

# Genesis of a Pre-Eyckian Masterpiece: Melchior Broederlam's Painted Wings for the *Crucifixion Altarpiece*\*

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## INTRODUCTION

Melchior Broederlam's painted wings for Jacques de Baerze's sculpted *Crucifixion Altarpiece* (Dijon, Musée des Beaux-Arts) are the earliest known dated examples of pre-Eyckian panel painting. Their significance cannot be overstated, not only for their historical value – several extant source documents describe their commission and early history – but for their extraordinary achievement as works of art.

The panels, depicting the Annunciation and Visitation to the left and the Presentation of Christ at the Temple and Flight into Egypt to the right, present a rich and nuanced display of narrative, colour and texture. They form the reverse sides of the *Crucifixion Altarpiece*, and are thus only viewed together when the altarpiece is closed (fig. 1). The retable in its open position displays de Baerze's delicately carved sculptures and tracery, comprising the Crucifixion, Adoration of the Magi and Entombment in the central panel, and five carved statuettes of saints and martyrs in each wing (fig. 2). Gilded and polychromed by Broederlam, they form a harmonious ensemble with the painted wings.

Since the mid-nineteenth century, the *Crucifixion Altarpiece* has attracted regular commentary from scholars and connoisseurs alike.<sup>1</sup> Chrétien Dehaisnes (1886), Cyprien Monget (1898) and Bernard Prost (1902-1913) were the first to publish transcriptions of contemporary documents relating to the commission.<sup>2</sup> As part of his 1976 doctoral study, *The Patronage of Philippe le Hardi, Duke of Burgundy*, Patrick De Winter explored the circumstances of the commission and significance of the retable.<sup>3</sup> In 1986, Micheline Comblen-Sonkes provided a summary of the diverse opinions on the iconographic and stylistic sources for the altarpiece.<sup>4</sup> She also published the results of the first technical examination, including remarks relating

1. *Crucifixion  
Altarpiece*,  
165.5 × 255 cm  
(with frame),  
closed position

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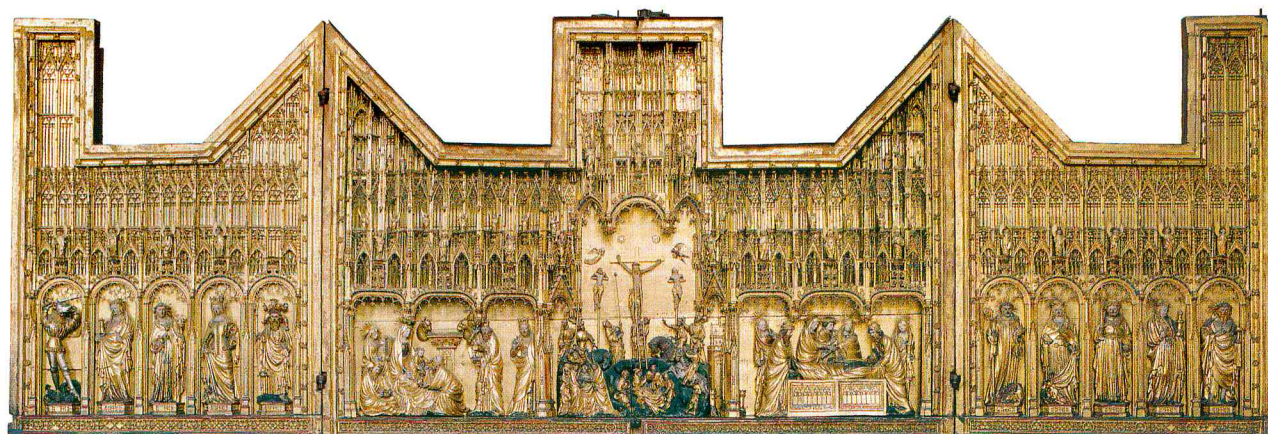












to the underdrawing and an analysis of techniques and materials by Leopold Kockaert.<sup>5</sup> Renate Prochno's recent monograph on the Charterhouse of Champmol details the artistic projects for the foundation and includes new transcriptions of the archival documents.<sup>6</sup>

Recent improvements in infrared reflectography and digital photography facilitated a new consideration of the artistic techniques in Broederlam's painted wings, as part of the Royal Institute for Cultural Heritage's pre-Eyckian research project.<sup>7</sup> The present essay examines the style and materials used in the underdrawing and paint layers and discusses the genesis of the two compositions from the initial design stage through to the final painted image. Extracts from the remarkably detailed ducal account records and from medieval recipe books for painters anchor Broederlam's techniques in their original context and give a glimpse into the workshop practice of a court artist in the late fourteenth century.

2. *Crucifixion*  
*Altarpiece*,  
166.5 × 502 cm,  
open position

#### AN ALL-IMPORTANT COMMISSION

Philip the Bold commissioned the *Crucifixion Altarpiece* for the Charterhouse of Champmol, a Carthusian monastery just outside Dijon. The letters 'P' and 'M' designating the patron and his wife are subtly integrated into the punched floral designs on the central frame member uniting the two wings (fig. 3). For the Duke of Burgundy, the Charterhouse's founder and benefactor, the institution was particularly important, for it was to house his family tombs.<sup>8</sup> From its start, the ambitious project for the decoration of the church, cloisters and monks' living quarters involved some of the foremost artists of the day. These included the Duke's official sculptors Claus Sluter and Jean de Marville, sculptor Jacques de Baerze and painters Jean de Beaumetz, Jan Maelwael and Melchior Broederlam. Beaumetz, the Duke's court painter in Burgundy until his death in 1396, made twenty-six small devotional panels for the Carthusians' cells and altarpieces for the chapel, whilst Maelwael, taking over Beaumetz's duties in 1397, created five large panels for church altars and polychromed Sluter's well. Broederlam, the Duke's painter and *valet de chambre* for Flanders since 1386 was entrusted with the creation of two





3. Frame: initials of Philip the Bold and Margaret of Flanders

important altarpieces for the church, in collaboration with Jacques de Baerze. These northern-based artists were the logical choice for this particular task, since the Duke required the altarpieces to replicate, respectively, two existing altarpieces, one located in his church in the Flemish town of Dendermonde, where De Baerze had his studio, and the other in the Bijloke Abbey in Ghent.<sup>9</sup> Ypres, Broederlam's place of work, was not far off.

De Baerze and Broederlam's *Crucifixion Altarpiece* and the *Altarpiece of Saints and Martyrs* took eight years to complete.<sup>10</sup> The earliest document relating to the commission is an account register for the works of the Charterhouse, dated 25 May 1390. This acknowledges the payment and receipt of an advance of two hundred francs out of a pre-agreed total of four hundred francs to Jacques Macharus of Dendermonde, on behalf of Jacques de Baerze, for the latter to start work on the sculpted figures and carved tracery parts of the two altarpieces and purchase the necessary materials.<sup>11</sup> A further advance of thirty francs, via an intermediary, Copin Macharus, was made on 15 April 1391.<sup>12</sup>

In August 1391, the retables were transported from De Baerze's studio in Dendermonde to Champmol using the services of cart driver Hue Manin, for which



the latter was paid thirty francs.<sup>13</sup> The stated purpose of this long trip was 'for the completion of the said altarpieces by Jacques de Baerze to his satisfaction'.<sup>14</sup> De Baerze was then advanced a further one hundred and thirty-six francs on 5 October 1391 for his work on the two retables.<sup>15</sup> On 24 February 1393, another cart driver, a certain Daniel Daens from Dendermonde, was paid thirty-six francs to take them from Dijon to Ypres to be painted.<sup>16</sup> The last payment to de Baerze was made on 16 November 1398, for carrying out finishing touches to his collaborative work with Broederlam for the Charterhouse at Dijon.<sup>17</sup>

Broederlam's workshop in Ypres was clearly the destination for the altarpieces on their return from Dijon in February 1393. De Baerze probably made final touches to his sculpted parts whilst Broederlam worked alongside on the painted panels. The first surviving mention of Broederlam's contribution to the project is a payment order of eight hundred francs – subsequently crossed out – for art materials for gilding and painting two altarpieces for the Charterhouse. The account mentions that the sum conforms to a pre-agreed amount negotiated in Paris on the last day of February 1393.<sup>18</sup> This was replaced with a very similar document for the accounting period August 1394 – February 1395, recording a payment of the same amount to Broederlam for the purchase of precious materials:

A Melchior Broederlam, peintre de mons[eigneur], demourant a Yppre de marchié a luy fait pour or, couleurs et aultr[re]s estoifes a dorer et paindre II tables d'autel ouvr[ees] de bois a ymages et tabernacles de maçonnerie lesquell[es] tables maistre Jaques du Bars ouvr[ier] d'entailleure demour[ant] a Thenremonde a faites et delivr[ees] p[ar] l'ordonn[ance] de mondit s[eigneur] aud[it] Melchior po[ur] les paindre et mett[re] en l'église des chartreux lez Dijon [...] Po[ur] ce: VIII<sup>e</sup> frans.<sup>19</sup>

The same payment order recalls that Broederlam was personally liable for the successful completion and delivery of his work, according to the agreement of February 1393:

[...] p[ar] laquele ledit Melchior oblige luy et ses b[ie]ns env[er]s mondit s[eigneu]r sens fraude et malengien de rendre et delivr[er] ycell[es] II tables peintes et assouvies b[ie]n et nettem[en]t audit de ouvr[ier]s ayans en ce cognoissance.<sup>20</sup>

The Duke may have visited Broederlam's studio at some point to see for himself the work in progress, as the ducal accounts for 1393–1394 record the payment on 18 February 1394 of a gratuity of 'V frs. XII s. VI d. t. [five francs, twelve sol, four denier tournois]' to Broederlam's valets for work on an altarpiece to be sent to the church of the Charterhouse of Dijon.<sup>21</sup>

Little more of consequence is recorded until 2 August 1399, when Broederlam was reimbursed 'V franz IIII g[ro]s' for the cost of transporting the two altarpieces from Ypres to the Church of the Charterhouse at Champmol and packaging materials.<sup>22</sup> These included sixty elm planks for making packing boxes fixed with nails and twenty-two ells of waxed cloth for protection from the rain. In Burgundy, ducal receipts record how various local craftsmen worked on the preparation of the altars in the chapel of the Duke de Berry and the Chapterhouse, where the De Baerze-Broederlam retables were to be installed.<sup>23</sup> A stoneworker,



Belin de Comblanchien carried out masonry work for the mounts<sup>24</sup> whilst Michiel Cornu was responsible for the carpentry, aided by assistants.<sup>25</sup> Huguenin Le Chapux, for example, worked with Cornu for four days on the clerestories of the altarpieces and Jehan de Chalon and Monin de Prenoiz helped him make pieces of wood on which to place the retables. Jehan de Tonneurre, a lock maker living in Dijon, provided eight dowels to be driven into stone for the secure attachment of the altarpiece in the Chapterhouse.<sup>26</sup> Precautions were also taken to ensure the future conservation of the precious works. On 22 November 1399, Robin Gauthier, a tradesman living in Joigny, was paid for supplying linen canvas for the wooden cases of the altarpieces as well as for ten ells of coarser hemp canvas to place between the cases and the wall to prevent wood-rot.<sup>27</sup>

When the much-anticipated altarpieces arrived at the Charterhouse, they were received by a committee of notables, including the Duke's treasurer Josset de Halle, receiver-general of finances Amiot Arnaut, court sculptor Claus Sluter, court painters Jan Maelwael and Guillaume de Beaumetz (nephew of Jean de Beaumetz) and goldsmith Hannequin de Haacht; a certificate dated 14 August 1399 acknowledges this historic event.<sup>28</sup> The *Crucifixion Altarpiece* was placed in the Chapel of Saint John (founded by the Duke of Berry), while the *Altarpiece of Saints and Martyrs* was positioned on the altar of the Chapterhouse.<sup>29</sup>

Broederlam and de Baerze's commission was one of the highlights of Philip the Bold's grandiose plans for the Charterhouse of Champmol. From the surviving documents, it appears that no logistic or financial hurdles were too great concerning the execution and delivery of the two altarpieces – including three long and potentially perilous journeys for the retables from Dendermonde to Dijon, from Dijon to Ypres and finally from Ypres to Dijon. A month after their installation, on 12 September 1399, Philip the Bold acknowledged his satisfaction with Broederlam's loyal service during the commission, granting him a bonus of two hundred gold francs over and above his yearly salary [also two hundred francs] for additional trips, expenses associated with the altarpieces and also for 'the good and pleasing work he did and still does day after day.'<sup>30</sup>

#### BROEDERLAM'S PAINTED PANELS: CONDITION

The *Crucifixion Altarpiece* has survived largely intact, despite being moved several times in its history. The painted wings and gilded frames are in their original state, although many of the carved figures on the interior sculpted scenes, together with their frames, have been re-polychromed and re-gilded. Inevitably, the painted panels have been affected by exposure to daily and seasonal cycles of humidity, as well as suffering accidental damages over the years and also minor alterations in appearance occasioned by former restoration treatments.

During the Second World War, the paintings were evacuated to the Châteauneuf in the Côte d'Or, where in June 1943 they underwent a documented conservation treatment. In his written report, Lucien Aubert, former restorer for the 'Musées Nationaux et des Monuments Historiques' describes consolidating paint flakes around knots in the supports and at the joins between the planks, cleaning dust from the surface of the paint, inpainting new losses and correcting old retouching



along the joins.<sup>31</sup> He also mentions tinting losses in the gilded sculptures with watercolour, and where necessary, filling and retouching losses in the frames. Aubert's examination report from 29 May 1953 details the presence of several small new areas of flaking paint, mainly along the upper join of the background as well as lifting paint along an age crack similar to that observed in 1943. To reduce vibrations caused by the opening and closing of the wings, ball bearings were placed in the hinges of the wings.<sup>32</sup> Comblen-Sonkes published the results of examinations from April 1975 and July 1980. Small areas of lifting paint were observed over most of the surface of the left panel and around the points of original pegs attaching the sculpted figurines on the interior sides of the wings. Further small losses were attributed to tractions caused by a gelatine-containing protective layer.<sup>33</sup> Certain joins were noted as opening up along their entire width and it was also pointed out that the right panel was in a much better condition than the left.<sup>34</sup>

The present author examined the painting in August 2006. When viewed from the front, it can be seen that most of the horizontal boards present a slight convex warp (fig. 4). This intensifies the play of reflections between the gilded and non-gilded surfaces, drawing attention to the material nature of the wooden support. Several joins have moved slightly, cracking the ground and paint above them (fig. 5 a-b). There is also a horizontal crack in the third plank from the bottom in the right wing measuring approximately 24 cm. At the junction of the panel with the frame on the left edge of the right wing, the paint has ruptured revealing the original canvas reinforcement, torn as a result of the same tractions that caused certain joins to open. The gilded frames, assembled with pinned corner tenon joints, appear original, although the lower member of the right wing has been replaced. The frames are replete with original tooling, although some areas may have been regilded and retooled.<sup>35</sup>

The paint layer is in an excellent condition overall, taking into account the age of the altarpiece. In both panels, there are numerous small losses, the newer ones revealing the underlying ground layer, the older ones mostly retouched. The retouching does not disturb the reading of the image at a distance, but on closer inspection discoloured and clumsy passages detract from the quality of the original paint. Remnants of wax from a consolidation treatment are also somewhat disturbing. In each wing there is a small filled and retouched loss at the same height, probably due to candle burns, approximately 78 cm from the bottom edge of the painted surface.<sup>36</sup> Overcleaning is responsible for the worn appearance of certain glazes and parts of gilding revealing the warm orange-red bole layer underneath the gold. The left part of the Virgin's halo in the Presentation was probably re-gilded during



4. Right wing lit from the front, revealing the slightly convex boards and areas of gilding





5a. Right wing:  
linen interleaf,  
ruptured between  
panel and frame

a former restoration, as some of the original tooling is no longer visible and the gold leaf gives a slightly different sheen. Nonetheless, the majority of the delicately tooled and painted gilding remains intact.

In certain areas, particularly on the left wing, there is an incongruous, semi-transparent yellow-brown layer, already remarked upon in the 1986 *Corpus*.<sup>37</sup> Crudely applied with a brush, the coating overshoots motifs in many places, and sometimes beads up at the ends of strokes. It is particularly disturbing in areas of lighter paint, where it flattens original modelling and disturbs the overall tonal balance. Its presence on certain of the architectural structures adversely affects the painting's sense of recession. Since it settles into old losses in many areas, this coating was almost certainly applied during a former restoration, most likely as a protective layer; it has more than likely darkened over time.<sup>38</sup>

#### PREPARATION OF THE PANELS

Broederlam's wooden shutters were made ready for painting using techniques and materials typical of fifteenth and sixteenth century Flemish painting. Each wing comprises five horizontal planks, with two shorter sections for the upper rectangles and triangles (fig. 4).<sup>39</sup> The wood is oak and the planks approximately 1 cm thick.<sup>40</sup> The boards were most probably glued together, with or without dowels within the thickness of the planks.<sup>41</sup> The frames would have been made around the same time as they are linked to the panels by a linen interleaf (see below) and are similarly grounded and gilded.

5b. Left wing: linen  
interleaf, visible  
through crack in  
paint





*Planing and Scraping*

The newly joined panels were most likely planed or scraped down in some way to ensure as flat a surface as possible. A ducal account of 1398 refers to the purchase of iron scrapers by Jan Maelwael for scraping down panels for altarpieces of the church of the Charterhouse of Champmol:

A Jehan Perrenin Fevre et Gilet le fontenier demour[ant] a Dijon po[ur] la vendue et delivrance de XXXVI pieces de racles de fer acerees f[ai]tes par ledit Jehan et baill[iees] a Jehan Maluel paint[re] et varlet de chambre de mons[eigneur], pour racler plus[ieur]s tables et tableaux que ledit peintre fait pour les autelz de l'egl[is]e desdiz chartreux, XLIIIs. t.<sup>42</sup>

This was standard practice during the period; Theophilus's *De Diversis Artibus* (early 12th century) also refers to the use of an iron plane for the purpose of rendering panels smooth for altarpiece panels and doors:

[...] they should be levelled with an iron spokeshave [*planatorio ferro*] which is curved and has an edge on the inner side and two handles so that it can be used with both hands. With this, panels, doors and shields are planed down until they are perfectly smooth.<sup>43</sup>

*Linen Interleaf*

A plain weave linen canvas was glued directly onto the surface of the panels, extending onto the frames.<sup>44</sup> Woven fibres are visible in losses along joins and cracks and at the edges of the panels where the fabric and ground layers have ruptured (fig. 5a-b). However, the absence of open losses in the flat parts of the frames makes it impossible to assess whether or not the canvas is also present in these areas. The linen canvas would have hidden the wooden pegs attaching the wooden tracery on the other sides of the panels, smoothed out any remaining irregularities in the wood, helped adhesion of the ground and provided some physical continuity with the frames.<sup>45</sup> This step is also advised by Theophilus for the preparation of the panels of altars and doors:

These are covered with the untanned hide of a horse, an ass or a cow, which has been soaked in water until the hairs can be scraped off; then some of the water is wrung out and, while still damp, it is stuck on with the casein glue. If you have no skins for covering the panels, they can be covered with ordinary unused cloth in the same way and with the same glue.<sup>46</sup>

Cennino Cennini's *Il Libro dell'Arte* (late 1390's), also recommends the application of linen cloth to panels prior to the application of the ground and paint layers, but says the cloth should be old and thin.<sup>47</sup> He advises sizing the wood panel first with several coats of glue made from clippings of sheep parchment, dipping pieces of linen in the best glue size, and then spreading on the cloth by hand onto the panel surface.<sup>48</sup> His advice is borne out by practice; most Italian paintings in the fourteenth century have a canvas interleaf between panel and ground.



The ducal accounts for the Charterhouse of Champmol for 1399 allude to Jan Maelwael's use of a textile interleaf for panels and altarpieces:

A Guiot Poissonn[ier] marchant demour[ant] a Dijon pour les caus[es] et p[ar]ties cy apres esc[ri]ptes, par lui baill[ees] et delivr[ees] [...], pour conv[er]tir en la peinture et façon de plus[ieur]s tables et tableaux d'autel fais et a faire par ledit Jehan Maluel pour l'egl[is]e desdiz chartreux audit Champmol [...] Item pour XVI aulnes de toile blanche de lui pour couvrir et celer sur lesd[i]tes tables et tableaux pour paindre sur ycelle au p[ri]s de II s. XI d. l'aune: XLVIs. VIII d. t. [...]. Item pour III<sup>c</sup> de cloux a clavin po[ur] cloer les toilles afin de paindre sur ycelles plus aisiem[en]t: I I s. VI d. t.<sup>49</sup>

In pre-Eyckian painting, the paucity of surviving works makes it impossible to assess whether a textile interleaf was indeed widespread in the North, although occasional cases have been observed.<sup>50</sup> It is, however, common to find paintings where small pieces of cloth have been used to reinforce joins or cover defects prior to priming.<sup>51</sup> In this region, the use of oak – a stable wood with few natural defects – would make a cloth lining less necessary than in Italian Trecento painting, where the more reactive wood, poplar was the preferred support.<sup>52</sup>

#### *Chalk-Glue Ground*

A chalk ground layer, leanly bound in animal glue, was applied over the linen canvas and frame, probably in several layers.<sup>53</sup> Its thickness, estimated at between 1–2 mm,<sup>54</sup> completely masks the canvas texture. A chalk-glue ground layer is typical in Flemish, and indeed most northern panel painting from the late fourteenth century to the early part of the seventeenth century, unlike Italian painting of the same period, where gesso (calcium sulphate) was the norm.

The brushes used to apply the white ground were likely made from hog hair. Cennino Cennini recommends a soft bristle brush made from hog hair for the application of the *gesso sottile* on panels.<sup>55</sup> It is likely that homemade brushes, using bristles purchased from a local supplier, were employed for the routine task of ground application in Broederlam's studio. A 1399 ducal account from Champmol attests to the purchase of raw materials by Jan Maelwael to make this type of brush in the context of wall painting and the making of panels and altarpieces:

A P[er]renot Barbisey m[ar]chant demour[ant] a Dijon pour les causes et parties cy apres esc[ri]ptes, par lui baill[ees] et delivr[ees] a Jehan Maluel peintre et varlet de chambre de mons[eigneur] [...], pour conv[er]tir en l'emprimure et peinture du parlour pres du grant cloist[re] audit Cha[m]pmol, du portal de lad[i]te egl[is]e au costé p[ar] dev[er]s le petit cloist[re] pres des sieges des conv[er]s, de plus[ieur]s tables et tableaux d'autel, et de plus[ieur]s aut[re]s chos[es] par ledit Maluel [...] pour soyes de porc pour faire broisses, et fil pour loyer lesd[i]tes broisses: XLV s. t. Item pour I quart[er]on de cire pour cirer le fil desd[i]tes broisses: XIII d. t.<sup>56</sup>

Once dry, the ground layer would have been smoothed down to ensure an even surface for drawing and painting. Theophilus mentions the plant 'uocatur asperella' in this context, most likely identifiable with horsetail (*Equisetum arvenis*), a common vascular plant whose stems contain silica:



Then spread this [the gesso] very thinly over the hide with a paintbrush, and, when it is dry, spread it rather more thickly and, if necessary, apply a third coat. When it is completely dry, take the plant called shaveweed, which grows like a bulrush and is knotty. You gather it in the summer, dry it in the sun, and rub this whitening with it until it is completely smooth and shining.<sup>57</sup>

The third book of Eraclius, *De coloribus et artibus romanorum* (thirteenth century) also advises the use of this naturally abrasive plant for rubbing down wood prior to applying paint:

Whoever wishes to adorn any wood with divers colours, let him hear what I say. First make the wood very flat and smooth by scraping it, and lastly by rubbing it with that herb which is called shave-grass.<sup>58</sup>

Alternative abrasives might have been cuttlefish or sharkskin.<sup>59</sup> Cennini suggested a metal scraper for this purpose that he referred to as a 'raffietto', followed by the use of a spatula with a straight edge.<sup>60</sup>

#### *Workshop Assistance*

Broederlam would have had one or more apprentices and assistants for the routine preparation of panel supports, making brushes, preparing and applying grounds, grinding pigments and mixing paints.<sup>61</sup> He may also have had assistance painting and gilding on occasion. There are occasional references to these helpers in the ducal accounts. Josset de Halle's account from 15 February 1390 to 2 May 1392 for the Château of Hesdin – a property Broederlam supervised from 1395 until at least 1391 – records payments to Broederlam for the wages of several 'workmen' painters for gilding an arbour:

A Melchior Broederlam, peintre et varlet de chambre de monseigneur, pour le salaire de plusieurs ouvriers peintres qu'il mist et qu'il emploia par plusieurs journées pour peindre une gloriette au chastel de mondit seigneur a Hesdin de plusieurs PP d'or de bature et d'autres devises, par mandement et quittance données le dernier jour d'aoust mil CCC IIII<sup>xx</sup> et onze, XI fr. IIII s.<sup>62</sup>

Concerning Broederlam's work for Champmol, the first mention of assistants is on 18 February 1394, when Philip the Bold paid a gratuity to his valets for their contribution to an altarpiece for the Charterhouse church.<sup>63</sup> At some point during 1393-1394, Hue de Boulogne was sent as an apprentice to Broederlam in Ypres with the Duke's financial support.<sup>64</sup> Broederlam presumably knew of the boy; his father, Laurens de Boulogne, had worked at the Château of Hesdin for many years.<sup>65</sup> On 12 September 1399, the accounts record that 'Melchior worked with several others of the said profession [for a] long period of time.'<sup>66</sup>

Payment records concerning workers assisting Jean de Beaumetz and his successor Jan Maelwael at the Charterhouse of Champmol from 1387-1403 give more details as to their particular roles and respective wages. At the lower end of the scale, local painters were employed for a specific number of days to grind colours,



the usual rate being two 'gros' per day; a certain Jan Gentilz, for instance, was paid eight francs and ten 'gros' for fifty-three days' work at two 'gros' per day for grinding colours for Beaumetz in 1388.<sup>67</sup> Local painters were employed at a higher rate – usually three or four 'gros' per day – for assisting the Duke's painters in painting or gilding. For example, in 1392 'Guillaume of Francheville painter residing in Dijon', was paid forty-and-a-half francs for one hundred and sixty-two days at three 'gros' per day for working with Jean de Beaumetz on several painted works in the oratory and chapel.<sup>68</sup> Eight years later, a ducal receipt from 1400 relates how an identical rate was paid to 'Guillaume the painter residing in Dijon' for gilding a stone cross for Jan Maelwael. The account also states that a valet was paid one-and-a-half 'gros' per day to help grind the colours for the cross's priming layer.<sup>69</sup>

### THE UNDERDRAWING

While Broederlam almost certainly delegated the making of the panel and application of the canvas and ground layer to assistants, the underdrawing stage was most likely his own personal responsibility. This assumption is based on an analysis of the underdrawing, which reveals deft and often bold handling in a range of drawing materials and techniques, as well as presenting subtle modifications during execution.

#### *From Construction Lines to Outlines: Laying in the Architectural Framework*

**Markings:** It is probable that the first markings Broederlam made on the smooth white ground were those situating architectural structures. The artist progressed through this stage in two phases. First, using a dry-medium drawing material with a soft, rounded tip, possibly a metal stylus, he ruled on a series of diagonal, vertical and horizontal construction lines for the architectural framework (fig. 6a-b).<sup>70</sup> These often cross the figures and sculptural motifs, which were drawn in later. The positions of vaults, columns and capitals are indicated, the lines often overshooting the actual motifs (fig. 7). In the Presentation in the Temple, the most important guides are the vertical 'plumb' lines for the temple structure: a central line running from the very top of the temple to the bottom of the stone steps marking the exact vertical centre of the frontal arch, lines delineating the shafts of the main columns, and a line marking the outer right edge of the building extending down into the grassy foreground (to the left, the frame occupies the place where a line would have been). In the Annunciation, initial markings include ruled horizontal lines locating the upper and lower extent of the rose trellis in the interior courtyard garden – the upper edge appearing lower down in the final paint layer – and vertical and horizontal 'grid' lines for the pinnacled mulioned windows surmounting the entablature of the tiled passageway (fig. 8). In more than one place, the artist's rush to establish the basic construction led to several sets of lines for the same outline and inadvertent slipping of the drawing instrument (figs. 7 and 10). With the same drawing tool and at around the same time, Broederlam indicated rough double circles in the entablature of the Presentation scene (fig. 10).





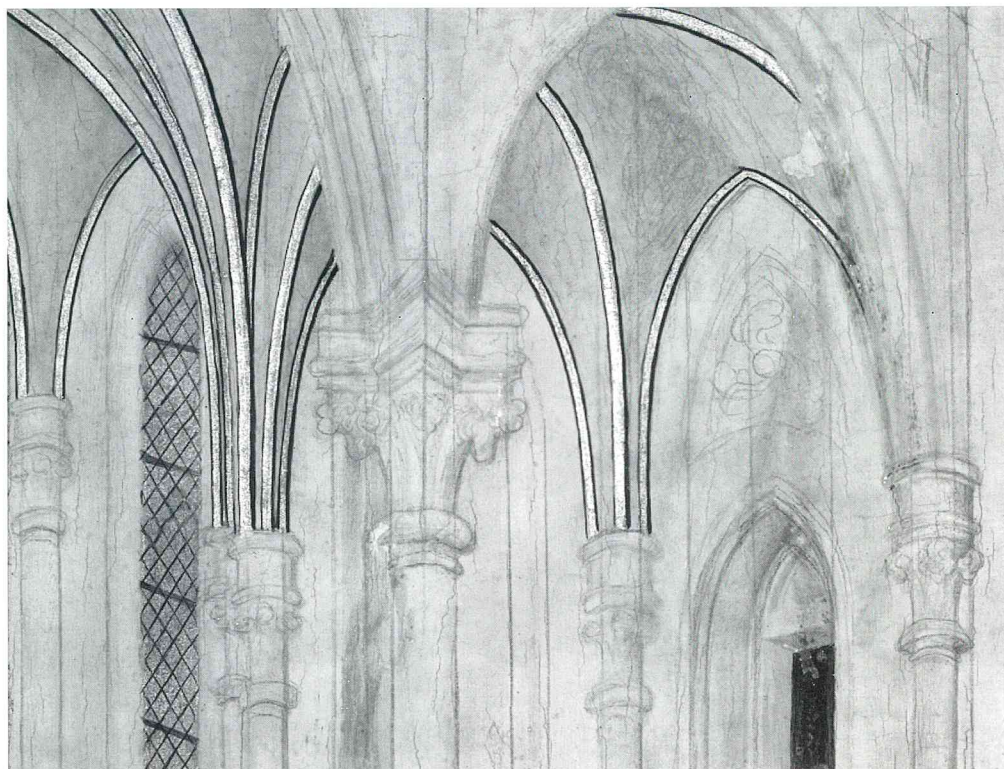
6a. Infrared reflectogram assembly (IRR), left wing: ruled construction lines and underdrawn outlines annotated in red, assumed continuations of these markings in pink



o. IRR, right  
ing: as in 6a.







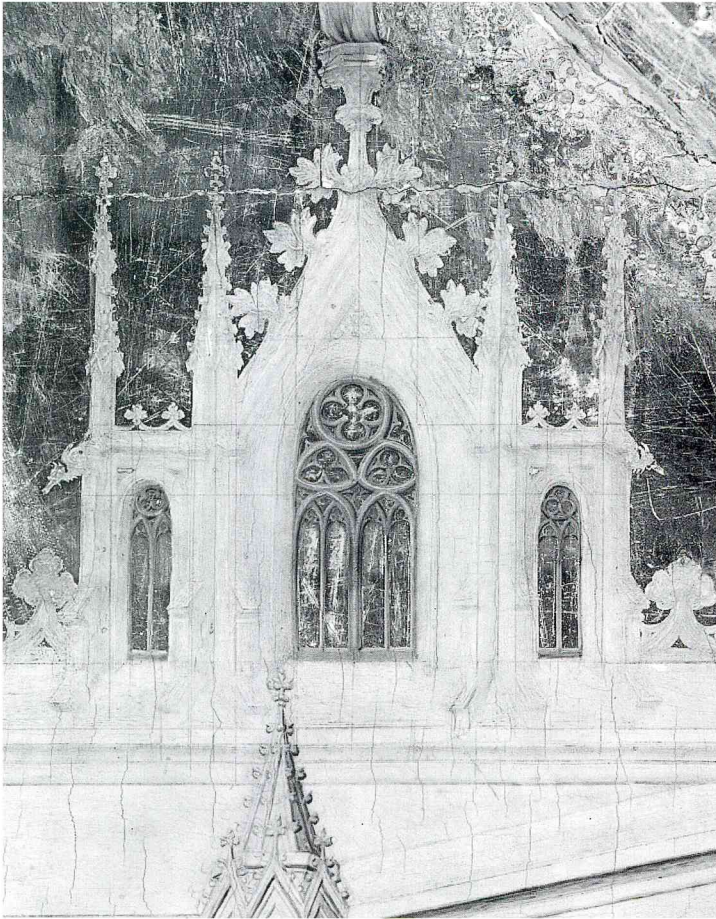
7. IRR:  
Presentation, temple  
vaults and columns

For the second phase, Broederlam continued to mark in the architectural elements, adjusting some and adding further detail. Like the first stage – and sometimes indistinguishable from it – he executed straight lines with the aid of a ruler, but any curved outlines and details of architectural mouldings were carried out freehand. For the ribs of the dome, he employed his wrist as a pivot rather than resorting to any mechanical aids; curved lines result from several sweeps of the drawing tool, sometimes gone over more than once (fig. 9). In the Presentation in the Temple, the artist replaced the double circles in the entablature with a carved, inset frieze depicting an undulating oak foliage pattern contained within rectangles (fig. 10). Broederlam also added a triangular insert with a carved leaf pattern to the wall arch at the right of the temple interior (fig. 7), later dropped during painting. In the Annunciation, he reduced the width of the cornice of the covered passageway to prevent it from touching a decorative curved window head to the left. Finally, the artist marked areas of deep shade with scribbled or hatched lines.

Where architectural structures are profiled against areas of gilding, the artist passed over the drawing lines with a sharp stylus or needle (see below, 'Marking out the areas to be gilded' and fig. 23).

**Drawing Materials:** The soft, dark grey construction lines for placing the architectural structures are in a dry, rather than liquid medium. The lines have an even density and width, taper slightly at the ends of strokes and never culminate in a droplet. Rather than conforming to the surface texture, as would be expected from





8. IRR:  
Annunciation,  
pinnacled windows

Ancora per disegnare ho trovato certa pria [pietra] nera che vien del Piemonte, la quale è tenera pria, et puola aguzzare con coltellino, ch'ella è tenera, e ben negra [nera], et puoi ridurla a quella perfezione [perfectione] che il carbone: e disegna secondo che vuoi.<sup>75</sup>

Broederlam could have mounted a small block of black chalk in a wooden or metal holder, and sharpened it for use.

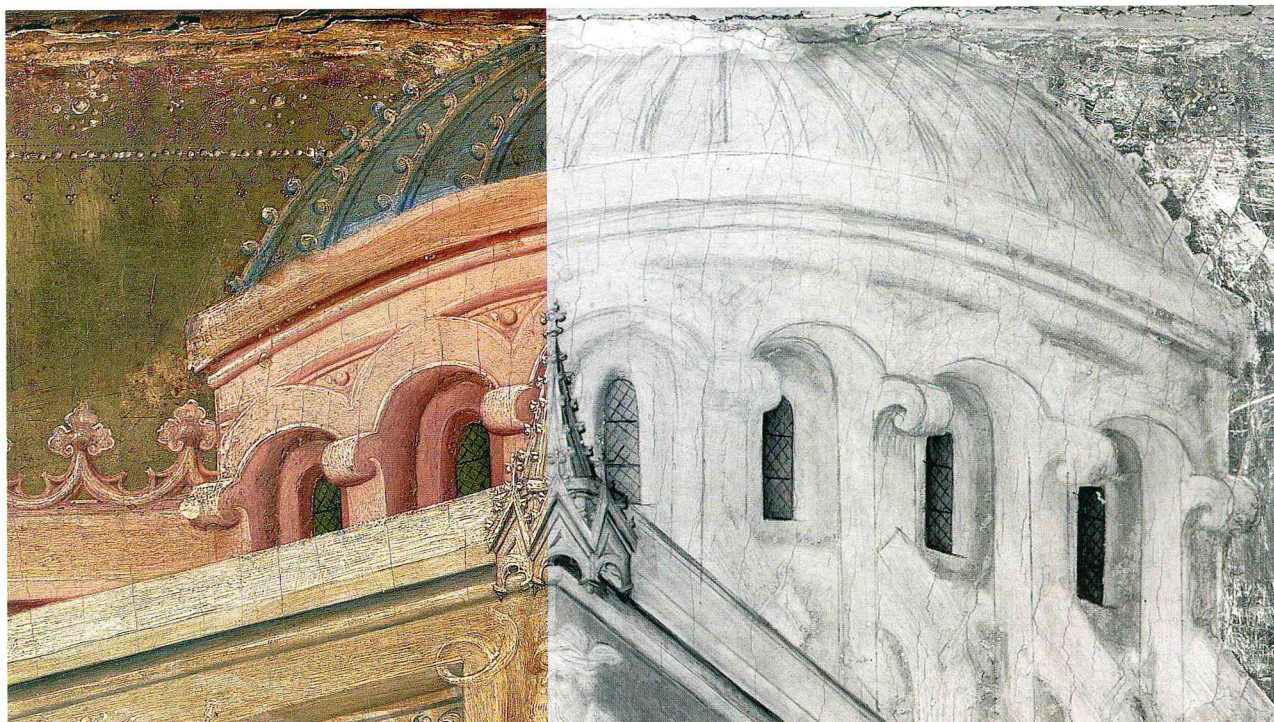
The freehand lines are clearly executed in a dry medium, and again both metal point and black chalk remain possibilities.

**Perspective:** The perspective of Broederlam's two architectural scenes, although not based on any mathematically coherent system such as one point perspective, was carefully planned to enhance the meaning of the narratives.<sup>76</sup> In the Presentation in the Temple, the perspective framework of the temple focuses attention on the baby Jesus. The vertical plumb line dissects the baby's head and orthogonals from the receding floor tiles tend to converge at the junction between Mary and Jesus's hands. The orthogonals leading out from the upper and lower sides of the structure, if joined and a horizontal line drawn between them, also dissect Jesus's

a liquid medium, markings skip the low points. Close inspection reveals minute clumps of drawing material of random size and shape. These observations suggest the use of a metal stylus.<sup>71</sup> Silver, brass, lead and lead-tin points are recommended by Cennini for practicing drawing on prepared panels, parchment or paper.<sup>72</sup> Alcherius mentions gold, silver, bronze or brass for the same purpose.<sup>73</sup> Scientific analysis of the drawing lines would be needed for confirmation.

In the entablature of the temple in the Presentation, the modifications to the initial layout were also made in a dry, grey-black drawing medium. The markings are finer and slightly more absorbent of infrared than the first drawing lines.<sup>74</sup> (fig. 10). This could suggest a carbon-based drawing medium such as black chalk, but a fine metal point is also possible. Black chalk is a naturally occurring mineral deposit of clay and carbon and sometimes described as carbonaceous shale. It is one of the oldest materials used by artists for drawing. The earliest known written reference is by Cennini in the late thirteen-nineties:





head. In the Annunciation, the receding orthogonals of the tempietto, when similarly joined, draw the eye towards Mary's hand gesture and book.

Broederlam's manner of articulating space and volume is similar to that in earlier Italian Trecento painting, such as Ambrogio Lorenzetti's *Presentation at the Temple*, 1342 (Florence, Galleria degli Uffizi).<sup>77</sup> As with Lorenzetti, Broederlam's use of receding orthogonals in the architecture and tiled floors helps establish a credible setting for two of the four narrative scenes. The angled structures also echo to some extent the triangular sections of the panel supports, linking the paintings' compositions to the unusual shape of the retable.<sup>78</sup> The source(s) of Broederlam's primitive perspective settings is unknown; the temple may have been inspired by the strikingly similar motif in the great Apocalypse tapestry series in Angers castle in Anjou (c. 1375);<sup>79</sup> for the architecture as a whole, he may have been aware of the style through unrecorded travels to Italy or elsewhere, from manuscripts or from the record drawings of fellow artists (see below, 'The role of preparatory drawings and model books'). Alternatively, he could simply have copied an existing composition. Jacques de Baerze's first advance payment receipt states that the *Crucifixion Altarpiece* should be a replica of an already-existing altarpiece. However, this instruction may well have only applied to the overall conception of the altarpiece and its subject matter, leaving Broederlam the freedom to compose the paintings for the wings as he saw fit.

9. IRR and normal light: Annunciation, dome

10. Digital infrared photograph assembly: Presentation. Two phases in underdrawing: initial markings, registering as soft and pale (e.g. double circles, horizontal ruled lines) and later corrections, appearing finer and darker (e.g. undulating frieze pattern, horizontal ruled lines)







### *Drawing in the Figures*

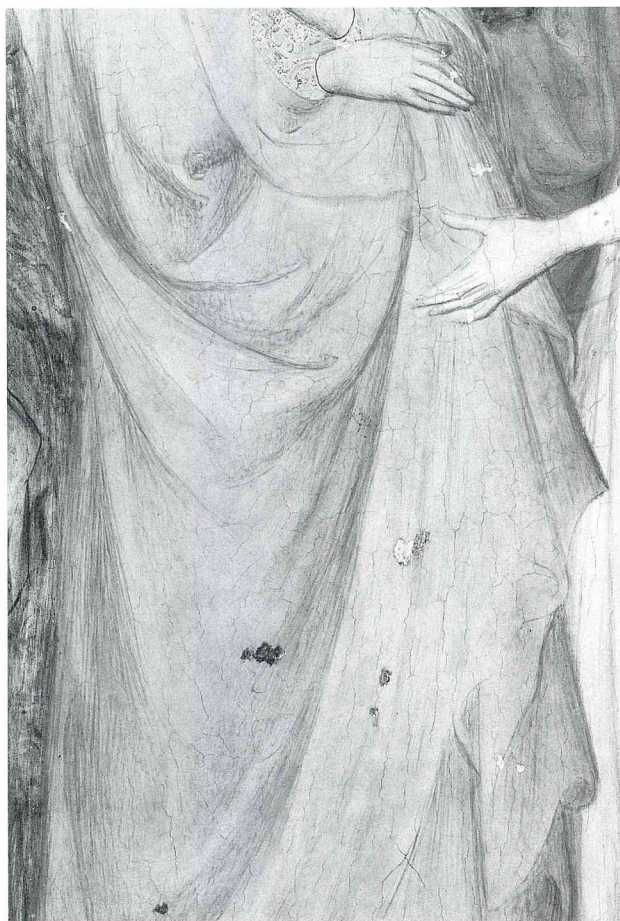
It is likely that the figure groups were drawn in soon after the architectural framework and prior to the landscape background. The buildings would have provided the 'stage set' in and around which the characters could be advantageously positioned, and the landscape would have been drawn around later as a backdrop.

**Markings:** Broederlam drew the figures in a liquid medium applied with a brush, indicating principal outlines and carefully mapping out drapery folds and zones of light and shade (fig. 11a-b). He varied the level of detail according to the importance of a motif and its position in the composition; the decorative floating angels in the upper left and right are, for example, less detailed than the main characters.

In the figures, outlines are lively, accurate and sensitive to small detail. Joseph's boots provide an example of the artist's deft liquid drawing style: outlines are confident, loose but precise, and the ends of fold lines curl into small hooks to mark the innermost points (fig. 12). Strokes sometimes culminate in a droplet and show variations in tone and width, as in the white shawl draped over Saint Anne's shoulder in the Visitation (fig. 13). Contours and shadows are generally modelled in

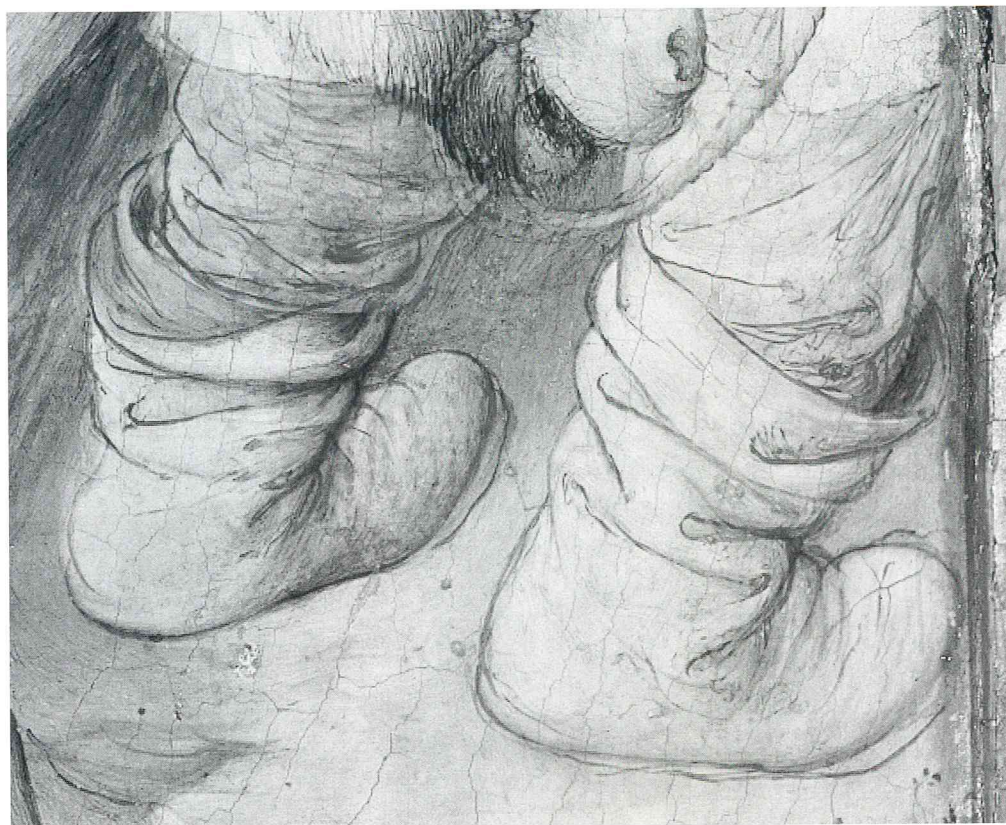
11a. IRR: Visitation,  
Virgin

11b. Visitation,  
Virgin





12. IRR: Flight  
into Egypt, Joseph's  
boots



finer, more regular strokes, an example given by the sets of long lines for vertical drops in draperies. Shadows in the latter are sometimes indicated with diagonal hatching strokes. The artist cross-hatched complex folds, curving the strokes in the direction of contours. In Simeon's velum, for instance, there is three-way cross-hatching on the insides of folds, now faintly discernible through the white paint (fig. 14a-b). It is unlikely, however, that Broederlam originally intended these hatching marks to play a part in the final appearance of the painting, as the paint layer subtly transitions from pure white through to dark grey and does not require additional modelling.

In certain faces, Broederlam reveals an ability to capture individual traits specific to different characters, particularly in the more boldly drawn male figures. Joseph exemplifies the rugged, sun-weathered traveller of humble origins with a hooked nose and protruding lower lip; these features were smoothed away at the paint stage to give a more stylised profile (fig. 15a-b). Simeon's underdrawn face on the other hand, suggests a reflective and learned personality, with its delicate hatching and cross-hatching in the eye cavity and perfectly regular undulating lines for the beard (fig. 16a-b). Women are generally drawn with less vigour than their male counterparts. St Anne's face has broad, short strokes marking the main features, finer, longer outlines for the overall shape and closely applied strokes in shadows. The underdrawing of the Virgin's face is altogether simpler, more decorous and



formulaic than that of the other characters, and modelling cannot be distinguished; this is also the case for the Angel Gabriel.

Features such as hands are often indicated cursorily in both drawing and paint layer; elegance and smoothness were clearly valued above anatomical correctness, conforming to prevailing courtly style.

**Materials:** Close examination of a small loss from the forth finger of the Virgin's proper left hand in the Visitation shows that liquid, reddish-brown strokes applied directly on the ground layer correspond precisely with the underdrawing as revealed in infrared (fig. 17). This observation is supported by Kockaert's analysis of a cross-section from the same area, which tentatively identifies the underdrawing as a mixture of carbon black and red ochre and applied directly above the chalk ground.<sup>80</sup>

To investigate whether all the liquid underdrawing in the figures could be a warm brown hue rather than black, open losses in the paint layer were scrutinized. In St Anne's white headdress, a painted brown line was discerned on the ground layer, clearly part of the liquid underdrawing; similar observations were made in the middle finger of her left hand and face.

In the face, attempts have been made by a restorer to conceal a broadly applied reddish-brown underlayer – probably the underdrawing – between the eyes.

In the angel Gabriel, the transparent orange paint of the hair curls – invisible in infrared – is underlain by dark, infrared absorbing strokes; in this area though, the colour of the underlying strokes cannot be ascertained as reddish material in losses could also represent later retouching for the hair. Nonetheless, in Gabriel's right hand, two small losses reveal reddish-brown strokes consistent with the underdrawing as seen in infrared.

In the Presentation, there is a small paint loss in the beard of the male attendant behind Mary; here, reddish-brown brushstrokes correspond to underdrawing lines for the beard. The artist also appears to have applied broader strokes to establish areas of dark tone, both under the proper right eye and for the eyelids.

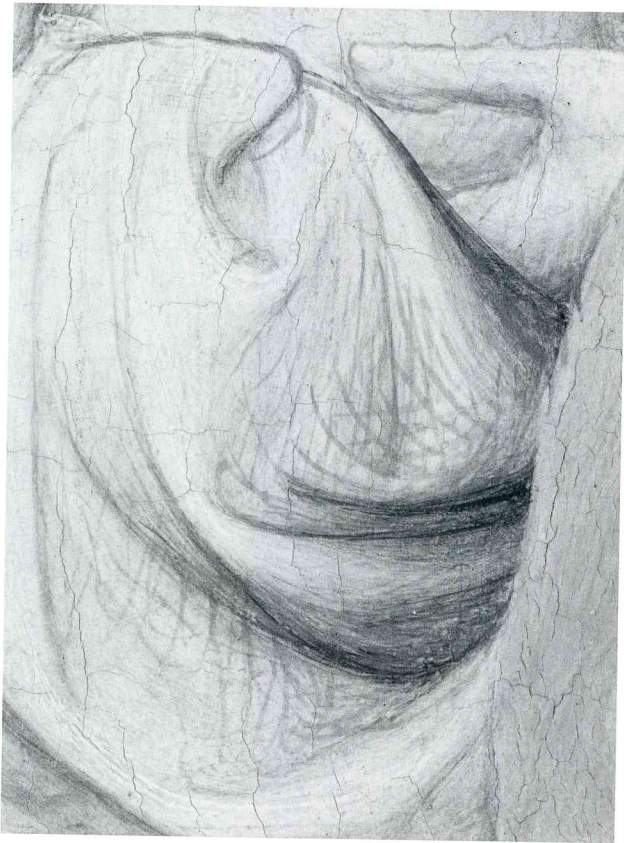
In Joseph's face, the thickness of the paint prevents any speculation as to the colour of the brush underdrawing, which takes on a faint greyish appearance through the paint; however, the underdrawing of his boots – also perceived as greyish in normal light – is clearly reddish-brown when observed in a paint loss (fig. 18a-b).

A dilute, reddish-brown paint therefore appears to be Broederlam's preferred medium for marking in outlines and areas of shadow tone in faces, draperies and accessories. Later, during the painting stage he employed the same hue for outlines and shadows, combining it with a darker brown in hands and faces. The medium of the brush drawing could not be analysed, but is most likely water or glue, perhaps mixed with a local gum to improve its wetting properties.

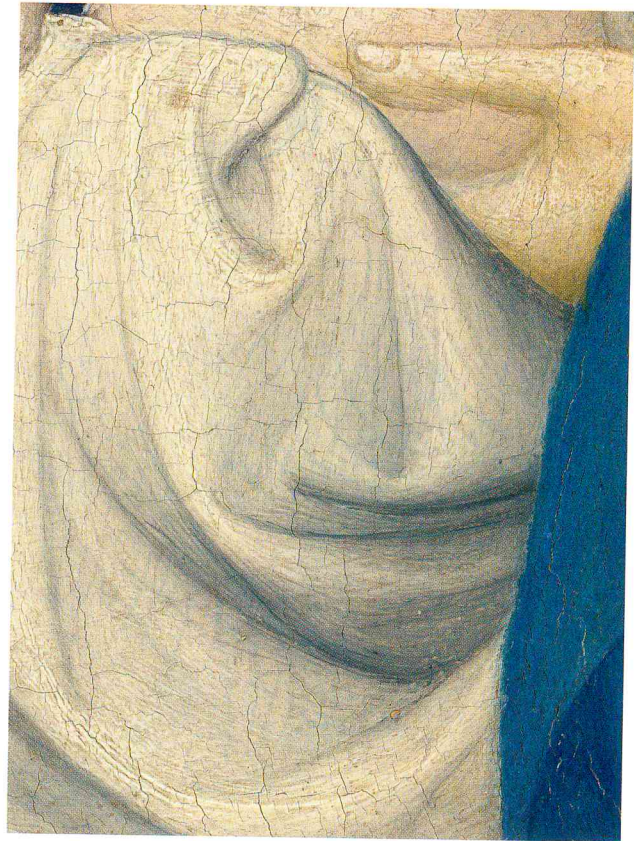


13. IRR: Visitation, St Anne's shawl





14a. Digital  
infrared photograph  
assembly:  
Presentation,  
Simeon's velum



14b. Digital  
photograph  
assembly:  
Presentation,  
Simeon's velum

**Brushes:** Broederlam would have most likely delegated to assistants the task of making a range of medium to very fine brushes suitable for both laying in the design and painting. The fine strokes of the underdrawing, often tapering to a point, suggest a soft but flexible pointed brush, most likely made from the tail of a small animal such as a squirrel, marten, ermine or sable. Cennini advocates making brushes from the fur of a 'vaio' [vair], emphasising that only their tails were suitable for the purpose.<sup>81</sup> A 'vair' was a type of squirrel, probably today's Siberian squirrel; the word also refers to its fur, prized in the Middle Ages for trims and linings of cloaks. For brushes, Cennini advocates cooking vair tails, and using only the 'straightest and firmest hairs out of the middle of the tail'. He suggests making small bunches from these hairs, the bunches to be added together according to the size of brush required, 'some to fit in a vulture's quill; some to fit in a goose's quill; some to fit in a quill of a hen's or dove's feather.' Swan's quills were used by Broederlam's contemporary Jan Maelwael for the same purpose; a 1399 ducal account recording materials bought by Maelwael for his work at the Champmol lists '100 tubes of swan feathers for making [fine] brushes: 7 sol 6 denier tournois.'<sup>82</sup>

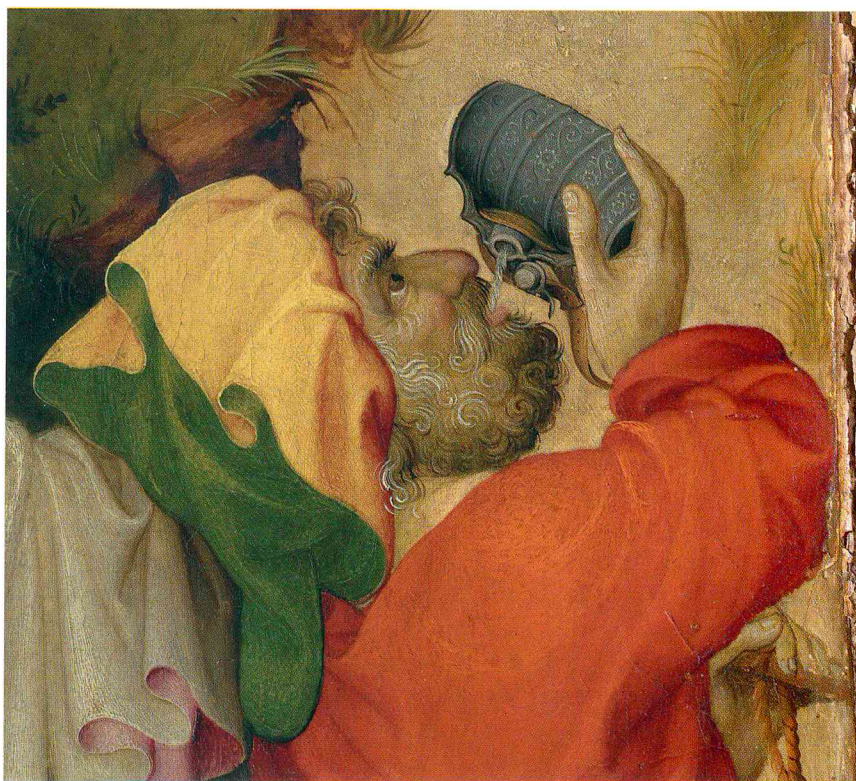
Cennino advises tying the bunches of hairs with thread or waxed silk and placing them into the tube of a cut or open quill, allowing some of the tips to stick out, adding that 'the stiffer and shorter it is the better and more delicate it will be.' Handles he says, should be made from a 'little stick of maple or chestnut, or other





15a. IRR: Flight  
into Egypt, Joseph

15b. Flight into  
Egypt, Joseph







16a. IRR:  
Presentation, Simeon



16b. Presentation,  
Simeon

good wood', [...] 'smooth and neat, tapered like a spindle' [...] 'and [...] nine inches long.' Of the various types of vair brush an artist might use, he advises that 'one brush ought to be pointed, with a perfect tip for outlining; and another ought to be very, very tiny, for special uses and very small figures.'<sup>83</sup> A French manuscript illustration of 1403 shows a female painter at work with a series of brushes laid out on a table for use.<sup>84</sup> These appear to have fairly long dark hairs, a white (quill?) section to hold the hairs in place and a long beige handle, probably wood.

#### *Sculpted Motifs*

Like the principal figure motifs, Broederlam marked in the stone plinth supporting the falling pagan idol in the Flight into Egypt and the intricate base of the lectern





17. IRR and normal light: Visitation, Virgin's hand, showing liquid brown underdrawing in loss

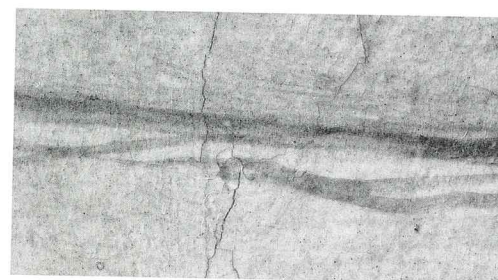


18a. Digital infrared photograph: Flight into Egypt, underdrawing for sole of Joseph's right boot

18b. Flight into Egypt, as in 18a. Note warm brown colour of underdrawing, as in fig. 17

in the Annunciation with a fine brush and liquid medium, probably completing them around the same time. In the case of the lectern, the underdrawing – almost completely invisible to the naked eye except for the occasional greyish shadow through the paint – is brushed on using a very thin medium and fairly loose strokes. The artist later shifted several details of the carved leaf pattern during painting. An absence of open paint losses prevents unambiguous identification of the colour of the underdrawn strokes; however, a brown layer discernible in small losses at the left edge of the motif may represent the underdrawing. In the base of the fallen idol's plinth, the shadows are cross-hatched in a liquid medium. Broederlam does not appear to have underdrawn the two stone sculptures on the columns of the pavilion in the Annunciation; these are carefully delineated in the paint layer in a style similar to the painted underdrawing of the lectern.

Broederlam also indicated the lectern's golden eagle in a liquid medium (fig. 37b). This underdrawing is not visible through the gold leaf, but can be seen where the underdrawn tips of feathers extend slightly beyond the gold and under the surrounding ochre-coloured paint. The lines appear greenish in tone through the ochre paint, so could be either brown or black.

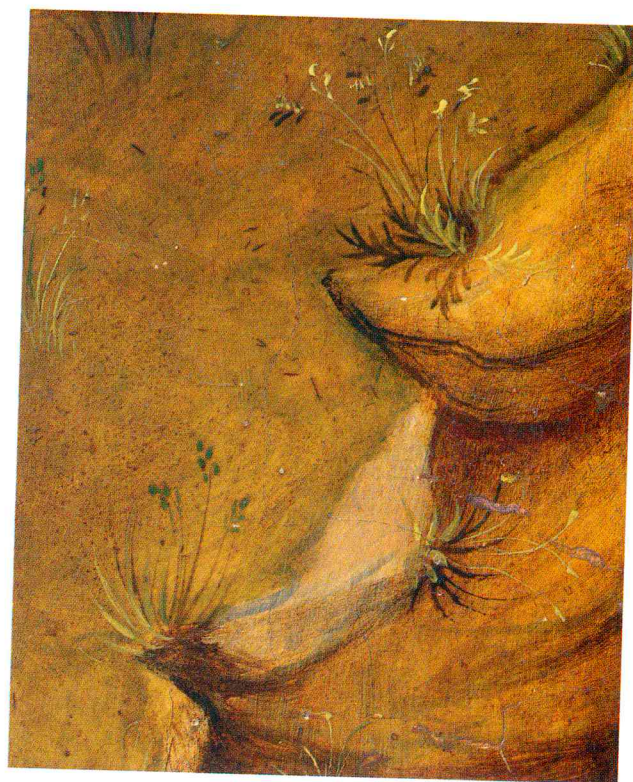


19. IRR and normal light: Flight into Egypt, rocks









### *Sketching in the Landscape Background*

Broederlam rapidly sketched in the landscape background with a brush using a dark, fluid medium, boldly indicating all the outlines and contours (figs. 19-21; see also fig. 22a-b, which clearly demonstrates the difference between the liquid underdrawing and the paint layer proper). In place of the delicate lines and hatching strokes seen in figures, shadow areas are characterised by closely applied, broad strokes, sometimes joined to give a wash effect. In rocky outcrops, shady undersides are filled with densely applied, curved strokes, roughly following the forms. The medium varies from dilute to quite concentrated in terms of pigment, and strokes sometimes pool into small dark blobs at the ends, as do the vertical strokes for the fortress in the upper right corner of the right panel (as in fig. 13). The brush used was most likely wider and capable of holding more medium than that employed for the figures, but could well have been made of the same type of animal hair.

The distant fortresses were probably included in this drawing phase, since they are also loosely indicated with a brush and dilute medium. As in the rocky outcrops, shadow sides are roughly brushed in.

The colour of the underdrawing proved to be impossible to determine, as losses are usually retouched. It remains feasible that it consists of diluted black ink or paint, or alternatively, that it is brown, but mixed with a heavier concentration of black pigment than the figures.

A further stage, comprising several loose outlines in a dark green paint reinforces important outlines and forms in the landscape background. These strokes

20a. Digital infrared photograph assembly: Visitation, rocks, centre right

20b. Digital photograph assembly: Visitation, rocks, centre right



21a. IRR:  
Flight into Egypt



21b. Flight into  
Egypt. Note  
green colour of  
underdrawing





appear very dark in infrared and are often hard to distinguish from the first stage of underdrawing. They are rarely visible with the naked eye except in one or two areas, for example, near the thinly painted rocks to the upper left of the Virgin in the Flight into Egypt (fig. 21a-b).<sup>85</sup> Completely concealed by paint, they form part of the design stage for the landscape rather than being associated with the paint layer proper.

### *The Role of Preparatory Drawings and Model Books*

Although no drawings by Broederlam have come down to us, it is clear from the lack of fundamental change to the design during execution and the absence of hesitation or sketchiness in the underdrawing of the figures and architectural framework that the artist worked out the compositions beforehand on separate drawing supports. The extent and size of these studies is unknowable, but scaled cartoons are unlikely, as there are no signs of cartoon transfer on the panel, and the underdrawing does not have the appearance of tracing or joined-up pouncing. The composition could have been worked on parchment, paper, or with a stylus using a reusable wax or wooden tablet.<sup>86</sup> However, the most likely support for preparatory drawings was paper, as suggested by Champmol ducal accounts listing purchases of art materials. For example, in 1399 Jan Maelwael was supplied with:

IIII quayer de papier com[m]un pour trassier et getier des ymaiges et aut[re]s besoingnes de son mestier au p[ri]s de XX d. le quayer: VI s. VIII d. t. Item pour IX quayers d'aut[re] papier de la g[ra]nt forme pour semblable au p[ri]s de VI s. VIII d. le quayer: LX s. t.<sup>87</sup>

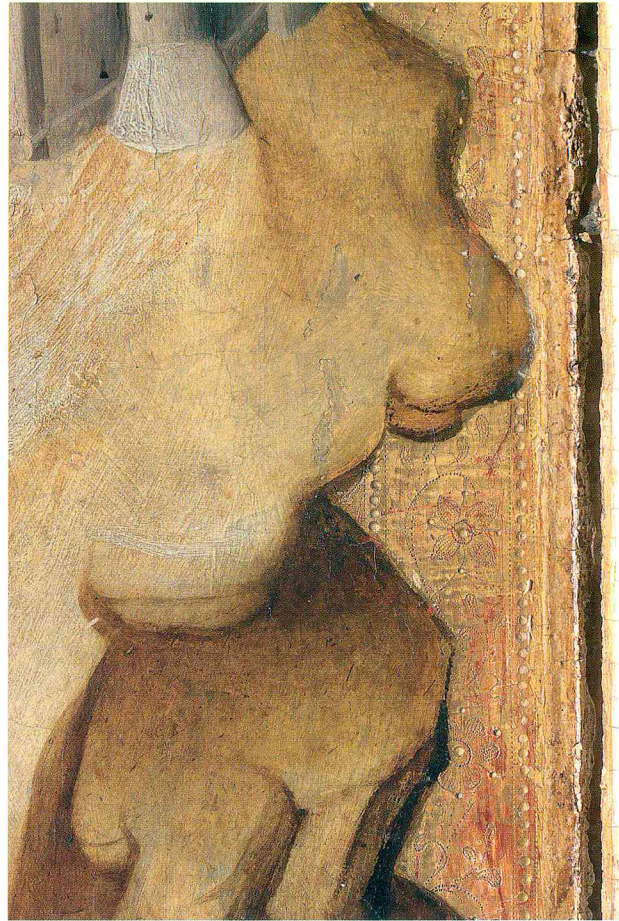
The presence of ruled guidelines for the architectural structures, often overshooting the actual forms, suggest that Broederlam transferred the composition by eye, perhaps aided by a plumb line, dividers or proportional compasses and a straight edge.<sup>88</sup>

For certain architectural elements, figures, and possibly parts of the landscape, Broederlam may well have relied on a model book. During the Middle Ages, it is thought that artists and artists' workshops collected and referred to a private stock of images, such as copies after artworks they would have seen or copies after fellow artists' drawings of the latter. The original models would not necessarily have been restricted to painted panels or murals, but may also have included architecture, tapestry, illuminated manuscripts, metalwork, stained glass and sculpture. As Broederlam was also responsible for providing designs for stained glass windows, floor tiles and murals, a stock collection of relevant designs or motifs to exploit as needed would have come in useful whilst fulfilling his diverse duties for the Duke. The Italianate architectural structures in the *Crucifixion* wings suggest he might have collected drawings of motifs after Tuscan mural or panel paintings. The figures may have been chosen from a range of preferred 'types'; possible sources for these include French, Flemish, German, Bohemian or 'international court' painting and manuscript illumination.<sup>89</sup> It is of course possible that Broederlam travelled around Europe prior to 1381, when he is first recorded as working for the Count of Flanders, Louis of Male, during which time he could have collected





22a. IRR: Flight into Egypt. Gold leaf squares applied after liquid underdrawing and before painting

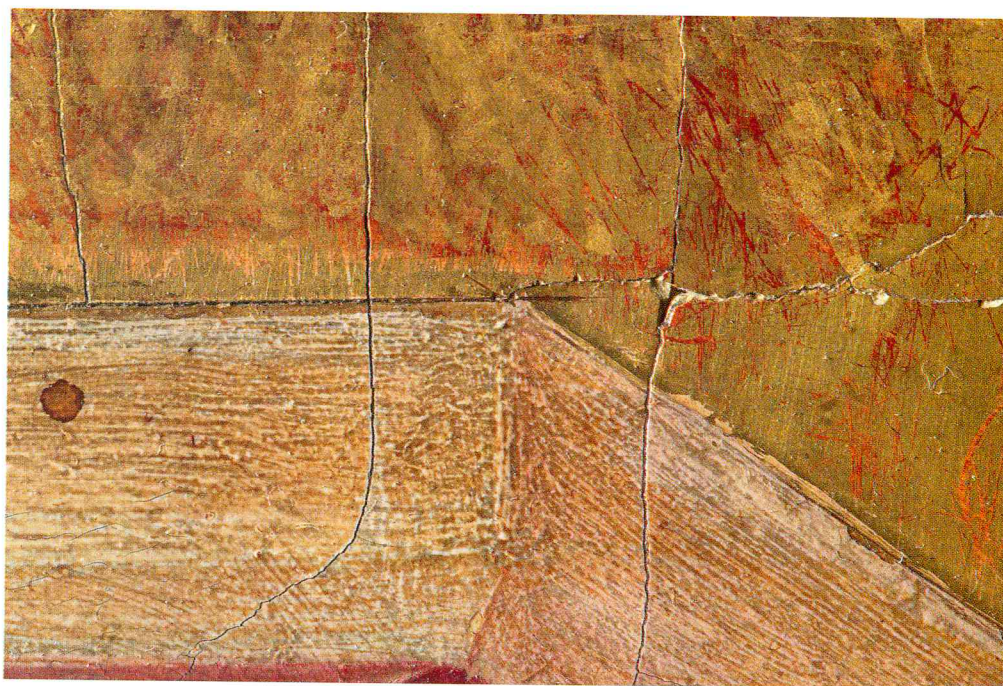


22b. Flight into Egypt

images of motifs and/or compositions. Unfortunately, nothing is known of his life during this early period.

Although no surviving model book can be associated with Broederlam's workshop, several extant examples show the variety of designs and motifs that European artists were recording for their professional use.<sup>90</sup> A collection of drawings on parchment from Bohemia, *circa* 1390, for example, records human figures in various poses, most replete with hatching and cross-hatching for shadows.<sup>91</sup> Another model collection, on seven boxwood panels, by Jacquemart de Hesdin from the last quarter of the fourteenth century, contains seated and standing figures and busts, delicately modelled in terms of tone.<sup>92</sup> From the same period, there are the anonymous Wiesbaden drawings, comprising a collection of both preparatory and model drawings, showing a mix of pictorial styles seen in northern France and the Netherlands during that time.<sup>93</sup> A further group, also from Bohemia, dated 1400-1410 shows a collection of heads in a linear style, certain of which recall the design of the Angel Gabriel's head in Broederlam's Annunciation scene.<sup>94</sup> A slightly later model book, given to Jacques Daliwe of the Southern Netherlands, comprises a collection of twelve panels on boxwood, some of which depict identifiable religious scenes.<sup>95</sup> The eclectic collection of drawings thought to be by an itinerant artist from the





23. Annunciation.  
Incised lines used  
to demarcate gilded  
areas prior to gilding

first quarter of the fifteenth century includes both direct copies, most likely after frescoes, panels and drawings and his own interpretations of the latter; it includes line drawings of groups of figures, a more sketchy scene including a rocky landscape background similar to those in Broederlam's *Crucifixion Altarpiece* wings and designs for figurative letters.<sup>96</sup>

Despite probable reliance on motifs gathered from diverse sources, one or two figures have an expressiveness that betrays Broederlam's personal touch, as for example, the face of Joseph.

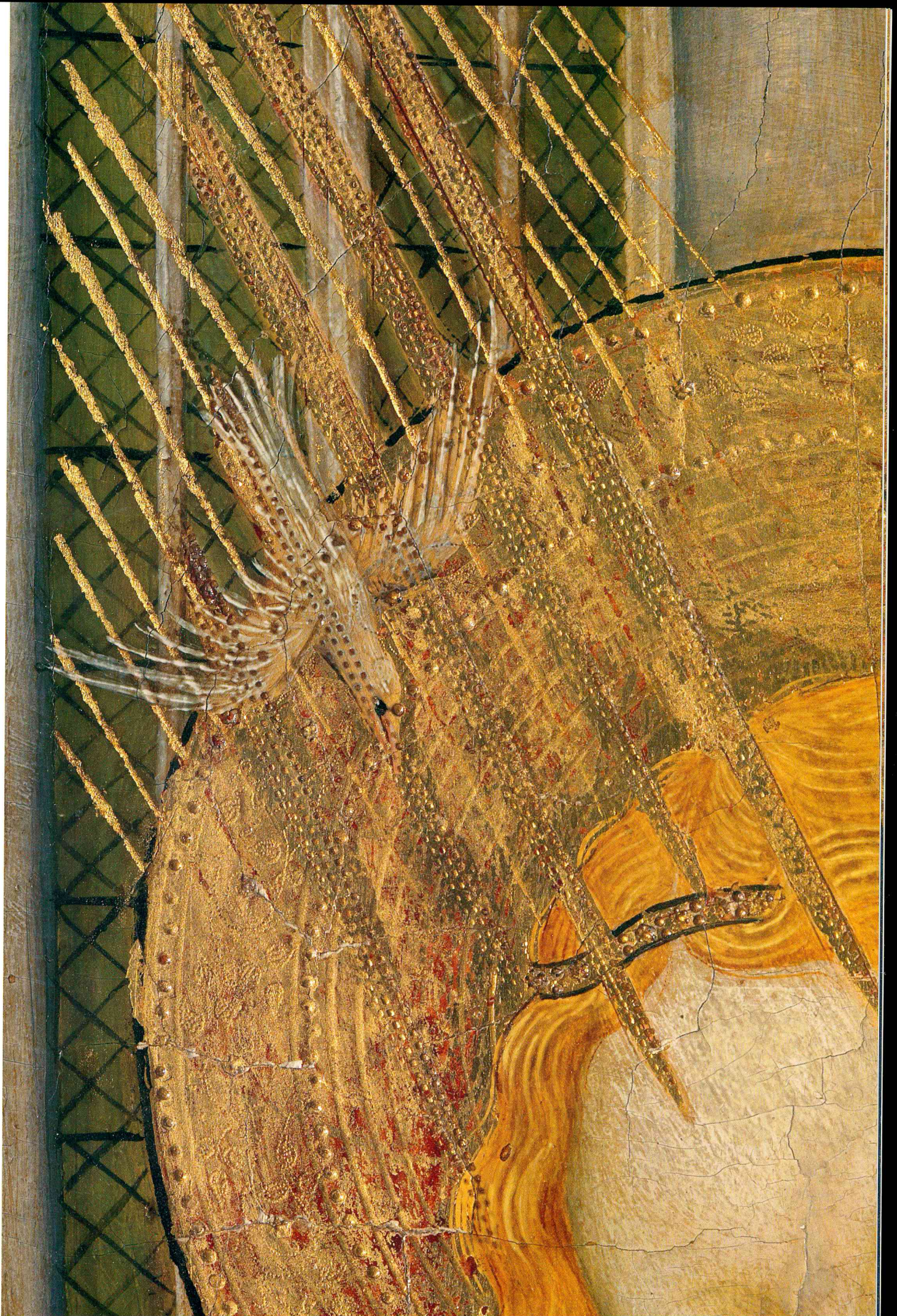
#### GILDING AND EMBELLISHMENT OF GOLD SURFACES

One of the most extraordinary features of Broederlam's painted wings is the rich and varied use of gold. Burnished water-gilding characterises the sky, saints' haloes, the Angel Gabriel's wings, Simeon's mantle trim, floor tiles and still life motifs such as the lily vase. It also offers a glowing underlayer for coloured brocades. The panel's frames are similarly gilded, and form part of the decorative ensemble. Unburnished gilding provides the body colour of the eagle lectern and picks out details such as the ribs of the vaulted temple and pavilion. Diverse techniques embellish the gilded surfaces, including punching, scoring and painting. The overriding presence of gold evokes an otherworldly, spiritual atmosphere for the holy events taking place and would have had special significance for the educated contemporary viewer.<sup>97</sup>

The panels were gilded and tooled prior to painting, although some of the more elaborate embellishments may have been completed during the painting process. This sequence is shown by the infrared image of the border of the gilded sky with

24. Annunciation,  
Virgin. Water-gilded  
rays punched with  
square-toothed  
cog-wheel; finer,  
unburnished rays  
result from mordant  
gilding









the cliff in the right shutter: here, a square-shaped gold leaf, its corners cut slightly, overlaps the underdrawing of the rocky cliff; the paint layer, following incised markings, has been painted directly on top of the left edge of the actual leaf (fig. 22 a-b).

The infrared image of the painting also reveals occasional tool marks – particularly those made by the mechanical rolling of a cog-wheel – going underneath original paint, usually at the edges of motifs.<sup>98</sup>

#### *Marking out the Areas to be Gilded*

The zones to be gilded were marked by scratching fine lines into the ground with a needle. This step would most likely have been done directly after underdrawing, prior to gilding and painting, as advised by Cennino Cennini:

Disegnato che hai tutta la tua ancona, abbi una agugiella mettuda [uno ago messo] in una asticciuola, e va grattando su per li contorni della figura in verso i campi che hai a mettere d'oro, e i fregi che sono a fare delle figure, e certi vestiri, che si fanno di drappo d'oro.<sup>99</sup>

The incisions would have guided Broederlam or his assistant during gilding, and remained visible during painting. He scratched rounded contours in freehand, but

25. Annunciation,  
vase, granulation;  
some rows of  
punched dots appear  
pre-scored





26. Presentation,  
Virgin, compass  
points

used a ruler for architectural structures, as in the left wing, where the ends of two ruled incised lines can be seen to cross each other neatly at a corner stone (fig. 23). The artist also employed a straight edge for the heavenly rays emanating from God the Father and the Holy Spirit in the Annunciation (fig. 24). The junctions of haloes with heads, on the other hand, are scratched in freehand; outer borders of haloes – probably similarly marked – are concealed by a thick black painted line (fig. 24).

Unburnished gold details do not appear to have been pre-marked on the whole, although dark lines, possibly incised, can be made out on the upper left edge of the eagle lectern (fig. 37a).

#### *Water Gilding*

Broederlam – or an assistant – brushed on a thin layer of an orange-red coloured clay known as bole on the areas to be water-gilded, using the incised lines for



guidance. This slightly streaky substrate is seen through abrasion and small losses (fig. 25). The use of bole provided a warm underlayer for the gilding, but also a measure of cushioning that chalk alone could not provide, facilitating burnishing and tooling.<sup>100</sup> Although there are no records of Broederlam buying bole, the 1399 Champmol accounts list Jan Maelwael's purchase of 'a pound of bole for preparing surfaces for gilding'.<sup>101</sup>

Before the application of gold leaf, the surface of the bole would have been rubbed smooth. The delicate process of gilding would have entailed the wetting of small areas of the bole with either water, beaten egg white or glue size and the careful transfer of the gold leaf squares one by one, tamping each down gently. Kockaert's analysis of a cross-section from an area of gilding concluded that the bole substrate in Broederlam's case was simply wetted.<sup>102</sup>

After drying, the gilded areas would have been burnished with a tool such as an animal tooth or polished agate to obtain a smooth lustre, the joins between the individual leaves disappearing in the process. In the right wing, the size – approximately 3cm<sup>2</sup> – of these leaves can be seen in the upper right (fig. 22a). Theophilus gives a lively account of this ancient technique:

To apply the gold, take the white of an egg beaten up without water, and with a paint-brush lightly coat the surface on which the gold is to be placed. Moisten the handle of

27. Presentation,  
Simeon's skullcap





this brush in your mouth, touch one corner of the leaf you have cut off, and, lifting it like this, apply it with the greatest speed and smooth it out with the brush. At this moment you should be careful of draughts and hold your breath because if you breathe out you will lose the leaf and only retrieve it with difficulty. When it has been applied and is dry, lay another over it in the same way if you so wish, and a third similarly, if required, so that you can polish it more brightly with a tooth or with a stone.<sup>103</sup>

Alcherius relates the technique of water gilding wood panels and other supports as described to him in 1398 by Jacob Cona, a Flemish painter living in Paris. This involves the application of a chalk-bole-saffron substrate, tempered with warm size made from white leather or parchment, followed by polishing and the application of a second substrate tempered with whipped or beaten white of egg, 'because this white of egg makes a size or vehicle sufficiently strong to hold the gold for burnishing and to resist the shaking and violence of the friction and rubbing the burnisher over the gold.'<sup>104</sup>

Cennini advises waiting for mild, damp weather when water-gilding. He writes that wetting with the usual tempera mixture and applying scraps of gold can patch up faults in the gilding 'so that you may always be as thrifty with the gold as you can, and make economies with it.'<sup>105</sup>

Where gold abuts non-gilded areas, Broederlam generally took care to remove excess gold leaf prior to painting, following Cennini's good practice recommendation

to 'take your little tools, and scrape off all the gold which is superfluous, or which laps over the figure.'<sup>106</sup> However, this is not always the case in the landscape background, as jagged or cut edges of gold leaf sometimes extend under the paint layer, as mentioned above (fig. 22a). Occasionally, very small architectural embellishments are painted directly on top of the gold background, for instance the balls and crescent moon on the dome in the right panel. This technique has led to partial flaking of the painted details in question.

#### *Gold Tooling and other Embellishments*

Through delicate tooling, Broederlam infused light, relief and interest into the water-gilded areas of the composition. He created composite patterns with a combination of tools, including single dot and ring metal punches, two minute motif punches, a stylus, a needle and a cog-wheel.<sup>107</sup> Some of the gilded areas were adorned with punching only, such as the background sky and haloes whilst others were partially painted with glazes and opaque details, as in brocades.

Haloes were first swung with compasses, the indented concentric circles serving as guides for the

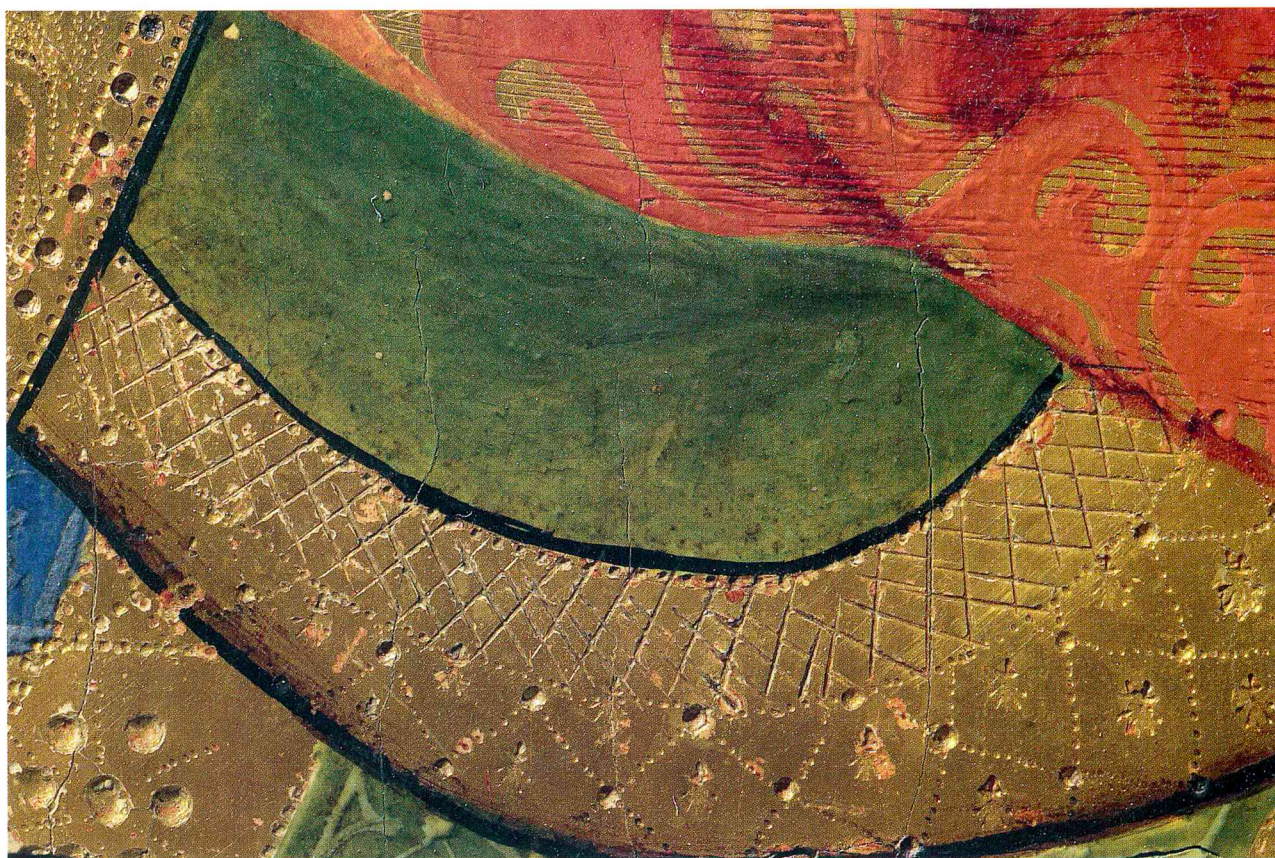
28. Flight into Egypt, Joseph's kettle











29b. Presentation,  
Simeon's robe, gold  
trim. Note use of  
single motif punch  
and decorative  
scoring after gilding

positioning of punched designs (fig. 24). The rounded lines were made with a blunt point, without breaking the gold leaf. The compasses' centre points are visible in the Virgin's halo in the Presentation, but filled in with original paint in the other figures (fig. 26). Whether Broederlam's haloes were swung after or prior to gilding is a point of debate.<sup>108</sup> Erling Skaug, in his seminal study on tooling in Tuscan panel painting *circa* 1330-1430, claims that indented circles in Sienese painting were made after gilding; he attributes the fact that they do not disrupt the gold leaf to the cushion of hygroscopic ground and the intrinsic softness of the gold leaf.<sup>109</sup> Cennini's advice would seem to support this sequence:

Quando hai brunito e compiuto [di mettere] la tua ancona, a te conviene principalmente torre il sesto, voltare le tue corone, over diademe, granarle, coglierle alcuni fregi, granarli con istampe minute che brillino come panico, adornare d'altre stampe, e granare se v'è fogliami.<sup>110</sup>

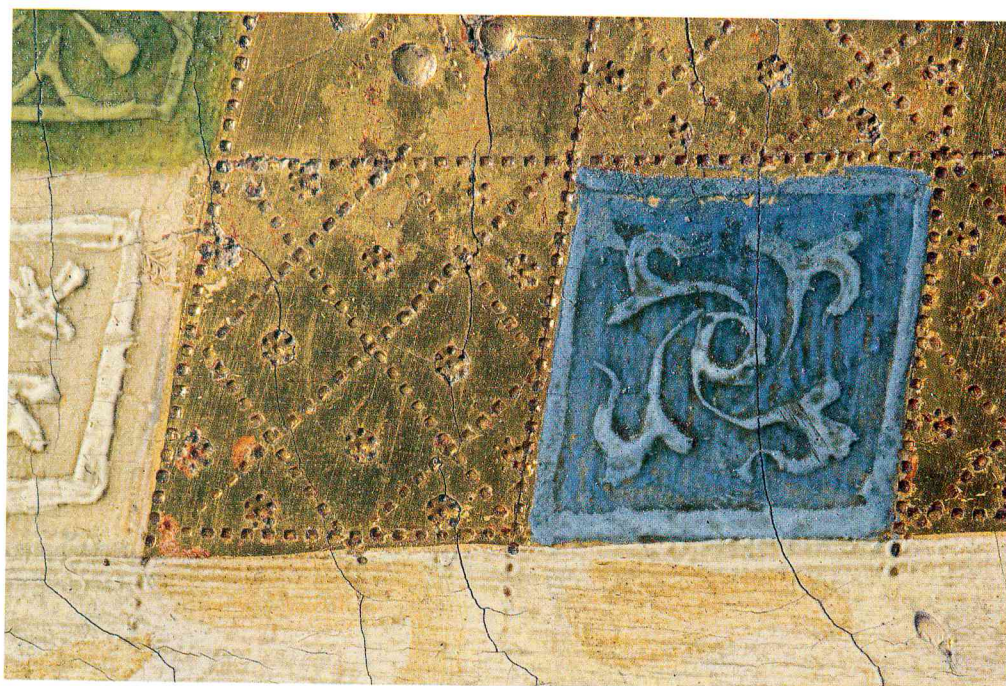
29a. Presentation,  
Simeon's robe

As well as indented circles, haloes present specific floral or vegetal designs according to their bearer; the Virgin's halo, for example, has a pattern of undulating stems and leaves in the four scenes, composed of strings of minute, single punch dots, punctuated every 12 mm or so by a tiny, six-point rosetta with central dot struck with a single motif punch (figs. 24 and 26).<sup>111</sup> The latter stamp was employed in



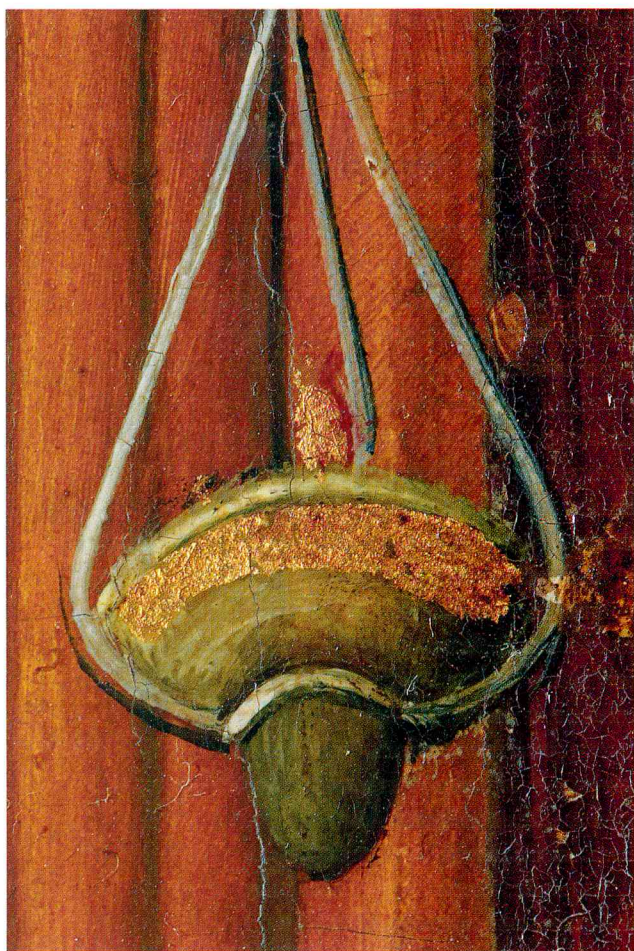


30. Presentation, altar cloth. Gilding painted and embellished using both cog-wheel and dot punch



31. Presentation, tiled floor. Design applied with cog-wheel and single motif punch





32. Annunciation,  
oil lamp, mordant  
gilding

various ways in the design of every single halo in the four scenes; in St Anne's halo, for example, it was used to stamp each of six petals of a repeat floral motif, and in Simeon's halo, it alternates with dot-punched leaf motifs in the central band of the halo (fig. 27). The halo designs reveal a consummate mastery of the refinements possible with tooling; for example, by adjusting the distance between dots and modulating the pressure of the hammer strikes, the artist ensured that stippled outlines taper as elegantly as brushstrokes. The delicate border patterns on the gilded sky and frames were painstakingly created in a similar manner using dot punches of various diameters, the larger dots sometimes embellished with the same rosetta stamp used in the haloes (fig. 5b).

Large gilded motifs, such as the lily vase, the wings of Gabriel, the fallen idol and Joseph's kettle were deftly granulated to catch the light and give a sense of volume (fig. 28). For curved surfaces and bulbous shapes, rows of closely spaced lines made up of tiny punched dots serve as modelling, their locations pre-scored into the gold with a fine needle (fig. 25). Strokes of brown transparent paint are occasionally present on under- or shadow sides of granulated motifs to increase the sense of three-dimensionality. In the case of the lily vase, its lower section also presents decorative touches of black paint encircled with punched dots.

The illusion of rich, embroidered brocades was made by tooling and painting over burnished gold leaf. Simeon's undermantle shows the full gamut of decorative possibilities: after gilding, the surface was scored to imitate the fabric's texture; this was followed by the application of vermillion red paint for the body of the textile, reserving spaces for a complex eagle and foliage design; on the remaining gold parts, the eagles' wing spans were marked with blue and the tips accented in white (fig. 29a). Broederlam did not rely on pouncing or stencil patterns for the repeat eagle motif; the eagle's shape and wingspan were adjusted each time according to the width of the space available.<sup>112</sup> The eagle patterns were painted on flat, with no concession to the actual curves of the drapery; the illusion of drapery folds was created later with the addition of dark translucent red shadows on top of the painted brocade. This contrasts with later Eyckian painting, where brocades on clothing follow the contours of the folds in an illusionist manner. Scoring of the gilding prior to painting appears frequently in brocades, as in the Virgin's undermantle in the Annunciation, where scored lines mark the direction of the folds under a layer of red paint.

The upper section of the golden trim on Simeon's green undergarment is decorated with incised cross-hatching made with a sharp instrument such as a needle,



whilst the lower part displays large squares made with a small dot punch (fig. 29b). The former was scratched through the gold and bole layers with the aid of a ruler and left starkly visible, without any painted embellishments. A tiny motif – an anchor shape with five dashes – struck by a single motif punch lies at the centre of each dotted square. Similarly, in the gilded band of Simeon's skull-cap, there is a four-petalled flower pattern, each repeat made by a single punched dot surrounded by four punched rings, the flowers themselves enclosed in a diamond pattern incised freehand into the gold (fig. 27).

Foliage designs characterise certain brocades: in the Virgin's brocaded undergarment in the Visitation and in Simeon's embroidered skullcap in the Presentation, foliage patterns are created through the partial painting of the gilded surface, the design reserved in the gold (fig. 27). In each case, the reserved gilding was punched with a single dot punch, and further embellished with delicate touches of red, white or green paint. In Simeon's skull-cap, a deep purple glaze, only partially surviving today, was applied on top of the embroidery design to model the rounded shape of the head; a similar glaze has been superimposed on the brocaded undermantle of the Virgin's assistant in the Presentation to form shadows in the folds.

The green and white striped altar cloth in the Presentation shows yet another combination of techniques: on a gilded and burnished base tone, the area was painted with green and white stripes, reserving strips and circles of gold leaf; next, the soft paint was passed over with a square-toothed cog-wheel and the exposed gilding stippled with a fine dot punch (fig. 30).

The tiled floor in the Presentation comprises gold, green, white and blue tiles, arranged in an ordered yet varied manner (fig. 31). After gilding and burnishing, each golden tile was outlined with a square-toothed cog-wheel. Some of these were then punched with a single dot punch whilst others were given a diamond pattern using the same cog-wheel as before. The central points of each diamond were punched with a rosetta, producing the same cluster of tiny dots as observed in the halos and frame. Remaining tiles were then painted in solid colours and decorated with simple designs in a lighter tone of the same hue. Like the tiled floor, the divine golden rays were also burnished and stippled with a square-toothed cog-wheel (fig. 24).

Notwithstanding the large range of techniques Broederlam employed for imitating brocades and other textiles, one method is conspicuous by its absence. Sgraffito, the method by which gold leaf is brushed over with coloured paint, left to dry and then patterns scratched through to reveal the leaf, was one of the principal techniques in panel painting during the same period in Italy.

#### *Punches*

Punches may well have been made in Broederlam's workshop to his own specifications. Although there are no specific references to Broederlam in this regard, ducal



33. Annunciation, holy rays, mordant gilding



account records from February 1398 state that Jan Maelwael ordered brass for the carving of punches for the painting of 'several things' in the Charterhouse church:

A Jehan Perrenin Fevre et Gilet le fontenier [...] pour une table de latton pesant XXII l[ivres] f[ai]te par ledit Gilet et baill[iee] audit peintre [Jan Maelwael] pour taillier en ycelle plus[ieur]s estampes neccess[air]es po[ur] la peinture de plus[ieur]s chos[es] a faire pour lad[i]te egl[is]e [Church of the Charterhouse] et aut[re]s besoingnes pour ledit mons[eigneur], au p[ri]s de IIIs. t. la livre: LXVI s. t [...].<sup>113</sup>

Theophilus offers instructions as to the manufacture of ring punches in his section on metalwork:

A tool is made of steel, in length the size of one's finger, thin at one end and thicker at the other. When it has been smoothly filed at the thinner end, a tiny hole is struck through the middle of it with a very fine tool and small hammer. Then you carefully file around this hole until its rim is consistently sharp all round, so that, wherever it is struck, a very small circle appears.'<sup>114</sup>

Broederlam's punchwork, using combinations of single dot, ring and very small motif punches to create designs, is typical of northern and central European court painting. Again, as with the sgraffito technique, there is no sign of the use of the larger, carved motif punches so frequent in Tuscan panel painting during the same period.<sup>115</sup>

#### *Unburnished Gold: Mordant Gilding*

A number of gilded motifs do not have a bole underlayer and are not burnished, resulting in a bright and glittery appearance from all viewing angles. The largest and most striking example of these is the golden eagle of the lectern in the Annunciation (fig. 37a). For the most part, unburnished gilding picks out small details: the narrow shafts of light emanating from God the Father (placed side-by-side with burnished gold rays), the ribs of interior vaults and the decorative bands and flames of hanging oil lamps (fig. 32).<sup>116</sup>

The unburnished gold areas either result from mordant gilding, whereby gold leaf is laid on a tacky substrate and buffed gently rather than burnished, or from the application of shell gold, when gold leaf is ground up with glair (beaten egg white) and applied with a brush. In the case of the *Crucifixion Altarpiece* wings, mordant gilding appears to be the method used. The most compelling evidence is an abraded section of unburnished gilding in a light ray in the Annunciation; here, a raised, narrow, translucent, dark ochre-coloured line is distinguishable on top of the paint, conforming precisely to what would be expected for an oil-based mordant applied with a fine brush (fig. 33). Also, none of the unburnished gold details show brushwork in the gilding itself, such as the tapering of strokes, which might be expected if powdered gold paint were used.

Apart from the golden eagle, where the mordant gilding is probably applied directly on the lead white based priming, Broederlam appears to have placed the mordant gilding on top of the final paint layer. According to Cennini, the mordant



mixture was painted on with a brush, allowed to dry for a day or so to obtain the correct degree of tackiness, then gilded with very finely beaten gold leaf, allowed to dry further, and finally swept with a feather to remove excess leaf and rubbed with cotton.<sup>117</sup> Traditionally, mordants for gilding consisted of thickened linseed oil, sometimes mixed with resins and pigments such as lead white, verdigris and various ochres, the latter serving as dryers. A water mordant based on garlic is mentioned in certain sources, including Cennini, who suggests mixing garlic juice with a little white lead and bole and diluting it with urine for use.<sup>118</sup> Unfortunately, there were no cross sections available for analysis from the areas of unburnished gold in the *Crucifixion Altarpiece*.

At a late stage, Broederlam emphasised some of the gilded areas with thick black lines at the junctions of areas of colour and gilded zones; these include the golden eagle, the golden trim of Simeon's mantle and haloes.

#### *The Quality and Cost of Gold Leaf Purchased for Charterhouse Projects*

Gold is the first item mentioned in a ducal payment order for eight hundred francs reimbursing Broederlam for materials he bought for gilding and painting the *Crucifixion Altarpiece*.<sup>119</sup> The quality of gold is not mentioned, unlike the orders for gold leaf for Jean de Beaumetz and Jan Maelwael's respective projects at the Charterhouse. Beaumetz made several purchases of 'or fin' or 'or double' from the goldsmith Thevenin and other suppliers for the price of four and a half francs the 'papier' [book] and on separate occasions bought 'or doublé renforciez' and 'or fin double' from Thevenin for nine francs the book.<sup>120</sup> A certain Hugues le Vicair was paid for '8 books of fine gold for the price of 4 francs the book' as well as for '6 books of part gold for the price of 2 francs the book'.<sup>121</sup> From the accompanying descriptions, it seems that the most expensive gold leaf was reserved for panels and altarpieces. Gold leaf at four-and-a-half francs per book was used for both decorative schemes and panels and altarpieces. There is also a reference to a purchase by Maelwael from a certain Guiot Poissonnier of '1 book of gold leaf and 700 "pans" of fine gold: 15 pounds 10 sol tournois' and '300 "pans" of part gold: 45 sol tournois' for paintings and altarpieces in the church and other places in the Charterhouse of Champmol; the 'pans', being less expensive, may indicate crushed gold leaf.<sup>122</sup>

#### *Gilding in Broederlam's Workshop*

The skilful application and embellishment of gold leaf in the *Crucifixion Altarpiece* wings using a range of techniques attests to Broederlam's accomplishment in the craft of gilding. Indeed, he was obliged to carry out gilding regularly in his capacity as official painter to the Duke. His routine commissions included painting and gilding banners, standards and pennons (small flags) for ceremonies and military expeditions.<sup>123</sup> Gilding was also often part of Broederlam's decorative schemes in the Duke's chapels and private residences, such as at the Duke's fortified house near Ypres, the Zaelhof, and at the Château of Hesdin.<sup>124</sup> Competence in gilding was expected of all court painters during the period.<sup>125</sup> Broederlam's counterpart in Burgundy, Jean de Beaumetz, as well as painting and gilding devotional panels, altarpieces and sculptures for the Carthusian monastery, from 1384 up until nearly

34. Flight into Egypt, Virgin and Child







1389 carried out – with the help of assistants – the polychromy and gilding of the chapel of the Duke's Château of Argilly, near Dijon, for which ducal accounts record several separate large purchases of gold leaf.<sup>126</sup>

In the case of Broederlam, it is likely that he delegated the preparation and application of the bole substrate for the *Crucifixion Altarpiece* wings, as well as the gilding process to suitably qualified workers. Nonetheless, since gold was so expensive and punching impossible to correct without starting afresh, tooling and other embellishments were most likely the preserve of the master and his most trusted assistant(s).

### PAINTING THE TWO COMPOSITIONS

The painting style in the two panels suggests a single and highly accomplished hand, doubtless that of Broederlam himself with little or no workshop assistance.

In previous publications, Leopold Kockaert describes the painting technique of the *Crucifixion Altarpiece* panels in terms of stratigraphy and composition of the paint layers.<sup>127</sup> The current campaign offers further insights into the painting style on the basis of visual observations.

#### *Lead White Priming Layer*

One of Kockaert's main discoveries was that there is a thin, lead white priming layer over the ground and underdrawing in all areas of the composition except the gilded parts.<sup>128</sup> This layer would have sealed the glue ground, providing an even porosity for painting, whilst at the same time ensuring the underdrawing remained visible. It is only visible in cross sections.

#### *Sequence of Painting*

For the most part, Broederlam avoided superposing different zones of paint, ensuring good adhesion of the paint layer. Commenting on the sequence of painting of the different motifs is therefore only possible where there are slight overlaps. For example, the paint of Simeon's purple robe spills over slightly onto a white column to the left, indicating that at least part of the architectural setting was painted prior to the draperies. Again, small overlaps in Joseph's yellow head covering reveal that the background was painted first, followed by the head covering, but that at a later stage the artist painted over the tip of the garment with the brown-black rock colour (fig. 15a-b).

**Faces and Hands:** Broederlam underpainted flesh areas in a greenish hue, lighter for the highlights and darker, in a copper-based pigment, for the shadows.<sup>129</sup> He left the fine strokes of this underpaint visible or lightly scumbled, giving faces and hands a peculiarly cool tonality. The artist was perhaps influenced by what he knew of Italian panel and mural painting, where green undermodelling in flesh tones is commonplace. For pale complexions such as those of the Virgin and Child, other female characters and Simeon, he then applied opaque pink and white paint for the lighter areas, blending brushstrokes together (figs. 34 and 16b). The actual brush



marks are emphasised today by discoloured dirt and varnish trapped in tiny crevasses within the strokes. To define lips, he employed opaque pink and red paint, with a touch of dark red glaze for the darkest shadows. He modelled cheeks and bridges of noses in a soft opaque red. At a later point, he emphasised lips, noses and eyes with neat brown lines. At the same time he would have painted the pupils black and applied thick white paint to suggest the reflected light above lips, the highlight at the ends of noses and the whites of eyes. For the ruddy complexion of Joseph, he used light pink and white in the flesh tones for lips and wrinkles, modelled the contours in deep reddish or brown strokes, and strengthened the eyes and nose with fine, dark reddish-brown strokes (fig. 15b).

Broederlam painted hair in a stylised manner, in keeping with Gothic courtly style. Simeon's hair and beard, for example, consist of closely spaced white, black and brown painted lines, each strand organised into neat undulating patterns (fig. 16b). The artist allowed himself slightly more liberty in the eyebrows' somewhat whimsical arrangements of a few, well-defined black and white strands. Joseph's eyebrows are similarly treated, but his beard shows a more open arrangement of 's' and circular curls in white, black and brown (fig. 15b). The beard is shorter and rounder than Simeon's, as befitting his more rugged lifestyle. Simeon's hair and beard are almost totally white whilst Joseph's show a mix of dark and white strands, suggesting their respective ages. For the angel Gabriel's golden-coloured locks, Broederlam painted a set of tight sculptural, wave-like curls: on a ochre coloured undercoat the hair is modelled in a mix of transparent and opaque earth colours, with tapering strokes of intense yellow for highlights and dark brown and black for shadows (fig. 35). The hair of the angels in the upper background is similarly treated.

**Draperies:** Draperies were most likely painted after the faces and hands, as there is slight overlapping of the former onto flesh areas. Broederlam tended to adopt one main colouring pigment per drapery, using one or two layers, adding transparent glazes of a similar hue for the shadows.<sup>130</sup> As well as ensuring that the pigments retained their own unique properties and brightness, the use of single or very simple pigment mixtures means that each drapery stands out as an individual block of colour. Each figure in the scene has his or her particular colour code. For the Virgin's dark blue robe – featuring four times – the artist chose the most admired and expensive blue pigment available, natural ultramarine, with the addition of a little lead white for lighter areas (fig. 11b). For St Elisabeth's bright red robe, he used vermilion, overlaid with a red glaze in the shadows, and in her rich green cloak he employed a copper-based pigment. In Simeon's mauve-coloured robe, the artist mixed ultramarine and an organic red pigment, varying the proportions so that the highlights appear blue and the shadows purple, sometimes even black (fig. 29a).<sup>131</sup> Joseph's yellow head covering and the yellow robe of the angel in the top right corner of the Visitation are markedly different from the rest of the draperies in that a rich red glaze forms the shadows (fig. 15b).<sup>132</sup> Indeed, the character of Joseph seems to have served as a vehicle for Broederlam's decorative impulses. Not being a saint, Joseph could be depicted without the decorum and restraint given to the other characters; he is endowed with a bright, vermilion red robe,





35. Annunciation,  
Gabriel

36. Annunciation,  
garden trellis



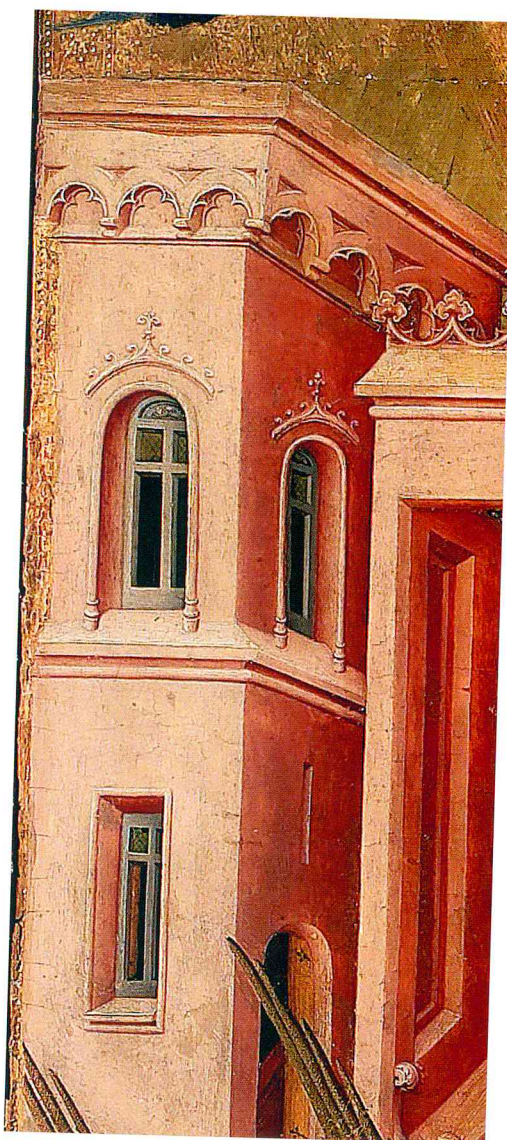
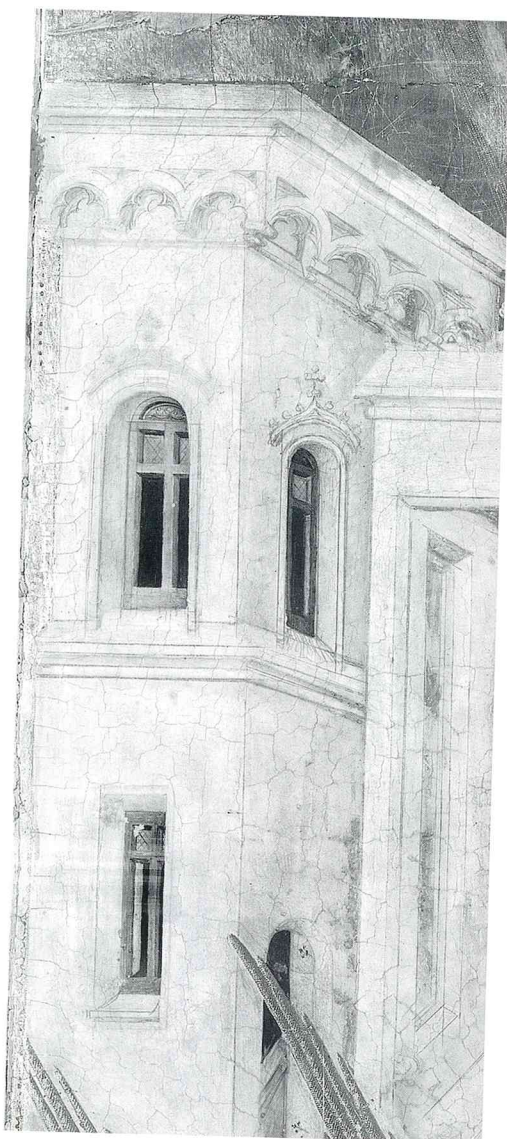




mauve trouser hose, yellow head covering with an intense green lining and luxurious white mantle with pink underside.

It is worth noting that for the great part, the draperies do not appear to have suffered any significant alteration in the pigments over time, so that the colours retain much of their original impact.

**Architecture:** Broederlam's choice of colour for architectural structures ranges from white, ochre and pink for the main stonework through to red and blue for specific features. In most areas, after applying a pale, opaque paint in a thin layer for the main body of the stonework, the artist applied darker transparent paint to suggest shadows and sculpted mouldings. The mouldings and shadows of the arched recesses under the altar in the Presentation are modelled in a rich,



37a. IRR:  
Annunciation,  
square tower. During  
painting, lancet  
window added in  
lower right and  
decorative arch  
placed above window  
in upper left

37b. Annunciation,  
square tower

38a. Annunciation:  
eagle lectern







transparent green. In other areas, such as in the stone frieze of the entablature, carved mouldings are picked out in a transparent mid-brown; otherwise dark grey is used. For pink stonework, dark pink glazes form the shadows.

**Landscape Background and Flora and Fauna:** In the dry, desert-like landscape, Broederlam applied a smooth ochre-coloured base coat, concealing the underdrawn modelling almost entirely. He then applied green and brown tones, softly blending the transitions. Near the spring in the Flight into Egypt, he glazed the base coat with a transparent, copper green paint, suggesting a lush and fertile setting for the meeting between Mary and Elizabeth.<sup>133</sup> He painted rocks in a dilute brown paint using sweeping brushstrokes, echoing to some extent the loose style of strokes in the underdrawing (figs. 19-21).

Broederlam painted in the scrubby trees and bushes directly on top of the desert landscape paint (fig. 21a-b). These vegetal forms represent a successful reworking of a known formula that the artist might have picked up from contemporary examples in painting or manuscripts: well-defined leaves and stems, painted in dark brown or black transparent strokes and variations of green, the latter ranging from opaque pale yellow through to translucent green-black (figs. 20b and 21b). The paint varies in thickness as well as in tone. Although hardly naturalistic in approach, this neat arrangement of leaves and branches gives a certain vivacity and three-dimensional quality to the vegetation. In contrast, Broederlam may have been directly inspired by nature in the depiction of wild flowers in the trellised garden to the left of the Annunciation (fig. 36) and in the desert landscape. In the garden, the presence of columbine, rose and lily flowers has been interpreted in terms of iconography.<sup>134</sup>

There is no detectible underdrawing for the lily in the Annunciation. The leaves and flowers are painted directly over the background paint, as with the trees.

Broederlam painted the ass carrying Mary in a straightforward and direct manner. Long, black and white strokes suggest the animal's fur over a warm, thin, ochre-coloured undercoat, mid-brown strokes smoothing the transition between the black and white tones.

Small birds were applied late during painting, such as the dove of the Holy Spirit in the Annunciation and the bird of prey in the right background of the same panel.

#### *Modifications during Painting*

Although conforming to the underdrawn layout for the great part, Broederlam made small adjustments here and there to improve the design. In the stone interior of the Presentation scene, he initially planned a carved leaf pattern in a triangular opening in a wall arch to the right, but dropped it at the paint stage (fig. 7). In the same temple, he abandoned two small decorative triangular corner inserts on the lateral sides (figs. 6b and 7). In the square tower of the Annunciation, he added a



38b. IRR:  
Annunciation, eagle  
lectern: position  
of wing modified  
during painting





39. IRR: Flight into Egypt, ass

lancet window and a decorative arch above a larger window, probably to establish a better balance with the other windows (fig. 37a-b). In the same scene, he integrated decorative 'rosette' insets into the flat sides of the stone base of the lectern and adjusted the shapes of floral motifs in the lectern's sculpted support. He also made very minor modifications to the perspective of certain features, such as the ceiling of the covered passageway above the Angel Gabriel and the lower right corner of the stone tempietto in the Annunciation.

Modifications to the figures, where discernible, are minor and appear to have been made during the painting, rather than drawing stage. They are mostly aesthetic in nature and tend to enhance the Gothic elegance of the forms.

Purely formal changes include the blue drapery of the seated Virgin in the Annunciation scene, painted slightly shorter than its drawn position, and the headdress of the male attendant in the Presentation, simplified during painting. Certain details were smoothed out; for example, the undulating profile of St Anne's white shawl was painted over on the left with background paint to line up the shawl's profile with the green cloak. The lower tip of the golden eagle's left wing was tucked into its body during

painting, probably to improve the foreshortening of the motif (fig. 38b). Finally, the hooves and legs of the ass in the Flight into Egypt were shifted up and right (fig. 39).

In terms of expression, Jesus's downward facing pupils in the Presentation in the Temple were moved upwards so that his eyes gaze at his mother's face. Similarly, in the Flight into Egypt, the Virgin's pupils were shifted from the centre of the eyes to the right to focus more on her baby (fig. 34). In the Presentation, Simeon's proper left eye and nose were also raised slightly during painting.

## CONCLUSION

The present study of Melchior Broederlam's *Crucifixion Altarpiece* wings, much benefiting from new infrared and photographic documentation, presents a more intimate understanding of the artist's techniques and materials than was previously possible. His methods were not new – as demonstrated by recommendations in medieval recipe books – but he excelled in his craft on both technical and stylistic levels. Interestingly, although clearly influenced by Italian Trecento painting in terms of composition and colour, Broederlam's working methods differ considerably. This suggests his practical training and early career took place in the North rather than in Italy.



Subtle modifications in design during both drawing and painting reveal that Broederlam was personally responsible for the creative side of the commission, although he would certainly have had assistance for more menial tasks such as grinding pigments, ground laying and gilding. The ducal accounts reveal that Broederlam's workshop at the time employed both a named apprentice and paid workers, whilst payments to contemporaries Jean de Beaumetz's and Jan Maelwael's assistants shed light on the hierarchy of hired labour in a court painter's workshop. A commission as onerous as the *Crucifixion Altarpiece* would have been produced by a team of skilled workers, with the master(s) – in this case Jacques de Baerze and Melchior Broederlam – participating at the highest level.

The *Crucifixion Altarpiece* is a rare witness of Philip the Bold's extensive artistic program in the thirteen-nineties, surviving the destruction of the Charterhouse at Champmol. The painted wings, like Broederlam's other tasks as court painter – making flags, banners and supervising interior decorative schemes – served but one purpose, to promulgate the Duke's power and influence. The *Crucifixion Altarpiece* represents the high point of this endeavour, assuring Philip the Bold's artistic legacy for future generations.

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ADN Flandre: Archives départementales du Nord. Fonds de la Chambre des Comptes de Lille. Registres relatifs à la Flandre

1400-1401: *Compte de la recette générale de Flandre, rendu par Pierre Adorne, du 1<sup>er</sup> février 1395 (v. st.) au 31 janvier 1396 (v. st.)* (Dehaisnes 1886: 740).

ADN Lille: Archives départementales du Nord. Fonds de la Chambre des Comptes de Lille

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## NOTES

- For a complete bibliography up to 1985, see Comblen-Sonkes 1986: 125-133. For the succeeding period until 1998, see Mund and Stroo 1998: 70-71.
- Dehaisnes 1886; Monget 1898; Prost 1902-1913.
- De Winter 1981.
- Comblen-Sonkes 1986.
- Kockaert examined the *Crucifixion Altarpiece in situ* in Dijon and took several paint samples for analysis, Comblen-Sonkes 1986: 73-79; see also Kockaert 1984.
- Prochno 2002 (on the *Crucifixion Altarpiece*: 127-136).
- Broederlam's painted wings were examined with an Inframetrics InfraCAM-SWIR™ (short-wave infrared) video camera in 2003. Full assemblies of the infrared reflectograms were made with Adobe Photoshop. Close-up details were taken in 2006 in infrared and normal light using a Phase One LightPhase digital camera back on a Mamiya RZ67 body.
- For the most recent collection of essays on the history of the Charterhouse of Champmol, and artworks commissioned for it, see contributions by Renate Prochno, Sherry Lindquist, Sophie Jugie and Marie-Françoise Damongeot-Bourdat in the catalogue of the 2004 Dijon-Cleveland exhibition (Dijon and Cleveland 2004: 167-238); on Broederlam's *Crucifixion Altarpiece*, see Jugie's catalogue entry pp. 196-197.
- ADCO B 11671: fol. 361r (Prochno 2002: 312). Neither of these altarpieces survives.
- Broederlam's role as court painter meant he undertook diverse duties for the Duke, which explains the considerable length of time taken to complete the two retables for the Charterhouse of Champmol. For example, in 1394, he was paid 247 pounds and 10 sol by the treasurer of the town of Ypres, on behalf of the Duke, for non-specified work (Annales 1862: 185). The ducal account for Ypres for the period 1395-1397 also cites a payment to Broederlam for decorative painting, gilding work and giving advice on stained glass windows and roundels in the Zaelhof (Annales 1862: 184-185) and a further ducal account for Flanders for the period 1396-1397 cites a payment to him for decorating standards and pennons for the Lord of Dicquemme to take on a journey to 'Frize' (ADN Flandre (Dehaisnes, 1886: 740)).
- ADCO B 11671: fol. 361r (Prochno 2002: 312).



12. ADCO B 11672: fol. 32r (Ibid.: 316).
13. ADCO B 11672: fol. 32r (Ibid.: 316).
14. 'pour ycelles tables assouvir et achever illec par ledit maistre Jaques de Baerze', ADCO B 11672: fol. 32r (Prochno 2002: 316). With the exception of Cennini, Theophilus, Eraclius and Alcherius, English translations are by the present author.
15. ADCO B 11672: fols. 31v-32r (Ibid.: 316).
16. ADCO B 1495: fols. 82v-82r (Ibid.: 262).
17. ADCO B 1511: fols. 168r-168v (Ibid.: 264).
18. ADCO B 1501: fols. 62r (Ibid.: 262-263).
19. 'To Melchior Broederlam, painter of milord, residing at Ypres by agreement with him for gold, colours and other materials to gild and paint two sculpted altarpieces with tracery that master Jacques de Baerze workman sculptor residing in Dendermonde made and delivered according to the order of my said lord, to the said Melchior to paint them and place them in the church of the Charterhouse in Dijon [...] for this: 800 francs;', ADCO B 1501: fol. 90r (Ibid.: 263).
20. '[...] by which the said Melchior is personally liable to the said lord, with his goods as guarantee, to paint, finish and deliver the work without fraud and deceit, and using qualified workers', ADCO B 1501: fol. 90r (Ibid.: 263).
21. ADCO B 1500: fol. 172v (Ibid.: 262).
22. ADCO B 11673: fol. 43r (Ibid.: 331).
23. ADCO B 11673: fol. 47r (Ibid.: 332).
24. ADCO B 11673: fol. 47r (Ibid.: 332).
25. ADCO B 11673: fols. 44r-45r (Ibid.: 331).
26. ADCO B 11673: fols. 50v-51r (Ibid.: 333).
27. ADCO B 11673: fols. 58v-59r (Ibid.: 336). Although there is no ambiguity as to the function of the hemp canvas, it is not clear from the account record what the linen was actually used for. The account states that the linen was 'pour garnir de toile III chassis de boiz dont les II sont es II tables d'autel q[ue] Melchior peintre et varlet de chamb[re] de mondit s[eigneur] a amenees aud[it] Dijon [...] [to furnish with canvas 3 wooden supports of which 2 are the 2 altarpieces that Melchior painter and valet de chambre of my said lord brought to the said Dijon [...]]'. It may have served a similar purpose to the linen canvas supplied to Jan Maelwael the same year: 'A Belot la tixiere demour[ant] a Dijon pour la vendue et delivrance de VI grans linceaux de lin, chascun de III toilles de large, par elle vendus et deliv[rés] a Jehan Maluel peintre et varlet de chambre de mons[eigneur] en la p[rese]nce de Ph[ilipp]e Arnault, pour c[on]v[er]tir en la courv[er]ture de plus[ie]urs tables et tableaux d'autel fais et a f[air]e par ledit Maluel pour l'egl[is]e desdiz chartreux afin que le pouss[ie]r ne grieve a la peinture d'iceulx, et aussi pour faire des bandes pour coler sur les bors desd[ic]tes tables et tableaux pour peindre sur [...]'.  
[To Belot the weaver at Dijon for the sale and delivery of 6 large sheets of linen canvas, each 3 'toilles' wide, sold and delivered to Jan Maelwael painter and valet de chambre of milord in the presence of Philippe Arnault, to convert into covers for several paintings and altarpieces made and to be made by the said Maelwael for the church of the said Charterhouse so that dust does not harm their paint, and also to make strips to glue onto the edges of the said altarpieces and paintings to be painted on [...]]', ADCO B 11673: fol. 29r (Ibid.: 329).
28. ADCO B 1501: fol. 90r, notes in margin (Ibid.: 333).
29. Dijon and Cleveland 2004: 193.
30. 'les bons et agréables services qu'il lui a faiz et fait de jour en jour', ADCO B 1526: fols. 163v-164r (Prochno 2002: 265). The Duke regularly rewarded his artists and other workers for loyal service in the form of extra cash payments, as explained by Sherry Lindquist (Lindquist 2002). On ducal salaries, wages and gifts, see also Cassagnes-Brouquet 2004-a, particularly pp. 90-92.
31. See transcription of Aubert's report of his work in June 1943 in Comblen-Sonkes 1986: 148.
32. See transcription of Aubert's report from 29 May 1953 in Ibid.: 148-149.
33. Ibid. 'Description matérielle (avril 1975 et juillet 1980)': 143-144. The gelatine-containing protective coating was identified on both wings in most of the samples taken by Kockaert (see charts of analytical results in Ibid.: 74-75 and 78).
34. In 2003, Anne and Aubert Gérard and Juliette Lévy consolidated lifting paint and removed dust from the retable. Full conservation (cleaning and retouching) is planned for 2009.
35. Observations regarding frames from Myriam Serck, who examined the altarpiece in 2003.
36. Myriam Serck (notes from 2003 examination).
37. Comblen-Sonkes 1986: 72.
38. This layer is probably one and the same as the gelatine-containing coating identified by Kockaert. See n. 33.



39. The panel was not examined from the reverse by the author. The number of horizontal planks in the main part of the wings can be counted due to their convex nature; the number of sections for the upper rectangles and triangles was recorded by Serck in 2003. The dimensions of the planks in the right wing from the bottom up are as follows: 13 cm, 22 cm, 20.8 cm, 22 cm, 21.2 cm, 19.5 cm (final section not measured).
40. Comblen-Sonkes 1986: 76. Examination of the X-radiograph suggests that oak is the wood support, although inspection of the edges of the panels would be necessary for confirmation (Pascale Fraiture, private communication, February 1 2007).
41. Since the X-radiograph is a superimposed image of the sculpted interior scenes and the painted panels, it is impossible to distinguish whether or not dowels are present in the joins of the painted wings.
42. 'To Jehan Perrenin iron worker and Gilet the well-borer/fountain-maker living at Dijon for the sale and delivery of 36 sharp iron scrapers made by the said Jehan and purchased by Jan Maelwael, painter and valet de chambre of milord, to scrape down several panels and panels for painting that the said painter is making for the altarpieces of the church of the said Charterhouse, XLII sol tournois', ADCO B 11673: fols. 22r-22v (Prochno 2002: 328).
43. 'XVII. The Panels of Altars and Doors and Casein Glue', Theophilus (ed. Dodwell 1961): 17. Charles Reginald Dodwell argues that Theophilus's original treatise was written by the Benedictine monk and metal-worker Roger of Helmarshausen (an important artistic centre in north-west Germany) at a date between 1110-1140 (ibid: 18-44). Note that 'spokeshave' is translated as 'planing tool [i.e., drawknife]' by John G. Hawthorne and Cyril Stanley Smith in their translation (Theophilus (eds. Hawthorne and Smith 1963 (1979)): 26).
44. The linen fibre was identified at IRPA/KIK by Joseph Vynckier (unpublished report dated 25 May 1975; cited in Comblen-Sonkes 1986: 77-78).
45. On the panel construction of Broederlam's *Crucifixion Altarpiece*, see Verougstraete and Van Schoute 1995: 373-374 and Verougstraete and Van Schoute 1996: 87 and 91-92.
46. 'XVII. The Panels of Altars and Doors and Casein Glue', Theophilus (ed. Dodwell 1961): 17. Hawthorne and Smith refer to the glue as cheese glue (Theophilus (ed. Hawthorne and Smith 1963 (1979)): 26-27 and note 1).
47. 'How you should put cloth on a panel. Chapter CXIII', Cennini (ed. Thompson 1960): 70. For the dating of Cennini's handbook, see Bambach 1999: 373 and note 7.
48. Cennini (ed. Thompson 1960): 69-70.
49. 'To Guiot Poissonn[ier] tradesman living in Dijon for the purposes and goods mentioned below, agreed and delivered by him [...], for the making of paints and the manufacture of several panels and altarpieces, the latter made and still to be made by the said Jan Maelwael for the church of the said charterhouse at the said Champmol [...]. Item for 16 ells of white canvas for him to cover and conceal the said panels and altarpieces for painting on them for the price of 2 sol 11 denier the ell: 46 sol 8 denier tournois [...]. Item for 300 'clavin' nails to nail the canvases on with, so as to paint on them more easily: 2 sol 6 denier tournois.', ADCO B 11673: fols. 55v-56r (Prochno 2002: 334-335).
50. Hélène Verougstraete and Roger Van Schoute cite the case of a painted wing of a lost pre-Eyckian altarpiece (Antwerp Royal Museum of Fine Arts) as having a linen interleaf on the inner side of the wing (Verougstraete and Van Schoute 1996: 87-88, figs. 2-3).
51. For example, see cat. no. 4 (vol. 1) by Dominique Deneffe. *The Wilton Diptych* (London, National Gallery) – dated around the same time as the *Crucifixion Altarpiece* – has a mat of fibres, derived from parchment, between the panel and chalk ground layer (but not on the frames), probably intended 'to reinforce the adhesion of the ground to the panel.' (Gordon 1993: 74).
52. For a discussion of the issue of parchment, canvas and fibres as structural components in the grounds of medieval paintings, and a comparative table of occurrences between 1100 and 1600 in Italy, Spain, Germany, Austria, Switzerland, Norway, Sweden, Denmark, England and Bohemia, see Skaug 2006: 182-201.
53. Kockaert 1984: 84.19.7 and Comblen-Sonkes 1986: 74-78.
54. Myriam Serck (notes from 2003 examination).
55. 'How to gesso an ancona with gesso sottile; and how to temper it. Chapter CXVII', Cennini (ed. Thompson 1960): 72; On the making of hog hair brushes, see 'How you



- should make bristle brushes, and in what manner. Chapter LXV', *Ibid.*: 41.
56. 'To P[er]renot Barbisey, tradesman living in Dijon for the purposes and goods described below, agreed and delivered to Jan Maelwael painter and valet de chambre of milord [...], for the priming and painting of the parlour near the great cloister at the said Champmol, the portal of the said church on the side of the small cloister near the seats of the lay brothers, for several panels and altarpieces, and several other things by the said Maelwael [...] for pig bristles for making brushes, and thread for binding the said brushes: 45 sol tournois. Item for 1 quarter of wax to wax the thread of the said brushes: 14 denier tournois', ADCO B 11673: fols. 54v-55v (Prochno 2002: 334).
  57. 'Whitening hide and wood with Gesso', Theophilus (ed. Dodwell 1961): 18. This citation is part of Theophilus's description of how to prepare panels of altars and doors, following on after his instructions to glue a layer of hide or cloth to the wood support. Note that the word 'shaveweed' is Dodwell's translation for Theophilus's term 'uocatur asperella'.
  58. 'How wood is to be prepared before painting on it', Chapter XXIV. [268]', in 'Manuscripts of Jehan le Begue' (Merrifield 1849 (1967): 228). For references to the use of horsetail in later historical treatises, see Currie and Ghys 2006: 198-199.
  59. The ducal accounts record the purchase of 'une peau de chien de mer [dogfish shark skin]' alongside other artists' materials such as pigments and oil for the use of Jan Maelwael in his panels and altarpieces for the Charterhouse of Champmol (ADCO B 11673: fols. 55v-56r in Prochno 2002: 334); Cennini advises 'cuttle such as the goldsmiths use for casting' for smoothing down boxwood panels for drawing, Cennini (ed. Thompson 1960): 4.
  60. *Ibid.*: 74 and note 71.
  61. On the status of artists, apprentices and other studio hands during this period, particularly in Dijon, see Cassagnes-Brouquet 2004-b.
  62. 'To Broederlam, painter and valet de chambre of milord, for the salary of several painter workmen that he hired and employed for several days to paint an arbour for my said lord at Hesdin with several books of beaten gold and other "devises", according to an order and receipt given the last day of August 1391, 11 francs, 4 sol', ADCO B 1486: fol. 30 (Dehaisnes 1886: 687).
  63. 'Pour autres deniers paieez par ledit t[re]sorier, c'est assavoir [...] aux varlez de Melchior peintre et varlet de chambre de mons[eigneur] qui euvre[n]t en une table d'autel q[ue] led[it] Melchior paint po[ur] mondit s[eigneur], pour don a eulz fait: V frs. XII s VI d. t. laquelle table s[er]a portee en l'eglise des chartreus les Dijon [For other deniers paid by the said treasurer, that is to say [...] to the valets of Melchior painter and valet de chambre of milord who are working on an altarpiece that the said Melchior is painting for my said lord, for a gift to them of 5 francs 12 sol 4 denier tournois for which the panel will be carried to the church of the Charterhouse in Dijon]', ADCO B 1500: fol. 172v (Prochno 2002: 262).
  64. ADCO B 1500: fol. 87v (Dehaisnes 1886: 707). Hue de Boulogne is also mentioned in the ducal accounts of 1398, where it states that he is a painter of the Duke residing at Hesdin, and that he was receiving one hundred francs wages per year, paid in two instalments (ADN Lille (Dehaisnes 1886: 767)).
  65. Laurens de Boulogne was 'peintre du chastel et garde des engiens d'esbattement' from 1372-1379, a job involving the maintenance of the castle's interior decoration and the paintwork on the hydraulically-powered automata (ADN Hesdin (Dehaisnes 1886: 508)). For documents relating to Broederlam's supervision of restoration and decorative works at the Château of Hesdin during this period, see Dehaisnes 1886: 623, 638, 644, 652, 683 and 687-688.
  66. 'Melcior vacqua avec plusieurs aut[re]s dudit mestier longue espace de temps', ADCO B 1526: fols. 163v-164r (Prochno 2002: 265).
  67. 'Jehan Gentilz pointer demor[ant] a Dijon pour son salaire de LIII journ[ees] entier[es] que il a f[ai]tes et employees de l'ordonance dudit Beaulmez [...] au broyer et faire couleurs en l'esgl[is]e desdiz ch[a]rtreux [...] au p[ri]s de II g[ro]s la journe[ee] [...] VIII f[ra]ns X gros [Jehan Gentilz painter residing in Dijon for his salary of 53 full days that he did and employed under commission of the said Beaumetz [...] to grind and make colours for the church of the said Charterhouse [...] at the price of 2 gros per day [...] 8 francs 10 gros]', ADCO B 11671: fol. 230r (Prochno 2002: 299). Beaumetz also hired Jehan Gentilz for periods in 1389 and 1390, two of which were specifically for grinding colours



- (ADCO B 11671: fol. 296v-297r (Ibid.: 307), ADCO B 11671: fol. 354v (Ibid.: 311). For other references to hired labour for grinding colours in the Charterhouse accounts, see ADCO B 11671: fol. 229v (Ibid.: 299), ADCO B 11672: fol. 25r (Ibid.: 315) and ADCO B 11673: fol. 79v (Ibid.: 337).
68. 'A Guill[aum]e de Francheville peintre demoura[n]t a Dijon po[ur] ses gaiges de III gros par jour a lui ordenez par madame la duchesse pour VIII<sup>es</sup> et II jours entiers qu'il a esté et vacqué avec Jehan de Beaumes [...] au faire plus[ieur]s ouvraiges de peinture, tant en l'oratoire [...] comme en sa chapelle audit Champmol [...] XL fr[ancs] demi [To Guillaume of Francheville painter residing in Dijon for his wages of 3 gros per day ordered by milady the Duchess for 160 and 2 full days that he remained and worked with Jean de Beaumetz [...] to execute several painted works, in the oratory [...] and in the chapel of the said Champmol [...] 40 ½ francs]', ADCO B 11672: fol. 58v (Prochno 2002: 319). For references to other painters employed by Beaumetz, see ADCO B 11671: fols. 229r, 229v and 230r (Ibid.: 298-299), ADCO B 11671: fols. 296v, 296r, (Ibid.: 307), ADCO B 11671: fol. 354v (Ibid.: 311), ADCO B 11672: fol. 25r (Ibid.: 315).
69. 'A Guill[aum]e le peintre demour[ant] a Dijon pour XXIII journees de lui f[ai]tes a dorer la grant croix de p[ier]re qui est ou milieu du grant cloist[re] audit Cha[m]pmol, au pris de III gros la journee: VI frans. Et pour XII journ[ees] d'un varlet qui lui a aidie a broier les coulours pour emprimer lad[i]te croix au pris de I gros de[m]i la journee: XVIII g[ros] [To Guillaume the painter living in Dijon for 14 days spent gilding the large stone cross that is in the middle of the great cloister of the said Charterhouse, for the price of 3 gros per day: 6 francs. And for 12 days for a valet who helped him grind the colours to prime the said cross at the price of 1 gros and a half per day: 18 gros.]', ADCO B 11673: fol. 79v (Prochno 2002: 337). A ducal receipt from 1403 also states that 'Herman de Couloingne peintre et ouvrier' was paid a salary of one year one hundred and thirty days, plus expenses to 'dorer a plat V tables d'autels que pieça ycellui mons[eigneur] avoit enchargiés aud[it] Maluel faire pour l'egl[is]e desdiz chart[reux], et pour aidier a paindre le cruxifis de la croix et aut[re]s ymaiges estans sur la pille du grant cloister d'iceulx chartreux [gild flat 5 altarpieces that the said milord had ordered from the said Maelwael to make for the church of the said charterhouse, and to help paint the crucifix and the cross and other remaining images on the pillar of the great cloister of the said charterhouse]', ADCO B 11673: fols. 150r-150v (Ibid.: 342).
70. In the annotated infrared reflectograms, where ruled construction lines are likely to continue but are no longer discernible (e.g. areas of gilding), they are marked with a paler line. It is also likely that such lines continued through faces and draperies, and that the artist partially erased them after drawing in the figures; these are also marked with a paler line.
71. The use of metal-point for the underdrawing of the architecture was first proposed in Comblen-Sonkes 1986: 72.
72. Cennini (ed. Thompson 1960): 4-8. Cennini states that lead and lead-tin points are suitable for surfaces prepared without bone.
73. '296. To prepare parchment, or paper, primed panels, and linen, so that you may be able to draw upon them in black, with a pencil or stile of gold, silver, bronze, or brass, as is done upon panels of boxwood whitened or covered with bone or stag's horn burnt and whitened in the fire.', Alcherius, 'A Treatise upon Colours of Various Kinds', in 'Manuscripts of Jehan le Begue' (Merrifield 1849 (1967): 274-275). Jeffrey Jennings demonstrated through practical tests that silverpoint lying underneath a paint layer is detectable in infrared reflectography (Jennings 1993, particularly p. 245, n. 15-16 and pl. 101). Tests on the visibility of various drawing materials under a painted surface, including silverpoint, are also described in Kirby et al. 2002: 27 and figs. 33-34. In this study, the silverpoint line is described by the authors as 'fine and very even'.
74. It is possible that these late modifications were made after the application of the lead white priming, which would explain their darker appearance in the infrared photograph.
75. 'Also for drawing, I have come across a certain black stone, which comes from Piedmont; this is a soft stone; and it can be sharpened with a penknife, for it is soft. It is very black. And you can bring it to the same perfection as charcoal. And draw as you want to.', in 'About a stone which has the character of charcoal for Drawing. Chapter XXXIII.', translation from Cennini (ed. Thompson 1960): 20; original



- text from Cennini (ed. Torresi 2004): 78. Cennini's recommendation is for drawing, rather than the underdrawing of panel paintings, for which he recommends charcoal, fixed with ink.
76. Florentine artist, architect and theorist Leon Battista Alberti was the first to describe how painters should represent three-dimensional forms using linear or one point perspective (*Della Pittura*, 1435-1436).
  77. Panofsky 1953: 87.
  78. Sophie Jugie suggests that Jacques de Baerze, in making the *Crucifixion Altarpiece* for the church of the Charterhouse, may have had to take into account an architectural constraint, such as a descending vault, which would explain its unique form (Dijon and Cleveland 2004: 194).
  79. Panofsky 1953: 87.
  80. Kockaert identifies this black as charcoal and the medium of the underdrawing as tempera (Kockaert 1984: 84.19.7). These results could not be verified during the current campaign through lack of samples.
  81. Cennini (ed. Torresi 2004): 91.
  82. '1<sup>c</sup> tuyaux de plumes de cigne pour faire pinceaux: VII s. VI. d. t.', ADCO B 11673: fols. 54v-55v (Prochno 2002: 334).
  83. 'How to made minever brushes. Chapter LXIII', Cennini (ed. Thompson 1960): 40-42.
  84. Boccaccio's *Des Cleres et nobles femmes*, Paris, BnF, ms. fr. 12420: fol 86, illustrated in Perkinson 2002: 52, fig. 1.
  85. These green lines can be distinguished with the naked eye through thin paint. In the infrared reflectogram, they are easily confused with black underdrawing lines.
  86. Wooden tablets for drawing were made of box or figwood and prepared with bone for use (Nottingham and London 1983: 44 and 220); on wax tablets, see Scheller 1995: 2-4.
  87. '4 quires of ordinary paper for drawing and sketching images and other needs of his profession for the price of 20 denier the quire: 6 sol 8 denier tournois. Item for 9 quires of other large format paper for the same purpose for the price of 6 sol 8 denier the quire: 50 sol tournois]', ADCO B 11673: fols. 55v-56r (Prochno 2002: 335).
  88. The proportional compass was invented in Antiquity; a Roman example was discovered in Pompeii dating from 79 AD approximately (Hambly 1991: 20 and 128, fig. 10). In around 1495, Leonardo da Vinci drew one with a screw (Codex Trivulzianus (BTM), c. 38v, Istituto e Museo di Storia della Scienza, Florence, see [www.imss.fi.it](http://www.imss.fi.it)).
  89. For a summary of opinion on international influences on Broederlam's motifs and style, see Comblen-Sonkes 1986: 107-112.
  90. For a recent analysis of surviving model books, see Scheller 1995.
  91. Ibid.: cat. no. 18.
  92. Ibid.: cat. no. 19.
  93. Renger 1987.
  94. Scheller 1995: cat. no. 20.
  95. Ibid.: cat. no. 21.
  96. Ibid.: cat. no. 31. The landscape background is seen in *ibid.*: fig. 192.
  97. See Barbara Baert's contribution on the symbolic meaning of gilding in paintings in this volume.
  98. The term 'cog-wheel', a device also known as a 'rotella' or 'rulino' is taken from Skaug 1994, vol. 1: 65.
  99. 'When you have got your whole ancona drawn in, take a needle mounted in a little stick; and scratch over the outlines of the figure against the grounds which you have to gild, and the ornaments which are to be made for the figures, and any special draperies which are to be made of cloth of gold', in 'How you should mark out the outlines of the figures for gilding the grounds. Chapter CXXIII', Cennini (ed. Thompson 1960): 76, original Italian text from Cennini (ed. Torresi 2004): 119.
  100. Billinge et al. 1997: 31. For definitions of bole and its use as a gilder's clay, see Nadolny 2006: 149.
  101. 'une livre de boul pour faire assises a dorer dessus', ADCO B 11673: fols. 54v-55v (Prochno 2002: 334).
  102. Kockaert 1984: 84.19.8.
  103. 'XXIII. Gold Leaf', Theophilus (ed. Dodwell 1961): 22. Theophilus recommends this technique to be used for 'the haloes round the heads of figures, stoles, the borders of draperies, and so on as you wish'. It is not completely clear as to which support Theophilus is referring, but it would seem to be painting on wood, given the context.
  104. '291. For laying gold in different ways upon various articles so that it may be burnished, and the cautions to be observed concerning this in painting', in 'A treatise upon colours of various kinds', Alcherius, in



- 'Manuscripts of Jehan le Begue' (Merrifield 1849 (1967): 258-266).
105. 'How to gild on panel. Chapter CXXXI-III', Cennini (ed. Thompson 1960): 80-82.
  106. 'Chapter CXL How you should begin swinging the diadems and do stamping on the gold, and mark out the outlines of the figures', *Ibid.*: 86.
  107. On punch tools and punch work, see Skaug 1994: 12-14 (glossary of terms) and 62-66 (execution of gold tooling).
  108. Myriam Serck reasons that these indentations would have been made prior to gilding, as the gold would otherwise have been ruptured by the tool used to incise the markings (private communication, 29 March 2007).
  109. Skaug 1994: 62-63 and note 92.
  110. 'When you have burnished and finished your ancona, you must start by taking the compasses; swinging your crowns or diadems; engraving them; tapping in a few ornaments; stamping them with tiny punches, so that they sparkle like millet grains; embellish with other punches; and do stamping if there are any foliage ornaments', in 'How you should begin swinging the diadems and do stamping on the gold, and mark out the outlines of the figures. Chapter CXL', original Italian text from Cennini (ed. Torresi 2004): 127; English translation from Cennini (ed. Thompson 1960): 85.
  111. The tool used to make this single motif rosetta was only about 1.5 mm in diameter.
  112. This was ascertained through tracing and superposing the repeated motifs.
  113. 'To Jehan Perrenin ironworker and Gilet the well-borer/fountain-maker [...] for a slab of brass weighing 22 pounds made by the said Gilet and delivered to the said painter [Jan Maelwael] for carving several punches necessary for the painting of several things to do for the said church [Church of the Charterhouse], and other tasks for the said milord, for the price of 3 sol tournois per pound: 66 sol tournois [...]', ADCO B 11673: fols. 22r-22v (Prochno 2002: 328).
  114. 'Chapter LXXIII. Punched Work', Theophilus (ed. Dodwell 1961): 130-131. Theophilus also describes the same method of making punches for gold, silver or gilt copper in 'Chapter XIII. Chasing Tools' *Ibid.*: 71). On the manufacture of punches, see Skaug 1994: 58-62.
  115. See Frinta 1965 and Idem 1998. On different types of punches, see also Skaug 1994: 65-66.
  116. Myriam Serck considers it possible that these small details might all represent later additions on the basis of the quality of execution, although has no such reservations regarding the golden eagle (private communication, March 29 2007).
  117. 'A short section on mordant gilding. How to make a standard mordant, and how to gild with it', Cennini (ed. Thompson 1960): 96-97.
  118. 'How to make a mordant out of garlic.', *Ibid.*: 97-98. See also Alcherius's recipe number 106, 'To make a mordant with garlic.', a recipe he states he copied in 1410 from a book lent to him by a painter living in Bologna (Merrifield 1849 (1967): 9 and 95).
  119. ADCO B 1501: fols. 62r, 66v and 90r (Prochno 2002: 262-263).
  120. A purchase order from 1393 reveals that a 'papier' is not a single gold sheet, but a book of sheets: 'A Thevenin l'orfevre dit de Sens demourant a Dijon pour la vendue et delivrance de XXX papiers chascun contena[nt] III<sup>e</sup> feuilles d'or fin au pris de IIII frans demi chascun papier [To Thevenin the goldsmith from Sens residing in Dijon for the sale and delivery of 30 books each containing 300 sheets of fine gold for the price of 4 1/2 francs per book]', ADCO B 11672: fol. 88v (Prochno 2002: 321). For other references to purchases of gold from Thevenin for the Charterhouse project, see: ADCO B 11671: fol. 228r (*Ibid.*: 298), ADCO B 11671: fol. 295v (*Ibid.*: 306), ADCO B 11672: fol. 24r (*Ibid.*: 314), ADCO B 11672: fol. 88v (*Ibid.*: 321), ADCO B 11672: fol. 122v (*Ibid.*: 323), ADCO B 11672: fol. 147r (*Ibid.*: 324). For information regarding Northern European metalbeaters and further details regarding metal leaf during the period, see Nadolny 1999.
  121. 'VIII papp[ie]rs d'or fin au pr[is] de IIII f[ra]nz demi le pappier [...] VI pappiers d'or p[ar]ti au pris de II frans le pappier', ADCO B 11671: fol. 296r (Prochno 2002: 306).
  122. 'I papier et VII<sup>e</sup> pans d'or fin: XV livr[es] X s.t. [...] III<sup>e</sup> pans d'or parti: XLV s. t.', ADCO B 11673: fols. 55v-56r (*Ibid.*: 334-335).
  123. The ducal records give examples of this production, for example Josset de Halle's



- accounts from 22 June 1386 to 30 June 1387: 'Audit Melchior, peintre de monseigneur, pour l'or, facon et franges de chief de soye de III banieres et de III pennons, une aux armes d'Artoiz, une autre aux armes de la conté de Bourgoingne, une autre aux armes de Rétheloiz, pour l'or et facon de III<sup>m</sup> pannonceaulx a la devise de monseigneur et pour semer IIII estandars de mer sur les queues blanches de lettres d'or, sur lesquelles queues estoient semées de lettres bleues, par quittance donnée le derrenier jour de septembre mil CCC III<sup>xx</sup> et VI, III<sup>l</sup> IIII<sup>xx</sup> frans. [to the said Melchior, painter of milord, for the gold and making of silk fringes for 3 banners and 3 pennons, one with the arms of the Artois, another with the arms of the country of Burgundy, and another with the arms of Réthelois, for the gold and making of 3000 escutcheons with the arms of milord and for decorating 4 naval standards with white tails made of golden letters, on which tails should appear blue letters, according to a receipt given the last day of September 1386, 380 francs.], ADCO B 1466: fol. 21v (Dehaisnes 1886: 636). In the account of 1391-1392, the same Joset de Halle records: 'Id. a lui [Broederlam] pour avoir délivré l'or et l'argent de bature et pour les salaires de certaines ouvriers peintres qu'il a mis et employés pour faire VIII banieres pour les trompettes de mon dit seigneur, XXXII frans. [to him (Broederlam) for gold and beaten silver and for the salaries of painter-workmen who were employed to make 8 banners for the trumpets of my said lord, 32 francs.], ADCO B 1486: fol. 30 (Ibid.: 688).
124. Broederlam's contribution to the decorations of the Zaelhof are recorded in the account of Jean de Medom, payer for works for the Duke's house at Ypres, dated 6 October 1395 to 2 September 1397: 'Item, a Melcior Broederlam, pour peindre un pignon, qui est mis sur le grent sale, d'un chevalier a cheval avec les armes de Bourgoigne et de Flandre, et pour dorer le pumiel et le moyenne de le bergh ['verghe', Deshaines 1886: 732] sur quoi le pignon est mis, payé IIJ lib. Item, pour peindre d'or et d'autre colleur une creste de plonc qui est mis sur l'oratoire, IIJ liv. XII s. Item, pour peindre un autre pignon, qui est mis sur la nouvelle chambre des armes de Bourgoigne et de Flandres et pour dorer une noke de fer, VIJ lib. III J.S. [Item, to Melchior Broederlam, for painting a pennon in the great hall with a mounted rider with the arms of Burgundy and Flanders, and for gilding the knob and the middle of the rod on which the pennon is placed, paid 3 pounds. Item, for painting a lead crest in gold and another colour to put on the oratory, 3 pounds, 12 sol. Item, for painting another pennon for the new bedroom with the arms of Burgundy and Flanders and for gilding an iron 'noke', 7 pounds, 4 sol.], (Annales 1862: 184-185).
125. Gilders are only mentioned for the first time as a separate profession in the Antwerp guild statutes in 1552 (Vandamme 1982: 29 and note 26).
126. Prost 1909: concerning payment of 'gaiges par jour [daily wages]' to Beaumetz and his valet for work on the chapel, see page 163, no. 1094 and note 7; on purchases of gold leaf for the project, see pages 250-252, nos. 1515-1520.
127. Kockaert 1984 and Kockaert's observations in Comblen-Sonkes 1986. Kockaert's medium analysis of selected samples, using 'microchemistry and the micro-probe' identified most of the colours as bound in protein temperas or protein-oil emulsions, ultramarine as bound in pure tempera, brown and dark red glazes bound in oil and dark green glazes as probably copper resinate.
128. Kockaert's observations in Comblen-Sonkes 1986: 73. Kockaert identified the medium of this layer as protein-oil (whole egg). A lead white oil priming layer was noted above the chalk-glue ground and underdrawing layers in the *Thornham Parva-Cluny Retable* (early 14th century, English), see Massing 2003: 44.
129. Kockaert 1984: 84.19.8.
130. Ibid.
131. Ibid.
132. Kockaert identifies the yellow pigment in the angel as lead-tin yellow II, see Ibid.
133. Ibid.: 84.19.7-8.
134. Comblen-Sonkes 1986: 85-86.



PRE-EYCKIAN PANEL PAINTING  
IN THE LOW COUNTRIES

2

ESSAYS

Edited by  
CYRIEL STROO



BRUSSELS

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Contributions to Fifteenth-Century Painting  
in the Southern Netherlands and the Principality of Liège

9

CENTRE FOR THE STUDY OF FIFTEENTH-CENTURY PAINTING  
IN THE SOUTHERN NETHERLANDS AND THE PRINCIPALITY OF LIÈGE

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