: 6). He then kept them engaged thanks to his enthusiasm and willingness to explain and demonstrate his skills. It is easy to imagine North in 2024, testing the latest conservation products and sharing the results on his social media accounts, likely followed by millions.

At the start of this research, exploring the career of a paintings conservator from a century ago felt distant, but the more I read North's words and tried to understand his thinking and processes, the more I reflected on my own, albeit short, career. North ensured his successes were publicised, but he also documented his losses to an extent, not only detailing the steps, but also explaining and sometimes reflecting on his choices. Perhaps the most valuable lessons I have taken away from this research have been the value and influence of context when considering past treatments and the importance of remaining professionally critical while avoiding personal judgement. Our field evolves rapidly – methods I used as a student are already outdated – and it is likely to continue to evolve at an exponential pace. It is obvious that North, along with many restorers, thought that wax was superior and the most appropriate choice for consolidation, lining, retouching and 'varnishing'; yet we now avoid using it, as we are aware of its lack of reversibility and impact on colour changes. At the heart of our profession remains the commitment to providing the best care possible, within the means available, at any given time, and I can only hope that future generations of conservators will assess our own practical work with similar considerations and a good dose of graciousness.

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Notes

1. https://www.npg.org.uk/collections/research/programmes/directory-of-british-picture-restorers/ (accessed 31 May 2024).
2. Born Harry Stanley North, he seems to have gone by the name of Stanley, dropping the name Harry. In 1920, he added Kennedy, his wife's maiden name, to his own surname. Finally, towards the end of his life, he was known simply as Stanley North (as shown on his death certificate).

3. 'Fanny North', 1881 England Census, Piece 2030, Folio 100, Page 15. Available at: https://www.ancestry.co.uk/imageviewer/collections/7572/images/WILRG11_2027_2032-0761?ssrc=&backlabel=Return&pId=23107306 (accessed 10 May 2024).
4. 'Charles North', 1881 England Census, Piece 2030, Folio 100, Page 15. Available at: https://www.ancestry.co.uk/imageviewer/collections/7572/images/WILRG11_2027_2032-0761?ssrc=&backlabel=Return&pId=23107306 (accessed 10 May 2024); 'Charles North', 1891 England Census, The National Archives of the UK (TNA), Kew, Surrey, England; Class: RG12; Piece: 46; Folio: 8; Page: 9. Available at: https://www.ancestry.co.uk/imageviewer/collections/6598/images/LNDRG12_44_46-0562?pId=724663 (accessed 10 May 2024); 'Charles North', 1901 England Census, Class: RG13; Piece: 37; Folio: 119; Page: 54. Available at: <https://www.ancestry.co.uk/imageviewer/collections/7814/images/LNDRG13_37_38-0239?pId=344827> (accessed 10 May 2024).
5. RCA, Our History. Available at: https://www.rca.ac.uk/more/our-history/ (accessed 10 May 2024).
6. Date and author unknown, Stanley Kennedy North 1887–1942. The Men who said No. Peace Pledge Union project. Available at: https://menwhosaidno.org/men/men_files/n/north_stanley_kennedy.html (accessed 10 August 2024).
7. Stanley North, *Courtly Love: The Arrival of the Suitor*; *Garden Courtship*; *The Bride*; and *The Wedding Feast*, *c.*1920s, private collection. Tempera and gesso on canvas, laid down on panel, 21 × 4 in. Available at: https://www.christies.com/en/lot/lot-5818175 (accessed 31 May 2024). Stanley Kennedy North, *Illuminated Testimonial to Tobias Matthay* (framed triptych), Royal Academy of Music, tempera, ink and gilding on parchment, h. 56 × w. 86 cm, 2003.1774.
8. Stanley Kennedy North, *Menu card for the Savoy Hotel*, 1925, Victoria and Albert Museum, London. Colour lithograph, 29.21 × 20.32 cm, E.5162-1958.
9. Not to be mistaken for Sir Edwin Henry Landseer (1802–1873), painter and sculptor.
10. A painting on canvas or paper adhered to a rigid support such as a wall or panel.
11. *Oxford Dictionary of National Biography* 2004. Entry for 'Tristram, Ernest William (1882–1952), E.C. Rouse'. Available at: https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-36559 (accessed 10 May 2024).
12. Unfortunately, his technical methods of preservation were flawed: his use of wax, dissolved in turpentine, as a fixative often proved disastrous, as the impervious and shiny surface thus produced, bloomed and collapsed when lime-impregnated damp in the walls could not escape.
13. For example: Knut 1999; Hill Stoner and Rushfield 2012.
14. For instance, to name just a few: the Paduan manuscript (Anon. 1500); *The Excellency of Pen and Pencil* (Anon. 1662); *The Handmaid to the Arts* (Dossie 1758); *De la peinture à l'huile* (Merimée 1830).
15. The Magazine went through various titles: *Transactions of the Society, Instituted at London, for the Encouragement of Arts, Manufactures, and Commerce* (1783–1843), *The Journal of the Society of Arts* (1852–1908), *Journal of the Royal Society of Arts* (1908–1987) and *RSA Journal* (1987–2021).
16. The subject of North and X-radiographs has already been discussed in more detail by the author in a separate paper (Polkownik forthcoming).
17. National Gallery archive, NG1/10, p.97, via *The Directory of British Picture Restorers 1600–1950*, National Portrait Gallery. Available at: https://www.npg.org.uk/research/programmes/directory-of-british-picture-restorers/british-picture-restorers-1600-1950-n (accessed 10 May 2024).
18. National Gallery archive, NG13/1/11. via *The Directory of British Picture Restorers 1600–1950*, National Portrait Gallery. Available at: https://www.npg.org.uk/research/programmes/directory-of-british-picture-restorers/british-picture-restorers-1600-1950-n (accessed 10 May 2024).
19. Duccio di Buoninsegna, *Triptych: Crucifixion and other Scenes*, *c.*1302–08, Royal Collection Trust, tempera on panel, 44.9 × 31.4 cm, RCIN 400095.
20. Thomas Gainsborough, *Blue Boy*, 1770, The Huntington Library, Art Museum and Botanical Gardens, oil on canvas, 178 × 112 cm, acc. no. 21.1.
21. Titian, *Diana and Callisto*, 1556–59, jointly owned by the National Gallery, London and National Galleries of Scotland, oil on canvas, 187 × 204.5 cm, NG6616; Titian, *Diana and Actaeon*, 1556–59, jointly owned by the National Gallery, London and National Galleries of Scotland, oil on canvas, 184.5 × 202.2 cm, NG6611; Titian, *Venus Rising from the Sea*, 1520, National Galleries of Scotland, oil on canvas, 74.00 × 56.20 cm, NG 2751.
22. Andrea Mantegna, *The Triumphs of Caesar*, *c.*1431–1506, Royal Collection Trust, tempera on canvas, ensemble composed of nine monumental canvases, varied dimensions. RCIN 403958 through to RCIN 403966.
23. While many of the papers were published in *Mouseion* (the French International Magazine for Museography), in the four issues published in the year 1931: issues 13, 14, 15, 16.
24. The newspapers do not mention which watercolours were treated.
25. Pierre-Auguste Renoir, *La Loge*, 1874, The Courtauld, London, oil on canvas, 80 × 63.5 cm, P.1948.SC.338.
26. Édouard Manet, *A Bar at the Folies-Bergère*, 1882, The Courtauld, London, oil on canvas, 96 × 130 cm, P.1934.SC.234.
27. Joseph Mallord William Turner, *Hulks on the Tamar*, *c.*1811, Tate, oil on canvas, 13.1 × 16.2 cm, T03881. Currently located at Petworth House, West Sussex.
28. Joseph Mallord William Turner, *Teignmouth*, exhibited 1812, Tate, oil on canvas, 128 × 158 cm, T03870. Currently located at Petworth House, West Sussex.
29. Joseph Mallord William Turner, *Windsor Castle from the Thames*, *c.*1805, Tate, oil on canvas, 129.8 × 161.2 cm. Currently located at Petworth House, West Sussex.
30. The process was adapted by various restorers who used different impregnation materials. 'Pfanner Biittner zu ThaI, published the "Pettenkofer process" with long-lasting success (and therefore fraught with grave consequences), employing "Phobus A", an embrocation containing non-drying oil of Vaseline' (Schmitt 1990: 82).
31. Apart perhaps from painter Han van Meegeren in his Vermeer forgeries (Alberge 2011).
32. NT Conservation Report, 2015, NT 486146. NT/PET/P/48. Treasury Ref. 582.

33. John Sell Cotman, *The Judgement of Midas*, *c*.1808–09, Norfolk Museums Service, oil on canvas, 60.8 × 73.7 cm, bequeathed, 1946, NWHCM: 1951.235.117: F.
34. John Sell Cotman, *The Beggar Boy*, 1808, Norwich Castle Museum and Art Gallery, oil on millboard, 72.7 × 61.5 cm, NWHCM: 1951.235.92.
35. The inscription, located on the upper member, reads: 'To slacken canvas – equally turn nuts counter clockwise / to tighten canvas – equally turn nuts clockwise / conserved by S. Kennedy North / 1936–1937'.
36. John Sell Cotman, *The Silent Stream, Normandy*, 1824–28, Norfolk Museums Service, oil on canvas, 40.2 × 33.5 cm, NWHCM: 1951.235.120; John Sell Cotman, *Moreton Hall, Cheshire*, 1807–08, Norfolk Museums Service, oil on canvas, 62.3 × 75.5 cm, NWHCM: 1951.235.116; John Sell Cotman, *The Waterfall*, 1807–08, Norfolk Museums Service, oil on canvas, 57.3 × 43.2 cm, NWHCM: 1951.235.118.
37. National Library of Scotland, Acc.9769, 97/42, 9 December 1931, *via The Directory of British Picture Restorers 1600–1950*, National Portrait Gallery. Available at: https://www.npg.org.uk/research/programmes/directory-of-british-picture-restorers/british-picture-restorers-1600-1950-n (accessed 10 May 2024).

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Aspects of Duncan Grant's early practice: repurposing, reuse and refinement within the Bloomsbury artist's oeuvre

ALICE LIMB AND JUSTYNA KĘDZIORA

Abstract Duncan Grant (1885–1978) was a core member of the artistic and literary circle known as the Bloomsbury group. The Hamilton Kerr Institute's ongoing survey and treatment of the King's College painting collection – including the Keynes bequest of Bloomsbury group paintings – has facilitated a unique opportunity to explore the range of this extraordinary artist's earliest years. A wide-ranging group of five early paintings on several different supports (canvas, millboard and cedar panel) are used to contextualise various aspects of Grant's early practice, and to illuminate three main themes relevant to Grant's artistic ideals and painting techniques, 1903–*c.*1920. Findings from technical analysis and close examination, as well as documentary and contextual research alongside conservation treatment, were used to help understand how and why he worked as he did. Consistent findings from this sample of paintings include: Grant's propensity to experiment with traditional painting techniques and materials; a willingness to reuse and repurpose supports and compositions; and a fundamentally 'Bloomsbury' aesthetic, regardless of subject matter or style.

Introduction

Duncan Grant (1885–1978) was a core member of the artistic and literary circle known as the Bloomsbury group. The group included his cousin, Lytton Strachey, as well as his artistic and romantic partner Vanessa Bell, her sister and author Virginia Woolf, the art critics Clive Bell (Vanessa's husband) and Roger Fry, and the economist John Maynard Keynes. The Bloomsbury group is famed for the prodigious artistic and literary outputs of its members, as well as for the complicated romantic relationships and fluid sexualities of its members. Grant had a relatively conventional early artistic education, attending the Westminster School of Art, making copies (including the *Detail of Piero della Francesca's Nativity* discussed here), and travelling to the Continent with his aunt. Grant contributed enormously to the characteristic aesthetic developed by the Bloomsbury group – colourful, with distinct brushstrokes and a generally matte surface. This would ultimately be used in his later work to serve the mythological subject matter to which he became drawn as well as for portraiture, and to depict landscapes and interiors (including decorating the latter). While the focus here will remain on the materials and techniques of Duncan Grant's early paintings, social and artistic context cannot be ignored when discussing Grant's output, as his biography and relationships were pivotal to the development of his artwork and artistic practice.

Paintings treated at the Hamilton Kerr Institute between 2021 and 2023 form the basis of this article's investigation of Duncan Grant's early practice (1903–*c.*1920). All works belong to the collection of King's College, Cambridge, and form part of the bequest made by John Maynard Keynes, an alumnus of the college. King's College acted as a nexus for the Bloomsbury group, as several of its members were associated with King's, and it was visits to the college that inspired Virgina Woolf to write her famous work, *A Room of One's Own* (first published 1929). Keynes frequently bought works by other members of the Bloomsbury circle, and was a regular guest at Charleston, the Sussex farmhouse where Duncan Grant and Vanessa Bell lived from 1916 onwards: he even had a dedicated bedroom there. Within the group of works discussed here, three paintings are small-scale landscapes on wooden panels, one is a partial copy of Piero della Francesca's *Nativity* (London, National Gallery, NG908) painted on canvas, and the last is a double-sided work on a paper pulp board (millboard) support. The earliest work is Grant's copy of the *Nativity*, executed while he was still an art student, between 1904 and 1906 (figure 1). The double-sided work *Riders/Queen of Sheba* was begun not long after this date. The *Queen of Sheba* composition dates to the winter of 1911–12, while *Riders* was developed over a span of years, commencing prior to *Queen of Sheba* and finishing later (figure 4). The landscape paintings – *Poplars* (figure 11), *Rocky Landscape* (figure 12) and *Classical Temple* (figure 13) – are all painted on wooden boards of near-identical dimensions, thought to have been removed from a piece of furniture. The exact date of these works is not known, although they are believed to date from *c.*1910–20.

The analysis of these paintings, alongside their treatment, enabled us to investigate some of Grant's choices of materials and techniques across this small sample of his work. Various themes and strands emerged through the lens of these paintings: reuse,

Figure 1. Duncan Grant, *Detail of Piero della Francesca's Nativity*, *c.*1905, oil on canvas, 50.9 × 50.9 × 1.9 cm: before treatment in normal light. King's College, University of Cambridge. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photograph © Alice Limb, Hamilton Kerr Institute, University of Cambridge.

repurposing of materials and the refinement of artistic practice in several different directions emerged as central to Grant's early work. The treatment of other paintings from the Keynes collection by other Bloomsbury group artists, such as Roger Fry, was also informative from a technical and stylistic standpoint. Authorship within the Bloomsbury context can be difficult to establish, due to the intensive nature of artistic collaboration between members fostered by their close physical and intellectual proximity to one another as well as to the distinctive style and aesthetic developed by the group as a whole. Authorship of paintings executed by Duncan Grant and Vanessa Bell during their early years living together at Charleston are notoriously difficult to separate, for precisely these reasons.[1] While attribution will not be discussed in detail here, all works under discussion are accepted to have been executed solely by Grant, without collaboration with other artists.

Refining artistic practice: Old Master influences in Grant's early oeuvre

Grant first encountered Piero della Francesca's work when travelling in Italy with his aunt, Lady Jane Strachey in 1904, while a student at the Westminster School of Art (Cluston-Brock 1959). During this time, he lived with the Strachey family at their home at 69 Lancaster Gate (Grant stayed with them from at least 1900 until 1906) (Brown 1975: ix). Lady Strachey sponsored much of Grant's early travels abroad: an important context for the landscape paintings discussed below, all of which are of Southern European locations. The works Grant viewed on the 1904 trip made a great impression, leading to a lifelong preoccupation with the work of Piero della Francesca, characterised by some as 'a great admiration' (Cluston-Brock 1959). Study and emulation of the Old Masters was a preoccupation shared by Roger Fry and Vanessa Bell. This reached its apogee among the Bloomsbury group in May 1917 with the staging of the exhibition *Copies and Translations of Old Master Paintings*, hosted by the Omega Workshops in Fitzroy Square, London, featuring works by Grant, Bell, Fry and Fry's wife Helen. The Omega Workshops, active between roughly 1913 and 1919, was a short-lived commercial entity of the Bloomsbury group selling craft products and interior design. The exhibition was not a commercial success however: only two works by Grant were sold, both to Keynes (Howells 2015: 53). The titles of these

works are not known, but Grant's *Detail of Piero della Francesca's Nativity* is believed to have entered Keynes' collection at this time. Another notable work exhibited at the exhibition was Grant's copy of Piero della Francesca's *Portrait of the Duke of Urbino*, now in the collection at Charleston (CHA/P/226) where it hangs in the dining room.

The first years of the twentieth century appear to have been a fertile time for Grant's copying of the Old Masters. He is recorded as a copyist in the National Gallery, London, in February 1903,[2] and other sources allege that he was painting a *Nativity* copy in the National Gallery in 1905 (Brown 1975: ix),[3] although no surviving entry in the Copyist Register (which records the paintings selected for copy by artists) corroborates this suggestion.

The Charleston collection copy of the *Duke of Urbino* is notable as a contrast to the materials and techniques of Grant's copy of the *Nativity*, executed around the same time. One key technical difference is the variation of Grant's ground preparation layers. While the *Duke of Urbino* copy is executed over a white ground (observed in losses while examining the painting *in situ* at Charleston), for his *Nativity*, Grant applied an orange layer over the entire commercially prepared canvas (figure 2).[4] This artist-applied, orange layer contains occasional small black particles within the matrix (figure 3). Drying cracks were widespread throughout the painting, revealing the lower orange layer, which is therefore assumed to be a slower-drying paint (probably more medium-rich) than the upper paint layers of the composition. The orange layer does not fluoresce under ultraviolet (UV) illumination, so is unlikely to be a varnish such as shellac or similar.[5] The working hypothesis is therefore that this was a medium-rich oil layer mostly made up of iron earth pigments, applied as an underlayer by Grant in an attempt to imitate the dark tonality of the *Nativity* as it looked when he saw it hanging in the National Gallery in the early twentieth century. He appears to have then executed the composition of his *Nativity* copy before this lower layer was fully dry, thus causing the widespread ductile cracking seen in the upper paint layers. Through this coloured ground, it appears that Grant was attempting to imitate the effect of the Old Master palette – as best he knew it – during his time as an art student.

Grant's *Nativity*, while exceptionally close in proportions to the original, is of a different size and is not an exactly scaled match. No evidence for the use of a grid or other transfer method is present in the copy, so it is assumed that he drew out the composition freehand, a testament to his skill as a draughtsman. The colours of this copy differ from the original, and Grant left large passages unfinished, for instance, leaving the underskirt of the Virgin unpainted to allow the orange priming to show through, rather than mimicking the blue of the original skirt. His brushwork here, while much broader and looser in application than that of Piero's *Nativity*, is neither the pointillistic style

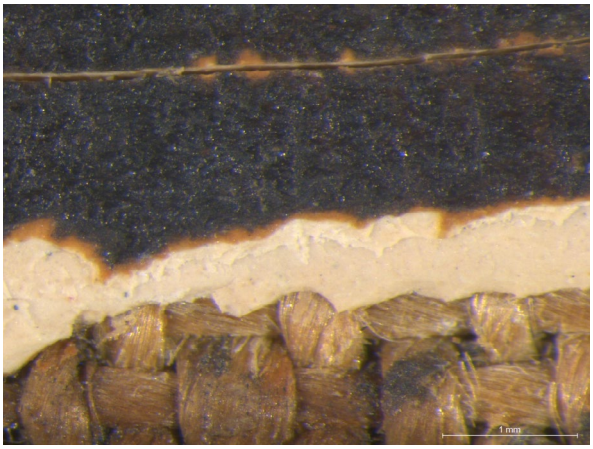

Figure 2. Duncan Grant, *Detail of Piero della Francesca's Nativity* (Figure 1): photomicrograph detail of loss at the bottom edge showing the double white ground and orange layer below the blue paint layer. Photograph © Alice Limb, Hamilton Kerr Institute, University of Cambridge.

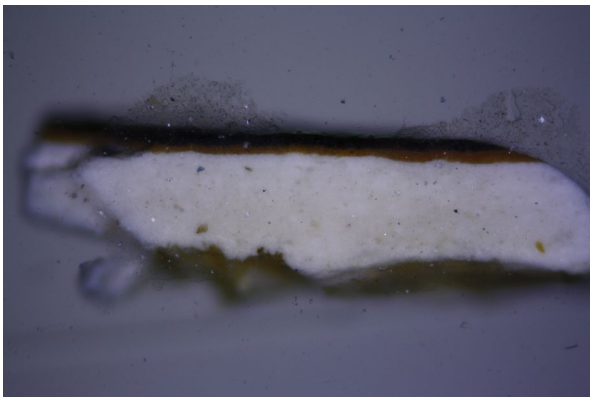

Figure 3. Duncan Grant, *Detail of Piero della Francesca's Nativity* (Figure 1): paint sample taken from the left edge at 10× magnification in normal light. Photograph © Alice Limb, Hamilton Kerr Institute, University of Cambridge.

recognisable from his 1911–13 period nor the loosely handled, distinct brushstrokes that would become a trademark of Bloomsbury group works.

Grant's *Nativity* appears to have darkened significantly over time, leading to a decidedly brown overall tonality. This is likely due to the medium-rich nature of his paint and ground layers meaning that discoloration of the oil is more visible than might have been the case in a less medium-rich paint film. While in 1903–06, the Piero della Francesca *Nativity* had not yet been cleaned and was therefore covered in several layers of darkened varnish, it is unlikely to have ever looked as dark as this copy.[6] The intersection of Grant's copy with the conservation history of the National Gallery's Piero della Francesca *Nativity* provides a fascinating insight into the methods by which Grant was experimenting with that most conventional of all academic practices: copying. As we shall see in relation to his *Riders*, Grant's early academic training provided both fascination and a bind that he sought to subvert in later works.

Figure 4. Duncan Grant, *Riders/Queen of Sheba*, oil, watercolour and charcoal on millboard, *c.*1911–12, 62.3 × 75.2 × 0.5 cm: after treatment in normal light. (a) Front and (b) reverse (note: the two sides are inverted relative to each other). King's College, University of Cambridge. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photographs © Elaine Holder, Hamilton Kerr Institute, University of Cambridge.

Reuse of supports: understanding the chronology of *Riders/Queen of Sheba*

Grant's double-sided work *Riders/Queen of Sheba* (figure 4) demonstrates his reuse of supports for the development of subsequent, unrelated compositions. Repurposing materials is a theme discussed in more detail below, however, in this case, the reuse of the support is likely to be tied to his biography at the time of production. Unlike many of his Bloomsbury group contemporaries, the young Grant was not a man of independent financial means and was heavily dependent on his aunt, Lady Strachey, particularly in his early adult life and during his time at art school.

Riders/Queen of Sheba is executed on a low-quality millboard support, made up of layers of brown paper laminated together then sized by the manufacturer. The *Queen of Sheba* side has exposed paper visible between the brushstrokes, while the *Riders* side was primed with a thick white layer. Dribbles of this are evident on the *Queen of Sheba* side, beneath the painted composition. This indicates that *Riders* was commenced prior to the reuse of the support for the *Queen of Sheba* sketch. The board was flipped, rather than turned, so that the two compositions are inverted relative to each other.

The *Queen of Sheba* composition is believed to date to late 1911/early 1912. A related, much larger work on plywood is held at Tate. The Tate *Queen of Sheba* (N03169) was painted in London in the spring of 1912 as a full-scale sketch for a mural commission envisaged for the dining room at Newnham College, Cambridge, where Grant's cousin Pernel Strachey (Lytton's sister) was teaching.[7] The Strachey siblings served as the models for the Queen of Sheba and King Solomon in Grant's compositions. The King's College version is probably the precursor to Tate's larger format composition: several *pentimenti* are present within the smaller King's College composition and the Tate version is much more highly finished. Grant's use of very short, almost pointillistic brushstrokes is a hallmark of his work between 1911 and approximately 1913, further placing the two *Queen of Sheba* compositions within this relatively narrow date range.[8]

MA-XRF scanning of select regions on both sides of *Riders/Queen of Sheba* was undertaken at the Hamilton Kerr Institute using a Bruker M6 Jetstream macro-XRF scanner.[9] This enabled mapping of the chemical elements present, allowing identification of the likely pigments, while the spatially distributed maps generated provide insights into the chronology of the layers applied, enabling characterisation of the different materials used at varying points in the complex evolution of *Riders*. It also facilitated comparison with the materials and techniques of the *Queen of Sheba* side, and with other Grant paintings examined at the HKI, including the landscape panels discussed below. Visual examination under the microscope was also key to teasing out the stratigraphy and chronology of layers described below, and for contextualising the findings of the MA-XRF maps with the actual painting. Key findings are summarised below (tables 1–3). The suggested chronology of painting campaigns and pigments used are conjectural based on the available data at the time of publication. The paintings and data collected are highly complex, therefore further analysis and a broadening of the research to other Grant paintings would be beneficial for future investigation.

Analysis has demonstrated that the *Riders* composition was certainly begun before the *Queen of Sheba*, but was finished later. The multiple

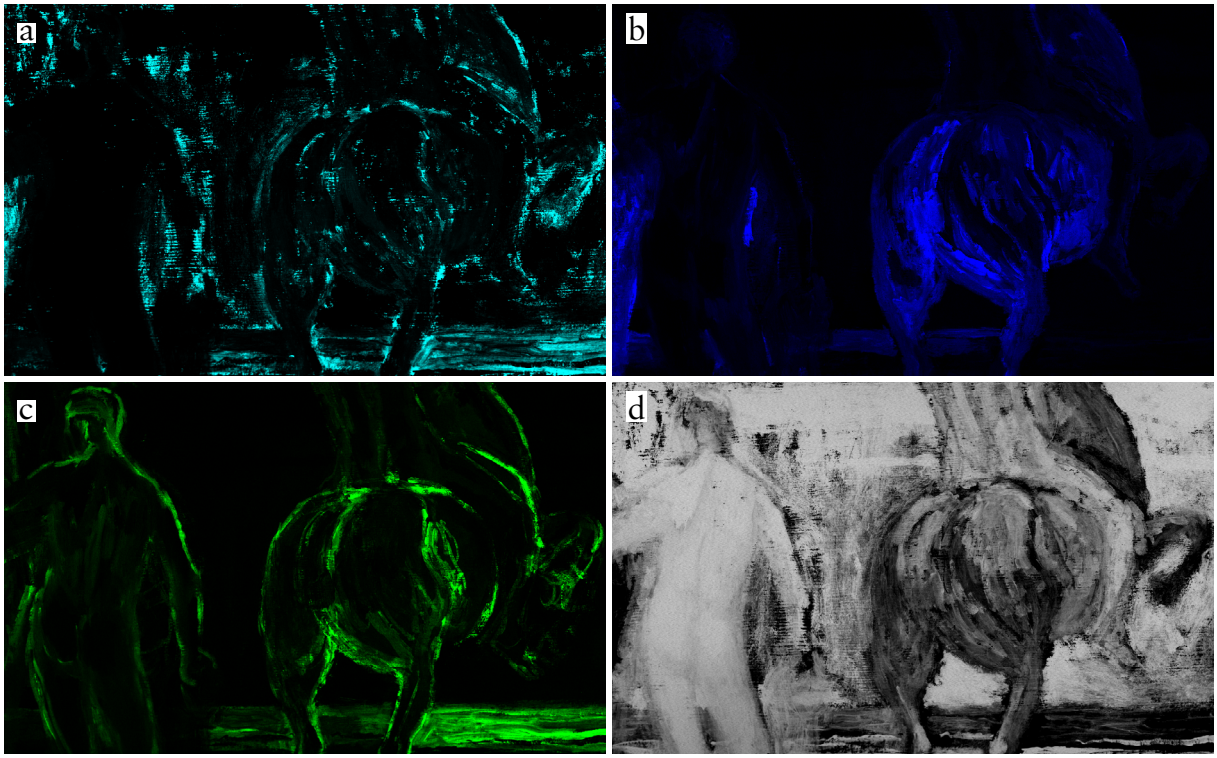

Figure 5. Duncan Grant, *Riders* (Figure 4a): a selection of MA-XRF element distribution maps of an area showing central figures. (a) Ca K calcium, (b) Co K cobalt, (c) Cr K chromium, (d) Pb L lead in all layers. Photographs © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

campaigns in evidence, differing consistencies of paint, and additions of dry media – made after the paint beneath was totally dry – point to a long period of genesis for the *Riders* compositions, probably years. While *Queen of Sheba* appears to have been executed in one continuous campaign of painting, *Riders* seems to have 11 distinct campaigns present and a much wider range of paint consistencies, as well as the additions in dry media. The *Riders* palette is notably different to that used for *Queen of Sheba* (see figure 5 and tables 1–3 below). Changes in Grant's technique and painting methodology – notably variations in the layering of different paint consistencies in the different campaigns of painting further point to the evolution of *Riders* over an extended period of time.

These variations in technique – and the divergent aesthetics exemplified by *Riders* and *Queen of Sheba* – can be attributed to Grant's highly experimental approach to developing compositions early in his artistic career. In contrast to the other early Grant works discussed in this article (all single-sided, single composition works), *Riders/Queen of Sheba* represents two very different painting practices: one side being returned to multiple times over a prolonged period, with a resultant mutability of technique and greater compositional evolution; and the other an all-in-one painting executed on the reverse of the previous painting at a specific temporal moment, mid-genesis of the other. The physical manifestations of these differing approaches could not be closer in proximity: they share a support yet they cannot be viewed simultaneously, requiring a manual process of flipping to allow each composition to be seen by the viewer, and by Grant himself.[10] Flipping further distances the two sides from each other, conceptually and practically: neither can be displayed in its correct orientation and it stands to reason that this results in an enhanced degree of mental separation, possibly helpful for Grant as he reused the *Riders* support reverse for the unrelated composition of *Queen of Sheba*. The result is a double-sided painting almost entirely unconcerned with display. This is a work of, and about, artistic process and experimentation through movement as well as technique. It must itself be experienced through movement and with a degree of temporal distance: not dissimilar to the experiences of viewing the painted interiors of the Bloomsbury group or to the experience of viewing the many artistic additions in various media to the ephemera of their everyday lives, which is likewise manifest across the group.

Riders: the central group

Riders is executed over a white ground layer applied to the millboard by Grant.[11] This was identified as chalk in an aqueous medium.[12] The first version of the central grouping of figures and horses depicted the mounted rider and an early version of the horse to the right, with the horse to the left more fully realised in shades of purple and blue. Several significant *pentimenti* were made between this campaign,

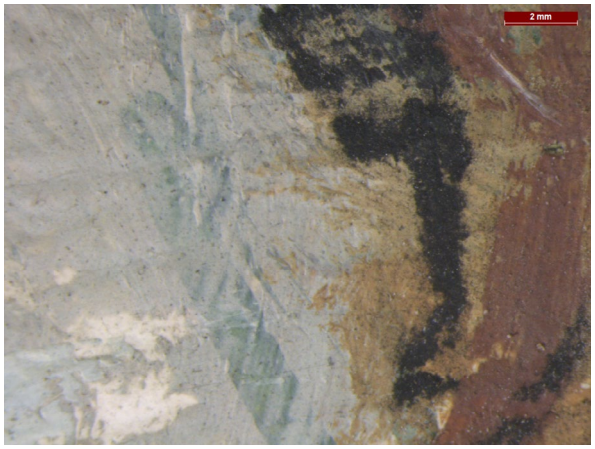

Figure 6. Duncan Grant, *Riders* (Figure 4a): photomicrograph detail showing viridian underdrawing beneath lead white-containing paint of the sky. Photograph © Alice Limb, Hamilton Kerr Institute, University of Cambridge.

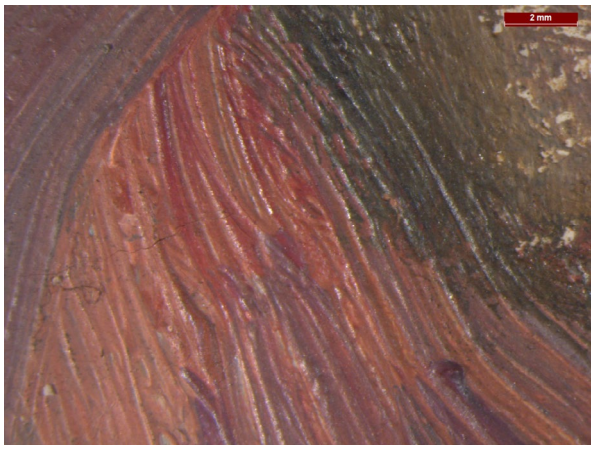

Figure 7. Duncan Grant, *Riders* (Figure 4a): photomicrograph detail showing wet-in-wet brushstrokes in the pink scarf held by the central standing figure. Photograph © Alice Limb, Hamilton Kerr Institute, University of Cambridge.

characterised by outlines painted in a vivid dark green paint, containing chromium (this is likely the pigment viridian, a hydrated chromium oxide), and the next.

Within this first campaign, the left horse was painted using a blue-purple colour comprising a mixture of pigments containing cobalt and nickel,[13] mixed with iron- and manganese-containing earth pigments, and possibly also with cobalt violet.[14] Underlayers of this same mixture were also applied to the rear of the right horse, where it was combined with a greater proportion of iron- and manganese-rich earth pigments to create a more brown colour. Notable *pentimenti* made after this first campaign of painting include an adjustment to the right horse's raised foreleg, which was brought up and in closer to the flank, and adjustments to the left rider's body and arm positions. This first campaign of painting was executed with fairly dry oil paint, resulting in a scumbled appearance as brushstrokes were dragged across the textured painting support. The exceptions to this are the viridian green outlines in the underpainting, which are more fluid and uniform in nature, indicating a more dilute, liquid paint application (figure 6).

A thick white layer containing predominantly lead white was then brushed onto the background after this first campaign of painting, partially obscuring some of this first composition. Brushstrokes, including partially over the head of the left horse, were applied after the underlying paint of the first campaign was already dry. The radio-opacity of the lead used for this second phase of painting explains why the chrome green outlines (belonging to the first campaign of painting), which lie beneath these altered areas, are less visible in the MA-XRF element maps than they appear using microscopy (figure 6). This lead white layer has some pale blue-grey passages, and functions as the background sky colour. It is thick and buttery in texture, holding impasto well.

Above this second layer is a third phase, comprising more viridian green outlines and denoting a revised version of the first painting campaign's central figure and horse grouping. This is applied above the lead white of the sky. No cadmium-based pigments are evident in these early campaigns of painting, setting them apart from both the *Queen of Sheba* side and from later campaigns present in *Riders*.

A fourth campaign of painting, localised to the centre of the *Riders* composition, is distinguishable from the first three campaigns (depicting the left horse and first phases of the right horse and rider; the sky; and the later viridian green outlines of the right horse, its rider and the left horse's rider: first, second and third campaigns respectively). The standing figure at the centre (seen from the back) was added during this fourth stage: the thick lead white of the flesh tone is evident in the MA-XRF map for lead (figure 5), as it blocks signal from all elements lying beneath it in this area, including the cobalt- and nickel-containing purple-blue used to outline the left horse in the first painting campaign. The MA-XRF map for calcium further confirms this standing figure's status as a later addition: surrounding areas of the left horse and the background around the riding figure (mostly part of the first and second campaigns of execution) have small patches of the calcium-containing chalk ground peeping through the relatively dry brushwork, while the standing figure's thick, opaque underlayer of lead white blocks signal from all other elements below.

A *pentimento* to the standing central figure was then made, constituting a fifth campaign for this area of the composition. In this, the standing figure is partially outlined in a mixture of viridian with iron-rich, black-brown (iron oxide earth) pigments, further distinguishing it from the green painted outlines of the first and third campaigns (solely in

Figure 8. Duncan Grant, *Riders* (Figure 4a): before treatment in UV light. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

viridian). The multicoloured brushstrokes applied to the right horse's hindquarters and to the figures' flesh were also applied as part of this fifth campaign of painting. Brushstrokes in this campaign were mostly applied wet-in-wet and are of a more buttery texture than the drier strokes forming part of the first and third campaigns (figure 7): while also holding impasto, they were applied more wet than those belonging to the second campaign (sky).[15] This fifth campaign of painting makes use of cadmium-based pigments (not found in the first three campaigns: these were also identified by their fluorescence in UV light, figure 8), as well as of the thick, predominantly lead white layers of the fourth campaign applied to block out lower campaigns. It is also – green outlines of the first and third campaigns aside – distinguished by being significantly more vibrant and multicoloured than the first three phases of the *Riders* composition.

The sixth campaign of *Riders* is fairly minor in scope: it consists of the addition of a bridle to the left horse, as well as another outline indication of a *pentimento* to the mounted left figure. Applied in fairly dry paint which drags across the surface, this area was not scanned using MA-XRF. These outlines were added after the underlying paint layers were well dried.

A seventh (and final) campaign is also present in the central grouping. This correlates with the uppermost phase of the figure grouping at the far right of *Riders* (discussed below) consisting of a dry, carbon-based drawing media, most likely charcoal. Identified optically as carbon (which is not detectable by MA-XRF), this was used only in some parts of the riding figures, for example, to outline the head and back of the right rider (see figure 6), and rubbed over the face of the left rider, above the dry paint layers. The use of charcoal provides a strong link to the practice of drawing, and hence to academic practice, as experienced by Grant during his education at the Westminster School of Art and his practice of copying Old Master models in the National Gallery. However, the application of charcoal as the last layer in the sequence of production can be read as a subversion of classic academic practice, due to this inversion of artistic norms (usually drawing precedes painting).

Table 1. Comparison of painting campaigns identified in Duncan Grant's *Riders*, central figure grouping.

***Riders,* central horse and figure grouping** + unknown when campaign was executed relative to the figure group at right edge * denotes campaigns executed after the first 4 campaigns of the figure group at right edge # denotes campaign in common with figure group at right edge		
Painting campaign	**Colour and location** (non-exhaustive list, key colours only)	**Elements identified: pigments inferred**
Ground layer	White ground layer: throughout	Ca (absence of S): chalk (calcium carbonate)
Campaign 1: first iteration of horse and figure grouping +	Green outlines: delineating horses and mounted figures	Cr: viridian
	Blue: horses	Co: cobalt blue (cobalt aluminium oxide - Al not detectable with MA-XRF in settings used)
	Purplish-blue: horses	Co, P: possibly cobalt purple (cobalt phosphate). May instead be a mixture of cobalt blue with a red lake on an unknown substrate if P is associated with earth pigments)
	Brownish-purple: horses	Fe, Mn, K: iron oxide earth pigments (including umbers). K present with earths.
Campaign 2: sky around horse and figure grouping *	White/pale blue-grey: sky	Pb: lead white. Black particles observed optically likely to be carbon black (undetectable with MA-XRF).
Campaign 3: second iteration of horse and figure grouping *	Green outlines: largely in right horse and mounted figures	Cr: viridian
Campaign 4: addition of central standing figure, possibly some wet-in-wet brushstrokes in existing figures *	Underlayer of standing figure: flesh tones	Pb: lead white
Campaign 5: *pentimento* to central standing figure, wet-in-wet colourful brushstrokes in existing figures/horses *	Brown: horses (and applied to block out lower arm placement of standing figure from campaign four)	Fe, Mn, Hg: iron oxides in mixture with vermillion
	Bright orange-brown: horses, notably right horse's lifted front leg, standing figure's hair	Cd, Zn: cadmium yellow (cadmium sulfide - absence of selenium indicates cadmium yellow rather than cadmium red or orange) mixed with zinc white (zinc oxide) to lighten the hue. Also found in mixtures with Fe, Mn, K (iron oxides with K) and with Ba (barium based red lake, likely a synthetic organic dye). Hg: vermilion: in mixtures with all of the above. K: red lake on potash-alum substrate: present in localised brushstrokes in horse's hindquarters and raised foreleg.
	Red: brushstrokes in right horse's hindquarters	Ba: barium based red lake, likely a synthetic organic dye, here mixed with Hg, indicating vermillion.
	Reddish-purple: drapery held by standing figure	Ba: barium based red lake (likely synthetic organic dye)
	Blue brushstrokes: horses	Co, Ni: cobalt blue, with nickel. Appears to be the same nickel-containing cobalt blue in use on *Queen of Sheba*.
	Green brushstrokes and outlines: standing figure's back	Cr, Pb: viridian in mixture with lead white
	Blackish-brown: outlining of standing figure	Cr, Fe, Mn, K: viridian mixed with iron oxide earth pigments, including umber. K present with earths.
Campaign 6: brown painted outlines *	Brown: painted bridle and outlines indicating pentimento to mounted left figure	Not scanned.
Campaign 7: black drawing #	Black, dry media	No elements detected: visually identified as charcoal.

***Riders*: the right side group**

The build-up of the figure(s) to the far right side of *Riders* follows a different sequence to the central grouping of two horses and three figures, and features several different media: oil paint, charcoal drawing and possibly even watercolour. It demonstrates a high degree of evolution in the intended composition, with body parts indicated in earlier campaigns in this area being recycled as different constituent parts of later iterations of the figure(s). The scale is also differs from that of the central grouping, and the lack of relationship to the central grouping's landscape horizon indicates that Grant viewed this as entirely distinct from the central composition, despite some phases of its execution running concurrently with the central group.

The beginning of any composition in this area was several strokes of red-brown paint, applied very thinly and dilute, directly to the chalk-based ground. This first campaign is extremely sketchy and rather abstract: an indication of the positions of limbs with lines and washes, rather than a fully conceived drawing. It appears to be watercolour, or possibly extremely dilute oil paint, and contains iron and perhaps a little chromium (in what pigment formulation it is not known – see figure 9 for a selection of the MA-XRF maps). Above this, Grant used a second campaign of thicker chromium- and cobalt-containing paint to delineate the outline of the figure's thigh. A third, slightly more liquid, very dark brown or black paint containing mercury (possibly indicating vermilion), iron, cobalt and some chromium was then used to delineate the outline of a crouching figure, with a raised proper left arm resting on the right edge of the millboard support. The proper right arm reaches down towards the ground, and the legs are bent with the torso in *contraposto*. This figure is highly reminiscent of many Old Master models of bathing figures that Grant would have known – from Titian to Rembrandt in the National Gallery – as well as in more contemporary works

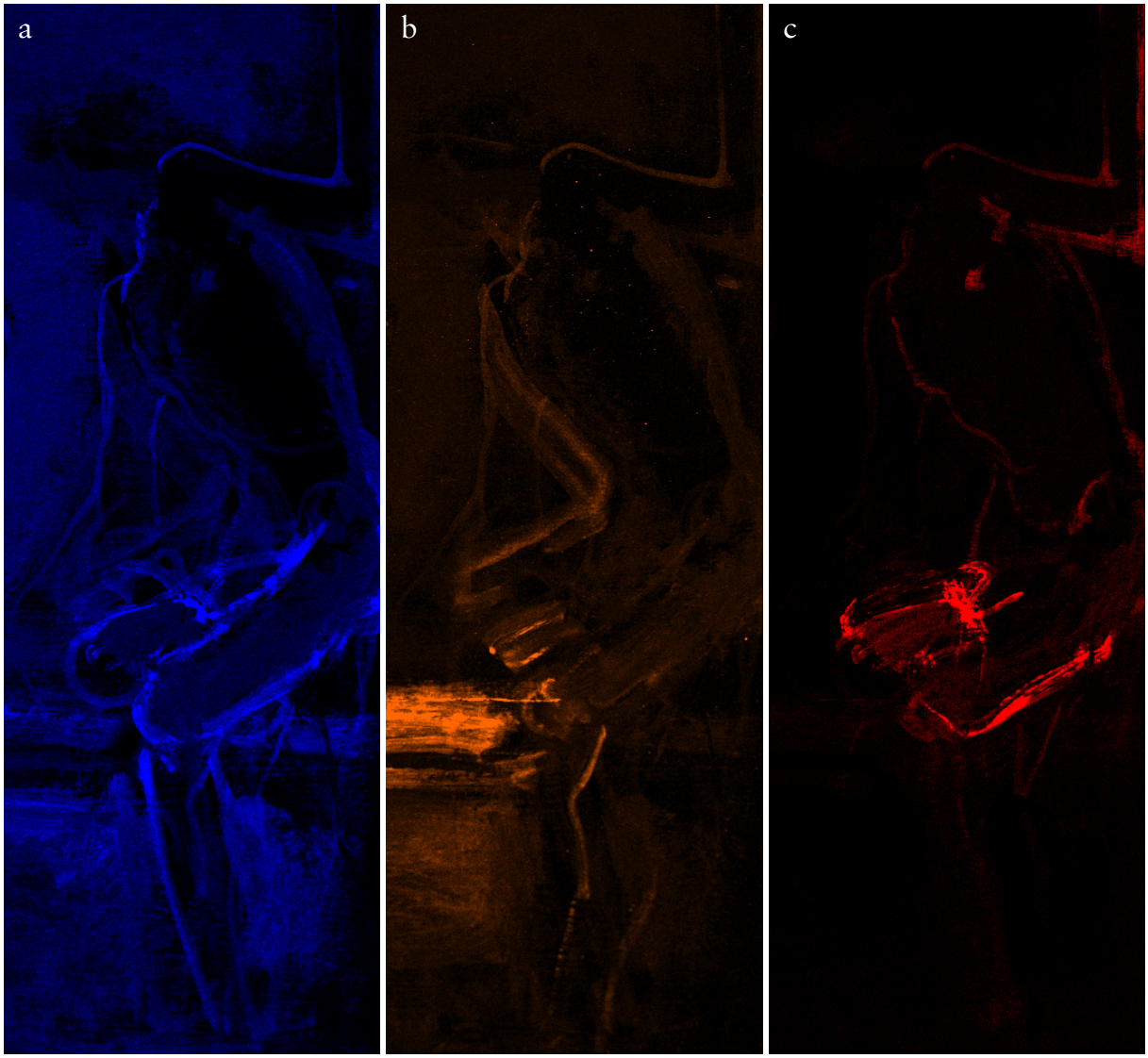

Figure 9. Duncan Grant, *Riders* (Figure 4a): a selection of MA-XRF element distribution maps of an area showing a figure at the far right. (a) Co K cobalt, (b) Fe K iron, (c) Hg L mercury. Photographs © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

Table 2. Comparison of painting campaigns identified in Duncan Grant's *Riders*, right figure.

***Riders,* figure at right edge** # denotes campaign in common with central horse and figure grouping		
Painting campaign	**Colour and location** (non-exhaustive list, key colours only)	**Elements identified: pigments inferred**
Ground layer	White ground layer: throughout	Ca (absence of S): chalk (calcium carbonate)
Campaign 1: thin and washy paint, possibly watercolour	Reddish-brown: delineating abstracted limbs and head	Ca, Cr, Fe, K, Pb: pigments not identified, likely a mixture of iron-based pigments (iron oxides), with chrome and lead based pigments
Campaign 2: slightly thicker paint: dark outline of figure's thigh and shin	Extremely dark greenish black: thigh and shin	Predominantly Co with some Cr: minor traces of Fe: pigments not identified but possibly carbon black mixed with viridian.
Campaign 3: thicker, more liquid very dark brown/blackish paint	Extremely dark brown/blackish paint: delineating outline of crouching figure with raised arm and no head	Hg, Fe, Co, Cr: possibly vermillion mixed with unidentified pigments, possibly viridian, iron oxides and cobalt blue.
Campaign 4: thicker, impasted flesh tones	Pale pink: impasted brushstrokes in legs and at ribcage	Pb, Fe: lead white mixed with iron oxides
Campaign 5: black drawing #	Black, dry media	No elements detected: visually identified as charcoal.

by Manet and Cézanne (the latter a great favourite of, and well known in, Bloomsbury circles – see Bell 1922). This figure's head belonged to the first, largely iron-based campaign of very dilute paint, although this was later concealed by the predominantly lead white mixture used to paint in the sky as part of the second phase of the central group's painting. The paint used for the third campaign of this right figure group varies in colour due to differing levels of dilution, from red-brown to near black, and was applied in a very liquid state. These black areas appear to be mercury (presumably in vermilion) mixed with iron and a cobalt-containing pigment, possibly a blue.[16] Isolated brushstrokes in this painted sketch were applied in iron-based pigments (as at the knee and calf). Despite belonging to the same campaign of execution, different brushstrokes within this portion of the painted sketch contain different elemental mixtures, indicating a paint applied after minimal mixing that was therefore not necessarily very homogenous from stroke to stroke.

Above this painted sketch outlining a figure, Grant applied several brushstrokes of lead white mixed with vermilion and iron oxides as preliminary indicators of flesh. These are most evident in the figure's thighs and can be considered a fourth campaign for this right-hand group. It was after this layer that the lead-white 'sky' associated with the second campaign of the central grouping was applied, partially obscuring some aspects of the multi-campaign figure, notably the head. The first four phases of this figure grouping at the right edge therefore predate the execution of the central group's second campaign, hence their lack of relationship to the horizon of the central composition.

The latest layer in the chronology of the composition at the right edge was the drawing of another figure over this partial, unfinished figure. It was drawn in a carbon-containing dry medium, most likely charcoal. This upper layer is equivalent to the drawn elements on the central group of *Riders*, and was applied long after the oil paint layers beneath were fully dry. As with the drawn elements added to the central grouping, this drawn composition is not visible in MA-XRF scans (as previously mentioned, carbon is not detectable with this method). This drawing used the outline of the down-stretched proper right arm of the painted figure, transforming this into the thigh of a standing frontal figure. The lack of wear and handling damage to the charcoal drawing also implies that this was executed after *Queen of Sheba* was painted on the reverse side. The transformation of the painted figure's arm into the leg of the drawn frontal figure also implies a temporal distance from the execution of the lower layers of this area. Eleven distinct campaigns of painting/drawing – six in the central grouping, four at the right edge, plus one drawn across both – are therefore present within *Riders*.

Queen of Sheba

Queen of Sheba has a far simpler chronology than that of *Riders*. A calcium-rich carbon black (possibly bone black although phosphorus was not detected with MA-XRF) was first used to paint in the sketched outline of the queen and to indicate some outlines relating to Solomon (notably his

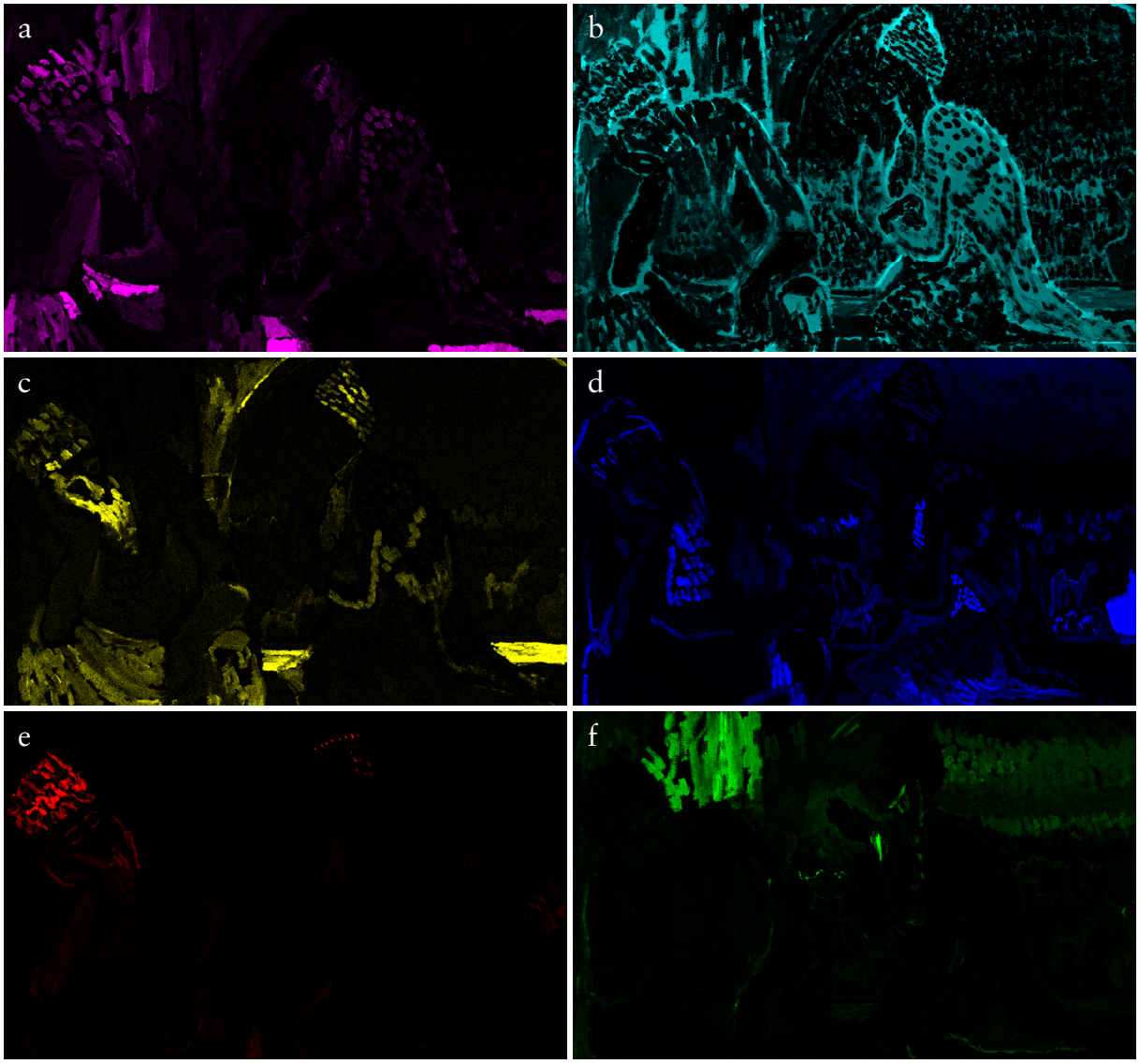

Figure 10. Duncan Grant, *Queen of Sheba* (Figure 4b): a selection of MA-XRF element distribution maps of an area showing a detail of figures. (a) Ba L barium, (b) Ca K calcium, (c) Cd L cadmium, (d) Co K cobalt, (e) Hg L mercury, (f) Cr K chromium. Photographs © Nathan Daly, Hamilton Kerr Institute, University of Cambridge.

headdress) and the arch in the background. The bulk of the colour was then added to the composition, mostly applied as discrete brushstrokes with very little wet-in-wet blending on the surface (although pigment mixtures within the brushstrokes themselves were identified from the elemental mapping). In some areas, Grant added further outlines in very dark shades of different colours: dark blue containing cobalt and nickel to delineate the outer edge of Soloman's hat; a purple mixture of cobalt-containing blue and mercury-containing red (likely vermilion) around Solomon's eyes, mouth and at his neck; and a very dark grey-green, containing cadmium, used to delineate architectural elements in the background around the queen. Such stylistic and material differences suggest that *Queen of Sheba* was painted at a different time to any of the nine campaigns in *Riders*: and, as the dribbles of ground layer originating from *Riders* present beneath indicate, was begun later. However, the relatively good condition and adherence of the carbon-based drawing media forming the uppermost campaign of both figure groups in *Riders* suggests that this was applied after the *Queen of Sheba* side was completed on the reverse.

Analysis of the palette used in *Queen of Sheba* was in some ways simpler than that of *Riders*, due to the mostly discrete brushstrokes used by Grant in this rather pointillistic painting, and to the smaller number of campaigns of work. However, the mixtures of pigments applied by Grant within brushstrokes are themselves very varied and complex (see figure 10 and table 3). Where the millboard was exposed, a strong signal for calcium was observed, probably due to the commercial preparation of the paper support rather than to a ground preparation (as in *Riders*). The palette of *Queen of Sheba* shares some similarities with *Riders*, largely with the fourth campaign of the central grouping of horses and figures: some chromium-based

Table 3. Comparison of areas in Duncan Grant's *Queen of Sheba*, central area.

***Queen of Sheba,* central area**	
Colour and location (non-exhaustive list, key colours only)	**Elements identified: pigments inferred**
Black underpainting: indicating outlines of Sheba, Solomon and some architecture in background	Ca: likely a calcium rich carbon black (C, P not detectable with MA-XRF in these settings)
Bright blue: in vase (left edge), landscape, uppermost brushstrokes in sky, Sheba's costume, background and Solomon's beard	Co, Ni: cobalt blue, with nickel content
Sky: darker blue at top edge graduated into lighter greenish-blues near horizon	Pb, Cr, Co, Ni: cobalt blue with nickel content, mixed with lead white (lead oxide), in the top portion of sky. Lower portion of the sky, near the horizon and around Sheba's hand, is mostly viridian mixed with lead white.
Dark purple: in Sheba's proper left arm (outlining bend of elbow) and in her coat; in horse in background	Cd, minor Co: cadmium red, possibly mixed with some cobalt blue (more likely to be mixed with a carbon-containing black, undetectable in MA-XRF with these settings) to make purple.
Dark purple: used to outline Solomon's eyes	Co, Hg: mix of cobalt blue with vermilion.
Reddish purples: in Sheba's coat, especially at her shoulder; in Solomon's headdress	Ba, minor Co, Fe, Pb: barium-rich red, mixed in various proportions with reddish iron oxides, lead white and possibly some cobalt blue, to make purples.
Darker reddish-orange: in horizontal seat below Sheba, in Solomon's beard	Ba, Cd, Fe, K: Barium-rich red, mixed with iron oxides, lead white and possibly some cadmium red.
Very dark greenish-black: in horizontal seat below Sheba: also used to outline architectural arch	Cd, Ba, Fe, K, Zn: green iron oxide earths (with Zn, K), most likely mixed with either cadmium red or barium-rich red to darken green to almost black. Ba could also be present as extender in iron oxide pigments (as in yellow iron oxides in Solomon's robe).
Greens, yellows and blues: skirt of Solomon's robe	Ba, Cd, Fe, K, Mn, Pb, Zn. Green and yellow iron oxides (earth pigments, with Mn indicating some umbers). Stronger signals for K and Zn in more blue-toned areas (part of a green iron earth, also identified by gritty paint texture in these areas). Ba present as extender in yellow iron oxides only. Cadmium yellow mixed into greens (but not mixed with iron oxide yellows); lead white mixed in throughout.
Pale yellow: Sheba's hat	Cd, Pb: Cadmium yellow mixed with lead white
Bright red: spots in Sheba's hat and on Solomon's headdress	Hg: vermillion
Dark green: architecture above Solomon's head	Fe, Mn, K, Zn: green iron oxides (earth pigments, with Mn indicating some umbers).
Green: architecture above and to right of Solomon's head	Ba, Cr, Fe, K, Mn: viridian, mixed with green iron oxides (including umbers, with barium extender - no zinc detected here).

greens, indicative of viridian (as in the background immediately to the right of Solomon); some iron-containing brown pigments, likely iron oxides (with manganese, indicating umber); and mercury in bright red passages (indicating vermilion). This painting also contains cadmium yellow in various shades of yellow, orange, red, purple and black. For the latter colours, cadmium yellow was mixed with barium-based red lakes and/or carbon black pigments: this was inferred due to the lack of any selenium signal, which would have indicated the additional use of a cadmium orange or red pigment (not present in either *Riders* or *Queen of Sheba*). As in *Riders*, in UV light, orange fluorescence of brush-strokes containing cadmium yellow was observed, indicating degradation.[17]

However, there are also numerous differences between the two sides: a green earth pigment was

used in the background above Solomon's head, identified by correlation between iron, manganese, potassium and zinc, and due to the slightly gritty texture noted in this area. Green earth is entirely absent from the palette used for any campaign in *Riders*. The barium-rich reds in *Queen of Sheba* contain additional elements (e.g. the queen's purple-red coat is composed of four variations of pigment mixtures, each containing different amounts of barium, lead, iron and cadmium). Barium is notably present in multiple locations elsewhere in *Queen of Sheba*, used presumably as an extender for iron-containing earths (likely ochre) in the yellowish strokes of Solomon's hat and in the skirt of his robe, and mixed with viridian for use in the green background near him. Barium was not found to be present to the same extent in *Riders*: on that side it was localised to the barium-based lakes used in the red scarf held by the standing figure (campaign four of the central group) and in the purples of the left horse, but does not appear to have been used as an extender.

Repurposing the domestic for artistic ends: the landscape panels

Just as Grant reused supports for new compositions (both on the reverse of, and even for elements on, the same side of a support already in use), his unconventional approach to supports for painting was demonstrated through three landscape panels also treated at the HKI between 2021 and 2023. Again, we must relate this to Grant's biography and his context within the wider Bloomsbury group. As his involvement in Omega Workshop events such as the *Copies and Translations* exhibition demonstrates, Grant was heavily involved in the Bloomsbury group's focus on interior schemes and decoration of domestic spaces. The extensive interior schemes at Charleston (where Grant lived from 1916 onwards) were executed in collaboration with Vanessa Bell and span walls, furnishings and decorative objects as well as paintings. Almost every surface was viewed as a surface for painting, and the sheer volume of surviving sketches, drawings and paintings held at Charleston are testament to the fact that Grant and Bell drew and painted incessantly. Painted and drawn sketches survive on the backs of shopping lists and on letters as well as in dedicated sketchbooks and on canvases or conventional panel supports.[18] The impact of WWI[19] undoubtedly had an impact on access to materials, but it is our view that the sheer scale of Bloomsbury output and Grant's own relatively modest financial standing contributed more to the use (and reuse) of unconventional and repurposed supports for the paintings discussed in this article.

On examining the paintings at the HKI, it was immediately apparent that the panels used for the King's College landscapes were not purpose-made as painting supports: all comprise individual boards measuring approximately 34.0 × 25.5 × 0.4 cm. *Poplars* (figure 11) is made of two such boards, joined to form a long portrait format using a batten glued over the bevels at the short ends.[20] Both *Rocky Landscape* (figure 12) and *Classical Temple* (figure 13) are single boards. The wood was identified as cedar (or a similar lightweight softwood), based on the wood's colour and grain characteristics (Meier 2023). All have been chamfered to a

Figure 11. Duncan Grant, *Poplars*, 20th century, oil on panel, top board: 34.4 × 25.7 × 0.4 cm, bottom board: 34.4 × 25.6 × 0.4 cm, frame: 74.3 × 31.5 cm. King's College, University of Cambridge. After treatment, framed, in normal light. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photograph © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

Figure 12. Duncan Grant, *Rocky Landscape*, 20th century, oil on panel, 34.1 × 25.5 × 0.4 cm. King's College, University of Cambridge. After treatment, unframed, in normal light. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photograph © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

Figure 13. Duncan Grant, *Classical Temple*, 20th century, oil on panel, 34.3 × 25.5 × 0.4 cm. King's College, University of Cambridge. After treatment (a) front in normal light and (b) reverse in raking light. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photographa © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

Figure 14. Duncan Grant, *Classical Temple* (Figure 13): detail of the top edge. Photograph © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

Figure 15. Duncan Grant, *Rocky Landscape* (Figure 12): a specular light image transformed in Adobe Photoshop CC 2017. Photograph © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

bevel at the short edges and have nail holes and damages present at the edges from their former situation within a wider structure. Diagonal saw marks are visible on both the front and reverse of all panels (figure 13b) but it is not clear if these saw marks are machine-made in origin or if the panels were cut by hand. The bevels are variable across the group of panels, indicating that they were cut by hand. Another distinctive feature is a pinhole present at the centre of one of the longer edges of each board (figure 14). The wood grain remains visible through gaps in the paint, washes and even thickly applied brushstrokes (the paintings have no ground layer). Grant used the wood's colour, pattern, texture, and gloss in contrast to the bright matte paint (figure 15)

The nearly identical materials and dimensions of the panels, coupled with the evidence of their physical histories as part of a different structure, lead to the hypothesis that they were all originally part of a piece of furniture.[21] The cedar wood was another point in favour of this theory: cedar is known for its moth-repellent qualities, and as such, is often used to line the interiors of wardrobes and chests of drawers (Joyce and Peters 1987: 33). These panels are all thought likely to be the bases of drawers given their dimensions and the location of bevels at the short ends, which suggests that they once slotted into channels in a larger structure. The pinholes at only one side might come from nails fixing the lining from the back of the drawers. The presence of several other extant panels with near-identical dimensions in other collections also supports this, suggesting that a chest of drawers was broken up into component pieces which Grant then used for painting. These include *Landscape (Hillside with Rocks)* (1913, 25.0 × 33.0 cm, frame sight size, National Trust, Mottisfont Abbey, Hampshire)[22] and *The Bridge* (1928, 26.6 × 34.3 cm, St Peter's College, University of Oxford).[23]

Most of the works executed on such supports are of landscapes from non-English contexts, produced by Grant during his travels such as *On the Acropolis* (1910, 26 × 17 cm, Fitzwilliam Museum) (Cluston-Brock 1959). Grant travelled extensively in Europe throughout the period 1903–1914, often to locations near the Mediterranean or elsewhere in Southern Europe. Later in life, he frequently spent time in Cassis, France. Stylistically, *Poplars, Rocky Landscape* and *Classical Temple* are all more congruent with his earlier work than with later paintings. *Poplars* might represent trees (poplars or cypresses) in Italy, and *Rocky Landscape* limestone karst in France, while *Classical Temple* could be the Acropolis in Greece (which is also represented in *On the Acropolis* at the Fitzwilliam Museum). The extremely light weight of the panels used for these three works would have been very helpful for travel, as they are small, stackable and of identical dimensions.

The minimal, quick execution of all three compositions points to them being painted *en plein air*. Grant first roughly sketched out some initial compositional lines in dark grey or black paint using a brush. He applied the upper paint layers with bold and swiftly applied brushstrokes which are thick and short with visible texture. There are reserves left in the composition and little modelling

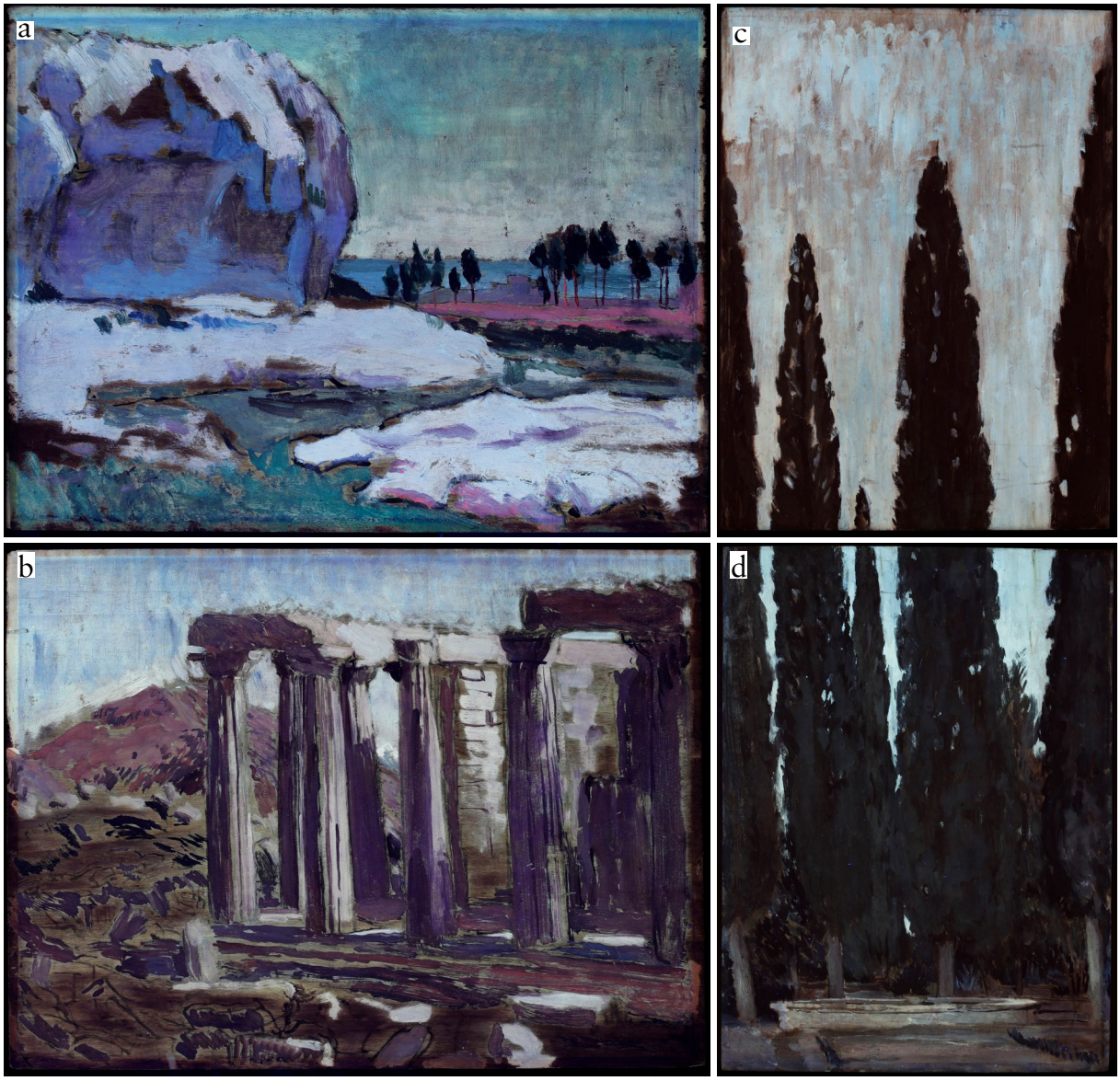

Figure 16. UV light-induced fluorescence photographs. (a) Duncan Grant, *Rocky Landscape*, after treatment. (b) Duncan Grant, *Classical Temple*, after treatment. (c and d) Duncan Grant, *Poplars*, two separated panels during treatment (c) upper panel and (d) lower panel. By permission of the Provost and Scholars of King's College, Cambridge.

or layering, a technique suited to efficient, swift execution. The palette is limited to a few shades: blue and green in *Poplars*, blue and grey in *Classical Temple*, and green and purple in *Rocky Landscape*. The bright colours might reflect the visual effects created by the strong Mediterranean sun. Some scratches in the wet paint, that must have occurred soon after painting, as well as embedded debris in the paint layer, might be a result of painting outside and transportation prior to drying. In addition, the minimal nature of the join between boards in *Poplars* suggests that this was done after the painting process was complete. It is possible that Grant travelled with the *Poplars* as two separate pieces before later joining them for display with the timber batten, adding a painted frame on arrival home.

The panels have been investigated in more detail with X-ray fluorescence spectroscopy (XRF),[24] UV-induced fluorescence (UVIF) photography (figure 16), and paint sample analysis (figure 17). The paint samples from *Poplars* were additionally analysed with scanning electron microscopy (SEM).[25] Following the contemporary manner, Grant created the paintings with paint blends containing several pigments and fillers (chalk and lithopone), rather than applying pure colours (containing just one pigment) in layers in different sections. Traces of all the pigments he used can be found across the painting, suggesting that he did not clean his brushes thoroughly and that he worked in a fast manner using the wet-in-wet method. The presence of multiple pigments alongside each other makes their identification even

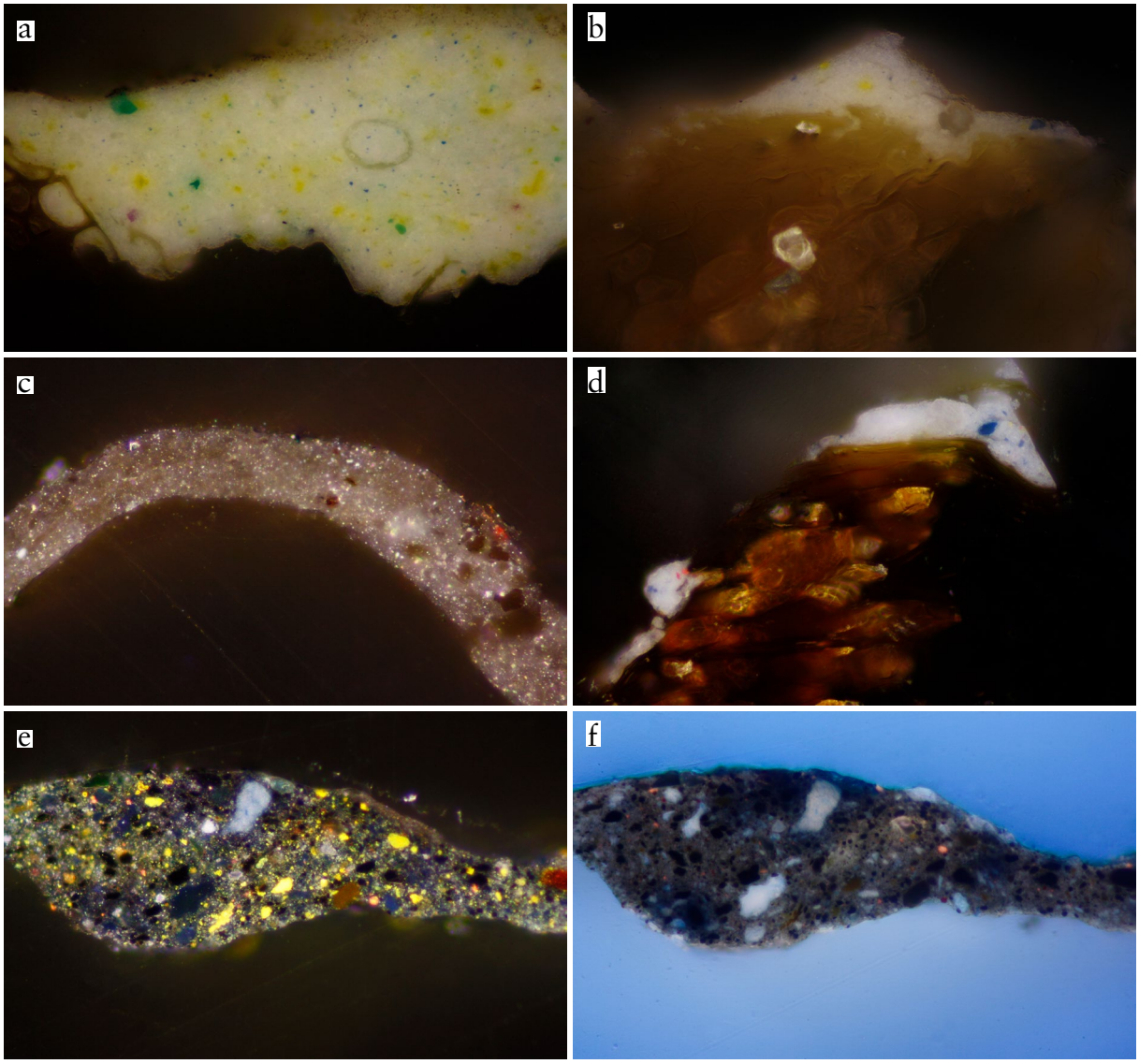

Figure 17. Microphotographs of paint sample cross-sections from Duncan Grant's paintings at 500× magnification. *Rocky Landscape*, a sample from the sky (a) dark field. *Classical Temple,* a sample from the sky (b) dark field. *Classical Temple*, a sample from the grey by the middle left edge (c) dark field. *Poplars*, a sample from the sky (d) dark field. *Poplars*, a sample from the dark green area of a tree (e) dark field and (f) UV light. Photographs © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

more difficult, nevertheless, an attempt was made to identify some of them.

The dark lines that set out the composition of the works were probably achieved by mixing almost all the pigments appearing in other areas of the painting, at hand on the palette, with an addition of organic black (most likely bone black). Some of the dark lines have more cobalt blue, giving them a greyer colour than they appear on *Poplars*, and some are mixed with more ochre/umber as in *Classical Temple*.

The white in the paintings is lead white while the sky is mainly composed of this white and cobalt blue. In *Poplars*, it is mixed with yellow ochre and a zinc-containing pigment (zinc white, lithopone, or less likely cobalt green). In *Rocky Landscape*, the sky has a slight green hue, probably from chrome green oxide.

The dominant green colour of *Poplars* is mostly comprised of emerald/Scheele's green and chrome green with an addition of other pigments such as cadmium yellow, cobalt blue, blue alum-(K)-based lake pigment, ochre, bone black, lake yellow or red pigment-based calcium carbonate. Grant seems to have used cadmium yellow for bright yellow highlights but most of the yellow hues were obtained with yellow ochre. Observation in cross-section of a paint sample from the green area suggests that cobalt green or zinc yellow are not present in the paint mixture. The brown colour is predominantly yellow ochre and umber, and the earths seem to contain a relatively high amount of titanium. Traces of vermilion were detected throughout the painting.

The blue-grey colours of *Classical Temple* are a mix of many paints present on the palette: mainly lead white, ochre/umber, red lake pigment based on

Table 4. Comparison of pigments detected in Duncan Grant's *Poplars*, *Classical Temple* and *Rocky Landscape*.

Pigments	Poplars	Classical Temple	Rocky Landscape
White	Lead white Zinc white?	Lead white Zinc white?	Lead white Zinc white?
Blue	Cobalt blue	Cobalt blue	Cobalt blue
Green	Emerald green or Scheele's green Chrome green oxide	Possibly: Emerald green or Scheele's green Chrome green oxide	Emerald green or Scheele's green Chrome green oxide
Yellow	Cadmium yellow Yellow ochre	–	Chrome yellow
Red	Traces of vermillion	Vermillion	Vermillion Cobalt violet
Dark lines	Bone black Cobalt blue	Bone black Earth pigments	Bone black
Brown	Ochre Umber	Ochre Umber	–
Fillers	Chalk Lithopone	Chalk Lithopone	Chalk Lithopone
Organic pigments	Red and yellow lske pigments, calcium carbonate-based and alum-(K)-based Blue alum-(K)-based pigment (indigo?)	Red lake, alum-(K)-based	Red and yellow lake pigments, alum-(K)-based

alum-(K), vermilion and organic black (vine or bone black). It is possible that Grant also used emerald/Scheele's green, chrome green, chrome yellow, zinc yellow, zinc white, cobalt green and cobalt blue. Analysis confirmed that what appears as different shades of grey-blue, is rather grey with almost no blue pigments. This reflects the fact that the intense colour of the underlying and exposed wood affects viewers' perception of colour.

The two main colours of *Rocky Landscape* come from cobalt violet and green oxide. Pink areas contain lead white, ochre, vermilion and lake pigment based on alum(-K), possibly also zinc white or lithopone. Apart from violet and green, yellow and earth pigments were also used. The yellow could be chrome yellow, zinc yellow, or barium yellow; cadmium yellow, Naples yellow or nickel titanate yellow are also possible although they contain difficult-to-detect elements and it is unclear if they are present. The strong signals from other elements indicate that yellow is rather one of the chromates (chrome yellow, zinc yellow or barium yellow). A yellow lake might also be present in the paint layer.

Small amounts of heavy elements were detected on the exposed wood of the panels suggesting that they have been covered with a translucent sizing layer. The elements might come from siccative added to speed up the drying process (lead or zinc ions) of a coating and/or from the pigment residues present on the brush used for the layer application (e.g. lead white).

Conclusion

Through examination of these varied paintings from Duncan Grant's early oeuvre, various aspects of his practice were revealed over the course of his artistic development. Above all, Grant was a highly versatile artist, with this group demonstrating his ability to work across a variety of supports and with varied consistencies of paint. However, key themes are borne out across this sample of his work. These include: experimentation with layer structures as shown in the lack of grounds on the landscape panels and *Queen of Sheba*, the coloured, medium-rich ground layer in the *Nativity*, and the unconventional mixed media approach seen on *Riders*; a willingness to reuse and repurpose supports, possibly in an attempt to reduce costs or simply to utilise materials at hand; and a fundamentally 'Bloomsbury' aesthetic in his use of colour, regardless of subject matter and style of brushstroke. No varnish layers were originally present on any works treated in this group (although the *Nativity* was varnished during conservation treatment in 1984), and the palettes are generally colourful but not excessively bright. Grant's many personal and artistic influences also make themselves felt across the group. His admiration of Old Masters is obvious both in the *Nativity* and more subtly in the standing figure at the far right edge of *Riders*, while the exposed wood seen across the landscape panels (and the exposed paper in *Queen of Sheba*) owes much to the influence of Fry on the Bloomsbury group's admiration of post-Impressionist painters such as Cézanne. The HKI's

ongoing survey and treatment of the King's College painting collection – including the Keynes bequest of Bloomsbury group paintings – has facilitated a unique opportunity to explore the range of this extraordinary artist in his earliest years. In future, we hope that more of this collection can be analysed at the HKI and compared with these results to further our understanding of Grant's approaches to painting and how they changed throughout his life. He is perhaps best summarised by his friend Roger Fry, who wrote of him that 'he has, I think, always succeeded in creating a singularly delightful atmosphere … by reason of the unexpectedness of his fancy, the gaiety and purity of his colour – which, however, never ceases to be essentially discrete and sober – and the perfect adaptation of even the oddest inventions' (Fry 1923: vii).

Acknowledgements
The authors would like to thank the following individuals: Iris Buisman, Emma Boyce Gore, Simon Bobak, Adèle Wright, Victoria Sutcliffe, Lucy Wrapson, Jean-Michel Massing, Darren Clarke, Miriam Phelan, Jill Dunkerton and Alison Ray. Special thanks are due to Nathan Daly, who undertook MA-XRF scanning and interpretation, and was heavily involved in shaping earlier drafts of this paper.

Notes

1. For an overview of early Bloomsbury group practice, see: https://www.tate.org.uk/art/art-terms/b/bloomsbury/art-bloomsbury. See also Shone 1999b; Shone and Leaper 2018.
2. NG11/2: Copyist Register 1901–1946, entry dated 12 February 1903.
3. Brown notes that Grant was making a copy of the musician angels, rather than of the holy family. If such a work was separate to the *Nativity* copy discussed here (where two of the angels are partially visible in the background), its location is no longer known.
4. This commercially applied canvas had a double white ground, consisting of a thicker lower layer and thinner upper layer (see figure 2).
5. Medium analysis was not possible in this case.
6. Jill Dunkerton (conservator treating NG908), personal communication, April 2022. By happy coincidence, the National Gallery's *Nativity* underwent treatment at the same time as Grant's *Nativity* copy was being treated at the HKI.
7. Pernel Strachey would later become Principal of Newnham College in 1927: see https://www.tate.org.uk/art/artworks/grant-the-queen-of-sheba-n03169 (accessed 25 February 2024).
8. For comprehensive surveys of Grant's work see: See Shone 1999a; Shone and Leaper; 2018; Brown 1975.
9. MA-XRF scanning was undertaken using the following settings. The measuring head consists of a 30 W rhodium-target microfocus X-ray tube, with a maximum voltage of 50 kV and a maximum current of 600 µA, fitted with polycapillary optics which allow a variable beam size (*c.*50–580 µm depending on the working distance used). The instrument is equipped with two 60 mm^2 silicon drift X-ray detectors with an energy resolution < 145 eV for Mn Kα. The data shown were acquired using both detectors set to a 275 kcps threshold with the X-ray tube set at 50 kV and 600 µA. The dwell time at each pixel was 15 ms and a pixel spacing of 400 µm was used along with a 220 µm beam size. The images shown are coloured 8-bit MA-XRF element distribution maps that were generated using the deconvolution feature within the Bruker ESPRIT software, with additional pixel binning and element map subtraction applied when appropriate and as noted. Scanning was undertaken by Nathan Daly and Alice Limb at the Hamilton Kerr Institute, March 2023. Interpretation by Nathan Daly and Alice Limb.
10. The visual separation of this material entanglement is only possible through photography and/or reproduction: interesting to note, given the iterative process and duplication seen across the various campaigns of *Riders* compositions, but also when the *Queen of Sheba* composition is considered within the context of its status as a preparatory piece for the Tate work.
11. This ground layer is locally present on the *Queen of Sheba* side as it dribbles beneath the composition.
12. The lack of sulphur in correlation with the calcium signals observed in regions with the ground layer exposed suggests that the ground is chalk (calcium carbonate) rather than gypsum (calcium sulphate).
13. This blue-purple is likely a variant of cobalt blue, cobalt aluminium oxide. Aluminium is not detectable via MA-XRF scanning with the settings used.
14. Cobalt violet is cobalt phosphate, although a red lake pigment on a non-alum or barium-based precipitate is another possibility for this purple.
15. These wet-in-wet brushstrokes were found to contain: cadmium with zinc suggesting a cadmium yellow with zinc white in lighter areas of the right horse; a barium-based lake pigment indicated by an area of barium in the red scarf held by the standing figure in which no other major elements are present – the colorant is therefore most likely an organic compound undetectable by XRF, probably a dye, which fluoresces very strongly in UV (figure 8); cadmium with barium indicating cadmium yellow mixed with what is likely to be the barium-based lake pigment described above, and used to make brown-orange passages, mostly in the right horse; and mercury indicating vermilion present in the red brushstrokes on the right horse's hindquarters and mixed with other pigments (mostly iron oxides) to create brighter oranges, also in the right horse. Iron oxides, in mixture with vermilion, were used to cover the *pentimento* of the standing figure's arm, where the fourth campaign covered the purplish-blue brushstrokes of the horse below.
16. Unlike the purple and blue passages in the central *Riders* group and on the *Queen of Sheba* side, these cobalt-rich brushstrokes are not associated with any nickel: see tables 1–3.
17. For further information on UV fluorescence of degrading cadmium yellow pigments, see Cornelli *et al.* 2019; Van der Snickt *et al.* 2009.
18. Many of these more ephemeral drawings and paintings are currently uncatalogued, but are held in the archives at Charlston.
19. Grant was a conscientious objector to the war: his status as such precipitated his move to Sussex where initially he picked fruit as a labourer for the war effort rather than joining up as a soldier.
20. During the recent conservation campaign, conducted at the HKI in 2022, the batten was replaced by a more appropriate joining system: see the article by Justyna Kędziora, in this volume, pp. 191–98.

21. An alternative possibility, although less convincing, being that they were originally cigar box linings.
22. https://www.nationaltrustcollections.org.uk/object/769765 (accessed 1 March 2024).
23. Dr Alison Ray (St Peter's College archivist), personal communication, May 2022. See https://artuk.org/discover/artworks/the-bridge-232068/search/actor:grant-duncan-18851978/page/3 (accessed 1 March 2024).
24. Undertaken with the X-ray fluorescence spectrometer Bruker M6 Jetstream with rhodium source and following setting: U 50 kV, I 600 µA, in air environment,180 s spectra acquisition time, 580 µm spot size. Measurements done in 19 areas by Lucy Wrapson and Justyna Kędziora in April 2022. Spectra processed with PyMca software by Justyna Kędziora in May 2022. Interpretation by Justyna Kędziora supervised by Lucy Wrapson and Nathan Daly.
25. Undertaken with a scanning electron microscope with energy dispersive X-ray spectroscope (SEM-EDX) FEI (Thermofischer) Quanta-650F SEM at 30kV at Earth Sciences, Cambridge University, operated by Iris Buisman, data collected by Emma B. Gore and processed by Emma B. Gore using Aztec software in April 2024. Interpretation by Justyna Kędziora.

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A novel joining system for disjoined boards using interlocking strips of wood for a twentieth-century British panel painting by Duncan Grant

JUSTYNA KĘDZIORA

Abstract Duncan Grant (1885–1978), a modern British artist, painted on everything from furniture to scraps of paper. In particular, he reused boards from different sources for his paintings, of which *Poplars* is an example. It consists of two boards that did not align because of different curvature profiles. The strip of wood holding them together, and in plane, detached due to the strong response of the boards to fluctuations in humidity. The edges of the boards have never been in plane and there has always been a slight gap between them since the painting was made. Drawing on experience with structural panel conservation, I designed and tailored a novel joining method whereby long, thin strips of jelutong wood are attached alternately to the top and bottom boards. My joining method is a modern variation on traditional cradles that are typically bulkier and would not be suitable for small, thin panels. When joined, the strips interlock and engage with the opposite board, resulting in the alignment of the boards. Minute alterations to the shape of the wood strips allow for more precise control over the forces applied to the panels. This article presents the steps that led to this novel solution and explains the joining system in detail.

The painting and the frame

The work consists of two small, thin, vertically grained wooden panels (top board: 34.4 × 25.7 × 0.4 cm; bottom board: 34.4 × 25.6 × 0.4 cm) arranged vertically (figure 1a and b). The panels are made of deciduous wood, which appears to be cedar as it is lightweight, orange, and has a pearl-like sheen that varies alongside the grain (Meier 2023a). The tangentially cut boards, with vertical wood grain, have a natural convex warp and some weaving undulations. The top and bottom edges of both boards have been bevelled on the reverse (*c*.0.2 cm deep and 1 cm wide), including the edges along the joint, indicating that the boards were not originally designed for this purpose.

The boards had been connected by a horizontal, cross-grained strip of wood (*c*.7.1 × 26.0 × 0.5 cm) glued to the back of the boards by the thick layer of adhesive. The boards have never been adhered directly to each other. The adhesive had been applied only in the centre of the strip, and it appeared to be an animal glue as it was dark brown, water-soluble and brightly fluorescent in UV light. The strip itself was made of dark brown hardwood.

The panel does not have a ground layer, but it was likely sized as small amounts of heavy elements were detected on the exposed wood areas via X-ray fluorescence (XRF) spectroscopy (see also the article by Limb and Kędziora, in this volume). The paint, likely to be oil-based, partially extends over the sides of the boards including a section along the joint. The wooden support has been left exposed between the brushstrokes. The unvarnished painting has low impasto and varied sheen. There are numerous extraneous particles and hairs embedded in the paint from the painting process.

The frame, made of coniferous wood, is an integral part of the work (*c*.3 cm wide, 2 cm deep). It has a simple profile, with no layering or carving, and has been covered with a thick (*c*. 0.1 cm) white ground layer with a very smooth finish. The frame appears to have been painted by the artist. The painting was secured in the frame with nails. The rebate was not lined and there was no glazing or a backing board present. The frame size and its sight size are suitable for the painting and provides some physical protection to the painting.

Condition and preliminary treatment

The painting was in a fair condition with no signs of previous treatments. The boards were slightly warped, especially the top area of the bottom board, which had detached from the joining strip of wood. Most of the thick, cracked and crumbling adhesive had remained on the joining wood strip. The top board, with the strip, had fallen behind the bottom one (viewed from the front) and become locked in the frame. The nails holding both boards remained in place and left pronounced dents on the reverse of the boards. The paint layer had several scratches, visible as white marks, all over the painting. A few minor paint losses and dents were also noted, which might have been caused by the fall of the top board. The painting was covered with a dark layer of surface dirt. The area along the painting's edges (*c*.0.5 cm wide), which had been covered by the rebate of the frame, appeared cleaner.

Figure 1. Duncan Grant, *Poplars*, 20th century, oil on panel, top board: 34.4 × 25.7 × 0.4 cm, bottom board: 34.4 × 25.6 × 0.4 cm, frame: 74.3 × 31.5 cm. King's College, University of Cambridge. The painting before treatment when the two boards were separated (a) and (b) front, (c) and (d) reverse, (e) and (f) front in raking light. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photographs © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

Figure 2. Duncan Grant, *Poplars* (Figure 1): scratches of unknown origin and remains of a label on the frame in raking light. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photograph © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

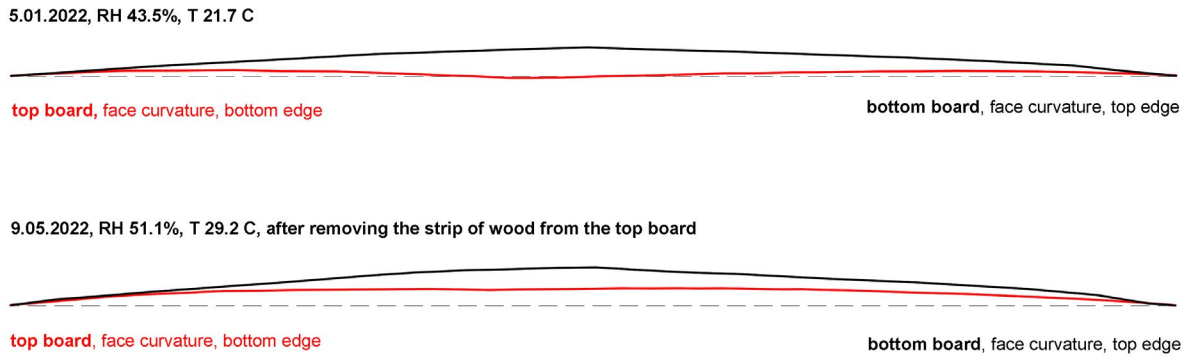

Figure 3. Curvature profiles of the boards' fronts along the joint. Top image: before detaching the strip of wood, 43.5% RH and 21.7 °C. Bottom image: 11 weeks after detaching the strip of wood and relaxation in a controlled environment: 51.1% RH and 29.2 °C. Diagram © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

The original joint had disconnected because the strip of wood that held the painting together was too rigid and did not allow movement of the boards that naturally occur during humidity changes (Hoadley 2000: 110–23): fortunately, it was the glue that failed rather than the boards. The boards were connected perpendicularly to the grain direction of the joining strip, thus the discrepancy of dimensional changes – influenced by changes in humidity – between the boards and the joining strip was exacerbated. Each of the boards responded differently, which resulted in increased stress on the joint and eventually its breakage. The restriction to movement caused by the joining strip probably also resulted in the weaving undulations of the boards (figure 1c), as has been noted on many other paintings attached to rigid cradles (Dardes and Rothe 1995a: 192). The frame had multiple scuffs, scratches, and ground and paint losses, especially around the corners and along the edges of the frame. There were numerous, regularly placed, short scratches and the remains of an off-white label on the front of the top member (figure 2). The frame was covered with a thin layer of surface dirt.

First, all elements were dry cleaned, followed by an aqueous cleaning method. The heavy soiling on the face of the painting was removed with 1% EDTA in water at pH 6.5, gelled with xanthan gum and rinsed with deionised water, which had a pH around 6.5 having absorbed carbon dioxide from the air. EDTA served both as a chelating agent and pH buffer. The glue holding the boards together was softened with moisture then the strip of wood and top board were mechanically separated by inserting a metal spatula between them and gently twisting. The boards were left for four months to relax to their natural curvature in the controlled humidity environment of the studio before proceeding by adding a supporting structure. During the relaxation, the water content in the wood equalises with the air humidity (Uzzielli 1998: 110–35). Figure 3 shows the curvature of the boards before and after removing the rigid strip of wood and their alignment.

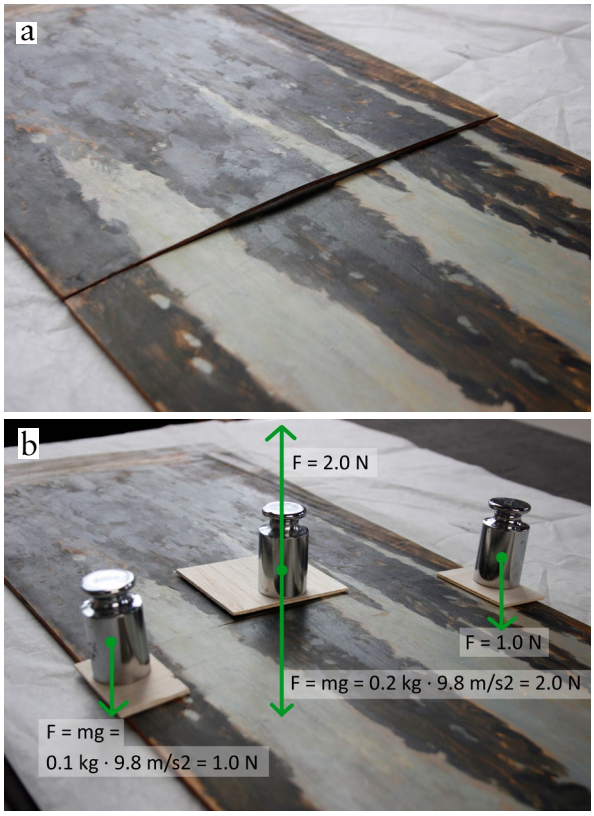

Figure 4. Comparison of alignment of the boards with and without applied external forces. (a) The boards are misaligned horizontally with a 0.5 cm gap between them at the centre when placed flat. (b) A test was conducted to determine whether the alignment of the boards was possible and if so, how much force would be required to align the boards. A wooden dowel was placed under the centre of the top board, a 0.2 kg weight on top of the centre of the bottom board, and two 0.1 kg weights at the edges of the top board. The wooden boards easily bend under the applied forces, and relatively light weights were required for this purpose. The arrows on the image represent the applied forces. A simplified estimation of the magnitude of these forces is as follows: $F_1 = F_4 = mg = 0.1\ kg \cdot 9.8\ m/s^2 = 1.0\ N$, $F_2 = mg = 0.2\ kg \cdot 9.8\ m/s^2 = 2.0\ N$, $F_3 = F_1 + F_4 = 2.0\ N$. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photographs © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

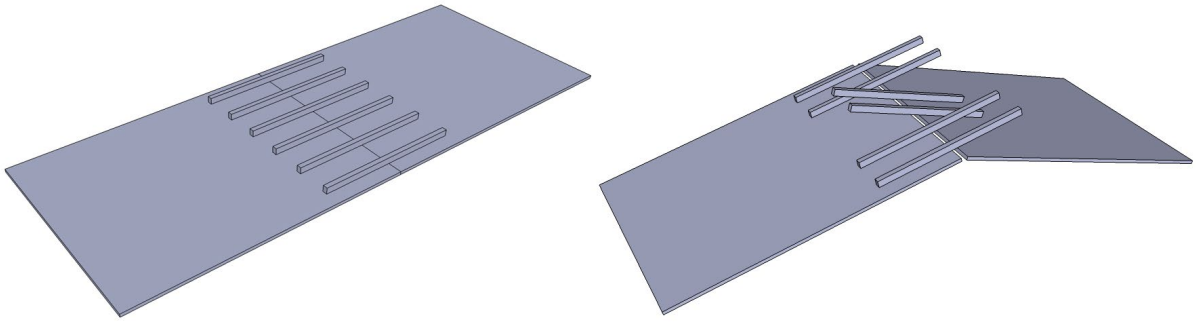

Figure 5. A scheme showing an initial idea of connecting the boards and how the joint would collapse without a locking system. Model prepared in SketchUp Pro 8 © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

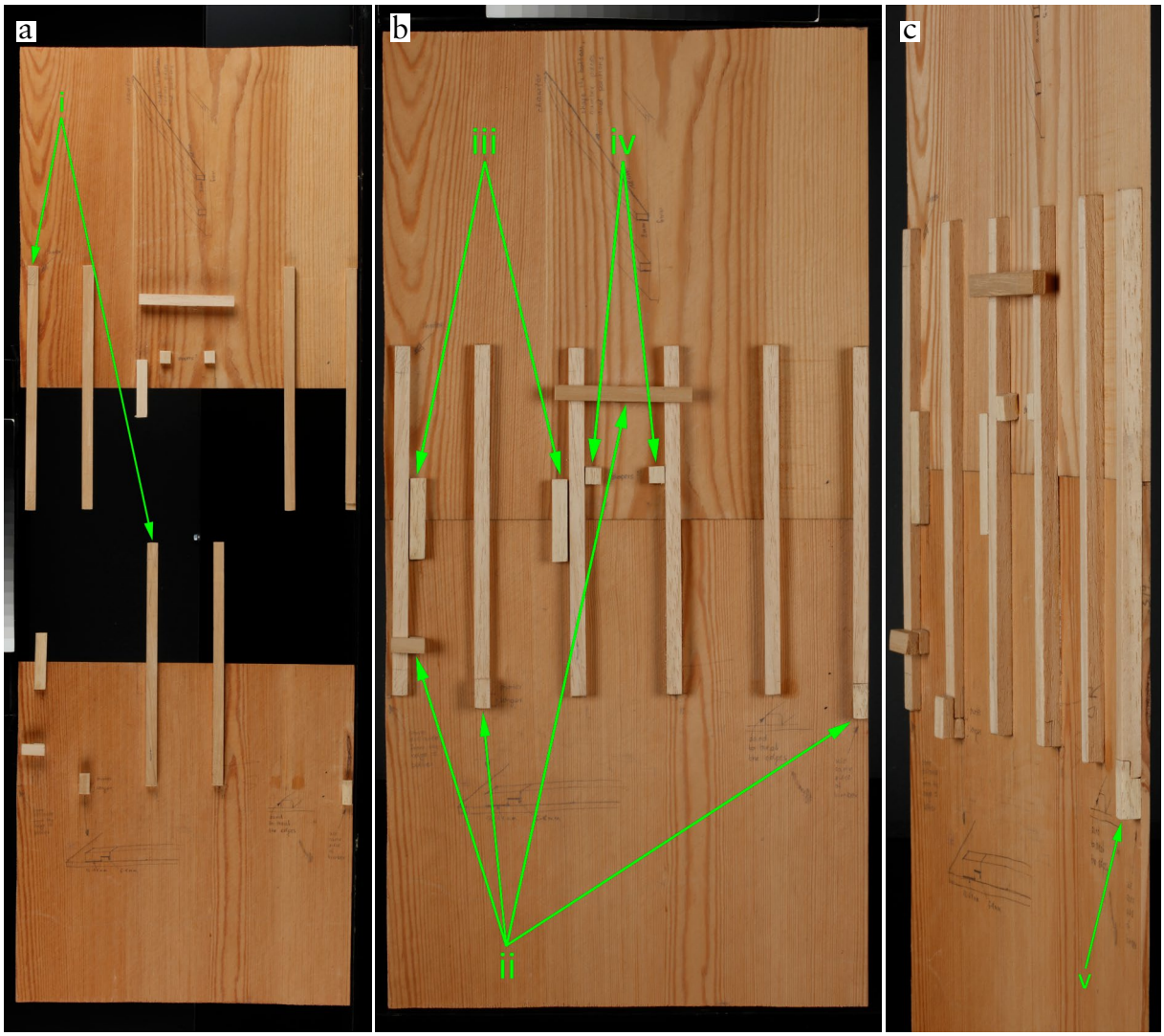

Figure 6. Mockup for joining the boards (a) showing (i) interlocking strips of wood, (b) showing (ii) different methods to block the strips of wood from collapsing, (iii) further strips of wood additionally adjusting the alignment of the boards, (iv) stoppers, (c) showing (v) chosen blocking method. Photographs © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

The joints of the frame were closed and glued together with fish glue. The solubility and sensitivity tests showed that wet cleaning was not safe for the frame's painted surface therefore no further cleaning was carried out. The sticker, softened with a 4% agar gel, was removed mechanically while the remaining glue was removed with acetone. After joining the boards as described in this article, and treating the frame, all the elements were retouched with gouache and watercolour.

An idea and mockup

The two boards did not align due to their differing curvatures (figure 4a). Removal of the rigid strip of

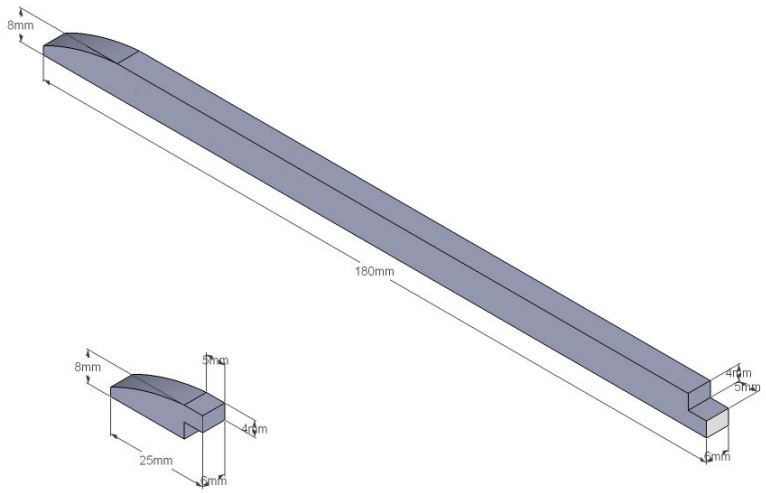

Figure 7. Dimensions of the strips of wood for the auxiliary support. Model prepared in SketchUp Pro 8 © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

wood allowed the top board to relax into its natural conformation. As a result, the difference in the curvatures of the two boards decreased. The joint between the boards was never intended to be tight and invisible even though the strip of wood glued to the reverse of the boards kept them, to an extent, flat. The repurposed boards have not been adjusted in any way to be connected. The paint present on the sides of the boards, in between the joint, evidenced that there was a gap between them while the piece was being painted. A possible option – in which the boards would be mounted in the frame as they are without any pressure and adjustments to their curvature – was considered, but later experiments showed that with minimal intervention, a good alignment could be achieved and ultimately a better visual affect.

On the other hand, the strip of wood that used to connect the boards was also meant to level them. A simulation was prepared to check if a better alignment could be achieved (figure 4b). The boards were positioned flat and an 8 mm thick wooden dowel was placed underneath the middle of the top panel, parallel to its side edges. On the bottom left and right perimeters of the top board, 0.1 kg weights were placed very slowly, and in the middle of the bottom board, a 0.2 kg weight was also gradually placed down. The thin and flexible boards bent easily under the gentle forces and an improved alignment was achieved. This confirmed that the boards could be joined together and realigned with only gentle pressure required.

Several ideas as to how to reconnect the boards were considered, from reattaching the original strip of wood in an altered flexible way (e.g. using springs) to modifying the frame in a way that would keep the boards in a desired position and conformation. None of the supporting structures reported in the literature or known to the author appeared suitable for connecting the boards (Dardes and Rothe 1995b; Phenix and Chui 2011). It was ultimately decided that the simplest solution would be to glue flexible wooden supports to the reverse of the boards across the joining line. To allow for more movement in the vertical axis (when the painting is upright), the sticks could be glued alternately to each board, creating an interlocking system (figure 5). However, such a construction would collapse without additional forces applied to the ends of the boards. To prevent that happening, locks could be added at the end of each support. Different solutions to this idea were tested on a mockup.

A mockup of the proposed joining method was made using pine wood boards of a similar thickness, flexibility and curvature to the original panels (figure 6). Long, thin strips of jelutong wood were attached alternately to the top and bottom boards (figure 6a: i). When joined, the strips interlocked and engaged with the opposite board, resulting in the alignment of the boards. Whether the wooden strips were adhered to the top or bottom board was determined by the relative curvature of the boards. Ultimately, two pairs of sticks were attached to each side of the top board, followed by two to the bottom board, set in the middle. The experiment presented in figure 5 further aided in this decision making.

Different methods to lock the strips were tested (figure 6b: ii): a small step placed 2 cm from the end of a wooden strip; a small step placed at the very end of a wooden strip; a perpendicular longer strip of wood placed over consecutive sticks; and a short strip with a step placed by the end of a wooden strip. The last option was chosen as being the most neat and effective (figure 6d: v). Two short strips were added across the joint to add minor adjustments to the alignment of the boards (figure 6b: iii). These added little improvement to the alignment and obstructed sliding the boards in place but did prove useful in preventing the boards from moving sideways. This was also achieved with the use of small 'stoppers' (figure 6b: iv).

Figure 8. (a) Overview and (b–e) details of the painting with attached cradle. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photographs © Justyna Kędziora, Hamilton Kerr Institute, University of Cambridge.

Rejoining the boards

The designed method of joining the boards worked well on the mockup therefore it was decided to implement it on the original. It was decided that six sticks in total would be an adequate amount to begin with, and if necessary, there would be enough space to add more. The first and last supports were placed 0.5 cm from the edges of the panel to avoid placing excessive strain on the panel's edges. The remaining four sticks were distributed evenly in between.

Jelutong wood was chosen for the joining strips of wood (Meier 2023b). Jelutong is uniform, soft, flexible, dimensionally stable and easily carved. The wood is used in much the same way as balsa wood. A few different dimensions were considered: the strips had to be long enough to distribute force along the panel and their thickness had to provide enough rigidity while still staying flexible without adding too much bulk to the back of the thin boards. Their width was less critical but had to be wide enough to avoid chipping or breaking too easily, while still acting locally. The first set of long sticks was 160 mm long, 6 mm wide, and 6 mm thick. However, after placing them on the back of the painting, they were deemed to be too short and too thin. The final dimensions were 180 mm in length, 6 mm in width, and 8 mm thick for the long supports, and 20 mm in length, 6 mm in width, and 8 mm thick for the short locking pieces (figure 7). The sticks were paired and the steps cut precisely with a scalpel to provide a perfect fit. The steps were made to be 4 mm thick – exactly half the height of the sticks. The strips were then chamfered, primarily for aesthetic reasons, but to some degree the chamfer acted to gradually reduce the pressure applied to the boards towards the ends of the sticks.

The location of each pair of the sticks was marked lightly with a pencil on the reverse of the boards, and the sticks were numbered. They were then glued to the boards with fish glue in pairs (the

Figure 9. (a) The front and (b) the back of a shadow box holding the painting after treatment. By permission of the Provost and Scholars of King's College, Cambridge. Copyright © Estate of Duncan Grant. All rights reserved, DACS 2024. Photographs © Emma Rebecca Boyce Gore, Hamilton Kerr Institute, University of Cambridge.

long strip and the short matching one at once) in the following order: 4 5 1 2 6 3. I started from the inside where the precise fit of the boards was the most crucial visually and to avoid applying pressure to the edges of the painting, which could cause the boards to split. Next, sticks were placed by the edges to achieve rough alignment; the final two sticks finetuned the fit. After applying each pair, an assessment of the panel's response was made in order to decide to which board, top or bottom, the next long strip should be attached.

Just before attaching, the base of each of the sticks was adjusted with a scalpel or sandpaper to perfectly connect with the uneven back of the boards. The heights of the steps in the long and short sticks were then adjusted to achieve a tight fit and prevent the boards from collapsing by even a millimetre. The fit between the steps in the short and long sticks allowed for the strength of the forces applied to the boards to be adjusted. This was a crucial phase in achieving the best possible alignment. The gaps between the strips and the bevelled part of the boards were filled in with jelutong inserts cut to size then adhered with fish glue to the jelutong sticks. Where visible on the front of the painting, the inserts were toned with dark brown acrylic paint. Finally, the locking surfaces of the strips were sanded to allow the smooth sliding of the boards. The sides of the pairs of the long and short sticks, and inserts were sanded. The edges of the sticks were slightly rounded with one pass of sandpaper.

Effect and possible improvements

The resulting construction held the boards in place and provided good alignment of the boards (figure 8a–d). This modern cradle is suitable for joining thin panels and can be fully customised. The location of the sticks can be determined during the design process, and the strength of applied forces can be modified at any stage. This neat system adds very little thickness to the back of the painting and allows movement of the boards in all directions.

There are a few improvements that could have been considered. The faces of the boards do not align completely but this could have been addressed by adding more sticks. However, the nature of the painting did not call for this as the join in this painting was never intended to be invisible. Furthermore, the length of the sticks and their vertical position could have been varied to spread the forces over a larger area. Finally, a thin interlayer of a Paraloid B72 resin added between the jelutong sticks and the boards would have improved the reversibility of the adhesive, allowing the sticks to be removed easily with a polar solvent if necessary.

The boards can move sideways and separate by sliding the top and bottom boards apart, meaning that the described cradle is not suitable for unframed artworks. In this case, the painting has a frame that is an integral part of the artwork that prevents the boards from accidental separation.

Display

The painting is unvarnished and will be displayed in a typical household environment, hence it was decided that this, and other unvarnished paintings from the collection, would be glazed. As the frame is original to the painting and thought to be a rare survivor of an original framing by Duncan Grant, the decision was taken to house both the painting and the frame within a glazed shadowbox to preserve and protect them from dust and buffer the impact of fluctuating humidity. A plain obechi moulding was chosen and toned to a slightly paler colour than the finish of the frame (figure 9). Curvature profiles were made to accommodate the slight convex curvature of the panel within the frame. The painting was mounted by four flexible plates placed on the top and bottom of the panel within the shadowbox. The strip of wood originally holding the two boards together was placed into a recess in the backboard and secured with Melinex and Beva 371 strips. A backboard of transparent corrugated polycarbonate was applied to the reverse.

In conclusion, the painting was rejoined by an innovative type of cradle and housed with its frame within a glazed shadowbox. The strip of wood that used to connect the boards was placed on the back of the shadowbox. The semi-transparent backing board protects the work and allows the back to be visible to curious viewers.

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The influence of visual perception on the interpretation of technical images in conservation

CHRISTINE BRAYBROOK

Abstract The accurate interpretation of diagnostic images in conservation can be essential to understanding the results of technical studies and treatment plans. Much emphasis has been placed on the often subjective interpretations of these images, yet little has been written on the influence of human visual perception on the interpretation of technical images in conservation. This article is intended as an introductory paper to engage and familiarise the conservator with issues involving visual perception and interpretation. The interpretation of medical diagnostic images is compared to the interpretation of images used in technical studies in painting conservation. Case studies are used to highlight the effects of ambiguity, illusion and the volume and grouping of available data points to enable an accurate interpretation and identification of fragmentary images. Cognitive knowledge and historical contextual understanding of a painting can assist a visual interpretation, engaging both top-down and bottom-up processing. The benefits of an image being interpreted by several conservators together is also considered.

Introduction

A conservator can use a variety of approaches to gain understanding of the multilayered and often complicated structure of a painting and its material composition. Images, acquired at different wavelengths of the electromagnetic spectrum (figure 1) – referred to in this paper as technical images – can be considered as non-destructive methods of analysis. They are especially attractive for the inherently visual-thinking conservator and are used widely in conservation decision-making. Acquiring images with different wavelengths has long been employed in the technical study of paintings. By penetrating upper paint layers an alternative visual representation is often possible, open to interpretation by the conservator; however, an individual's unique and subjective perception of an image can result in misinterpretation, or over-interpretation, leading to assumptions based on opinion rather than factual evidence.

The five human senses are responsible for relaying information to the brain, allowing our environment to be perceived. This paper focuses on human vision and discusses the influence of visual perception on interpreting technical images. A brief introductory history of the psychology of perception will be reviewed with a discussion on the influence of ambiguity and illusion aided by

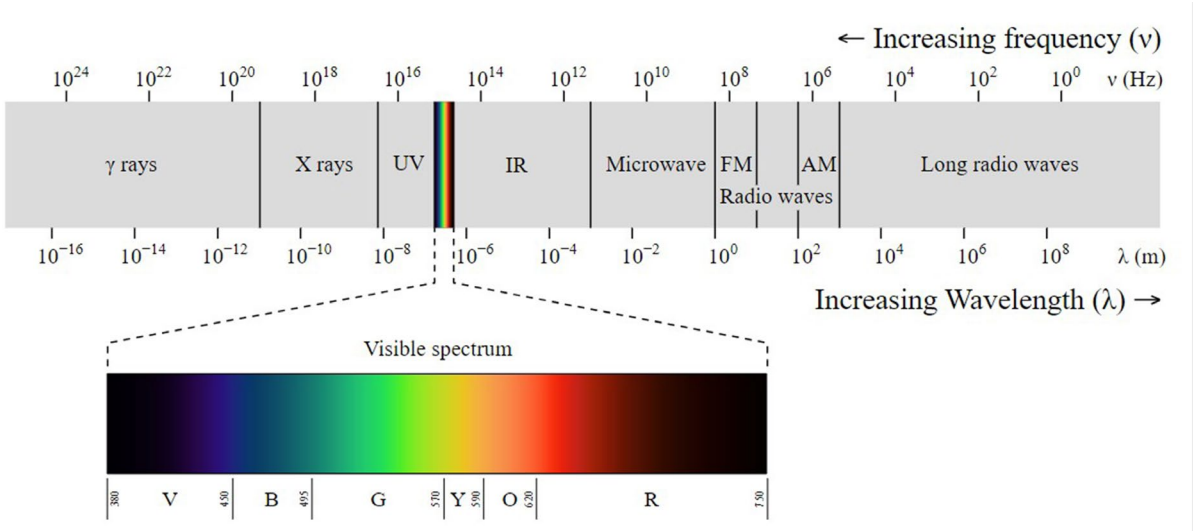

Figure 1. The electromagnetic spectrum. Image: https://commons.wikimedia.org/wiki/Category:Electromagnetic_spectrum#/media/File:EM_spectrum_updated.svg Authored by User:Zedh and User:Gringer and reproduced under CC BY-SA 4.0 copyright licence.

case studies to demonstrate these occurrences. This exposes our unfamiliarity when interpreting images acquired outside of the visible light portion of the electromagnetic spectrum, and explains why ambiguity can result in inaccuracy. An estimation of how much data is required to achieve an accurate interpretation of a fragmented image is assessed. Recent advances in neuroscience – exploring the mechanisms involved with neurological information handling – are considered, as well as what can be applied from the larger field of medical imaging interpretation. Acknowledgement and awareness is given to the influence of individual perception on the interpretation of images. Consideration of what information handling is undertaken by the brain on a neurological level is discussed in order to better equip the conservator to achieve a more accurate interpretation.

Although a number of conservation-specific articles exist, literature on the subject of image perception is limited and generally focuses primarily on the effects of age in relation to the material composition and how this affects a viewer's perception of an artwork, whether from a darkened varnish (Gombrich 1962: 51), craquelure network (Bucklow 1994) or the perceptual effects of restoration (Maisey *et al.* 2011). Braybrook and Titmus (2020) consider the importance of consistency and defined parameters for imaging in conservation, including discussing human visual perception and offering useful advice to achieve consistent documentary images, even with a basic setup. Covering both visual perception and neuroscience, Gottschaller (2017) conducted a psychophysical test on the visual perception of straight lines in contemporary art. She observed whether the human brain can perceive how a straight line was painted, either freehand or with the use of tape, and whether the brain correctly identified or made errors in the identification of the application method. These are welcome inclusions to the broadening conservation literature, yet nothing is readily available on the influence visual perception has on the interpretation of technical images. Perhaps this area has been overlooked because interpreting images is standard practice for paintings conservators who may take for granted that their perception of a technical image is accurate and their interpretation is without bias.

Visual perception

In the twentieth and twenty-first centuries, the development of scientific technologies that can be applied to the analysis of paintings has progressed at great speed. For example: light sources, cameras and screens that can reveal information beyond what the human eye can perceive when observing a painting, employed together, can visualise some aspects of a painting's physical composition; and using methods such as infrared (IR) and X-radiography, conservators can now view a painting's underlayers, often capturing an artist's preparatory sketching, changes in a composition or reuse of a painting support. Newer methods such as scanning X-ray fluorescence (XRF) can produce whole elemental maps of a painting – maps that can indicate likely pigment distribution – and advances in magnification can capture detail of a painting's surface previously undetectable. Although analogies with the human eye and brain are often used to explain the way in which these scientific techniques work (see later case studies, figure 4), the evolutionary origins of human visual perception mean that our bodies work in a very specific way that does not always enable accurate interpretation of these scientific images.

For our primal ancestors, a rapid assessment of a perceived threat was paramount, enabling sufficient time to retreat to safety, ultimately preserving life. Finer details were subordinated to the bigger picture. The small size of the human eye (and even smaller retinal surface area) compared to the size of the body means that the eye is most efficient at seeing the bigger picture (not the finer details). Normal human vision involves ignoring much of the available visual information but making up for this by filling in the blanks with past experience and knowledge to determine judgement (Teufel and Nanay 2017). Critically, in real-life situations, perception of the visual field is reliant on both speed and judgement; the brain swiftly recalls memories and experiences to make rapid assessments and assumptions, forestalling the need for a time-consuming full assessment of the visual environment. As an example, a medical radiographer's eye is accomplished and highly sensitised, the global percept takes just 250 ms, occurring before the brain is even conscious of this initial rapid perception (Samei and Krupinski 2019: 99). This highlights the significance of speed with human visual perception and the brain's ability to interpret a visual field by filling in the blanks, based around previous experience.

Psychology of perception

Image perception theory has a long and documented history (Bruce *et al.* 2003; Gombrich 1962; Pastore 1971; Snowden *et al.* 2012; Vernon 1937). The western notion of perception is rooted in Aristotle (Bynum 1987: 1), who contemplated perception as a physical change that left physical traces in the body, referred to as *phantasms*, constituting the objects of imagination; consequently cognitive thinking is correlated to perception, referred to as top-down processing (Gregory 2004: 46). 'Top-down' and 'bottom-up' processing are terms used to describe the way in which our brain forms the perception of a visual stimulus (or, whatever it is we are looking at in the visual field). Bottom-up processing uses only the stimulus to guide the perception, without preconceived ideas from past knowledge. Top-down processing uses past and contextual knowledge, as

well as the stimulus itself, to interpret the visual field. Pliny wrote of the eyes as expressing the mind: 'The eyes are the abode of the mind. It is the mind that is the real instrument of sight and of observation; the eyes act as a sort of vessel receiving and transmitting the visible portion of the consciousness' (Pliny 1956: 523). Isaac Newton, following on from his 1665 discovery of the nature of light (by separating white light through a glass prism), was instrumental in the modern science of vision. He found the understanding of vision to be in human visual pathways, and not in the nature of light itself (Newton 1704). In the nineteenth century, several theorists addressed visual perception including, among others,[1] the German physicist Hermann van Helmholtz (1821–1894) who developed the science of physiological optics. He proposed that perception was an interpretation of sensation, terming it 'unconscious inferences'; a process of mental adjustments constructing a coherent picture of experiences (Patton 2018). Perception theory progressed radically in the twentieth century with opposing concepts from James Gibson (1904–1979) and Richard Gregory (1923–2010) with Gregory identifying strongly with Helmholtz's 'top-down' theory, whereas Gibson saw it as a 'bottom-up' process, denying that perception involved construction, interpretation or representation (Bruce *et al.* 2003: 80). Perception is subjective and therefore notoriously difficult to study objectively, but this is becoming ever more possible through modern neuroimaging studies (Pearson *et al.* 2008; Stokes *et al.* 2009; Albers *et al.* 2013). Cognitive neuroscience research is largely led by methods enabling measurements of brain activity and have provided a better appreciation of the brain's mechanisms to perceive and interpret our daily environment. Now, with an understanding that extrasensory processing and multisensory integration contribute to visual perception, the ability to examine brain neuro activity using psychophysics, functional imaging and brain stimulation are all being used to investigate this subject (Chalupa and Werner 2014).

Technical images

The human eye only recognises a small range of wavelengths within the electromagnetic spectrum (figure 1), those between 400 and 700 nm, and consequently many go undetected. Using cameras/detectors and screens to convert information from outside of the visible range can reveal complementary information to that measurable with visible light. Technology has been developed to detect and capture this data, then transform it into a visual format that is perceivable by the human eye.

The first X-radiograph of a person was captured in 1896 and the method applied to paintings soon after, with dedicated studies using X-radiography published in 1938 (Macbeth 2012: 300).[2] The images produced from non-visible light can be different to the aesthetics of the original painting, both in colour and (sometimes) composition (e.g. see figure 4). These converted images 'translate' the non-visible information into visible data, but this is not the same as being able to actually 'see' beyond the visual spectrum. We are therefore challenged to use our eyes and minds – programmed through evolution to interpret only visible wavelengths – to understand this translation of the data from non-visible parts of the spectrum. Few have acknowledged how complex this process of translation and interpretation must be given the restrictions of our own human 'hardware' (and 'software', for that matter). Medical imaging, such as the interpretation of X-radiographs, is similarly complex, requiring a specialist practitioner whose job it is to see beyond the brain's perceptive glitches. Traditional radiographs capture a two-dimensional image of the three-dimensional body, curtailing any depth perception. This can create patterns within an image that can be mistaken for disease, leading to misinterpretation from perceptive inaccuracies, potentially resulting in a false-positive diagnosis.

The extent to which an X-ray is absorbed as it travels through matter depends on the material's properties; the higher a material's atomic number the more X-rays will be absorbed into it. Darker areas of an X-radiograph have been more exposed to X-rays (implying the material was less X-ray opaque), whereas lighter areas have been less exposed (suggesting that the material blocked more of the X-rays in this area). However, it must be acknowledged that an X-radiograph is dependent on the apparatus setup and an inaccurate setting may not give the most informative result. The setting to produce the most informative information is dependent on the painting's material composition. For example, an X-ray of a painting with a longer exposure time at a higher Kv will result in a different image compared to the same painting captured at a lower Kv with a shorter exposure time.

As visualised in figure 1, IR occupies a wide spectrum of low-energy wavelengths (780–10^5 nm), but it is the near IR region (780–3000 nm) that offers interest for investigating paintings. Many pigments become transparent within this range, enabling visibility of lower paint layers and underdrawing (if present and materially quenching in IR) (Macbeth 2012: 296). Infrared light passes through or reflects off different pigments at specific wavelength ranges, consequently some pigments can be identified using data from IR images (alongside information on the historic and geographic context of the painting). The sensitivity of the instrument's detector determines the resultant image, therefore, a multispectral detector, capable of capturing images at a wide range of wavelengths in the IR region, may offer increased information and assist interpretation. For example, an image of a painting captured at 780 nm may offer different information to the same painting captured at 3000 nm.

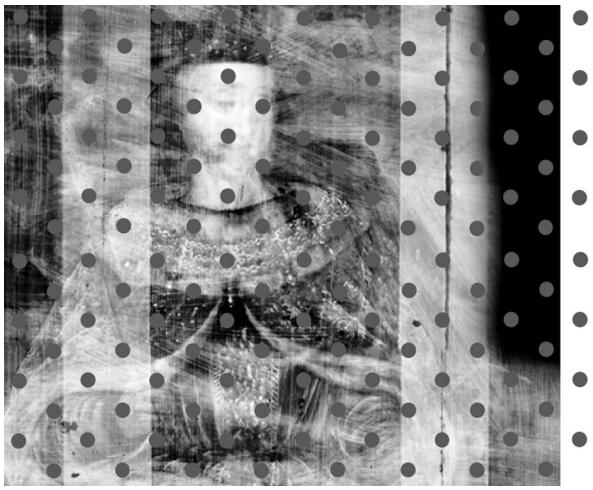

Figure 2. Disks with identical luminance placed upon a greyscale X-radiograph are perceived as having differing luminance because of the contrasting frames of reference, indicating how the surrounding tone affects visual perception and tonal interpretation. Photograph: Courtesy of the Masters of the Bench of the Honourable Society of the Middle Temple. Image © Chris Titmus, Hamilton Kerr Institute, University of Cambridge. Digital overlay by the author.

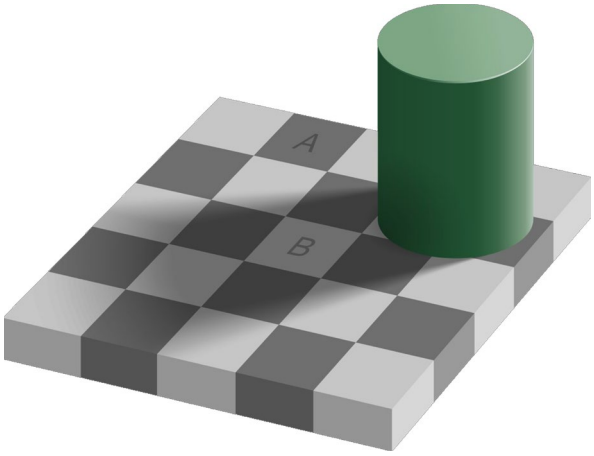

Figure 3. Adelson's checkerboard. A is perceived as darker compared to B, yet both A and B have identical luminance. B is perceived as a light square in shadow and A as a dark square in light. Experience of a checkerboard and knowledge that the cylinder is casting a shadow also acknowledges the use of top-down cognition. Image: Edward H. Adelson, original creator, vectorised by Pbroks13 and reproduced under CC BY-SA 4.0 copyright licence, https://en.wikipedia.org/wiki/Checker_shadow_illusion#/media/File:Checker_shadow_illusion.svg.

The data produced by scientific instruments can be characterised as objective (excluding user errors), yet, the subjective judgements and assumptions of the person interpreting the data will influence the conclusions. Information handling by the brain is individual, therefore the same image can be interpreted differently by two people. Furthermore, the brain's perception has not evolved to interpret challenging imagery, such as optical illusions, which may unexpectedly exist in a technical image, influencing the perception of the image by the brain. Discussed in the following section, an example is lightness perception which is most relevant to greyscale technical images, such as IR reflectographs and X-radiographs.

A technical image is the resulting visual stimuli (image) of an artwork, usually captured using non-visible light. A conservator commonly has in-depth knowledge of the artwork and is equipped with expertise that allows them to interpret an image with an understanding as to which aspects are relevant, or not, in a similar way to a medical radiographer, yet a conservator may still have preconceptions for a particular outcome. It is impossible to erase these assumptions, however, conservators endeavour to see, perceive and interpret the images responsively without being consciously guided by their own bias, while putting the information from the image into the historical and geographic context of the painting.

An image produced by a technical examination method such as the aforementioned techniques of IR and X-radiography is often (but not exclusively) in greyscale, which can induce perceptive errors during interpretation. All surfaces offer a reflectance (reflecting or absorbing incident light to some degree) and an individual's judgement of this becomes the surface's perceived lightness. This is especially prevalent with an opposing background colour, as demonstrated in figure 2. Against a white background, a grey spot will be perceived darker in comparison to the same grey spot against a black background (perceived as lighter); the surrounding context influences the perceived lightness (Gilchrist 2006: 7). Irradiation is another occurrence associated with lightness perception: a white spot on a black background is mutually reinforcing, giving the illusion of the white spot being larger and brighter (Luckiesh 1965: 114). Lightness perception is therefore relative to its context and spatially dependent. When interpreting greyscale technical images, two areas of similar chemical composition and physicality (i.e. pigment and paint application) can be erroneously perceived as having a different lightness and consequently interpreted as different pigment mixes. The Adelson checkerboard (figure 3) demonstrates this phenomenon and acknowledges how both surrounding context and cognition are influential with lightness perception. Although the majority of technical images, such as IR and X-radiography, have traditionally been greyscale, the human eye is more sensitive to colour. It may, then, seem logical for the colourisation of technical images to improve readability. To compare to medical imagery, in some specific techniques (such as functional imaging) this has been successful (Sabih *et al.* 2011), however in practice, the addition of colour creates visual clutter (noise) and does not aid in differentiating between normal and abnormal anatomy (Sabih *et al.* 2011). The use of colourised technical images is steadily gaining usage within conservation. Images acquired from such techniques as IR, scanning electron microscopy

with energy-dispersive X-ray analysis (SEM-EDX), Raman spectroscopy and macro X-ray fluorescence (MA-XRF) have all had false colourisation applied to their resultant image using digital imaging software. This is despite insight from the medical profession suggesting that conservators should be wary of these colourised images and aware of their potential limitations. Requiring further investigation and not within the scope of this paper, the addition of colour to investigative techniques, for example MA-XRF, especially with layering techniques, using software such as Adobe Photoshop has the potential to confuse interpretation as the complexity and number of the layers increases.

Collaborative cognition

When faced with ambiguity, the brain can be persuaded by the unconscious bias of the viewer, sometimes leading to an incorrect interpretation of an image. This effect can be reduced if more than one person interprets the image together in collaboration. Brennan and Enns (2015) researched the benefit of cognitively sharing an interpretive task, and favoured collaborative cognition because it increased accuracy compared with a solo interpretation.

Connoisseurship of artworks, particularly attribution, was once the role of an individual's sole understanding, interpretation and perception, of an artist's oeuvre; however, connoisseurship now applies collaborative cognition and is often contingent on a committee of experts to reach the conclusive verdict. This sort of collaborative research has not gone without criticism, as demonstrated by the ambitious Rembrandt Research Project (Bruyn *et al.* 1982–2015; Talley 1989: 191). Concerns were raised due to the departure from traditional solo connoisseurship and the potential impacts of group psychology. Comments of the committee achieved 'consensus of opinion much as a jury reaches a verdict, but members will always have their private reservations, doubts or outright disagreements which are not publicly expressed' (Talley 1989: 191). As with the interpretation of technical images, connoisseurship is subjective and reliance is placed on individuals' observation and experience in interpreting specific details of an artwork. A firm attribution requires conformity among the group and must not be persuaded by any individual's unconscious bias. With power in numbers, group psychology can create an easy platform for persuasion of an opposing viewpoint; however, a change in interpretation should only occur with collaborative contemplation and factual discussion. In conclusion, verbal communication and an exchange of opinions between a group of conservators during the interpretation of technical images should aid to challenge an individual's perception, providing increased probability of an accurate interpretation.

Ambiguity and illusion

The definition of 'ambiguity' in the *Oxford English Dictionary* is: 'open to more than one interpretation' and 'doubtful'. Ambiguity in interpreting

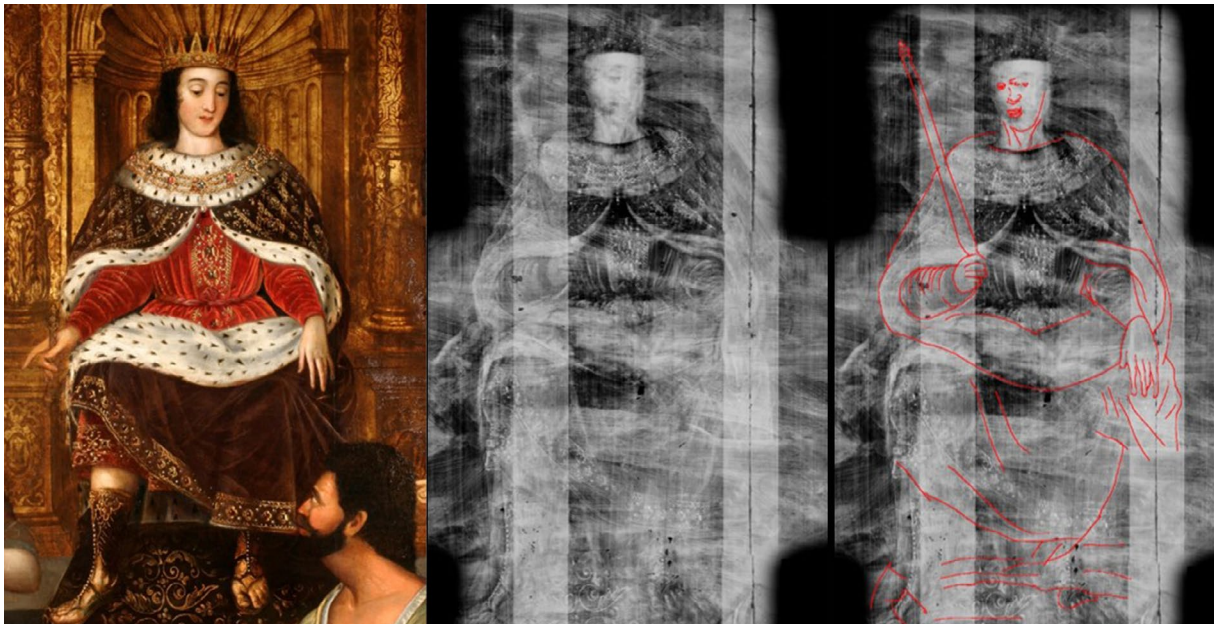

Figure 4. Artist unknown, *The Judgement of Solomon* (detail), *c.*1586–1602, oil on oak panel. Visible light (*left*), X-radiograph (*centre*), digitally enhanced X-radiograph, showing perceived visible markings differing from the figure viewed in visible light (*right*). Detail of King Solomon revealing the original positioning of his proper right arm, painted crossing over onto his lap. His original sceptre is visible, held by his right hand and resting on his shoulder. A change in head position is also made clear with visible facial features glancing down to his right. A suggestion of a foot position and drapery folds are also implied but without clear visual data reference points, leaving this positioning uncertain and ambiguous. Photograph: Courtesy of the Masters of the Bench of the Honourable Society of the Middle Temple. Images © Chris Titmus, Hamilton Kerr Institute, University of Cambridge. Digital tracing by the author.

Figure 5. William Ely Hill, *Young Woman/Old Woman*, 1915. This illusion depicts two recognisable figures, however, the brain can only perceive one figure at a time; a switch happens where the brain sees the other figure and a conscious effort is required to switch to the other perception. Photograph: Library of Congress, control No. 90707287, https://www.loc.gov/item/90707287/.

technical images can occur due to the way the human brain manages information. The brain sorts and prioritises incoming information, ignoring some, enabling shortcuts in the brain's processing ability (Critchlow 2019: 113). As discussed below, if more than 15% of the characteristic signals are received by the brain, a shape can become recognisable; however, with increased but opposing signals, the brain selects the highest probability outcome. An X-ray of a painting (detail) is shown in figure 4; here, a number of underlying head positions are plausible, none of which are conclusive, and the brain shifts between the multiple possibilities. Ambiguity occurs when uncertainty arises, and the brain is forced to consciously test each possibility alone, as an equal. Therefore, contrary to the dictionary definition, the neurobiological definition of ambiguity could be: 'it is not uncertainty, but certainty of the many, plausible interpretations, each one of which is sovereign when it occupies the conscious stage' (Zeki and Bartels 1999; Zeki 2006: 245). When confronted with ambiguity the brain (using top-down cognition) chooses the highest probability option as being correct; however, there is the possibility that the highest probable interpretation is, in fact, incorrect and in reality it is actually something less plausible. The brain has probably incorrectly filled in the gaps due to either not enough data or not enough previous experience of the object/visual stimuli (Gregory 1970: 36). Bi-stable illusions, such as figure 5, demonstrate how, with multiple plausible identities, the brain attempts to retain the opportunity of interpretation, however, efforts to disambiguate the ambiguous is impossible. Experiments by Lumer *et al.* (1997) and Kleinschmidt *et al.* (1998), found the deviation of perception of a bi-stable image is accompanied by a switch in excited brain locations, thus the ambiguous image becomes even more consuming to the conscious brain.

Interpretation of surface relief is one visual processing task commonly encountered within conservation. A painting's surface, illuminated from one direction at a shallow angle (raking light) highlights protuberant relief while adjacent depressions are cast into shadow. The appearance of the incident light depends on a number of factors, importantly, the direction and angle of the light source, as well as the position of the observer. Angled illumination of a painting's surface can indicate topographical variation, but unless the incident light is viewed from all angles it may not be a reliable diagnostic methodology and may deceive the interpreter. An example of this was recently experienced at the Hamilton Kerr Institute. A painting was viewed under high magnification with a strong raking light to illuminate an area of paint loss to the white ground below. Without being the primary conservator and observing the loss with limited past experience of the painting, the angle of raking light and the reflection of which created the illusion that the paint loss was higher than the surrounding paint, when, in fact, it was an area of paint loss at a lower level to the surrounding paint. By altering the light to a different angle to change the reflection and reducing the magnification, the true surface texture became clear.

Developments in the technical study of paintings has led to the re-evaluation of previous analysis, occasionally facilitating the revelation of previously concealed information. One example is Johannes Vermeer's (1632–1675) *Girl with a Pearl Earring* (*c.*1665) (Elkhuizen *et al.* 2019). A manual tracing of the painting's crack pattern, completed during a historic examination of the picture in the 1990s, suggested that the background paint had less cracking, with the figure having cracked preferentially (figure 6); however, when the painting's topography was analysed using 3D scanning technology, the resulting image showed comparable cracking throughout the painting. Unlike the tracing, the 3D scan showed that there was no cracking boundary between the figure and the background. This demonstrates that, with the naked eye, the cracks

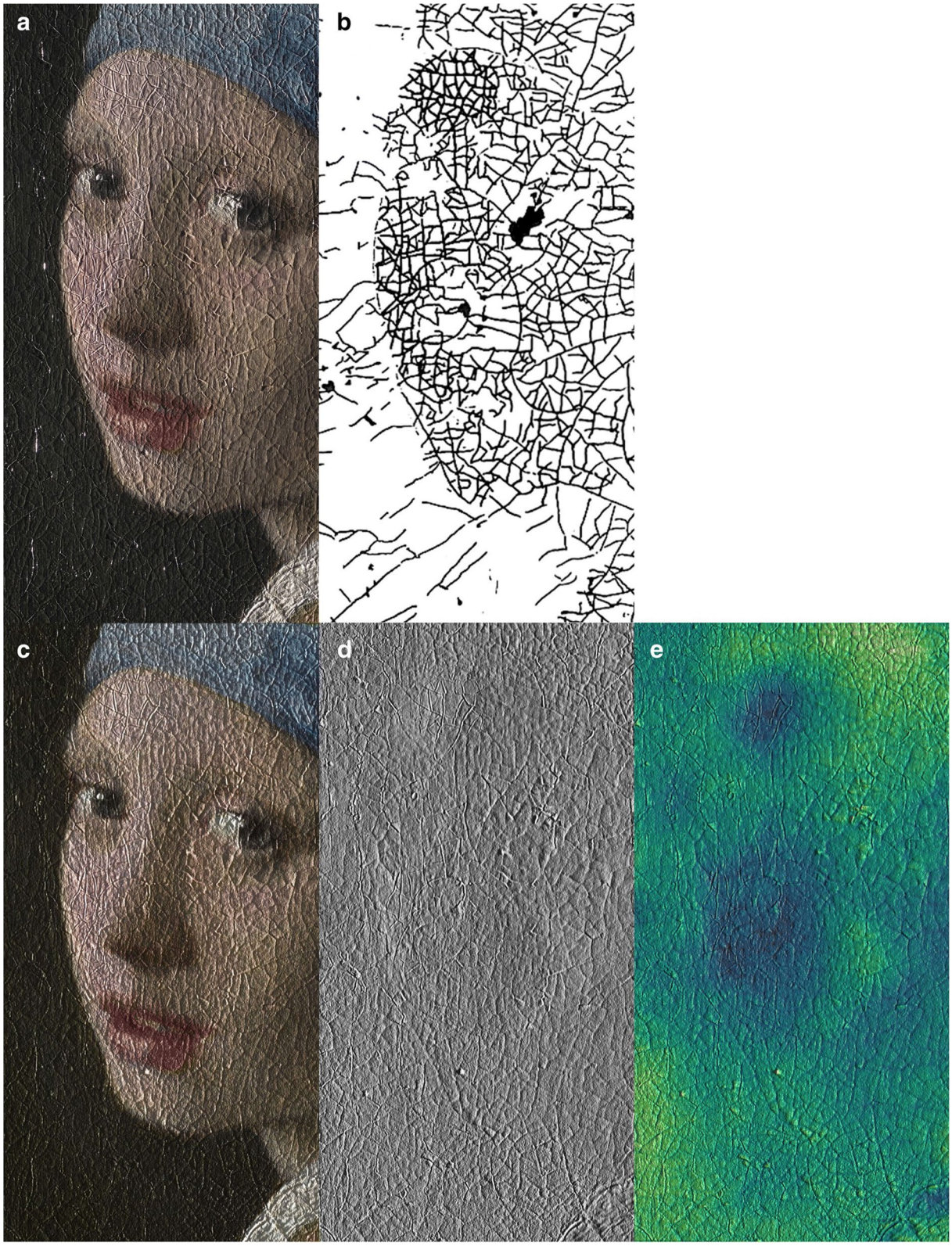

Figure 6. Detail of cracks visualised in Johannes Vermeer, *Girl with a Pearl Earring*, *c.*1665, Mauritshuis. Top row: (a) raking light and (b) manual crack tracing. Bottom row: (c) rendering of 3D data from Std-Res 3D scan using colour and topography data, and (d) rendered as a matte, white surface (e) rendered using a colour map, to enhance the height variations. Image: Elkhuizen, W.S. et al. Reproduced under CC BY 4.0 copyright licence. http://creativecommons.org/licenses/by/4.0/.

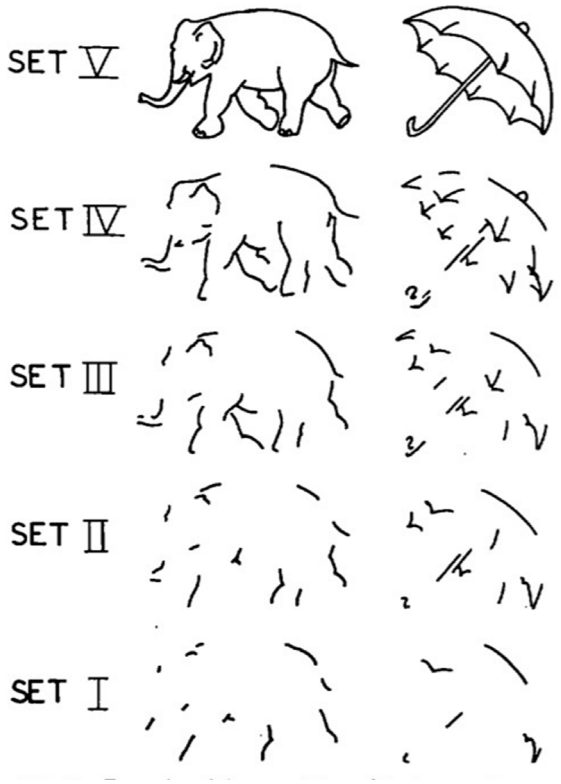

Figure 7. Two examples of Gollin test figures showing incomplete images with decreasing reference points for identification. Image: Eugene S. Gollin, 1960, *Perceptual and Motor Skills* 11(3): 290. Copyright 1960, Sage Publications. Reprinted by permission of Sage Publications.

Figure 8. Infrared reflectography detail from Barningham church (Norfolk, UK) rood screen dado. The volume of data reference points made visible in infrared is approximately 20% in both panels. The grouping of the data points on the right panel enables a confident attribution of the figure as St Margaret. Image: Courtesy of Opus Instruments.

in the darker background are less perceivable than those on the lighter figure. The lack of contrast between cracks and paint colour deceived the eye into an inaccurate interpretation of the paint's physical condition.

Image recognition and fragmentary information

The brain can extract visual data from complex surroundings and is efficient at selecting and integrating relevant data for identification, while ignoring the extraneous. Selection and grouping of visual data are closely associated with the Gestalt school of thought (Koffka 1935). Gestalt theory groups visual elements together as patterns and establishes such phenomena as proximity, similarity, symmetry and continuity to establish patterns. It posits that perception does not rely only on the physical characteristics and it cannot be broken down into individual sensory components (Sabih *et al.* 2011). Gestalt theory is also used in medical radiography where gestalt patterns guide subsequent systematic searches to differentiate and distinguish suspect features or disease (Samei and Krupinski 2019: 95).

A technical study of the anonymously painted *Judgement of Solomon* suggests the painting has been reworked (Braybrook 2016). An X-radiograph detail taken of King Solomon intermittently reveals markings distinct from the background, indicating the repositioning of the right arm and face, whereas reworking of the lower half of the figure remains ambiguous (figure 4). How much data does the human brain require for an accurate identification? During interpretation of an X-radiograph, the brain attempts to identify meaningful signals from background interference. Surveying the global image, as well as scrutinising local features, aids discrimination between signal and noise. In the *Judgement of Solomon*, the conclusions reached about the extent and date of the reworking were the result of surveying the technical images as 'the bigger picture', as well as analysing the smaller details with additional supporting information from historical research. The evidence of the reworking identified in the X-radiograph is complemented by documentary source material, confirming the reworking dates to a restoration campaign in the mid-seventeenth century. Although it was the technical images that provided evidence for the reworking, the specifics of what lay beneath the upper paint layers were not identifiable. The reworking of the king was evidently perceivable, yet individual characteristics (e.g. facial features) were not identifiable, nor perceivable, owing to the lack of visual data made visible by the X-radiograph: most likely due to the dense and blocking lead white pigment content of the overlying reworked face.

Eugene Gollin's 1960 experiment explored the extraction of fragmentary visual data (Gollin 1960) (figure 7). Results found recognition of objects increased with an increase of available reference points. Similarly to interpreting a technical image,

the mechanism involved for the Gollin test utilises the extraction of signal from noise (Shelepin *et al.* 2009: 272, 574). As concluded by Shelepin *et al.* (2009: 576), recognition thresholds for correct image recognition of fragmentary images amounts to between 15 and 25% of the figure's outline. Therefore, the fragmentary and often ambiguous data extracted from technical images requires evidence of at least 15% of the image, and potentially more if characteristic informative features are not identifiable or grouped accordingly.

In contrast and comparison to the estimated *c.*10% of distinguishable markings visible using X-radiography in the *Judgement of Solomon* example, recent advances in IR imaging technology enables operational wavelengths deeper into the IR region (0.9–1.7 μm) and capturing images at an increased resolution.[3] This has enabled the figurative depictions of a fifteenth-century British rood screen dado panel to become discernible, revealing up to an estimated *c.*20% of distinguishable data. The fragmentary painted scheme has significant historical paint loss and the remaining original has been covered with later overpaint. Yet, when imaged with IR, not only are figures perceptible, but specific saints become identifiable. Figure 8 is the IR image of two of the dado panels, with the markings made visible by IR and later digitally enhanced. The discernible markings are reminiscent of figures – probably saints, prophets or angels – which would be typical of an English medieval rood screen painting. The figure on the left remains unidentifiable; approximately 20% of the figure data is present, yet fragmentary. The right side panel also reveals approximately 20% of data, but sufficiently grouped, to suggest a female figure, holding a spear, with a dragon below. These characteristic attributes, being representative of St Margaret, resulted in the tentative identification of what would have previously been an unknown figure.[4]

Understanding the volume of data that is visible in a technical image is important to the interpretation and understanding of how ambiguous that interpretation is: human visual perception is accustomed to making judgements and 'filling in the blanks', and especially 'recognises' any patterns that resemble a face or a figure, known as pareidolia. When interpreting a technical image, the brain can easily be tricked into joining up fragmentary and random markings/signals that do not actually represent what exists in the object, and once seen it can then be very difficult to cognitively 'unsee' without significant conscious effort. If the quantity of data can be calculated, this might reveal that the number of reference points of the graph (i.e. under 15%) do not justify the existence of the shape the brain thinks it has seen. The volume and grouping of the reference points also play a role as the more space between markings gives rise to yet more chance of ambiguity and misinterpretation. Quantifying tenable data from technical images is debatable and subjective, especially for X-radiography, where the image is often obscured by background interference. Markings made visible in IR may be more identifiable, and therefore quantifiable, especially underdrawing of unambiguous representations. Assigning a quantitative figure to a fragmented image without prior knowledge of that image is problematic, however, an estimation of whether the visible data represents more or less than 15% should be achievable. The less tenable data that is available, the more ambiguous the image must be, interpretations based on limited data are therefore more likely to be influenced by assumptions and biases introduced by the interpreter. With increasing data there is an elevated probability of a more accurate conclusion.

Chance, familiarity and context

As discussed, pareidolia is the term used for human perception to 'see' a familiar object (often organic forms from the natural world such as faces) by chance in a field of vision that does not actually depict the object. Aristotle's theory on the perception of pictures discusses how *phantasia* (imagination) and likeness can facilitate identification. Leonardo da Vinci demonstrates this in his treatise, remarking (from his time with Botticelli): 'by merely throwing a sponge full of diverse colours at a wall it left a stain on that wall, where a fine landscape was seen' (McMahon 1956: 59).

A painting conserved at the HKI, designed by Peter Paul Rubens (1577–1640), painted by Jan van den Hoecke (1611–1651), and later reworked by Jacob Jordaens (1593–1678) has a remarkable physical history (Braybrook and Rose 2014). The painting, depicting the *Battle of Nördlingen* (1634–35), was one of a number of paintings displayed outside for Cardinal-Infante Ferdinand's triumphant welcoming procession into the city of Antwerp. After being displayed outside, Rubens' assistant, Jordaens, is documented as having retouched areas of the painting. A copy of the original *modello* (figure 9) (thought to be contemporary with Rubens' original) is extant and an etching made while the painting was on display also survives (figure 10). One striking difference between the *modello* and the etching is the angle of the horse's head; the sketch portrays it in profile, yet the etching depicts the head turned away from the viewer. The difference between the etching and the *modello* signals to the prospect that a change may have also occurred on the painting itself. Knowledge of the painting's physical history, combined with documentary source material, aids the interpretation of the painting. Above the current position of the horse's head is a *pentimento* partially detectable in visible light, and a little more definition is revealed in IR (figure 11).[5] Ordinarily, this would be considered an artist's reworking (the artist making alterations during the painting process). Here, the resultant IR image is

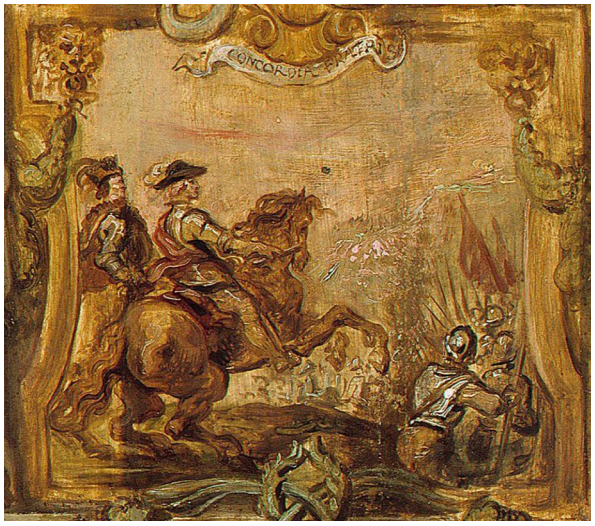

Figure 9. After Peter Paul Rubens, *The Arch of Ferdinand* (detail), *c.*1634, oil on panel, 102 × 74 cm, Rubenshuis, Antwerp. Photograph: Rubenshuis, Antwerpen © Collectiebeleid.

Figure 10. Theodor van Thulden, *Arcus Ferdinandi pars anterior* (detail), from *Pompa Introitus Ferdinandi*, Jean Gaspard Gevaerts, Antwerp, 1641, p. 156. Photograph from the British Library Collection.

Figure 11. J. Van den Hoecke/J. Jordaens *The Battle of Nördlingen*, 1634/35, detail with *pentimento* perceivable in visible light (left), and more discernible in infrared light (right). Royal Collection Trust/ © His Majesty King Charles III 2024. Photograph © Chris Titmus, Hamilton Kerr Institute, University of Cambridge.

certainly ambiguous, however, applying contextual knowledge from evidence of the painting's physical history, a correlation is made to the shape of the *pentimento*; on close examination of the IRR reflectograph, markings could be suggestive of the pointed ears of a horse and the back of a mane, akin to the composition of the *modello*. With a past knowledge of the extant modello (figure 9) (sketched as a guide for the first painting of the picture) and the etching (figure 10) (created around the time of the procession) it becomes a viable theory that the horse's head was reworked after the procession, back to Rubens' original intention (as seen in the *modello*, figure 9), by Jordaens. Without supplementary research offering historical context, this assumption would be somewhat far-fetched.

Top-down processing is largely accepted as a principle of perception. To offer comparison to medical radiology interpretation, a radiologist has access to the patient's medical history and often a suspected diagnosis, which aids the diagnostic approach, using knowledge of the patterns to look for. As with interpreting technical images, three basic steps are integral for interpreting medical images: seeing, recognising and interpreting. In the instance of the *Battle of Nördlingen*, the painting's documented contextual history and the knowledge of the conservator was influential to interpretation. A less-informed viewer of a technical image might have a different interpretation of the information than someone who has more knowledge of the context or other related artworks.

Neuroscience and visual perception

In 1970, Gregory questioned whether perceptual illusion can be explained without understanding brain function (Gregory 1970: 86). Since then, developments in neuroscience have revealed more about the functions of the brain, often using imaging techniques such as functional magnetic resonance imaging (fMRI) which detects blood flow changes in the brain (associated with neuron activation). Experiments conducted on the human brain in response to observing a bi-stable illusion suggest both higher-order areas of the brain (top-down processing, utilising past and contextual knowledge to aid visual perception, judgement and interpretation) and stimulus-specific sensory processes (bottom-up processing using only the stimulus, i.e. field of vision, to influence the perception) are involved during the interpretation of these ambiguous images, and initiate the perceptual switch (Ilg *et al.* 2008).

Top-down processing is principally established as being involved in the visual system, suggesting neuron activity of higher-order cognitive functions are influential over lower-order (bottom-up) perceptive processing; yet determining the boundaries of perception and cognition remain unclear (Teufel and Nanay 2017). Bottom-up and top-down processes are utilised when interpreting radiological images (Wolfe and Horowitz 2017) and interpretation of technical images are expected to also encounter these processes. Colour and brightness recognition chiefly involves immediate bottom-up processing, and top-down processes are associated with interpreting abnormalities (Waite *et al.* 2019). Nuanced questions may help to understand these mechanisms and were debated by Teufel and Nanay (2017), who concluded with there being no distinct boundary or neural processing point where perceptual processing ends and cognition begins, but undoubtedly, perception is subject to top-down cognitive influences. Having an understanding as to how the brain perceives an image is important when interpreting technical images in conservation. An awareness of the mechanisms used – both cognitive (top-down) processes and visual (bottom-up) processes are involved and influential to the final interpretation. The conservator should give thought to these mechanisms so there is an awareness of what brain mechanisms may be influencing their judgement.

As we learn, neuron activity in the brain is heightened, rooting neural pathways of connected dendrites. With repetition of a task, these neural pathways are used repeatedly and become engrained (so the action is almost unconscious). This enables completion of daily chores without much effort or thought such as the identification of a familiar object, for example, a chair: once the universal characteristic features of a chair are identified, neural energy is no longer needed to identify the object as a functional chair. The brain is resourceful, favouring this default circuitry over creating additional pathways (requiring energy-consuming neuronal firing), consequentially, changing an assumption or interpretation is cognitively costly.

Medical diagnostic imagery versus technical images in conservation

Throughout this paper, comparison has been made between medical diagnostic images and technical images in conservation. Can technical image interpretation be compared to medical image interpretation? The stakes are lower with the former, but the potential for interpretive inaccuracies is present in both specialities. With both professions, an imaging specialist captures the image ensuring the correct settings to achieve the clearest image. Although ultimately, the conservator (conservation) or interpreting radiologist (medical profession) interprets the results, they can both access additional information or alternative interpretations from colleagues and the documentary records. In conservation, the imaged painting is usually being treated and the conservator may have knowledge of that painting, and potentially preconceived ideas (or unconscious bias) for a particular result. Occasionally a painting is only imaged without treatment; the conservator is less equipped (with knowledge of the painting), increasing the potential for misinterpretation, further emphasising accurate perception as a top-down process. In conclusion, technical imaging can be compared to medical image interpretation, the difference being that the radiologist knows the appearance of a 'normal' (3D) body and is trained to extract abnormalities from an image. For the conservator, paintings are varied composite structures with several variables in terms of materials and methods used in their construction. Although an experienced conservator may be better equipped with knowledge and familiarity of interpreting such images, the conservator is not trained with a specific gestalt selection of abnormalities or patterns to look for. The medical industry is at the forefront of research and scientific advances and conservators could benefit from studying their philosophy, practice and mechanisms of self-reflection.

Conclusion

This paper aimed to familiarise the conservator with the complexity of visual perception in interpreting technical images. Technical images were addressed specifically as their appearance can be visually challenging and ambiguous. Greyscale images, such as X-radiographs and infrared images, can exhibit perceptually different tonal appearances of identical tones (lightness perception), leading to interpretive inaccuracies. It is estimated at least 15% of a fragmentary image is required for image recognition, as outlined in Shelepin's research using Gollin's figure tests. If an interpretation is extracted from a fragmentary or 'noisy' image, or based on

the slightest presence of a shadow or highlight, that interpretation is less likely to be accurate and should be tested through other means (more background research, consulting another conservator or using another method of visual analysis). Prior knowledge and assumptions can alter visual perception and ambiguous shapes can deceive the eye, erroneously suggesting the presence of familiar objects. The human brain is inclined to recognise faces, separating them from other objects. A ghostly appearance of a face in an X-radiograph can lead to speculation of an underlying portrait in lower paint layers; however, this interpretation might be the result of habitual neuron activity forming engrained pathways in the brain that enable us to make quick judgements on a complex visual field, rather than a considered assessment of the data actually present in the image.

The conservator must be mindful of the brain's perceptive flaws and its stubbornness to conform to an assumed – not necessarily correct – perception, so interpretation should not be adopted without objective visual evidence. Preconceived knowledge of a painting can enable enhanced understanding, but also bias a certain output. This cognitive knowledge must be used appropriately without interfering with the initial visual interpretation of the direct visual stimuli; however, using contextual knowledge in conjunction with the visual stimuli can assist and enable an accurate interpretation (engaging both top-down and bottom-up processes).

Keeping an unbiased, open mind throughout interpretation is beneficial to avoid influencing the observed perception of the image; however, the degree of 'openness' of the mind is not always possible to control consciously, therefore, collaborating with others and acquiring various opinions on the same question can increase the likelihood of an accurate interpretation. It is imperative to gather as much data as possible to avoid misinterpretation through historical contextual research and additional technical study (if applicable). This could involve, among others, further imaging in a variety of lighting conditions, as well as localised, targeted analysis such as X-ray fluorescence (non-destructive pigment analysis), sample analysis in cross-section (stratigraphy data) and polarised light microscopy (destructive pigment analysis).

Advances in neuroscience have improved our understanding of how the brain perceives direct visual stimuli. These advances bring objectivity to the innately subjective perceptive process of image interpretation and recognition. A conservator interpreting an image must be aware of the brain's processing mechanisms. The resultant image is the objective data yet the interpretation of that data by a human eye is subjective and an individual's perception of a pictorial image can contrast from another's due to the particular neural pathways that have already been built in the individual's brain. Interpretation is an art divulged from the science; the evolution of the human eye and brain do not always complement the analysis methods that are now available through conservation science. That is not to say a conservator cannot interpret accurately; however, we must be aware of our limitations as our ingrained neural pathways can deceive. An appreciation and understanding of the brain's processes should benefit conservators and increase accuracy (or increase humility) when interpreting technical images in conservation.

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Notes

1. Johannes Müller (1801–1858), James Clerk Maxwell (1831–1879) and Ewald Hering (1834–1918).
2. Ultraviolet light examination was in use from the 1920s (Macbeth 2012: 294). The earliest applied use of infrared reflectography for the examination of paintings came a decade later in the 1930s (Macbeth 2012: 296).
3. https://www.opusinstruments.com/cameras/apollo-camera/ (accessed 3 January 2024).
4. https://www.opusinstruments.com/case-studies/barningham-rood-screens-apollo-case-study/ (accessed 22 January 2023).
5. Regrettably, there is not an X-radiograph of the *pentimento*, which could have substantiated the interpretation.

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