



NATIONAL
GALLERY
TECHNICAL
BULLETIN

RENAISSANCE
SIENA AND PERUGIA
1490–1510

VOLUME 27

National Gallery Company
London

Distributed by
Yale University Press

This volume of the *Technical Bulletin* has been funded by the American Friends of the National Gallery, London with a generous donation from Mrs Charles Wrightsman.

'The Master of the Story of Griselda and Paintings for Sieneſe Palaces' is published with the additional generous support of The Samuel H. Kress Foundation.

Series editor Ashok Roy

© National Gallery Company Limited 2006

All rights reserved. No part of this publication may be transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without the prior permission in writing of the publisher.

First published in Great Britain in 2006 by
National Gallery Company Limited
St Vincent House, 30 Orange Street
London WC2H 7HH

www.nationalgallery.co.uk

British Library Cataloguing in Publication Data
A catalogue record for this journal is available from
the British Library

ISBN: 1 85709 357 7
ISBN 13: 978-1-85709-357-5
ISSN 0140 7430
525047

Publisher Kate Bell
Project manager Claire Young
Editor Diana Davies
Designer Tim Harvey
Picture research Joanne Anderson
Production Jane Hyne and Penny Le Tissier
Repro by Alta Image, London
Printed in Italy by Conti Tipocolor

FRONT COVER

The Master of the Story of Griselda,
The Story of Patient Griselda, Part III: Reunion, NG 914,
detail of PLATE 3, PAGE 6.

TITLE PAGE

The Master of the Story of Griselda,
The Story of Patient Griselda, Part II: Exile, NG 913,
detail of PLATE 2, PAGE 5.

Photographic credits

All photographs reproduced in this *Bulletin* are © The National Gallery, London, unless credited otherwise below.

BALTIMORE MD. Walters Art Gallery: p. 23, PL. 25; p. 51, PL. 70; p. 53, PL. 74; p. 56, PL. 77. BLOOMINGTON IN. Indiana University Art Museum. Photo Michael Cavanagh and Kevin Montague: p. 22, PL. 23; p. 54, PLS. 75, 76; p. 55, FIGS. 38, 39. BORDEAUX. Musée des Beaux-Arts, photo Lysiane Gauthier: p. 106, PL. 9. BUDAPEST. Szépművészeti Múzeum. Photo: András Rázsó: p. 21, PL. 22; p. 57, PL. 78; p. 59, PL. 82. FANO. Chiesa di Santa Maria Nuova © 1997. Photo Scala, Florence: p. 102, PL. 5. FLORENCE. Galleria dell'Accademia. Courtesy of the Opificio delle Pietre Dure e Laboratori di Restauro, Florence: p. 86, FIG. 9. Museo Nazionale del Bargello. Courtesy il Ministero dei Beni e le Attività Culturali: p. 21, PL. 21; p. 57, PL. 80; p. 69, PL. 87. MILAN. Civica Raccolta della Stampe Achille Bertarelli: p. 74, FIG. 2. Museo Poldi Pezzoli: p. 22, PL. 24. PERUGIA. Galleria Nazionale dell'Umbria, courtesy the Soprintendenza BAPPSAD dell'Umbria: p. 75, PL. 3; p. 100, PL. 2. Galleria Nazionale dell'Umbria, courtesy the Soprintendenza BAPPSAD dell'Umbria. Photo Alinari Archives, Florence: p. 100, FIG. 7. Galleria Nazionale dell'Umbria, courtesy the Soprintendenza BAPPSAD dell'Umbria. Photo Alinari Archives/Bridgeman: p. 104, PL. 6, 7. Galleria Nazionale dell'Umbria © 1997, photo SCALA, Florence – Courtesy of the Ministero Beni e Att. Culturali: p. 74, PL. 2; p. 75, PL. 4; p. 76, PL. 5; p. 87, PL. 18. San Severo, © 1990, Photo SCALA, Florence/Fondo Edifici di Culto – Min. dell'Interno: p. 88, PL. 19. Valentina Ricci Vitani: p. 76, FIG. 3: ROME. Galleria Albani e Collezione Archeologica, Villa Albani Torlonia. Photo Archivio Fotografico Soprintendenza per il Polo Museale Romano: p. 101, PL. 4. SIENA. Pinacoteca Nazionale. Photo Fratelli Alinari Museum of the History of Photography-Malandrini Collection, Florence: p. 117, FIG. 2. Pinacoteca Nazionale © Foto LENSINI Siena: p. 116, PL. 7. Santa Maria dei Servi © Foto LENSINI Siena: p. 118, PL. 8. Santa Maria in Portico a Fontegiusta. Photo Alinari Archives-Brogi Archive, Florence: p. 116, FIG. 1. WASHINGTON, DC. National Gallery of Art. Image 2006 © Board of Trustees, National Gallery of Art, Washington, DC: p. 20, PL. 20; p. 23, PL. 26; p. 28, FIGS. 9, 11; p. 30, FIGS. 14, 15; p. 36, PL. 44, FIG. 18; p. 37, PLS. 45, 46; p. 38, PL. 47, FIGS. 19, 21; p. 39, PLS. 49, 50, FIG. 22; p. 40, PLS. 51, 52, FIG. 23; p. 41, PLS. 53, 54, FIG. 24; p. 51, FIGS. 36, 37; p. 52, PLS. 71, 72, 73; p. 57, PL. 79.

Working with Perugino: The Technique of an Annunciation attributed to Giannicola di Paolo

CATHERINE HIGGITT, MARIKA SPRING, ANTHONY REEVE AND LUKE SYSON

IN 1881, the National Gallery purchased four panels from the collection of Marchese Perolo Monaldi in Perugia: three elements from an altarpiece, then attributed to Fiorenzo di Lorenzo and now thought to have been executed in the late 1470s by another leading Perugian painter of the same generation, Bartolomeo Caporali (NG 1103.1–3),¹ and a cut-down *Annunciation* given simply to the ‘School of Perugino’ (PLATE 1). It is not clear what exactly prompted the purchase of the *Annunciation*. Though charming in its way, the picture is not of notably high quality, and Martin Davies mustered only enough interest in his 1951 catalogue to note that the painting, by then ‘ascribed to’ Giannicola di Paolo, derived ‘perhaps from the upper part of an altarpiece in compartments’, adding laconically: ‘The attribution to Giannicola di Paolo does not appear to have been rejected; if the picture is by him, as seems likely enough, it would be a fairly early work, still strongly under Perugino’s influence.’²

Vasari listed Giannicola di Paolo, formerly erroneously called Giannicola Manni – his surname was actually Smicca – among the ‘many masters of that style’ that Perugino ‘made’.³ Towards the end of Vasari’s catalogue of Perugino’s *discepoli*, which is headed, of course, by Raphael (the only one of Perugino’s pupils, according to Vasari, to outdo his master), we find the Perugian Giannicola ‘who painted, in San Francesco, a panel of Christ in the Garden, the *Ognissanti* [All Saints] *Altarpiece* for the Baglioni chapel in the Church of San Domenico, and the stories of Saint John the Baptist in fresco in the chapel of the Cambio’.

The word *discepoli* has usually been translated simply as ‘pupils’; the painters to whom the term is applied are thus assumed to have been trained by Perugino in either his Florentine or his Perugian workshop. As a result Giannicola, like the more famous Raphael, has historically been treated as an artist whose style and technique were formed by



PLATE 1 Giannicola di Paolo, *Annunciation* (NG 1104), mid-1490s. Panel, 61 × 105.4 cm.

Perugino. Raphael's schooling by Perugino in Perugia in the late 1490s remains axiomatic in some quarters, but Tom Henry and Carol Plazzotta, among others, have recently taken a more sceptical view.⁴ It has therefore become all the more important to re-examine the functioning of Perugino's *botteghe* in both Florence and Perugia (and the relationship between the two), his alternative methods of collaboration with junior painters and, in particular, his possible use of assistants whose initial formation may not have been Perugino's responsibility, and who had in fact received their first training from another master. These last might belong to a different category of *discepoli*. The recent conservation treatment of Giannicola's National Gallery *Annunciation*⁵ has provided the opportunity to consider this question through technical examination of a painting by an artist who was demonstrably close stylistically to Perugino, and by comparison with the working methods of Perugino himself.

Technical examination

Examination of the poplar panel on which the *Annunciation* is painted, and of its X-radiograph, makes it clear that its shape has been altered. The panel consists of two planks with the grain running horizontally, with asymmetrical triangular additions at both top corners (FIG. 1).⁶ The grain of the left addition runs tangentially to that of the main part of the panel, while that of the right addition is parallel. In the X-radiograph of the main panel, pieces of canvas over the knots and joins can be seen beneath the thickly applied gesso ground layer. The ground on the additions is also thickly applied, with that on the left-hand addition again running in a different direction to the main work. Unfortunately, technical examination of the materials used in the additions does not help with the dating, but the direction of the gesso brushstrokes shows that the additions were not always part of the panel.⁷ Also visible in the X-radiograph are two haloes with punched decoration above and closer to the centre of the panel than the heads of Gabriel and the Virgin (FIG. 1). Their position suggests that they were made for an earlier version of the composition.⁸

The original shape and architectural setting of the *Annunciation* might distantly derive from the gable of Piero della Francesca's *Sant'Antonio* altarpiece,⁹ although the evidence of cutting and additions (as well as the composition itself) suggests a somewhat simpler shape. The architectural perspective indicates that a low viewing point was intended, so a position high up in an altarpiece, or conceivably over a door, seems likely. There are some clues in the painting itself to the possible original size and format: the rays of

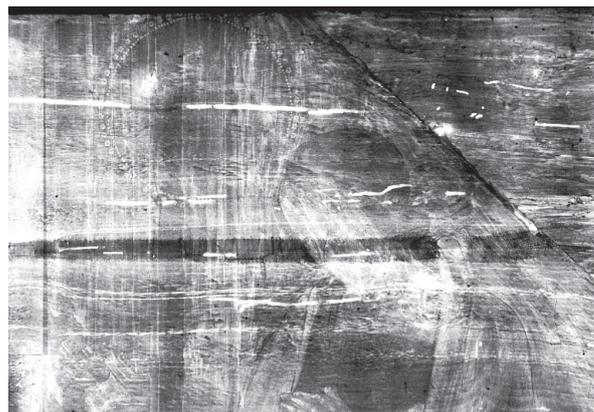
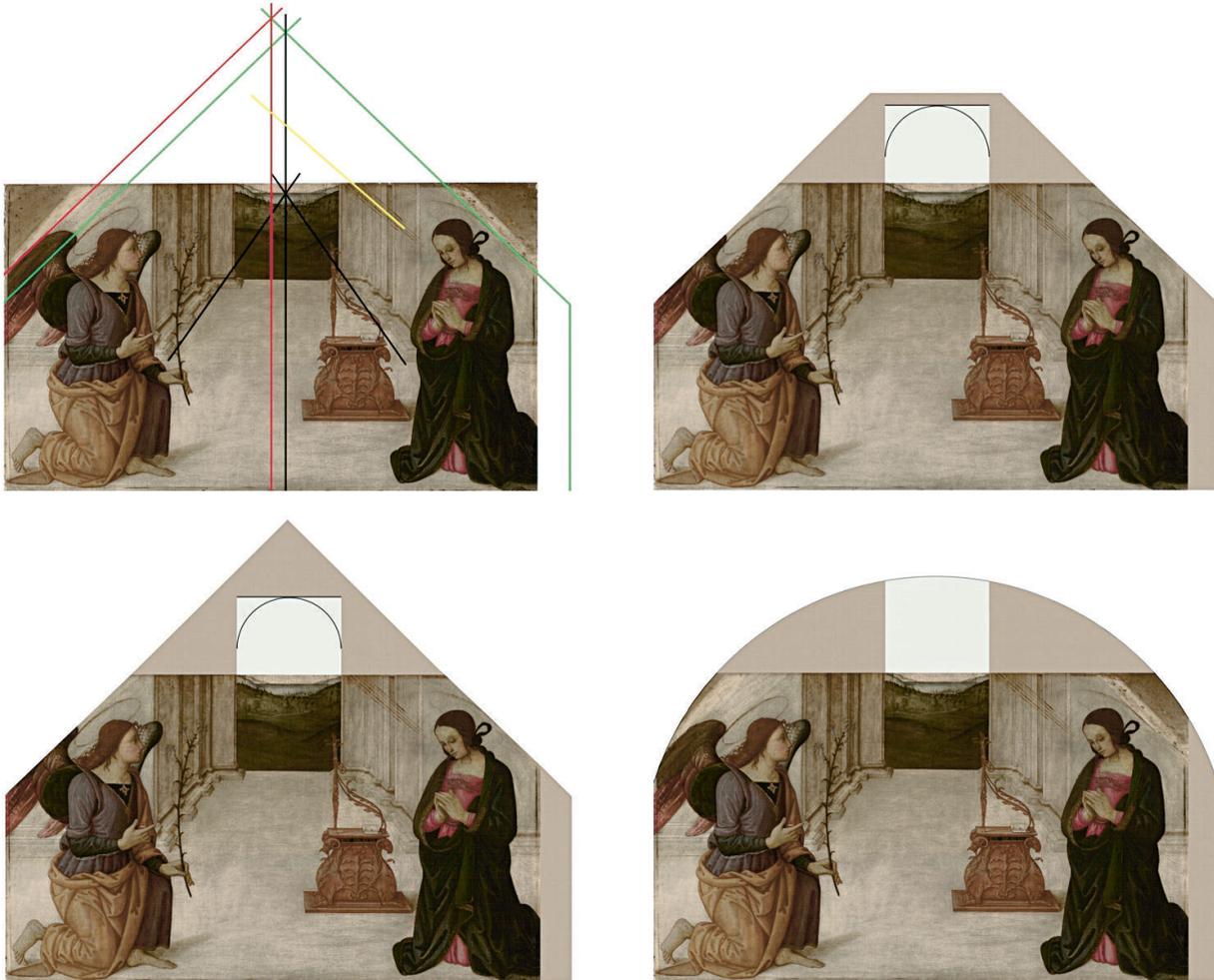


FIG. 1 Giannicola di Paolo, *Annunciation* (NG 1104). Detail of the X-radiograph showing the triangular addition at the top corner and the punched decoration of the halo from an earlier version of the composition.

golden light extending towards the Virgin would have been expected to incorporate a dove or a representation of God the father, and in the landscape seen through a gap in the architecture in the middle of the panel there are the thin wispy trunks of two trees that are missing their leafy crowns, suggesting that the top of the panel has been cut. The current central axis of the panel falls slightly to the left of the central point of perspective in the middle of the architectural doorway, suggesting that the panel has also been cut on the right-hand side. The Virgin is missing part of her cloak at the right-hand side and both the thick gesso and the paint itself run to the very edge of the panel, all of which suggests that this side of the panel has indeed been trimmed. The missing treetops, as well as the paint extending to the right edge, show that the change in panel format was made after the painting was completed, and so does not relate to the haloes from an earlier composition seen in the X-radiograph. The panel may have been cut and the corners added to give the picture a new format after removal from its original location, or because worm erosion or other physical damage may have made it necessary to remove some of the wood.

The original width of the panel can be estimated by assuming the architectural composition to have been symmetrical and the left-hand side to be original; this would add about 6 cm to the existing size (61 × 105.4 cm), making an overall width of about 111 cm. Determining the shape of the top of the panel is less straightforward. If it is assumed that the diagonal slope of the right-hand corner is original, and this slope is transposed to the left-hand edge (which would trace a line more or less along that of the current join) then, by extending these two diagonals, a number of possible formats with a gabled top or a



FIGS 2–5 Giannicola di Paolo, *Annunciation* (NG 1104). Diagrams showing postulated original shapes for the panel.

pointed pinnacle can be envisaged (FIGS 2–4). Such a format would mean that the figures would have been rather cramped. It is also conceivable, though perhaps less likely, that the panel originally had an arched top, giving the protagonists and landscape more space (FIG. 5); in that case, the corners would have been cut straight for convenience during the attachment of the triangular corner additions, and thus all evidence for an arched shape would have been lost when the format was changed.¹⁰

Pounced dots indicating transfer from a cartoon are visible with the naked eye around the contours of the lectern (FIG. 6). The underdrawing for the figures of the Virgin and Angel Gabriel revealed in the infrared reflectogram follows simple contours, and these also appear to have been transferred from a cartoon by pouncing; some *spolveri* are visible in the right wrist of the angel and around the feet. The drawing for the figure of the Virgin is less easily visible by infrared reflectography, but it appears to be similar in character to that for the angel, and some dots from pouncing can be seen around the hands.

The incisions that were ruled for the architecture, both those relating to that which was painted and some extra lines, perhaps perspective lines or ones pertaining to an earlier compositional idea, show more clearly in the infrared reflectogram. An incised horizon line crosses the window and runs through the tops of the hills. Very few changes were made to the composition at the underdrawing stage, except for slight adjustments in the position of the left hand of the angel, where the thumb and forefinger have been moved.

Before the recent technical examination, it had been thought that the binding medium of the *Annunciation* was oil, perhaps because of a supposed date of around 1500, the influence of Perugino, and the rough impasto-like quality of the background paint (where the brushstrokes have a marked texture not usually seen with egg tempera). Crucially for the argument presented below, new analytical work has, however, revealed that the work is actually painted in egg tempera. The pigments are all standard for the turn of the sixteenth century.¹¹ The angel's purple



FIG. 6 Giannicola di Paolo, *Annunciation* (NG 1104). Infrared reflectogram detail showing pouncing in the lectern.

robe is painted with a mixture of red lake, ultramarine and white on an underpaint of azurite, red lake and white. The multi-coloured wings have a red underpaint containing vermilion and red lake. The purplish paint strokes at the surface of the wings consist of mixtures of red lake, azurite, lead white and ultramarine. The wings have been decorated with semicircular highlights of silver leaf applied on an unpigmented mordant.¹² The silver is barely visible since it has degraded to black silver sulphide and is only detectable by elemental analysis. Kermes red lake mixed with lead white was used for the Virgin's dress,¹³ and coarsely ground azurite for her cloak, which is poorly covering so that the underlying gesso is visible in the thinner parts of the brushstrokes. Malachite was used for the green lining of her cloak, which now appears brown because of discoloration of the binding medium; it was also used for the landscape.

The green hilly landscape has been given a sense of depth by varying the density of small green dots of paint, a technique seen in a number of other paintings associated with Perugino in the later fifteenth century, particularly in fresco.¹⁴ The use of malachite reflects the choice of binding medium since generally at this period in Italy verdigris was used as the main green pigment when the binding medium was oil.¹⁵ The gold decoration on the Virgin's cloak and robe and on the angel's robe, and the rays directed towards the Virgin, are mordant gilded.¹⁶ The orange-brown paint of the lectern consists of vermilion, yellow earth and

manganese black. Rather few occurrences of manganese black have been reported in sixteenth-century paintings, although it has recently been found in some other paintings in the National Gallery¹⁷ and, interestingly, in two paintings attributed to Perugino in the Galleria Nazionale dell'Umbria (Perugia), the *Penitent Saint Jerome* on canvas (certainly after 1512, perhaps as late as 1520) and the roughly contemporary *Beato Giacomo della Marca*.¹⁸ The flesh paint in the National Gallery *Annunciation* has a greenish hue due to the green underpaint beneath the pink surface paint, a traditional and perhaps slightly old-fashioned technique by the mid-1490s, the proposed date of the painting, but again consistent with the use of egg tempera as a binding medium.¹⁹

The attribution to Giannicola

Giannicola is first documented in 1484 as the witness to a notarial deed (he was therefore of age), and first mentioned as a painter in 1493, contracted to work for the Perugian *comune*.²⁰ He is therefore thought to have been born in Perugia in the early 1460s, and he died, after a long, successful and well-documented career, in August 1544. He waited until 1500 before he registered his name in the *matricola* of the painters' guild, perhaps in order to take on his first *garzone*; one Francesco is recorded in the same year – painting with Giannicola in the area of the high altar of San Pietro in Perugia.²¹ Like Perugino's workshop after January 1502, Giannicola's workshop was on the Piazza del Sopramuro, although they rented their spaces from different organisations.²²

Only fragments of Giannicola's documented works from the 1490s survive; these include the figures of Christ, Saint John and Saint Peter and some of their architectural setting from a *Last Supper*, one of the frescoes commissioned by the *comune* for the Refectory of the Palazzo dei Priori, for which Giannicola received a very detailed contract in September 1493 (the month and year that are inscribed within the fresco itself) and which were assessed in April the following year (PLATE 2).²³ Recently restored, their style suggests that the attribution to Giannicola of other works usually dated to the beginning of his career should be queried.²⁴ His *Last Supper* was unmistakably a copy of the *Cenacolo del Fuligno* at Sant'Onofrio in Florence, executed according to Perugino's designs by one or more members of his Florentine workshop.²⁵ The date of this Florentine fresco is controversial, though it is probable that it was executed in the late 1480s, or perhaps a little after. It has not yet been established if the same cartoons were used for both, but it is equally or perhaps more probable



PLATE 2 Giannicola di Paolo, Fragments of a fresco of *The Last Supper*, 1493. Refectory of the Palazzo dei Priori.

that Giannicola had access to Perugino's *modelli* which he copied to make his own drawings; some of the group of drawings related to the *Cenacolo del Fuligno* may be Giannicola's.²⁶ He therefore is likely to have established a close association with Perugino by the winter of 1493/4, and it seems at least possible that he knew Perugino in his Florentine *bottega* prior to 1493.

The earliest of Giannicola's important altarpiece commissions to survive is the *Ognissanti Altarpiece*, mentioned by Vasari (FIG. 7). This was assigned to him in November 1506, and cost Margherita della Corgna, the wife of Baglione di Montevibiano, fifty florins; in January 1508, it was placed in the Baglioni family chapel, in the church of San Domenico Vecchio in Perugia.²⁷ Here the basic composition, although none of the individual figures, is heavily reliant upon the *Ascension* main panel of Perugino's San Pietro high altarpiece, now in Lyon – which is hardly surprising given Giannicola's own contribution to the decoration in the same part of the church as the altarpiece.²⁸ As we have already seen, Vasari mentions Giannicola's works in the chapel of the Collegio del Cambio, which can be dated to 1513–18 (vault) and 1526–8 (walls), and by this stage in his career it is plain that he had broadened his range of sources, inspired by the work of contemporary Tuscans such as Andrea del Sarto.²⁹ Other later, less Peruginesque works that are



FIG. 7 Giannicola di Paolo, *Ognissanti Altarpiece*, 1506. Panel, 211 × 225 cm. Perugia, Galleria Nazionale dell'Umbria, inv. 323.

securely, or traditionally, attributed to Giannicola include an *Annunciation* panel in Washington of about 1510–15, the altarpiece of around 1510–15 in the Duomo of Città della Pieve, and the *Quattro Santi Coronati Altarpiece* of 1512, painted for the Cappella dei Lombardi, now in the Louvre.³⁰

The style of his first two documented early works supports the attribution of the London *Annunciation* to Giannicola.³¹ The physiognomy of Gabriel in the *Annunciation* is close to that of other young male figures, in particular the sleeping Saint John in the *Last Supper*; they have the same stylised contours, straight noses, individuated curling tresses and simplified arched eyebrows. Despite the well-defined perspectival setting of the *Annunciation*, the figures remain notably flat, an imperfect three-dimensionality shared by Giannicola's two earliest documented works and resulting from the use of contour lines and the limited use of middle tones; the darks and lights are not well unified, especially when the artist has attempted shot colours.³² The Virgin Annunciate in the National Gallery panel and many of the figures in the *Ognissanti Altarpiece* have heads with big round foreheads and rather uncomfortable relationships between their mouths and noses. They also have the same brownish lines between their lips. The artist uses a greyish contour between their fingers in both works, sometimes strengthened to make a contour with a blacker tone. The fingernails are always very small and set some distance from the ends of the fingers, and the thumb ends have an oddly bulging appearance (PLATE 3), although this last is a character-

istic that appears in other Peruginesque works less certainly associated with Giannicola.

In this work, as in all of these early works, Giannicola's dependence on models by Perugino is obvious. The pose of the Virgin in the London panel is seemingly derived from the Nativity scene in the Albani Torlonia polyptych, almost always (though not necessarily correctly) attributed to Perugino (PLATE 4),³³ with an inscription dating the picture to 1491,³⁴ or from a drawing for it. She is not a traditional Annunciate, kneeling with her arms crossed or standing with her arms raised, but a Madonna adoring the Child, albeit minus the Child. The fact that she lacks the monumentality of the adoring Virgins in very similar poses dating from the later 1490s, such as the Virgin in the frescoed *Nativity* in the Sala dell'Udienza in the Collegio del Cambio (c.1499–1500), suggests that Giannicola had access to the earlier model, but not yet the later, and therefore that his National Gallery *Annunciation* should be dated to the mid-decade, a date stylistically compatible with the Palazzo dei Priori fresco fragments. The type and pose of Gabriel are copied from the *Annunciation* altarpiece painted by Perugino in 1488–9 for the Chapel of the Annunciation in the Church of Santa Maria Nuova in Fano, with only the tilt of the head and the position of his wings altered (PLATE 5).³⁵



PLATE 3 Giannicola di Paolo, *Annunciation* (NG 1104). Detail of angel's thumb.



PLATE 4 Perugino or workshop, detail of the Albani Torlonia Altarpiece, 1491. Panel, 140 × 160 cm. Rome, Museo di Villa Albani.

Although the billowing swathe of drapery at the shoulder is encountered quite regularly in Perugino's paintings, the angel's double sleeve (with an upper sleeve cut at the elbow in one colour and a lower sleeve in another colour, split to reveal a white under-shirt beneath), imitated by Giannicola, is seen only in the Fano *Annunciation*, confirming this picture as Giannicola's source. Since the colours are not the same, Giannicola is once more likely to have studied Perugino's drawings rather than the painting itself. The scaling-up of 'model-book' drawings on paper to the desired size before transferring the design onto the panel might explain the use of cartoons for the National Gallery *Annunciation*. This combination of models taken from different sources helps to explain the lack of emotional contact between the figures in Giannicola's own work.

Pupils and workshop

Despite this reuse of figures from Perugino's paintings, it remains to be asked whether or not Giannicola actually spent any time in Perugino's workshop, and if so, where and in what capacity. A number of artists were working in a Peruginesque style in Umbria in the late fifteenth and early sixteenth centuries, but their precise relationships to one another and to Perugino himself vary. Collaboration with Perugino did not necessarily imply entering his employ.

Perugino renewed his contacts with Perugia in March 1495 when the contract for the *Pala dei Decemviri* (now in the Vatican) for the chapel of the Palazzo dei Priori was revived³⁶ and when he received the commission to execute the high altarpiece of the church of San Pietro, which turned out



PLATE 5 Perugino, *Annunciation* (Fano Altarpiece), c.1489. Panel, 212 × 172 cm. Fano, Church of Santa Maria Nuova.

to be one of the most expensive altarpieces painted in the last part of the Quattrocento.³⁷ The frescoes for the Sala dell'Udienza in the Collegio del Cambio were commissioned in January 1496 and signed and dated in 1500. It has therefore frequently been supposed that Perugino set up the Perugia branch of his workshop in about 1495, forming a team largely to undertake these two latter enormous projects. In the next two years, however, he is known to have remained highly peripatetic, spending only short periods of time in the city. He was more firmly established in Perugia from February 1499, passing most of his time there for the next two years and deluged by a veritable flood of commissions for churches in Perugia. Only in 1502, for the first time, do we have records of a physical location, in Piazza di Sopramuro, for Perugino's shop in Perugia.³⁸ Thus its precise configuration and the date of its establishment remain issues of speculation.³⁹

Perugino had certainly established a permanent site for his *bottega* in Florence much earlier – from 1487 at the latest (he may have had other premises

there before this).⁴⁰ The elusive Rocco Zoppo (Giovannaria da Balforte), seemingly an assistant of long-standing but whose works remain stubbornly unidentified, and Bacchiacca's equally mysterious brother, Baccio di Ubertino Verde, are both listed among Perugino's *discepoli* by Vasari and are both documented in his *bottega* (supporting Vasari's assertion that Bacchiacca himself was also a pupil or assistant).⁴¹ This Florentine *bottega*, made up of a mixture of pupils and young pre-trained assistants, may have been run rather like Verrocchio's Florentine shop, in which Perugino worked after his initial training in Perugia.⁴² Vasari, as we have seen, mentioned other *discepoli* whose careers were focused partly or entirely in Perugia; apart from Giannicola, he listed Pintoricchio, Eusebio da San Giorgio, Domenico di Paris and his brother Orazio. Eusebio is documented as one of the witnesses to the 1495 contract for the San Pietro altarpiece.⁴³ Lo Spagna, documented in Florence and subsequently in Perugia, was, according to Vasari, driven out of Perugia because of the hostility of native Perugian painters.⁴⁴ Andrea Aloigi d'Assisi, called

l'Ingegno ('the Talent'), is described as collaborating with Perugino (and the young Raphael) on the frescoes in the Collegio del Cambio although there is no documentary support for this. Giovanni Battista Caporali appears after Giannicola in Vasari's list and he was to collaborate with Giannicola from the 1510s onwards. Significantly in this context, Caporali and Perugino were on dining terms in Rome and are sometimes thought to have worked together; however, we might reasonably assume that Caporali was first tutored in painting by his father, Bartolomeo.⁴⁵ A painter known as 'Il Montevarchi' and stated by Vasari to have painted pictures in his (presumably) native town and in San Giovanni Valdarno⁴⁶ is confirmed as having worked in Perugia. This must be Roberto da Montevarchi, described as one of Perugino's *garzoni*, who received payments on his behalf from the Collegio in 1502, 1503 and 1504, moneys assumed to relate to the painting of the Sala dell'Udienza.⁴⁷

The connections to Perugino of many of the painters in Vasari's list are therefore independently proven. More recently scholars have added to the catalogue of Perugino's 'pupils' on the basis of further documentation. Giovanni di Francesco Ciambella, called 'Il Fantasia', was the other witness of the 1495 San Pietro contract.⁴⁸ In May 1499, Ciambella is mentioned again in connection with payment for canvas for a *gonfalone* for the Confraternity of San Francesco commissioned from Perugino – here called 'suo charzone', and had therefore entered his employ by then if not before.⁴⁹ The first mention of *garzoni* in Perugia was almost exactly a year earlier in May 1498, when fifty ducats were paid to Perugino by the monks of San Pietro in relation to their high altarpiece 'per le spese facte a lui et suoi garzoni'.⁵⁰ Like Roberto da Montevarchi, Ciambella acted as courier for a payment by the Collegio in 1502.⁵¹ In 1494 one 'Ruberto di Giovanni', probably the painter later usually called Berto di Giovanni, seems to have delivered five florins to Bartolomeo Caporali on Perugino's behalf for a painting (which interestingly had been subcontracted to yet another painter, Sante di Apollonio, who was by this time dead) to be placed above Perugino's not-yet-executed *Decemviri Altarpiece*.⁵² Ludovico d'Angelo Mattioli was one of the witnesses to the final payment for the San Pietro altarpiece in 1500.⁵³ Given that Perugino himself does not seem to have had permanent premises for his activities in Perugia until the beginning of the sixteenth century, it is interesting to note that in 1496 Berto di Giovanni, Ludovico d'Angelo and Eusebio da San Giorgio joined with two other painters

(Sinibaldo Ibi and Lattanzio di Giovanni) in a 'società' sited nearby to where Perugino was to work from 1502, to undertake commissions together.⁵⁴ It is often assumed that this 'società' was formed to challenge Perugino's artistic and commercial hegemony but, more recently, it has been argued that it functioned with his blessing – exploiting his inventions by permission.⁵⁵ Several of the artists involved are documented as collaborating in other partnerships on particular projects in the first decades of the Cinquecento.

Documented works of the early sixteenth century, which can be treated as touchstones for the styles of Berto and Eusebio, link these two painters (in particular) to the 1500 *Tezi Altarpiece* painted for the Perugian church of Sant'Agostino (now Galleria Nazionale dell'Umbria), giving weight to the theory that they (and the 'società' to which they belonged) may have been responsible for executing this commission. This has another version of the *Cenacolo del Fuligno* for its predella (now Berlin).⁵⁶ The Virgin and Child in the *Tezi Altarpiece* are faithful copies of the central figures in the *Madonna della Consolazione*, an altarpiece commissioned from Perugino in 1496 (paid for in 1498) by the Disciplinati of Santa Maria Novella for their chapel.⁵⁷ This latter picture has most recently been catalogued as fully autograph.⁵⁸ There is evidence that in other circumstances Perugino sought to control the unauthorised use of his inventions.⁵⁹ Thus a repetition of a Perugino-designed Madonna by members of the Società, just like Giannicola's own derivations, is likely to have been approved by Perugino himself, perhaps as part of ongoing arrangements whereby those painters who collaborated with him at moments when his own workload became too great could benefit indirectly from their association with him.

It cannot be assumed, however, that even the majority of these painters received a first training at Perugino's hands (and the association of some, it should be pointed out, may have been somewhat tangential). For example, Berto di Giovanni and Ludovico d'Angelo are first documented in 1488 when Perugino was still in Florence.⁶⁰ Ludovico signed and dated a painting of *Christ as Redeemer with Saints Jerome, Francis, Martha and Anthony Abbot* made for San Simone (now in the collection of the Duomo, Perugia) in 1489 and he must therefore have been independently active by the early 1490s.⁶¹ Eusebio is thought to have been born in about 1465; he too was independently active by 1493 – he was paid in that year by San Pietro for a painting of Saint Benedict and for applying gesso to a tabernacle.⁶² Ciambella



PLATE 6 Collaborator of Perugino (Giannicola di Paolo?), *Luna*, 1496–1500. Fresco. Perugia, Palazzo dei Priori, Collegio del Cambio, detail of roundel from the vault of the Sala dell’Udienza.

too, for all that he was later called a *garzone*, in 1491 could also be found working autonomously in Monteluca.⁶³ It seems that at this period many Perugian painters worked as independent masters, maintaining small permanent workshops and joining together with partners and assistants as required, sometimes on a quite temporary basis, for particular commissions, or subcontracting certain aspects of their commissions. It is likely that this is exactly how Perugino and the group of younger painters working around him in Perugia operated.

These facts suggest a possible pattern of development for Perugino’s methods of collaboration in Perugia after the beginning of his renewed activity there in 1495. He may first (on projects such as the San Pietro altarpiece) have worked with local artists already established there in temporary arrangements of the type outlined above. As he became more settled, and as the number of commissions expanded, he took on his own assistants on a more permanent basis: Ciambella, who probably already had a physical base in Perugia, and (perhaps later) Roberto da Montevarchi. Finally, he set up his workshop in Piazza del Sopramuro, the ideal location to enable the continuation of his working partnerships with other painters. The chronology of his career suggests that Giannicola, possibly after a spell in Perugino’s Florentine workshop, could have been one of the established local artists in Perugia who worked in temporary partnerships with Perugino, although the only document that would support this proposal refers



PLATE 7 Collaborator of Perugino, *Venus*, 1496–1500. Fresco. Perugia, Palazzo dei Priori, Collegio del Cambio, detail of roundel from the vault of the Sala dell’Udienza.

to Giannicola’s work in the same part of San Pietro as Perugino’s altarpiece. This lack of documented direct contact with Perugino puts Giannicola into the same category as l’Ingegno. Giannicola’s putative involvement in Perugino’s known projects must thus be judged mainly on the basis of connoisseurship. Various suggestions have been made, but none has achieved wide acceptance.⁶⁴ Both the San Pietro altarpiece and the frescoes for the Sala dell’Udienza, however, have long been accepted as highly collaborative works.⁶⁵ Raphael’s involvement in the Cambio frescoes has also, following Vasari’s lead, often been alleged.⁶⁶ Although we know that Ciambella and il Montevarchi were involved latterly (or at least that they were in the workshop during the period payments were being made), we have no way of knowing exactly who Perugino’s first collaborators were or what they may have contributed because the accounts from the first two years of the Cambio project are lost. However, it has long been accepted that the roundel images of the moon and planets on the *alla grottesca* ceiling were delegated to at least two painters, and since it can probably be assumed that the ceiling was started first, their contribution would date to shortly after the work was commissioned in 1496.⁶⁷ How the work was divided between the different hands is a matter of considerable dispute among connoisseurs. But, if none of them was Raphael’s, it seems possible that one of Perugino’s collaborators was Giannicola.⁶⁸ Giannicola’s flattened anatomies and distinctive physiognomies make their appearance,



PLATE 8 Giannicola di Paolo, *Annunciation* (NG 1104). Detail of the lectern.

especially, in the image of *Luna* (whose profile is so like Gabriel's in the London *Annunciation*) and her handmaidens depicted on the Sala dell'Udienza ceiling (PLATE 6). The similarities between the head of the red-booted nymph on the centre left and the Virgin in the National Gallery *Annunciation* are especially striking. Certainly Giannicola knew these ceiling frescoes well; the Virgin's lectern in the London painting is clearly derived from the throne-chariot of Venus in another of the Cambio ceiling roundels (PLATES 7 and 8).

Egg tempera and oil techniques

Even if Giannicola did contribute to the Cambio ceiling, he is unlikely to have been acting as a pupil-assistant (already rendered improbable by the fact that he was working independently in 1493, three years before the Cambio project was begun) or to have been first trained by Perugino. This is borne out by the technique of the London *Annunciation* where an egg-tempera binding medium is used. There

remains much analytical work to be done, but the available evidence suggests that Perugino himself seems to have painted in oils on panel from the very beginning of his career.⁶⁹ Indeed, Perugino was evidently famed within his lifetime for his mastery of the oil medium. His canvas of the *Combat of Love and Chastity*, delivered to Isabella d'Este, Marchioness of Mantua, for her *studiolo* in June 1505 after what was seemingly a painful artistic struggle, may well be the only securely autograph work the artist ever painted in egg tempera. In this case, tempera was almost certainly used because it was understood, perhaps mistakenly, to be a term of the commission and intended to complement existing works by Andrea Mantegna (though the choice of support may also have been a factor). In the event Isabella, who claimed she had always wanted an oil painting, in the technique for which Perugino had become celebrated, deplored the choice of the tempera medium.⁷⁰

It should, however, be pointed out that there remains a much-disputed group of works of generally high quality considered or known to be works in tempera. These paintings are sometimes attributed to Perugino, either working alone or dividing the execution with a collaborator (according to different theories), and sometimes to one or other of his pupils or assistants, albeit again working under Perugino's direct supervision; this group should certainly include, for instance, the 1491 Albani Torlonia polyptych mentioned above.⁷¹ Judgements as to the autograph status of these works have usually been formed largely on stylistic grounds, and medium analysis has only rarely entered the argument. The problem is compounded because there are currently few analytical studies of the binding medium of those works from the last three decades of the fifteenth century that are reliably dated, attributed and documented.

Nevertheless, for paintings in which the binding medium has not been analysed, it is sometimes possible to infer indirectly that the painting is in oil because of the presence of finely ground colourless manganese-containing glass as a siccative in the red lake glazes.⁷² The manganese in the glass can be detected by X-ray fluorescence spectroscopy, a non-invasive technique that does not require a paint sample, allowing 47 works by Perugino to be examined. Manganese, and therefore siccative glass, was found in areas of red lake in all except four of the works dated after 1493 and thus it appears that the majority of the works have an oil binding medium.⁷³ The four exceptions are all, revealingly, ascribed only somewhat dubiously to Perugino rather than considered securely autograph. The absence of the siccative



PLATE 9 Workshop of Pietro Perugino, *The Virgin and Child between Saints Jerome and Augustine*, 1505–10. Canvas transferred from panel, 217 × 185 cm. Bordeaux, Musée des Beaux Arts (inv. Bx E 22).

glass in these paintings would suggest that these paintings are in egg tempera, as will be discussed below.⁷⁴

Although Giannicola certainly worked in an oil medium later in his career, his technique in his early years when he was working in tempera (at the point when he painted the National Gallery *Annunciation*) seems to have been untouched by his collaboration with Perugino.⁷⁵ If therefore Giannicola was working by Perugino's side, as the attribution of the roundel of *Luna* in the Cambio, the San Pietro association, and his inclusion in Vasari's list all imply, this is further evidence that he was employed as an assistant rather than as a pupil, using a technique in which he had been trained elsewhere. The haloes from the earlier design visible in the X-radiograph of the London *Annunciation* resemble those in works by Bartolomeo Caporali (active 1467–91) and Benedetto Bonfigli (c.1420–1496).⁷⁶ The punched gold leaf is certainly more old-fashioned than the delicate shell-gold haloes common in paintings by Perugino of the 1490s and early 1500s.⁷⁷ It is not possible to determine if the earlier design had progressed beyond the gilding and punching stage before it was abandoned, or indeed if the first design was Giannicola's, working in a different, non-Peruginesque mode, or that of another Perugian artist, such as Caporali himself. However, this finding might suggest that Giannicola was initially

trained in the Caporali workshop, a hypothesis that becomes perhaps more plausible because of his later professional connection with Bartolomeo's son, Giovanni Battista. Giovanni Battista and Giannicola worked together in 1512 when they painted the Perugian town clock, in 1516 on the commission for the Chapel of Sant'Ivo in the Cathedral, and in 1521 on the fresco decoration of the Chapel of the Annunciation in San Pietro, Perugia.⁷⁸ Even if it was not Giannicola himself who started the first abandoned version of the *Annunciation*, the fact that he inherited the project suggests a connection with a longer-established *bottega* in Perugia.⁷⁹ It therefore becomes likely that both the *Annunciation* and the 1506 *Ognissanti Altarpiece* were executed in tempera because, although Giannicola had almost certainly worked in collaboration with Perugino, he had not in fact been trained by him.

Since Perugino himself was working exclusively in oil in the period when Giannicola's *Annunciation* was painted, it is important to reconsider other late works in egg tempera associated with the workshop. With the exception of the *Combat of Love and Chastity*, produced, as we have seen, under particular circumstances, these late works are all paintings where the precise attribution is uncertain, or in which a number of artists seem to have been involved. The very large Sant'Agostino polyptych, for example, still unfinished at Perugino's death in 1523, is agreed to have been a highly collaborative piece. Thus it is revealing that, although most panels are in oil, two small panels from the top of the reverse were painted in egg tempera.⁸⁰ The *Daniel* and *David* roundels are probably the work of two different assistants. *The Virgin and Child with Saints Jerome and Augustine*, now in the Musée des Beaux Arts, Bordeaux, dated 1505–10, is also in egg tempera, and has green underpaint in the flesh; this too is almost certainly the work of an assistant (PLATE 9).⁸¹

Conclusion

Further consideration of the results of technical examinations of paintings by Perugino, those ascribed to his workshop, and those by known or supposed associates remains necessary. This study should be treated as merely a prolegomenon; nonetheless, since Perugino seems from the outset to have employed an oil medium, it appears that where egg tempera is found in Peruginesque paintings, this can be used as a factor to support connoisseurial judgements that the works were not executed by Perugino's own hand. Indeed, this fundamental difference in technique suggests that, although some may have been painted in Perugino's workshop, such works are likely to have

been undertaken by assistants initially trained elsewhere rather than by his own pupils. From this observation, we gain more insight into Perugino's methods of collaboration in Perugia. It has become clear that not all of the *discepoli* of Perugino listed by Vasari were in fact Perugino's pupils and that, like Giannicola di Paolo, they may have used his designs but not necessarily adopted his technique. Other divergences of technique might profitably be reassessed to arrive at a greater understanding of how the painters in Vasari's list (Raphael included) may have worked with Perugino.

Acknowledgements

We would like to thank Michael Bury, Carol Plazzotta, Francis Russell and Sheri Francis Shaneyfelt for their helpful comments concerning the attributional problems attached to paintings currently given (though usually not consistently) to Giannicola, Perugino, Raphael and other painters working in Perugia at the period, and about their working methods. We also acknowledge the assistance of Rachel Billinge for infrared reflectography, and Bruno Brunetti (University of Perugia) for providing a sample of Umbrian propolis, a material initially thought to be present in the mordant.

Notes

- 1 *The Virgin and Child with Saints, Angels and a Donor* (NG 1103). See M. Davies, *The Earlier Italian Schools, National Gallery Catalogues*, London 1961, pp. 181–2.
- 2 Davies 1951 (cited in note 1), p. 228.
- 3 G. Vasari (ed. G. Milanesi), *Le vite de' più eccellenti pittori, scultori ed architettori*, Florence 1878, III, pp. 590–8: 'Fece Pietro molti maestri di quella maniera, et uno fra gl'altri che fu veramente eccellentissimo, il quale datosi tutto agl'onorati studi della pittura, passò di gran lunga il maestro; e questo fu il miracoloso Raffaello Sanzio da Urbino, il quale molti anni lavorò con Pietro in compagnia di Giovanni de' Santi suo padre. Fu anco *discepolo* [our italics] di costui il Pinturicchio pittor perugino, il quale ... tenne sempre la maniera di Pietro. Fu similmente suo *discepolo* Rocco Zoppo pittor fiorentino ... Lavorò il medesimo Rocco molti quadri di Madonne e fece molti ritratti, de' quali non fa bisogno ragionare; dirò bene che ritrasse in Roma, nella cappella di Sisto, Girolamo Riario e Francesco Piero cardinale di San Sisto. Fu anco *discepolo* di Pietro il Monteverchi, che in San Giovanni di Valdarno dipinse molte opere, e particolarmente nella Madonna l'istorie del miracolo del latte; lasciò ancora molte opere in Monteverchi sua patria. Imparò parimente da Pietro e stette assai tempo seco Gerino da Pistoia ...; e così anco Baccio Ubertino fiorentino, il quale fu diligentissimo così nel colorito come nel disegno, onde molto se ne servi Pietro ... Di questo Baccio fu fratello, e similmente *discepolo* di Pietro, Francesco che fu per soprannome detto il Bacchiacca, il quale fu diligentissimo maestro di figure piccole ... Fu ancora *discepolo* di Pietro Giovanni Spagnuolo, detto per soprannome lo Spagna, il quale colori meglio che nessun altro di coloro che lasciò Pietro dopo la sua morte. Il quale Giovanni dopo Pietro si sarebbe fermo in Perugia, se l'invidia dei pittori di quella città, troppo nimici de' forestieri, non l'avessino perseguitato di sorte che gli fu forza ritirarsi in Spoleto ... Ma fra i detti *discepoli* di Pietro miglior maestro di tutti fu Andrea Luigi d'Ascesi, chiamato l'Ingegno, il quale nella sua prima giovinezza concorse con Raffaello da Urbino sotto la disciplina di esso Pietro, il quale l'adoperò sempre nelle più importanti pitture che facesse, come fu nell'Udienza del Cambio di Perugia dove sono di sua mano figure bellissime, in quelle che Andrea tal saggio di sé, che si aspettava che dovesse di gran lunga lavorò in Ascesi e finalmente a Roma nella cappella di papa Sisto; nelle quali tutte opere diede trappassare il suo maestro ... Furono medesimamente *discepoli* di Pietro, e perugini anch'egli, Eusebio S. Giorgio che dipinse in S. Agostino la tavola de' Magi, Domenico di Paris che fece molte opere in Perugia et attorno per le castella, seguitato da Orazio suo fratello; parimente Giannicola, che in S. Francesco dipinse in una tavola Cristo nell'orto, e la tavola d'Ognisanti in S. Domenico alla cappella de' Bagioni, e nella cappella del Cambio istorie di S. Giovanni Battista in fresco. Benedetto Caporali, altrimenti Bitti, fu anch'egli *discepolo* di Pietro, e di sua mano sono in Perugia sua patria molte pitture ...' Carol Plazzotta points out (oral communication) that the phrase 'il quale [Raphael] molti anni lavorò con Pietro in compagnia di Giovanni de' Santi suo padre' could be significant. It may be that Vasari is here implying a distinction between those who were taught by Perugino, such as Gerino da Pistoia, and those, like Raphael, whom he states 'worked with' the Umbrian master. The fact that he does not spell this out suggests that he was familiar with the system whereby some young artists were taken on by a master as apprentices, whereas others came into a famous workshop to work as more skilled assistants while continuing their training. A. Di Lorenzo, 'Documents in the Florentine Archives' in K. Christiansen, ed., *From Filippo Lippi to Piero della Francesca: Fra Carnevale and the Making of a Renaissance Master*, exh. cat., Metropolitan Museum of Art, New York 2004, pp. 290–8, has demonstrated that such a system operated in the workshop of Fra Filippo Lippi in the 1440s where artists pre-trained in the Marches were employed for brief periods.
- 4 T. Henry and C. Plazzotta, 'Raphael: From Urbino to Rome' in H. Chapman, T. Henry and C. Plazzotta, *Raphael: From Urbino to Rome*, London 2004, p. 16. The authors point out that Raphael is not mentioned as one of Perugino's pupils in any documents and that his earliest independent paintings are not in fact his most Peruginesque in style. Therefore, although they believe that he had a close association with Perugino slightly later in his career, they argue that it is unlikely that Raphael was trained in Perugino's workshop in the 1490s.
- 5 The picture was cleaned and restored by Anthony Reeve in 2004.
- 6 The triangular addition on the left side is 27 × 25 cm, while that on the right is 19 × 18.5 cm. The panel has been thinned to c.5–7 mm and has suffered worm damage in the past, as can be seen by filled holes on the back and open exit holes on the front, which are most prominent in the Virgin's robe. The character of the wood grain (as seen in the X-radio-

- graph) is similar on both additions, but different from that of the main part of the panel.
- 7 The additions have a gesso ground, and were painted in egg tempera, which suggests that they are early in date. Identification of the pigments used does not allow the paint to be dated, however. The paint of the angel's wing on the addition is brownish in colour (translucent yellow pigment and black). The translucent yellow pigment may be a red lake that has faded and which has proved to be less durable than that used on the main part of the panel, since the paint no longer matches the wing on the main part.
 - 8 Since punching of the decoration is carried out after gilding, one would expect to find gold leaf beneath the paint in the areas where the haloes are visible in the X-radiograph. Traces of gold were found in samples from these areas, but so little that it seems likely that the gold was scraped off when it was decided that the composition would be changed. This is also suggested by the fact that no trace of the haloes is visible in the infrared reflectogram.
 - 9 Galleria Nazionale dell'Umbria, Perugia.
 - 10 An arched format was certainly not unusual for fresco and panel paintings, both in works by Giannicola and by his contemporaries in Umbria. Several examples are illustrated in G. Carli, *Pittura in Umbria tra il 1480 e il 1540. Premesse e sviluppi nei tempi di Perugino e Raffaello*, Milan 1983, p. 75 (Perugino), p. 115 (Dono Doni), p. 118 (Tiberio d'Assisi and Eusebio da San Giorgio), p. 132 (Gian Battista Caporali), pp. 137 and 178 (Tiberio d'Assisi). For examples by Giannicola di Paolo see p. 101 (1515), p. 130 (undated), p. 153 (attributed). When the panel width was reduced (by cutting on the right side), it would have been necessary to make an addition to the upper left corner to balance the composition and it seems likely that this was when the corner additions were added. Painted lines on these additions suggest that at least two gabled formats have been adopted at various stages.
 - 11 The results of medium analysis are published in C. Higgitt and R. White, 'Analyses of Paint Media: New Studies of Italian Paintings of the Fifteenth and Sixteenth Centuries', *National Gallery Technical Bulletin*, 26, 2005, pp. 88–104. The pigments were analysed by optical microscopy, energy dispersive X-ray analysis (EDX) in the scanning electron microscope (SEM) and Fourier Transform Infrared (FTIR) microscopy.
 - 12 This rather unusual unpigmented mordant does not appear to contain any of the organic materials normally associated with mordants that are commonly mentioned in documentary sources (oils, proteins or polysaccharides). However, analysis of the mordant by FTIR microscopy and GC-MS gave a very close match to authentic samples of gum ammoniac or ammoniacum, a gum resin exuded from the stems of *Dorema ammoniacum* D. Don (Umbelliferae, now Apiaceae), native to Iran and India. Details of the analytical results and further research will be the subject of a future publication. Gum ammoniac has a complex composition, containing approximately 1–7% volatile oil, 50–70% resin and 18–26% gum. The resin contains a 3-alkyl substituted 4,7-dihydroxycoumarin, ammosesin, probably present as a salicylic acid ester. R.D.H. Murray, J. Méndez and S.A. Brown, *The Natural Coumarins, Occurrence, Chemistry and Biochemistry*, Norwich 1982, pp. 45–51, 56–69, 97–111 and 444; A. Tschirch and E. Stock, *Die Harze*, 3rd edn, Berlin 1933–6, pp. 201–10; *The Merck Index*, 12th CD-ROM edn, ed. S. Budavari, M. O'Neil, A. Smith, P. Heckelman and J. Obenchain, London and Boca Raton, Chapman and Hall/CRC, 2000. Gum ammoniac is mentioned in various early sources (as *aminiacho* or *armoniaico*) including a fifteenth-century Siennese manuscript, see A.P. Torresi, *Tecnica Artistica a Siena. Alcuni trattati e ricettari del Rinascimento nella Biblioteca degli Intronati*, Ferrara 1993, pp. 48–9 (referring to Siena, Biblioteca degli Intronati, MS L.XI.41 f. 40r.). The sources describe its use (sometimes mixed with gums, bole, egg white, garlic, urine or vinegar) for applying gold to a number of substrates including parchment or paper, see I. Bonaduce, 'A Multi-Analytical Approach for the Investigation of Materials and Techniques in the Art of Gilding', PhD thesis 2003–5, University of Pisa 2006. This is the first time that the use of gum ammoniac as a mordant component in easel paintings has been reported. A very similar mordant has been identified in panels by the Siennese artist known as the Master of the Story of Griselda (c.1492) see J. Dunkerton, C. Christensen and L. Syson in this *Bulletin*, pp. 4–71 and in a number of other fifteenth-century Siennese and North Italian works.
 - 13 See J. Kirby, M. Spring and C. Higgitt, 'The Technology of Red Lake Pigment Manufacture: Study of the Dyestuff Substrate', *National Gallery Technical Bulletin*, 26, 2005, pp. 71–87.
 - 14 The modelling of green areas in the landscapes with spots of green paint, both in the middle ground and in the background (including distant hills; this does not stand for grass) appears to be particularly common in fresco; it can be seen for example in the Perugino frescoes in the Collegio del Cambio in Perugia and in Perugino's *Adoration of the Kings* of 1504 in the Oratorio di Santa Maria dei Bianchi in Città della Pieve. However, Perugino also used this method in his panel paintings, for example the *Madonna in Glory with Saints* (c.1500), in the Pinacoteca Nazionale, Bologna (No. 579), and the *Transfiguration* of 1517 in the Galleria Nazionale dell'Umbria. It can also be seen on paintings by other painters, such as *Alexander the Great* by the Master of the Story of Griselda, in the Barber Institute, Birmingham; see the article in this *Bulletin*, pp. 4–71.
 - 15 Higgitt and White 2005 (cited in note 11).
 - 16 The gold leaf is applied onto the same translucent yellow unpigmented mordant observed beneath the silver decoration on the angel's wings. See note 12.
 - 17 M. Spring, R. Grout and R. White, 'Black Earths: A Study of Unusual Black and Dark Grey Pigments used by Artists in the Sixteenth Century', *National Gallery Technical Bulletin*, 24, 2003, pp. 96–114.
 - 18 C. Seccaroni, 'Some rarely documented pigments. Hypothesis [sic] and working observations on analyses made on three temperas by Correggio', *Kermes*, 34, January–April 1999, pp. 41–59. For a discussion of the date of the *Penitent Saint Jerome* see T. Mozzati in V. Garibaldi and F.F. Mancini eds, *Perugino, il divin pittore*, exh. cat., Galleria Nazionale dell'Umbria, Perugia, Milan 2004, pp. 316–17, cat. I.59.
 - 19 A pale green layer of lead white and a little green earth was seen in a cross-section of a paint sample from the Virgin's flesh. For general discussion of the painting techniques of the period, see J. Dunkerton and A. Roy, 'The Materials of a Group of Late Fifteenth-century Florentine Panel Paintings', *National Gallery Technical Bulletin*, 17, 1996, pp. 20–31. In tempera works, areas of flesh appear dark in infrared photographs because the green earth-containing underpaint absorbs infrared radiation.
 - 20 For Giannicola's biography see F. Canuti, 'La patria del pittore Giannicola con notizie e documenti sulla vita e sulle opere', *Bollettino della Regia Deputazione di Storia Patria per l'Umbria*, XII, 1916, pp. 279–337; U. Gnoli, 'Giannicola di Paolo', *Bollettino d'arte*, XXII, 1919, pp. 33–43; P. Mercurelli Salari, 'Giannicola di Paolo', *Dizionario biografico degli italiani*, LIV, Rome 2000, pp. 474–7; S.F. Shaneyfelt, *The Perugian Painter Giannicola di Paolo: Documented and Secure Works*, Ph.D. dis., Indiana University at Bloomington, 2000. We also look forward to the publication of Sheri Shaneyfelt's forthcoming lecture 'New documents for the Perugino School: a reappraisal of Giannicola di Paolo's early career', presented at the Southeastern College Art Conference (SECAC), 26–30 October 2005, University of Arkansas, Little Rock, Arkansas.
 - 21 F. Canuti, *Il Perugino*, Siena 1931, II, pp. 181–2, docs 233, 235. Interestingly, one further connection between the two painters can be traced: a contract of 1520 between Giannicola and canons of Santa Maria di Spello for paintings that were then executed by Perugino (Canuti 1931, II, pp. 279–80, doc. 482).
 - 22 Canuti 1916 (cited in note 20), p. 310, publishes a rental agreement of 1509, but the document implies that Giannicola may already have been working there before that date.
 - 23 F.F. Mancini, 'La residenza dei priori: uso e decorazione degli spazi interni dal XIV al XVIII secolo' in Mancini, ed., *Il Palazzo dei Priori di Perugia*, Perugia 1997, pp. 279–325, esp. pp. 290–1; V. Garibaldi, 'Novità su Giannicola di Paolo: i ritrovati affreschi dell'antico refettorio del Palazzo dei Priori a Perugia' in P. Mercurelli Salari, ed., *Pietro Vannucci e i pittori perugini del primo Cinquecento*, Perugia 2005, pp. 111–24; and V. Garibaldi, 'Da Perugino a Giannicola di Paolo: il Cenacolo di Perugia' in R.C. Proto Pisani, ed., *Perugino a Firenze. Qualità e fortuna d'uno stile*, exh. cat., Cenacolo di Fuligno, Florence 2005, pp. 45–9.
 - 24 For a complete list, see Mercurelli Salari 2000 (cited in note 20), p. 474. A detached *Crucifixion* fresco in the Galleria Nazionale dell'Umbria remains particularly problematic. Canuti, followed by Gnoli and others, connected it with payments in 1501 from the Confraternity of San Domenico for a *Crucifixion* for its oratory. See Canuti 1916 (cited in note 20), pp. 292 and 301, note 30; A. Alberti in Carli 1983 (cited in note 10), p. 193. Tiranti, however, re-examining the documents in 1985, suggested a later dating and an alternative attribution to the still somewhat ill-defined Pompeo Cocchi. See A. Tiranti, 'Novità per Pompeo Cocchi' in *Esercizi. Arte, musica e spettacolo*, 8, 1985, pp. 20–9. This suggestion was rejected by S. Blasio in G. Baronti, S. Blasio, A. Melelli, C. Papa and M. Squadroni, eds, *Perugino e il paesaggio*, Palazzo della Corgna, Città della Pieve (Perugia), Milan 2004, pp. 52–3, cat. 5, who accepts the attribution to Giannicola. The design of the corpus is clearly based on a Perugino model – such as the *Crucifixion* fresco in Santa Maria Maddalena de' Pazzi, Florence. Even if Tiranti's revised attribution cannot be proved with certainty, comparison with the fresco fragments in the Palazzo dei Priori suggests that his doubts about the attribution to Giannicola may be well founded.
 - 25 See S. Padovani, 'Il Cenacolo di Sant'Onofrio detto "del Fuligno"' in L.

- Teza, ed., *Pietro Vannucci, il Perugino. Atti del convegno internazionale di studio (Città della Pieve, 25–28 ottobre 2000)*, Perugia 2004, pp. 49–64; S. Padovani, 'Il Cenacolo del Perugino' in Proto Pisani ed. 2005 (cited in note 23), pp. 29–44, in which she unconvincingly argues for an early date and fully autograph status. More usually it has been recognised that the execution was delegated to one or more of Perugino's Florentine associates. The names Rocco Zoppo and Roberto da Monteverchi have been suggested (see F. Todini, *La pittura umbra dal Duecento al primo Cinquecento*, I, Milan 1989, pp. 306–7), but neither of these figures is sufficiently well defined for this proposal to be more than hypothetical; in particular, there is no evidence that Roberto worked with Perugino prior to c.1500. Until recently, it has also sometimes been cautiously proposed that Giannicola himself was one of the executors. See S. Ferino Pagden, *Disegni umbri del Rinascimento da Perugino a Raffaello*, exh. cat., Uffizi, Florence 1982, p. 47. This theory is disproved by the recent restoration and analysis of his Palazzo dei Priori copy, which is stylistically divergent.
- 26 See L. Aquino in Proto Pisani ed. 2005 (cited in note 23), pp. 152–63, cats 30–5: divided between the Uffizi (Florence), the Kupferstichkabinett (Berlin), the British Museum (London) and the Fitzwilliam Museum (Cambridge). That some of these (Uffizi nos 1725E, 1724E) are copies after drawings rather than the finished fresco is indicated by the fact that the legs of the apostles can be seen under the table, obscured in the fresco by the table-cloth.
- 27 The chapel was acquired in 1494. S. Blasio 2004 (cited in note 24), pp. 54–5, cat. 6.
- 28 The San Pietro altarpiece is discussed in C. Gardner von Teuffel, 'Carpenteria e machine d'altare. Per la storia della ricostruzione delle pale di San Pietro e di Sant'Agostino a Perugia' in Garibaldi and Mancini ed. 2004 (cited in note 18), pp. 141–53.
- 29 See F.F. Mancini, 'Giannicola di Paolo e la Cappella di San Giovanni al Cambio' in P. Mercurelli Salari ed. 2005 (cited in note 23), pp. 103–10.
- 30 The Louvre and Città della Pieve altarpieces are illustrated in Carli 1983 (cited in note 10), pp. 108 and 146 respectively.
- 31 This painting was first attributed to Giannicola di Paolo by Berenson (B. Berenson, *Central Italian Painters of the Renaissance*, New York 1909, p. 193) and Crowe and Cavalcaselle in 1909 and 1914 (J.A. Crowe and G.B. Cavalcaselle, *A History of Painting in Italy: Umbria, Florence and Siena from the Second to the Sixteenth Century*, III, *The Siene, Umbrian and North Italian Schools*, London 1909, pp. 326–7, and V, *Umbrian and Siene Masters of the Fifteenth Century*, London 1914, pp. 458–9) and this attribution has been followed in the subsequent literature. See Shaneyfelt 2000 (cited in note 20), 'Catalogue C: Works of Possible Attribution', pp. 519–20, which gives the wide date range of c.1485–1510; however, as the author explains, she had not had the chance to see the picture in person.
- 32 This effect may have become exaggerated by some fading of pigments. Nonetheless, it is more marked than in other paintings by Perugino or his disciples.
- 33 This polyptych, in the Albani Torlonia collection in Rome, has most recently been catalogued as a work in egg tempera by V. Garibaldi in V. Garibaldi and F.F. Mancini eds 2004 (cited in note 18), pp. 232–3, cat. I.31. Certainly the brushstrokes have the hatched appearance of tempera (see, however, the caveat in note 69 below). Interestingly, for the argument related to pictures in tempera attributed to Perugino presented below, the attribution has been questioned by L. Teza (cited by Garibaldi), who believes it to have been painted by l'Ingegno, and by F. Russell, 'Review: *Perugino, il divin pittore*', *Apollo*, CLIX, June 2004, pp. 94–5.
- 34 The inscription states PETRUS/ .DE PERUSIA/ PINXIT/ .M.CCCC.VIII.PRIMO. Perugino did not use this unusual dating format elsewhere, perhaps reinforcing the idea that the 'signature' may have been added by a member of his shop.
- 35 The Fano *Annunciation* is catalogued as a work in oil by P. Scarpellini, *Perugino*, Milan 1984, p. 84, cat. 46; V. Garibaldi, *Perugino. Catalogo completo*, Florence 1999, pp. 109–10, cat. 23. There is a fragmentary inscription on this *Annunciation* which seems to read 1489. There are also more superficial similarities with the *Annunciation* scene from the predella of the main altarpiece in the Church of Santa Maria Nuova in Fano of c.1497, often credibly thought to be a work by one of Perugino's pupils or assistants (Scarpellini 1984, pp. 92–3, cat. 73; F. Marcelli in Garibaldi and Mancini ed. 2004 (cited in note 18), pp. 314–15, cat. I.58a–58e), and the *Annunciation* in the Ranieri collection which has been attributed to Perugino, although both date and authorship of this picture are rightly debated, see Scarpellini 1984, pp. 99–100, 233, cat. 101; F.F. Mancini in Garibaldi and Mancini eds 2004 (cited in note 18), pp. 236–7, cat. I.33. These latter indicate only how Perugino's inventions were developed by his associates, and should not be treated as sources for Giannicola.
- 36 F. Canuti 1931 (cited in note 21), II, p. 175, doc. 220.
- 37 M. O'Malley, *The Business of Art: Contracts and the Commissioning Process in Renaissance Italy*, New Haven and London 2005, p. 133. The panels from the altarpiece are now dispersed, the main panel and lunette in Lyon, the narrative predella panels in Rouen, two prophet roundels in Nantes, and small panels of saints in Perugia and the Vatican (Scarpellini 1984 (cited in note 35), pp. 93–5, cats 74–88).
- 38 Canuti 1931 (cited in note 21), II, pp. 302–4, docs 541–7. Payments continue into 1509.
- 39 The issue of Perugino's workshops has most recently been examined by F.F. Mancini, 'Considerazioni sulla bottega umbra del Perugino' in L. Teza ed. 2004 (cited in note 25), pp. 329–34; E. Lunghi, 'Perugino e i suoi imitatori' in P. Mercurelli Salari ed. 2005 (cited in note 23), pp. 27–46; L. Teza, 'Un dipinto in società: Perugino, Berto di Giovanni e la bottega del 1496', in *ibid.*, pp. 47–61; F. Todini, 'Il Perugino, le sue botteghe e i suoi seguaci' in Proto Pisani ed. 2005 (cited in note 23), pp. 51–68.
- 40 A. Victor Coonin, 'New documents concerning Perugino's workshop in Florence', *Burlington Magazine*, CXXI, 1999, pp. 100–4.
- 41 *Ibid.*
- 42 A. Butterfield, *The sculptures of Andrea del Verrocchio*, New Haven and London 1997, pp. 185–98.
- 43 See Canuti 1931 (cited in note 21), II, pp. 176–7, doc. 224, on which basis it has been suggested that Eusebio was perhaps responsible for the predella figures of Saints Ercolano and Costanzo. See F. Russell, 'Perugino and the early experience of Raphael' in J. Beck, ed., *Raphael Before Rome. Studies in the History of Art, National Gallery of Art, Washington*, 17, 1986, pp. 189–201, esp. p. 192. Equally (but less convincingly) it has been suggested that these saints were painted by Giannicola. See Scarpellini 1984 (cited in note 35), p. 94, cats 81–2; they do not in fact seem to have been executed by the same hand. For Eusebio, see also C. Fratini, 'Eusebio di Iacopo', *Dizionario biografico degli italiani*, XLIII, 1993, pp. 524–7, esp. p. 524.
- 44 Coonin 1999 (cited in note 40), p. 101; F. Gualdi Sabatini, *Giovanni di Pietro detto Lo Spagna*, Spoleto 1984, p. 366, doc. 2 (1504).
- 45 Vasari (see note 3) actually lists 'Benedetto Caporali' but he certainly intended Giovanni Battista Caporali, c.1476–1554 (also sometimes called Gianbattista or Giambattista), son of Bartolomeo Caporali (active 1467–91). See also note 81 below.
- 46 Todini 1989 (cited in note 25), p. 306.
- 47 Canuti 1931 (cited in note 21), II, pp. 191–2, docs 260–1.
- 48 Canuti 1931 (cited in note 21), II, pp. 176–7, doc. 224.
- 49 Canuti 1931 (cited in note 21), II, p. 188, doc. 252.
- 50 Canuti 1931 (cited in note 21), II, p. 180, doc. 232 (19 May?).
- 51 Canuti 1931 (cited in note 21), II, p. 191, doc. 260.
- 52 Canuti 1931 (cited in note 21), II, pp. 174–5, doc. 219. 'Ruberto' however is not designated a painter.
- 53 Canuti 1931 (cited in note 21), II, p. 181, doc. 234.
- 54 An opinion influentially formulated by F.F. Mancini, 'Un episodio di normale "routine": l'affresco cinquecentesco dell'Oratorio di Sant'Agostino a Perugia', *Commentari d'arte*, I, no.1, 1995, pp. 29–48.
- 55 Lunghi 2005 (cited in note 39).
- 56 V. Garibaldi in Garibaldi and Mancini eds 2004 (cited in note 18), pp. 270–3, cat. I.47; Mancini in Teza ed. 2004 (cited in note 25); Teza in Mercurelli Salari ed. 2005 (cited in note 39). Todini 1989 (cited in note 25), I, p. 78, attributed the whole altarpiece to Giannicola. Others have thought that Giannicola may have been responsible for the predella alone. See Padovani in Teza ed. 2004 (cited in note 25), p. 52. This last suggestion deserves further consideration that might be assisted by technical examination.
- 57 Canuti 1931 (cited in note 21), II, p. 184, doc. 242.
- 58 Scarpellini 1984 (cited in note 35), p. 95, cat. 90; P. Mercurelli Salari in Garibaldi and Mancini eds 2004 (cited in note 18), pp. 266–7, cat. I.45.
- 59 Lunghi in Mercurelli Salari ed. 2005 (cited in note 39), p. 27. Lorenzo Ghiberti similarly sought to control the use of his drawings by others. See A. Thomas, *The Painter's Practice in Renaissance Florence*, Cambridge 1995, p. 157.
- 60 They are referred to in a notarial deed, and were therefore of age. For Berto, see F. Gualdi, 'Berto di Giovanni', *Dizionario biografico degli italiani*, IX, 1967, pp. 555–7.
- 61 U. Gnoli, *Pittori e miniatori nell'Umbria*, Spoleto 1923, p. 186.
- 62 Gnoli 1923 (cited in note 61), p. 103.
- 63 Gnoli 1923 (cited in note 61), p. 154.
- 64 It has been suggested unconvincingly that the *Virgin and Child with Saints* (Baltimore Museum of Art) and the *Flagellation* (Washington, National Gallery of Art, Kress Collection) are works by Perugino possibly in collaboration with Giannicola, see Scarpellini 1984 (cited in note 35), pp. 111–12, cats 136, 139; Garibaldi 1999 (cited in note 35), pp. 158–9, cats A11, A13.

- 65 V. Garibaldi, *Perugino*, Milan 2004, pp. 150–1, 171: 'La volta, che rappresenta la prima importante antologia della grottesca nella pittura italiana rinascimentale, è sostanzialmente estranea al gusto di Perugino e al suo modo figurativo e il pittore intervenne quasi esclusivamente a livello progettuale. Richiesta dalla committenza sull'onda della moda imperante in quegli anni, impegnò in un tema a lui non congeniale. L'estraneità culturale è confermata dalla scelta da affidare gran parte dell'esecuzione ai suoi aiutanti. Sono infatti rintracciabili tre diversi linguaggi figurative, che avolte si sovrappongono e si intersecano. Non è possibile dare un nome all'autore dei segni zodiacali. Vasari ricorda l'Ingegno, ma quelle poche, incerte notizie che abbiamo di lui non permettono di confermare la sua presenza. Neppure trovano riscontro diretto gli altri nomi che sono stati fatti, da Eusebio da San Giorgio, al Fantasia, a Roberto da Monteverchi, a Giannicola di Paolo, attivo di lì a poco nell'attigua capella di San Giovanni.'
- 66 Raphael has also sometimes been thought, with even less evidence, to have contributed to the predella of the San Pietro altarpiece. See Scarpellini 1984 (cited in note 35), p. 94, cats 79–80; Garibaldi 2004 (cited in note 65), p. 158.
- 67 Canuti 1931 (cited in note 21), pp. 189–90, doc. 256.
- 68 C. Acidini, 'Gli ornate delle tarsie perugine dal repertorio antiquario alla grottesca', *Annali della Fondazione di Studi di Storia dell'Arte R. Longhi*, I, 1984, pp. 55–69, esp. p. 68, note 14.
- 69 Statements in the literature about binding media are often based simply on the character of the brushstrokes. This, however, is not always a good criterion, as some painters at this time applied oil paint in the hatched brushstrokes typical of tempera. In addition, painters sometimes used a combination of oil and egg in the same painting and also some of the pigments and additives in the paint can interfere with interpretation of the instrumental analyses, see Higgitt and White 2005 (cited in note 11). The problem is compounded by a lack of unanimity among art historians as to the extent of Perugino's autograph oeuvre, and not just at the beginning of his working life. For the moment, inevitably, some judgements on medium use are based on the way in which they are currently catalogued and on their surface appearance. However, the authors of this article accept the attribution to Perugino of the following early works convincingly catalogued as having been painted using an oil medium: *The Birth of the Virgin* (Liverpool, Walker Art Gallery), the *Miracle of the Madonna della neve* (Polesden Lacey, from the same predella), the *Miracle of Bishop Andrea*, the *Miracle of the Hanged Youths* and the *Imago pietatis* (all from the same predella devoted to the miracles of Saint Jerome and all now in the Louvre) and, most importantly, the *Adoration of the Magi* of c.1475, from Santa Maria dei Servi (now Galleria Nazionale dell'Umbria). See Scarpellini 1984 (cited in note 35), pp. 71, 74–5, cats 8–10, 25; A. Bellandi and P. Mercurelli Salari in Garibaldi and Mancini eds 2004 (cited in note 18), pp. 176–83 and pp. 194–5, cats I.5–8, I.12.
- 70 S. Delbourgo, J.P. Rioux, E. Martin, 'L'analyse des peintures du *studiolo* d'Isabelle d'Este', *Laboratoire de recherche des musées de France, Annales*, 1975, pp. 21–8. For the exchange of letters see Canuti 1931 (cited in note 21), II, pp. 236–7, docs 376, 378. Isabella d'Este to Perugino, 30 June 1505: '... et rincrescena che quello Lorenzo Mantovano vi dissuadesse da colorirlo ad olio: perochè noi lo desideravamo sapendo che l'era più vostra professione et di maggior vaghezza ...'. Perugino to Isabella, 10 August 1505: 'Io ricevuta una vostra Rx.sa S. E. per quella inteso il quadro essere giunto a salvamento, di che ho preso piacere assai, ed émi da altro chanto doluto che da principio io non abbia saputo il modo del cholorire preso da M. Andrea Mantegna, perchè m'era più facile colorirla a olio che a tempera di cholla, e sarebbe riuscita più dilicata avando più dilicato il piano di sotto.'
- 71 For the Albani Torlonia polyptych see note 33 above. Other works that fall into this category include: the *Virgin and Child with the Infant Saint John the Baptist* in the National Gallery (NG 181), the *Virgin and Child with Saints Jerome and Peter* (Chantilly, Musée Condé), the tondo with the *Virgin and Child enthroned with Saints Rose and Catherine of Alexandria and Angels* (Paris, Louvre). See Scarpellini 1984 (cited in note 35), pp. 80, 87, cats 37, 39, 55. The first of these is currently labelled as a work by an associate of Perugino, at least partly on stylistic grounds, though it was catalogued by Davies as autograph (Davies 1951, cited in note 1, pp. 401–2). It was certainly painted in egg tempera and has green earth underpaint for the flesh and malachite in the landscape. See A. Roy, 'Perugino's Certosa di Pavia Altarpiece: new technical perspectives', *Postprints of the workshop on the painting technique of Pietro Vannucci, called Il Perugino*, *Quaderni di Kermes*, 2004, pp. 9–20. For a recent argument regarding this group, see L. Teza, 'Osservazioni sulla decorazione del Collegio del Cambio' in Garibaldi and Mancini eds 2004 (cited in note 18), pp. 115–27.
- 72 Recent examinations of many works in oil by Perugino, Raphael and other fifteenth- and sixteenth-century painters have revealed the addition of colourless manganese-containing crushed glass to red lake glazes. In works by Perugino where glass has not been found in red lake glazes (and where the medium has been examined) aqueous media have been found. See A. Roy, M. Spring and C. Plazzotta, 'Raphael's Early Work in the National Gallery: Paintings before Rome', *National Gallery Technical Bulletin*, 25, 2004, pp. 4–35; M. Spring, 'Perugino's painting materials: analysis and context within sixteenth-century easel painting', pp. 21–8, and C. Seccaroni, P. Moiola, I. Borgia, B.G. Brunetti and A. Sgamellotti, 'Four anomalous pigments in Perugino's palette: statistics, context and hypotheses', pp. 29–41, both in *Quaderni di Kermes* 2004 (cited in note 71).
- 73 In this period some painters used oil with transparent pigments such as red lake and verdigris, and egg tempera for opaque areas such as flesh. Perugino did not generally add powdered glass to flesh paint as it contains lead white, and therefore dries well. The presence of glass detected by XRF therefore only provides an indication of the binding medium of the red lake paint, and not of the whole painting.
- 74 Seccaroni et al. 2004 (cited in note 72). Other than works in fresco or on canvas, the paintings which did not contain powdered glass were the *Madonna della Cucina* (c.1520), the reverse of the *Monteripido Altarpiece* (c.1503–4), *David and Daniel* (reverse of the Sant'Agostino polyptych, after 1510?), *The Virgin and Child with Saints Jerome and Augustine* in the Musée des Beaux Arts, Bordeaux (probably 1505–10), is catalogued as a work by Perugino and collaborator and here the medium has been shown to be egg tempera by GC–MS. See E. Martin and J.P. Rioux, 'Comments on the technique and the materials used by Perugino, through the study of a few paintings in French collections', *Quaderni di Kermes* 2004 (cited in note 71), pp. 43–56. The absence of glass in the red lake paint of the London *Annunciation* by Giannicola is not surprising since the binding medium is egg tempera and therefore does not require a siccativo.
- 75 The *Ognissanti Altarpiece* by Giannicola di Paolo was most recently catalogued as a work in oil (Blasio 2004, cited in note 24). However, Santi describes it as a work in egg tempera (F. Santi, *Galleria Nazionale dell'Umbria, Dipinti, sculture e oggetti dei secoli XV–XVI*, 1st edn Rome 1985, reprinted 1989). This is also the opinion of the current authors and of the restorers who worked on the painting during the recent conservation treatment (written communication Sheri Shaneyfelt), although there may be some glazes in oil. The Washington *Annunciation* of c.1510–15, however, appears to be painted mainly if not exclusively in oil.
- 76 In the X-radiograph of Giannicola's *Annunciation*, scored radiating lines can be seen in the haloes, and a punched decoration of five-lobed flowers around the circumference. This is very similar to the decoration on the haloes in Benedetto Bonfigli's *Madonna and Child with Four Angels* in the Galleria Nazionale dell'Umbria (inv. no. 78). Caporali's *Virgin and Child with Saints Francis and Bernardino* (NG 1103) probably dates to 1475–80 and is catalogued as egg tempera and oil on wood, but has not been analysed.
- 77 Only Perugino's earliest paintings have punched gold leaf haloes. See the panels now in the Louvre (the *Pietà* and *The Miracle of the Hanged Youths*, c.1470–3) and *Saints Anthony of Padua and Sebastian* (Nantes, Musée des Beaux Arts, c.1476–8).
- 78 Canuti 1916 (cited in note 20), pp. 319, note 99, and 326, note 135.
- 79 As Michael Bury points out (written communication), the reuse of panels begun for one purpose and either never completed or not paid for is likely to have been common practice, since properly prepared and seasoned panels would have been quite expensive. It is also likely that if the work had been started by one master but interrupted by his death, it would be passed to one of his pupils.
- 80 L. Bordoni, G. Martellotti, M. Minno, R. Saccuman and C. Seccaroni, 'Si conclude l'anno del Perugino. Il polittico di Sant'Agostino. Ragionamenti e ipotesi ricostruttive', *Quaderni di Kermes*, 56, 2004, pp. 41–54; Seccaroni et al. 2004 (cited in note 72).
- 81 Martin and Rioux 2004 (cited in note 74). It has been catalogued by Scarpellini 1984 (cited in note 35), pp. 111–12, cat. 137, as a work by Giovanni Battista Caporali and Perugino, followed by Garibaldi 1999 (cited in note 35), p. 159, cat. A12. However, this attribution has no documentary foundation and should be treated as highly dubious, though there can be no doubt that it is not an autograph work.