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Front cover: Raphael, *'The Garvagh Madonna'*, detail.

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Windsor Castle, Royal Library, © 1993. Her Majesty The Queen: Fig. 12, page 15.

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**Plate 1** Raphael, *The Madonna and Child with the Infant Baptist* ('*The Garvagh Madonna*') (NG 744), c.1510–11. Panel, 38.7 x 32.7 cm.



# The Infra-red Examination of Raphael's '*Garvagh Madonna*'

Jill Dunkerton and Nicholas Penny

*The Madonna and Child with the Infant Baptist* (NG 744) (Plate 1), also known as the '*Garvagh Madonna*' or the '*Aldobrandini Madonna*' (from the families which owned it in previous centuries), is an undocumented and unsigned painting which seems always to have been accepted as by Raphael.<sup>1</sup> Scholars are generally agreed that it belongs to the artist's early years in Rome and that it is very close to Raphael's tondo, the *Alba Madonna*, in the National Gallery of Art in Washington (Fig. 1). The similarity between the paintings may be observed in the pose of the Infant Christ, in the handling of Saint John's camel skin and of the misty landscape, but also in its geometric ideal. The colours are distinctly less rich and saturated than those which Raphael preferred in the period immediately before he came to Rome: there is no deep blue, moss green or golden yellow such as in the Borghese *Entombment*, the *Canigiani Holy Family* in Munich and the National Gallery's *Saint Catherine of Alexandria* (NG 168) (Fig. 2, p. 9). Nor are there the luxurious textures and deep shadows of later devotional paintings such as the *Madonna della Seggiola* in Florence and the *Madonna della Tenda* in Munich.<sup>2</sup>

The *Garvagh* and *Alba Madonnas* have always been linked with the frescoes in the Stanza della Segnatura, the first room in the Vatican which Raphael was given to decorate by Pope Julius II; and in particular the faces of the children and the mouldings of the block seat in the *Garvagh Madonna* and the pose of the Virgin in the *Alba Madonna* recall the fresco of the three Cardinal Virtues in the lunette of what was probably the last wall which Raphael painted there, generally dated to early 1511.<sup>3</sup> Raphael's increasing acquaintance with ancient Roman sculpture, which is so important in his frescoes in the Stanza della Segnatura, is reflected in the way that the Virgin in the *Garvagh Madonna* holds the bunched fabric of her mantle — Roman senators are represented holding their togas in similar fashion.

A few sketches have been thought to be preparatory for the *Garvagh Madonna* but none of them can be certainly connected with it, whereas there is a sheet in the Musée des Beaux-Arts at Lille with preparatory studies on both sides for the *Alba Madonna* which provides a fascinating insight into

the way Raphael developed his designs.<sup>4</sup> Despite the absence of such drawings on paper for the *Garvagh Madonna*, we can still learn something of how this composition was perfected from the preliminary underdrawing on the painting itself. While some underdrawing has long been visible to the naked eye (especially beside Christ's right foot), until recently the only infra-red image available was an infra-red photograph taken before the painting was cleaned in 1970,<sup>5</sup> and although a very beautiful and quite extensive underdrawing was evidently present, the image was marred and obscured by old retouchings and by layers of dirt and varnish. The important role played by the newer and generally better penetrating technique of infra-red reflectography in the examination of the *Madonna dei Garofani* (Figs. 3, p. 10, and 4, p. 11)<sup>6</sup> prompted a re-examination of the *Garvagh Madonna* and the *Saint Catherine*, the two paintings by Raphael in the National Gallery closest to it in date and style. In addition, it is now possible to produce infra-red vidicon images of greatly improved legibility by using computerised image processing to join the component details; previously, to obtain an image of the whole painting, a mosaic had to be painstakingly assembled from individually printed photographs.<sup>7</sup>

The infra-red vidicon image of the underdrawing on the *Garvagh Madonna* (Fig. 5, p. 12) is of remarkable clarity. The extreme fineness and delicacy of many of the lines suggest that they may have been drawn in metalpoint (most probably silverpoint), but given the good condition of the painting and the thinness of the lines it was not possible to sample the drawing for analysis.<sup>8</sup> In a few places, principally where there are corrections or where a line has been strengthened and reinforced, the lines appear darker and have the broken, granular appearance associated with the use of a black drawing 'chalk'. This distinction is more clearly visible in the infra-red photographs taken during the re-examination of the painting (Fig. 6, p. 13) than in the reflectograms. It is just possible that the entire drawing is in black chalk, but the chalk, or more precisely stone, would have had to have been of exceptional hardness; it is difficult to believe that Raphael could have maintained a line of such constant sharpness with a friable drawing material.

There are numerous revisions in the underdrawing,



**Fig. 1** Raphael, *The Alba Madonna*, c.1510. Canvas (transferred from panel), diameter 94.5 cm. Washington, National Gallery of Art.

as well as departures from it in the painting, but it is clear that the figure composition must have been established in its essentials before the underdrawing was made. There is, however, no visible evidence of mechanical transfer: there are no pounced dots such as are apparent, in parts at least, in some of the underdrawings by Raphael so far published,<sup>9</sup> and no evidence of squaring. Moreover, the lines do not look as if they were traced. In places, for example down the back of the Christ Child and along the upper edge of the raised arm of the Baptist, the line is repeated two or three times in the search for the correct position in a way which certainly does not suggest the following of the pre-determined contours of a tracing.<sup>10</sup> The underdrawing is often careful and even rather schematic, as in, for example, the gathered

folds of the Virgin's underdress, and the lines tend to be short and discontinuous when compared with the long fluent lines of Raphael's drawings on paper.

Close examination of the reflectogram reveals that in at least two places, the heads of the Virgin and the Baptist, Raphael has very lightly and tentatively sketched the outlines in slightly different positions from those of the final design. Originally the head of the Virgin (Fig. 7, p. 14) was further to the right: the outlines of her neck, chin and jawline can just be made out, as can the lower edge of her coiled hair together with a few strands of hair to the left of her right eye. It might be argued that these are lines transferred by tracing and that the position of her head was only corrected in the underdrawing. It would be unusual, however, to include the rough lines which



**Fig. 2** Raphael, *Saint Catherine of Alexandria* (NG 168), c.1507–8. Panel, 71.5 x 55.7 cm.

indicate the strands of hair in a tracing, and in the case of the head of the Baptist, the faint lines of his brow, eye and possibly his mouth — again to the right of the present profile and slightly more tilted — are so free and sketchy that they can only represent a first approximate placement of the head. All this is suggestive of copying and it would seem likely that Raphael was consulting another drawing, probably different in scale, no doubt modifying it as he did so. The way that he uses the underdrawing to explore and define the structure of some of the forms — the circles at the knuckles on the hands, the lines defining the curvature and volume of Christ's head and right leg and the cheek and neck of the Virgin — is not consistent with a mechanical process of transfer. Perhaps the most idiosyncratic of these features are

the circles at the knuckles. They are not characteristic of Raphael's drawings on paper but are found in other apparently freehand underdrawings by him, notably the *Madonna dei Garofani* (Fig. 4) and the *Saint Catherine* (Fig. 9, p. 14).<sup>11</sup>

The fine and evenly spaced parallel hatching (very like that on many of Raphael's drawings in metalpoint on paper) is used not so much to suggest volume — already so successfully indicated by line — but more to establish the areas which are to be in shadow: for example, the deep fold of drapery behind Christ's right foot, the cast shadow on his chest and cheeks and lower jaw, and the shaded back of the Baptist and the Virgin's supporting hand. Even in the landscape, the fall of light has been considered and the shadowed side of the tower on the right indicated by hatching.





**Fig. 3** Raphael, *The Madonna dei Garofani*, c.1507–8. Panel, 29 x 23 cm. Northumberland, Alnwick Castle, Duke of Northumberland Collection (on loan to the National Gallery).

A notable feature of the reflectograms (and of the earlier infra-red photographs) is the vertical and horizontal ruled lines which bisect the picture area. A similar vertical line, which appears to serve as a sort of plumb-line, has been noted in infra-red reflectograms of the *Small Cowper Madonna* in the

National Gallery of Art in Washington (although it is not visible in reproduction).<sup>12</sup> On this work there is evidence that pounced cartoons were employed for the transfer of parts, if not the whole, of the design, so a ruled registration or plumb-line would have helped in the correct orientation of the pricked draw-





Fig. 4 Raphael, *The Madonna dei Garofani*. Composite infra-red reflectogram detail (assembled by computer).

ing on the gessoed panel. Sometimes these lines may not have survived: no plumb-line can be detected on either *An Allegory* ('*Vision of a Knight*') in the National Gallery (NG 213) or on the Washington *Saint George and the Dragon*, yet both have associated pounced cartoons which, as infra-red reflectography has confirmed, were used for the transfer of the designs to their respective panels.<sup>13</sup> Furthermore, in both cartoons a perforated vertical registration line appears. That on the National Gallery drawing has caused the sheet to tear along the lower part. The functional nature of the line is suggested by the fact that although the centre of the composition is defined with almost heraldic emphasis by the tree, the tree is the only important part of the composition which Raphael has not worked in detail in the cartoon, confining himself to the outlines of the trunk.

The presence of a registration line might be taken as evidence that a pounced or traced cartoon was used for the *Garvagh Madonna*, but a similar vertical line can also be detected on the *Saint Catherine* (Figs. 8 and 9). In this case, although a full-scale preparatory drawing in black chalk exists (Paris, Louvre) which has had the outlines pricked for transfer, it seems likely that the holes were made for a different purpose and perhaps at a later date. It has previously been pointed out that there are significant

differences between the pounced drawing and the finished painting,<sup>14</sup> and infra-red reflectography has revealed an underdrawing which is most unlikely to have been transferred by pouncing or any other mechanical process. It is far less extensive than on the *Garvagh Madonna* and the *Madonna dei Garofani*, and the lines, again probably metalpoint (with the exception of a correction to the crumpled folds of her skirt (Fig. 9), which, as with the *Garvagh Madonna*, may be in black chalk), are so faint and difficult to detect that a reproduction of the whole infra-red image is not informative. In fact the drawing is almost as readily visible in infra-red photographs as in reflectograms. The main outlines and the general disposition of the drapery folds are indicated in a summary manner with a few long sweeping lines of great boldness, suggesting an artist confident in the knowledge that he has an unusually detailed drawing from which to work. There is no shading or hatching,<sup>15</sup> and other than the circling of the knuckles referred to earlier, and a rough indication of the curve of Saint Catherine's brow (Fig. 8) (again a typical feature of Raphael's underdrawings), there is little to suggest volume or modelling.

If the underdrawing of the *Saint Catherine* is a free-hand copy made from the drawing on paper, then the plumb-line would have helped to centre the



**Fig. 5** Raphael, *The Garvagh Madonna*. Composite infra-red reflectogram (assembled by computer).

figure on the panel (although it should be noted that no such plumb-line is indicated on the Louvre drawing — perhaps to avoid spoiling this highly finished study, a stretched thread, or some other temporary device, was used). A close inspection of the X-ray and infra-red images reveals a horizontal ruled line as

well, detectable principally because the intersecting arcs scratched into the gesso by the metal points of the dividers (in the standard geometrical construction of dropping the perpendicular from the vertical registration line) have become filled with paint which is opaque to X-rays, and therefore show as white in the





**Fig. 6** Raphael, *The Garvagh Madonna*. Infra-red photograph detail, showing what appears to be the reinforcement with black 'chalk' of a metalpoint underdrawing.

X-radiographs (Fig. 10, p. 15). Unlike the horizontal line in the *Garvagh Madonna*, it does not divide the vertical line equally but crosses it just about level with the saint's waist: either the panel has been cut at the lower edge, losing some 10 cm of the design,<sup>16</sup> or, and perhaps more likely, Raphael was adopting the

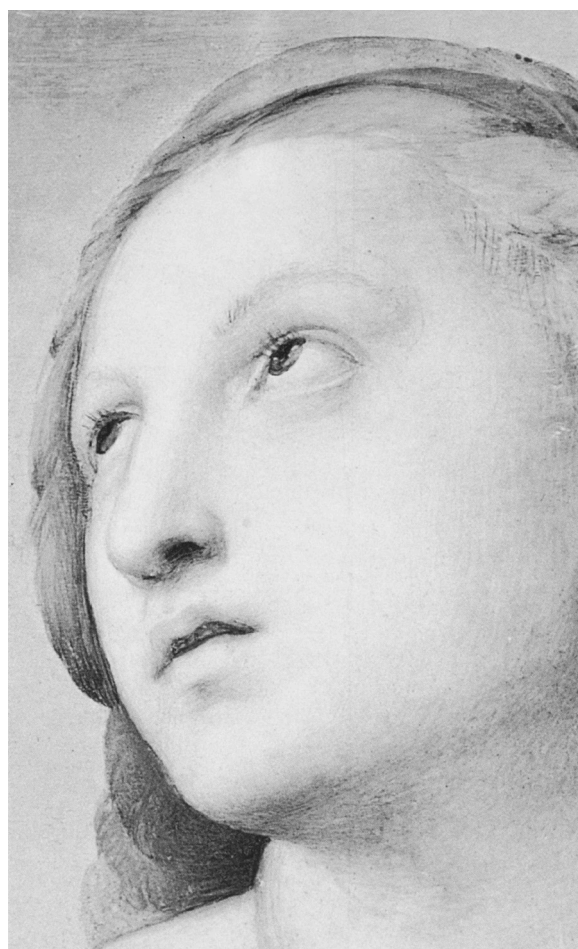
geometrical scaffolding with which his compositions, from his earliest altarpiece onwards,<sup>17</sup> were planned to help articulate the contrapposto of this, the most dynamically posed figure he had yet invented.

If these registration lines were ruled with the purpose of ensuring that the compositions being transferred,

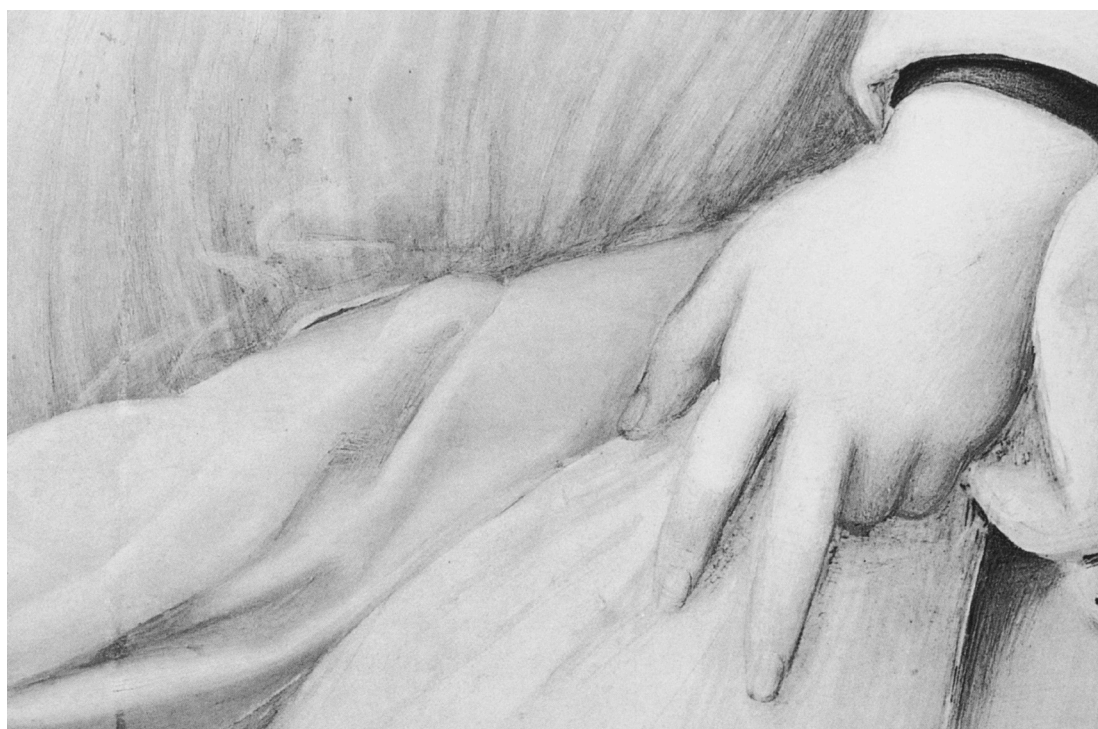




**Fig. 7** Raphael, *The Garvagh Madonna*. Infra-red reflectogram detail from Fig. 5.



**Fig. 8** Raphael, *Saint Catherine of Alexandria*. Infra-red photograph detail.



**Fig. 9** Raphael, *Saint Catherine of Alexandria*. Infra-red photograph detail.





**Fig. 10** Raphael, *Saint Catherine of Alexandria*. Detail of the X-radiograph, showing the drapery over her left arm.



**Fig. 11** (above) Raphael, *The Virgin, Child and Saint John, with a Packsaddle*, c.1512. Silverpoint on blue-grey ground, 19.3 x 22.8 cm. Oxford, Ashmolean Museum.

**Fig. 12** (left) Raphael, Study for the *Madonna dell'Impannata*, c.1512. Silverpoint and partly darkened white heightening on faded buff-grey ground, 21 x 14.5 cm. Windsor, Royal Library.





**Fig. 13** Raphael, *The Garvagh Madonna*. Infra-red reflectogram detail from Fig. 5.

whether freehand or by mechanical means, were properly centred on the panel, then one would expect to find such plumb-lines in many of Raphael's more finished compositional drawings, and not only those referred to above which can be demonstrated to have been used as full-scale cartoons transferred by pouncing. Such is indeed the case: they are commonly found on compositional drawings, and covering all periods of Raphael's career; occurring, for example, in the very early metalpoint drawing in the Ashmolean, *The Virgin, Child and Saint John, with a Packsaddle*

(Fig. 11), but also — admittedly roughly indicated rather than carefully ruled — in a study (Fig. 12) for the much later *Madonna dell'Impannata*, a painting which is freer in execution than his earlier works and with many compositional changes made during painting, and therefore less likely to have a laboriously pounced and transferred underdrawing.<sup>18</sup> On some drawings the plumb-lines are indented with a stylus rather than drawn (for example in a finished compositional study in the Ashmolean for *The Lamentation* which was later engraved<sup>19</sup>) and there is sometimes evidence as to a change of mind as to exactly where the centre of a composition should be — thus, in the drawing for *The Massacre of the Innocents* in the British Museum, a plumb-line is pricked somewhat to the left of the one Raphael has drawn.<sup>20</sup>

Although so much evident care was taken in the registration and positioning of the figures in the underdrawing of the *Garvagh Madonna*, many changes can still be observed. Christ's foot was redrawn, as was the lower part of the Virgin's left hand; the orthogonal of the block seat was adjusted (so that the vanishing point now occurs in the centre of the picture at the intersection between the vertical and horizontal divisions); and many of the contours were revised. But the most significant change, visible only by reflectography and not in infra-red photographs, was to the landscape and architecture. Raphael seems originally to have planned for the distant buildings to continue behind the Virgin — the slope of the hills is extended on the left, while on the right, schematic rooftops are clearly visible where the pier is now placed (Figs. 13 and 14).<sup>21</sup>

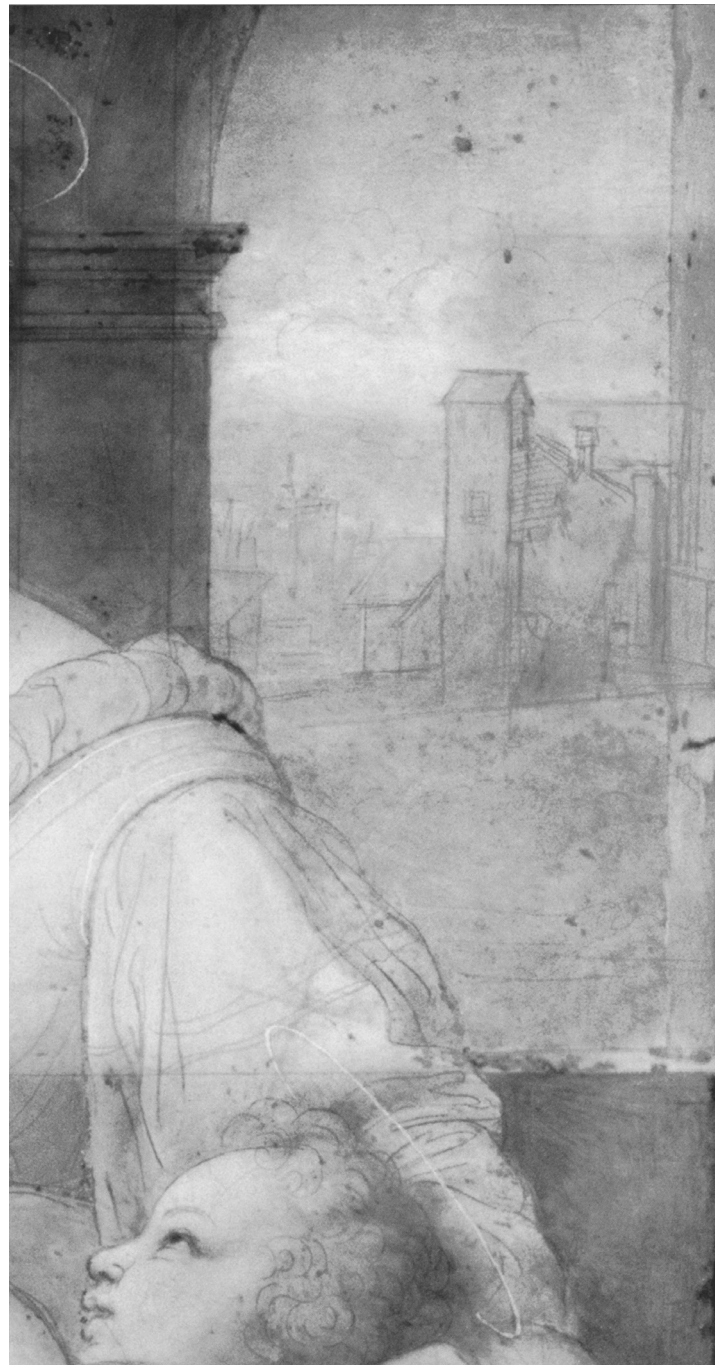
The decision to alter the background was certainly made at the underdrawing stage: the ruled lines of the central pier can be seen in the reflectograms, initially drawn straight up to the top of the picture area, with the curves for the arches inscribed afterwards — and, in the case of that on the left, only at the second attempt. The X-radiographs (Fig. 15, p. 18) confirm that no paint from the sky and landscape lies beneath that of the pier. On the other hand, the X-ray and infra-red images show that the paler bands of stone visible beyond the window openings are afterthoughts, added when the underlayers, at least, of the landscapes had been blocked in. Presumably they should be read as the sides of projections from the wall, but their main function appears to be as framing devices to contain the landscapes, since the outer edges of the window openings cannot be shown. A similar desire to frame and provide a decisive contrast for the Virgin's head may explain the introduction of the pier — perhaps Raphael found the smaller forms of the landscape confusing so near her face and decorative headdress. Perhaps he sought to avoid the effect of the original wall or parapet cutting the paint-

ing in half by taking its dark grey-brown colour into the upper part of the painting (although such concerns did not prevent him from placing the top of the parapet in the *Small Cowper Madonna* very nearly half-way up the picture). The improbability of the architectural scheme is as characteristic as the improbable anatomy: the harmony of the compositional solution discourages analysis of either.<sup>22</sup>

The use of a block of architecture as a foil for the Virgin's head was a solution favoured by Fra Bartolommeo,<sup>23</sup> but Raphael is more likely to have been thinking of his own earlier work, and in particular of the *Madonna del Granduca* (Florence, Palazzo Pitti). This now has a uniform dark background — probably added at a later date — but X-radiographs reveal that it was originally painted with a pier and arch behind the Virgin, distinguishing her from the landscape which was certainly present on the right-hand side of the painting and possibly on the other side as well. There too the composition seems to have been divided horizontally by the top edge of the window openings or a wall.<sup>24</sup>

Differences between the underdrawing and the painted image may be noted in the *Garvagh Madonna*, as well as changes made at the underdrawing stage. Some of these are very slight: for instance, the folds of the bunched drapery in the Virgin's hand; the character of the children's hair — the hair is hardly indicated at all on Christ's head in the underdrawing, while the tight, bubbling curls of the Baptist become loose and flowing in the painting; the substitution of a tower for an arched belfry in the church on the left; the addition of a fortified keep in the landscape on the right. There is a more substantial change in the Baptist's camel skin, which now passes round his back behind the Virgin's thumb and wrist. Most interesting of all perhaps are the parallel bands across the upper part of the sleeve of the Virgin in the underdrawing. If, as seems likely, these were intended as stripes in the fabric, then Raphael may have abandoned them because they distracted from the cross held by Saint John. This cross is only drawn in the small section where it runs through the Baptist's fingers. The remainder of it is lightly incised into the paint (and therefore produces a black line in the X-radiograph), as was Raphael's practice with straight lines, including, for example, the lines of the identical cross in the *Alba Madonna*.<sup>25</sup>

Although the infra-red vidicon has successfully penetrated even the dark green of the Virgin's headdress, the only lines to be seen here are those indicating the folds and twists of the fabric. It seems, therefore, that Raphael may have decided to transfer the idea of a striped pattern from the sleeve to the headdress. The lines of gold on this beautiful textile as well as those of the haloes show as white in the X-radiographs,



**Fig. 14** Raphael, *The Garvagh Madonna*. Infra-red reflectogram detail from Fig. 5.

indicating the presence of a pigment which is opaque to X-rays, almost certainly lead white. This is evidence that the gold was most probably applied with some form of oil mordant (the lead white being added as a drier), rather than as shell gold or with the colourless mordant, perhaps based on garlic juice, employed for the gilded decoration of his earlier works.<sup>26</sup> Raphael made extensive use of gilded decoration in his frescoes for the Stanza della Segnatura so he would have become familiar with the oil mordants used when gilding wall paintings.





**Fig. 15** Raphael, *The Garvagh Madonna*. Composite X-radiograph.

The use of an oil mordant for the fine lines of gilding on the *Garvagh Madonna* is only a small technical detail, but one which serves to underline the connections between this little *Madonna* and Raphael's great series of frescoes. In the frescoes of the Stanza of Heliodorus Raphael depicted gold with white and yellow pigments and he ceased from then onwards to use gilding in his panel paintings as well. The *Portrait of Pope Julius II* in the

National Gallery (NG 27) is a notable case of golden objects (the gilded acorn finials of the throne) being represented without the use of gold leaf. It was painted not much later than the *Garvagh Madonna* which may indeed be one of the last of Raphael's panel paintings in which gilding is employed. The *Garvagh Madonna* is also likely to be one of his last paintings to exhibit such extensive and detailed underdrawing.



## Acknowledgements

The infra-red reflectogram mosaics of the *Garvagh Madonna* and the *Madonna dei Garofani* were made by Rachel Billinge, Leverhulme Research Fellow in Infra-red Reflectography at the National Gallery. We would also like to thank her for her great patience when frequently asked to call up the images on the computer screen for discussion, and for her important contribution to these discussions. Thanks are also due to David Saunders and John Cupitt who devised the infra-red mosaic software (see Note 7). This is the first application of the procedure to be published.

## Notes and references

1. For the provenance of this painting in the Garvagh and Aldobrandini Collections see Cecil Gould, *The Sixteenth-Century Italian Schools*, National Gallery Catalogues, London 1975, pp. 215–16. Some details of the acquisition are worth adding to this account, however. The painting was, after the death in 1840 of the Rt Hon. George Canning, Baron Garvagh, the joint property of the dowager Lady Garvagh and her children. Approaches had been made by the Trustees of the National Gallery to acquire the painting before 10 July 1856 when Lady Garvagh wrote to Sir Charles Eastlake 'that if a very large offer were made it might be taken into consideration'. From a meeting on 15 July it was made clear to Eastlake that such an offer would have to be in excess of £3500. In the event £9000 was paid in June 1865 to Lady Garvagh with the consent of her children.
2. For illustrations of these paintings, with the exception of the *Madonna della Tenda*, see Roger Jones and Nicholas Penny, *Raphael*, London and New Haven 1983, plates 48, 49, 53–55, 57, 188. See also Pier Luigi de Vecchi, *Raffaello: La Pittura*, Florence 1981, plates XXVII, XXXVII, XXXIX, XLI, XLVII.
3. De Vecchi, op. cit., Plate LXXI. For the dating of the frescoes in the Stanza della Segnatura see John Shearman, *The Vatican Stanze: Functions and Decoration* (British Academy Italian Lecture, 1971), London 1972, p. 48 n. 94. It is possible that Raphael had already begun to work on the next stanza by July 1511.
4. For the preparatory studies in Lille for the *Alba Madonna* see Jones and Penny, op. cit., p. 82, plates 93 and 94, also p. 88, and Paul Joannides, *The Drawings of Raphael*, Oxford 1983, p. 202, nos. 278r and v. As Jones and Penny note, the compositional sketch shows Raphael toying with the idea of Christ receiving a flower from the Baptist, a theme which relates to that of the National Gallery's painting. Of the drawings which have been claimed as preparatory to the *Garvagh Madonna*, Gould (op. cit.) accepts Fischel 352 — a silverpoint study in Lille — as does Joannides (op. cit., no. 274). This does not seem to us certain and the figure of the Baptist, drawn twice — once with the Virgin's arm — is closer to the *Alba Madonna* in reverse than to the *Garvagh Madonna*. Gould considers that four other drawings have points in common — Fischel 346, 347, 348 and 349. The last of these seems to have no relationship. Nos. 346 and 347 are recto and verso of the same sheet in Lille and are evidently studies for a Virgin and Child with a book and without Saint John — the pose of the Child in one of the studies has some slight resemblance to that in the *Garvagh Madonna*. No. 348 also has some resemblance to the *Garvagh Madonna*, but in reverse. Joannides accepts the connections with the *Garvagh Madonna* except in the case of no. 349 (see his numbers 269r, 269v, 270, 274 and 275).
5. This photograph is published and discussed in Joyce Plesters, 'Technical Aspects of Some Paintings by Raphael in the National Gallery, London', in John Shearman and Marcia B. Hall, eds., *The Princeton Raphael Symposium. Science in the Service of Art History* (papers from a conference held in Princeton in 1983), Princeton 1990, p. 27, plate 204. The paper also includes an account of the pigments and paint layer structure (not discussed in this article). A re-examination of the cross-sections has failed to account for a puzzling feature which appears on both the infra-red photographs and the reflectograms. Below the horizontal dividing line a grey shadow appears. This is most marked across the Virgin's bodice and sleeve. There is no difference in the underlayers of the painting (a lead-white priming occurs both above and below the line, for example), so the explanation may simply be that the more shadowed parts of the draperies happen to coincide with the horizontal division.
6. Nicholas Penny, 'Raphael's "Madonna dei garofani" rediscovered', *Burlington Magazine*, CXXXIV, 1992, pp. 67–81 (especially pp. 74–5).
7. For information on the method of assembly of the reflectograms see Rachel Billinge, John Cupitt, Nicolaos Dessipris and David Saunders, 'A Note on an Improved Procedure for the Rapid Assembly of Infrared Reflectogram Mosaics', *Studies in Conservation* (in press).
8. There has been little discussion of the medium of Raphael's underdrawing but the claim was made by Massimo Seroni and Ottavio Ciappi in their analysis of the *Portrait of Francesco Maria della Rovere* in the Uffizi that Raphael cannot have employed metalpoint because it would show as white in the X-radiographs: see *Raffaello a Firenze*, exhibition catalogue, Pitti Palace, Florence 1984, p. 246. However, the amount of metal deposited by a metalpoint stylus, whether it is lead or silver, is so small (especially when

compared with the quantity of lead in a lead-white based paint, for example), that it may not necessarily register in an X-radiograph. An analogy may be made with gold leaf: like lead and silver, gold is an atomically heavy element, yet, because gold leaf is beaten out thinly, water gilding is transparent to X-rays.

**9.** Published examples of paintings by Raphael with pounced dots detected by infra-red photography and reflectography include: the *Madonna del Granduca* (see Pitti Palace, Florence, op. cit., pp. 247 and 249); the *Madonna in the Meadow* in Vienna (see Wolfgang Prohaska, 'Zu Raphael's "Madonna im Grünen". 1. Kunstgeschichtliche Aspekte und Infrarotreflektographische Untersuchungen', *Wiener Berichte Über Naturwissenschaft in der Kunst*, 1, 1984, pp. 76–86, summarised in Shearman and Hall, op. cit., pp. 63–4); the *Sistine Madonna* (on the papal tiara) (see Karl Heinz Weber, 'Die Sixtinische Madonna, Bemerkungen zu Erhaltungszustand, maltechnischem Aufbau, konservatorischen Massnahmen', *Maltechnik Restauro*, XC, 1984, Vol 4, pp. 9–28; the *Saint George and the Dragon* in Washington (see Carol Christensen, 'Examination and Treatment of Paintings by Raphael at the National Gallery of Art' in *Raphael Before Rome: Studies in the History of Art*, National Gallery of Washington, 17, 1986, pp. 49–50); the *Small Cowper Madonna* (see Ross Merrill, 'Examination and Treatment of the "Small Cowper Madonna" at the National Gallery of Art' in *ibid.*, p. 143); and *An Allegory ('Vision of a Knight')* (NG 213) (see Jill Dunkerton, Susan Foister, Dillian Gordon and Nicholas Penny, *Giotto to Dürer: Early Renaissance Painting in the National Gallery*, New Haven and London 1991, pp. 169–70). Given the difficulty of detecting the dots in the last two cases it seems possible that evidence of pounced transfer of drawings may be found on other paintings where it has not so far been noted. In the case of the 'Vision of a Knight' the evidence that the pricked drawing, also in the National Gallery, had indeed been used only became apparent in infra-red photographs and reflectograms made after the painting had been cleaned, and then it was the broken, hesitant nature of the lines drawn to link the dots, rather than the survival of the pounced marks, which alerted us to the fact of the cartoon having been used. Previously, on the basis of an infra-red examination made before the painting was cleaned, Plesters in Shearman and Hall, op. cit., pp. 17–18, suggested that the cartoon might not have been used for the transfer of the design to the panel.

**10.** It has been convincingly suggested that for certain details, if not the whole painting, of the *Canigiani Holy Family*, full-sized cartoons transferred by tracing were employed. In an infra-red reflectogram of the foot of Saint Joseph the faint and rather diagrammatic marks which appear to belong to the tracing have

been reinforced with a single, confident drawn line. See Hubertus von Sonnenburg, *Raphael in der Alten Pinakothek*, Munich 1983, pp. 52 and 66–7, and summarised in Shearman and Hall, op. cit., p. 70.

**11.** They can also be seen on the knuckles of the putti in the *Canigiani Holy Family*. These putti, as von Sonnenburg points out, are so bold and summary in their drawing that they must have been executed freehand without a cartoon. See von Sonnenburg, op. cit., pp. 52 and 66.

**12.** Merrill, op. cit., p. 143.

**13.** For the references see Note 9.

**14.** For these differences see Gould, op. cit., pp. 210–11. Plesters in Shearman and Hall, op. cit., p. 25, expresses doubt that the pricking of the drawing was done for the purposes of the transfer of the design to the panel, pointing out that the drawing has a soft 'painterly' quality which does not suggest a functional and linear cartoon intended for transfer. That the drawing was certainly made in preparation for the painting is confirmed by a recent composite X-radiograph of the whole work (previously only the head had been X-rayed). This reveals changes made during painting to the turned-back lining of the Virgin's robe: originally the twisted folds followed those of the drawing.

**15.** Plesters in Shearman and Hall, op. cit., p. 201, working from an old infra-red photograph taken before the cleaning of the painting in 1967, observed some apparent hatching in the shadows. Reflectography and new infra-red photographs have shown that in fact this hatching is all in the paint layers. Von Sonnenburg, op. cit., p. 70, comments on the difficulty of distinguishing painted hatched strokes from the underdrawing in the *Canigiani Holy Family*.

**16.** The placing in the lower right corner of the Borghese inventory number indicates that it would have had to have been cut at a relatively early date. Examination of the direction of the brush marks at the bottom edge is inconclusive: some horizontal strokes might suggest that the composition terminated at its present point, but others could easily have continued further down the panel. If the panel were once longer the uncertainty concerning the position in space of the dandelion and other plants would have been even more apparent.

**17.** Raphael's compositional study in the Musée des Beaux-Arts, Lille, for the *Coronation of Saint Nicholas of Tolentino* in black chalk over stylus includes 'compass, stylus and divider work' as noted by Joannides, op. cit., pp. 38–9 and plate 3, no. 14r. Joannides is particularly astute in observing, and reliable in recording, such evidence in drawings by Raphael. Some of this evidence is given in no other catalogue of his drawings.

**18.** The greater thickness of the paint layers on this work makes the underdrawing more difficult to detect.

Some underdrawing has been noted in areas of flesh painting. The only reflectogram detail to be published shows a free sketching of the forms with no signs of pouncing. See Seroni and Ciappi, op. cit., pp. 266–7.

**19.** Ashmolean Museum, Oxford (no. P II 529). See Joannides, op. cit., no. 127.

**20.** Ibid., no. 287, British Museum (where catalogued as no. 21, but without reference to these indications, by P. Pouncey and J. Gere). Joannides describes pricked vertical lines to the right of the central pen line, but they are to the left. He also notes compass intersections and a horizontal line of pricking.

**21.** The brisk shorthand drawing of the architecture is characteristic of Raphael and compares interestingly with the rapid study for the basilica of St Peter's of about 1514. This appears on a drawing in the Uffizi connected with the vault of the Stanza of Heliodorus (Joannides, op. cit., no. 242r). The clustering of elements in the church to the left — porch with hemispherical niche below apse with a semi-dome in front of a roof with two gables — and the tight complex of buildings to the right are both more similar to the buildings in the distance in the *Disputa* than to those in any other paintings by Raphael (for the latter see de Vecchi, op. cit., plate LVIII).

**22.** The improbability, and indeed inelegance, of a wall at this height cutting across a pier in this manner is no more surprising than the false perspective of the Virgin's throne in the *Ansidei Madonna* (NG 1171).

**23.** For example, in *The Virgin adoring the Child with Saint Joseph* (NG 3914), a version of which by Albertinelli in the Borghese Collection is dated 1511,

and also in a painting of this subject at Firle Place, Sussex. In a small painting of *The Virgin and Child with Saint John* in the Metropolitan Museum, New York, attributed to the young Fra Bartolommeo, the Virgin sits in the corner of a room with large openings in both walls to either side of her; this has the same effect as a pier behind her — and looks no less arbitrary as a device. The device was also used memorably by Bugiardini in his portrait in the Pitti Palace, Florence, of about 1512, known as *La Monaca*. It probably originates with the young Leonardo or at least with the workshop of Verrocchio.

**24.** See Seroni and Ciappi, op. cit., pp. 247–8, and for a reconsideration as to whether the dark background was indeed added at a later date, see Marco Chiarini, 'Paintings by Raphael in the Palazzo Pitti, Florence', in Shearman and Hall, op. cit., p. 83.

**25.** Christensen, op. cit., p. 50.

**26.** For Raphael's use of gilded patterns applied with a mordant which does not appear to be oil, see Plesters in Shearman and Hall, op. cit., pp. 20–1 and for a fuller discussion of shell gold and the different types of mordant gilding found on panel paintings see David Bomford, Jill Dunkerton, Dillian Gordon and Ashok Roy, *Art in the Making: Italian Painting Before 1400*, London 1989, pp. 43–8. For the use of oil mordants in gilding on wall paintings see Mauro Matteini and Arcangelo Moles, 'Le tecniche di doratura nella pittura murale' in Cristina Danti, Mauro Matteini and Arcangelo Moles, eds., *Le pitture murali: tecniche, problemi, conservazione*, Florence 1990, pp. 121–6.