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Colored Grounds in French Paintings before 1610: *A Complex Spread*)

Stéphanie Deprouw-Augustin

Comparing cross-sections to treatises and recipe books, pictorial representations, and descriptions of unfinished paintings, this paper reassesses the early rise of colored grounds in central France from the Romanesque era, first in wall paintings and then in easel paintings. It examines their spread in relation to the availability of earth pigments and to style. The desire to achieve chiaroscuro effects may have fostered their development, and this practice was then adopted by some Netherlandish courtly painters active in France by the end of the fourteenth century, long before the arrival of Italian artists at Fontainebleau, who were previously considered responsible for the introduction of colored grounds.

1. The history of colored grounds in Netherlandish painting has long been told as a story that begins in northern Italy, from where the practice spread northward in the sixteenth century. The idea of a French connection for colored ground layers in the Netherlands, in particular the School of Fontainebleau as an early source, was first suggested in 1979 by Hessel Miedema and Bert Meijer, who noted the presence of colored grounds in pictures by Abraham Bloemaert, Cornelis Ketel, and Cornelis Cornelisz van Haarlem on their return from France in the early 1580s.[1] The recent gathering of scientific analysis documenting the painting techniques of Old Masters active in France, however, reveals earlier and previously unrecognized examples, some dating back to the Romanesque period. This article reconsiders both the chronology and the mechanisms by which colored grounds were transmitted and the implications of these new findings from France for the study of Netherlandish painting.

2. This article's main technical findings derive from pigment cross-sections, most taken during conservation treatment. By comparing the ground layers that are visible in cross-sections to discussions of grounds in treatises and recipe books—and to the visual evidence of grounds in pictorial representations and archival descriptions of unfinished paintings—this article reassesses the development of colored grounds in central France from their early rise in wall paintings in the eleventh century until their use in easel paintings, beginning at least in the late fourteenth century. It examines their spread throughout France until the beginning of the seventeenth century, in relation both to the availability of the earth pigments that were used to make colored ground and to stylistic developments that rely on colored grounds. The desire to achieve chiaroscuro effects may have encouraged the development of colored grounds. This approach was then adopted by some Netherlandish courtly painters working in France from the late fourteenth century, well before the arrival of Italian artists at Fontainebleau, who were long credited with introducing the practice.

3. The study builds on and expands earlier technical scholarship on French painting. Alain Duval's pioneering work in 1992 analyzed 155 cases from the 1630s to the late eighteenth century.[2] His colleague Élisabeth Martin extended his research in 2000 and identified a technical turn around 1615, marked by the adoption of red-brown grounds across multiple artistic centers.[3] Examining a group of one hundred French, Italian, and Flemish paintings

from French museum collections dating between about 1600 and 1640, she grouped the works into six categories based on the predominant color of the ground (including white) and its main component: chalk, earth pigments, or lead white.[4] More recently, in her thorough study of preparatory layers in European oil paintings from 1550 to 1900 (2017), Maartje Stols-Witlox classified various ground layer recipes according to the painting support and included an important, recently rediscovered sixteenth-century French source, Ms. Fr. 640 from the Bibliothèque Nationale de France.[5] Following the suggestion of Miedema and Meijer, Laura Pichard focused on the influence of Italian artists at Fontainebleau in her master's thesis (2020) about grounds in easel paintings made in France at the turn of the sixteenth and seventeenth centuries.[6] She suggested that Nicolò dell'Abate, who worked at the French court from 1552 until his death in 1571, may have played a significant part in the introduction of colored grounds into French painting.

4. Indeed, until now, the use of colored grounds in European painting was thought to have originated in Northern Italy, in the work of Dosso Dossi and Correggio in the Po valley—and perhaps even as early as Carlo Crivelli's 1470 *Madonna*, which is on a yellow ocher ground.[7] However, the French evidence points to a more complex and earlier history. It appears that Romanesque and Gothic painters in France were already employing colored grounds centuries before the Italian examples that are traditionally cited as a point of origin. Their broader adoption was part of a complex process involving artists from various regions, including the Netherlands.

5. Until the 1630s, most French paintings were prepared with white grounds, usually made of chalk and glue (resembling Netherlandish panel grounds) or gypsum and glue in Provence (similar to Italian gesso).[8] Yet at least forty-six paintings with colored grounds produced in France before 1610 have now been identified. Most have been studied in conservation laboratories and sometimes published as case studies.[9] These examples challenge the traditional narrative of an exclusively Italian origin for colored grounds. This special issue, guest edited by Maartje Stols-Witlox and Elmer Kolfin from the *Down to the Ground* project, provides an opportunity to synthesize this evidence and to investigate how colored grounds emerged and spread in and beyond France, which painters employed them, and for what purposes. To establish the chronology of the spread, this article focuses on well-characterized cases supported by scientific analysis (**Table 1**). To explain the function of colored grounds and discuss questions of authorship, it also draws on recipes and documentary sources—including two manuscripts newly published since 2020—as well as the visual examination of artworks.[10]

A Chronology of the Spread

6. Colored grounds cannot be studied properly without taking both wall and easel paintings into account, since the same artists often practiced both techniques.[11] Wall paintings also provide the geographical framework necessary to understand the dynamics of the spread of colored grounds and to put the scarce early panels in context. Judging from surviving artworks, the rise of colored grounds in French painting appears to have begun in the Loire valley as early as the twelfth century.

Colored Grounds: A Precocious French Specialty (ca. 1100–1400)

7. The earliest known red-brown grounds seem to have been experimental layers in frescoes. Red-brown underlayers have been found locally under ultramarine blue in the *Miraculous Draught of Fishes*, in the chapter room of Trinity Abbey in Vendôme (Loir-et-Cher) (**figs. 1 and 2**), and under entire painted surfaces in nearby churches at Lavardin and Saint-Jacques-des-Guérets, as well as further south at Nohant-Vic (Indre), all from the twelfth century.[12] Around the same period in Brioude (Haute-Loire), a dark gray ground made of carbon black was applied to the *Last Judgment* fresco in the basilica of Saint-Julien.[13]

8. In Anjou, colored grounds were used almost continuously from the thirteenth century until the Renaissance, along with a new medium: oil. Around 1246–1250, a red-brown ground was used under the false-stone decoration of the Ronceray Abbey Church in Angers, one of the oldest preserved oil paintings in France.[14] From the next generation (ca. 1270–1280), the *Story of Saint Maurille*, a thirty-meter-long wall painting in the apse of Angers Cathedral, now hidden behind eighteenth-century wood paneling, shows evidence of several painting techniques (**fig. 3**).[15] One of the painters worked on a colored ground made of chalk, sand, and a little red lead (**figs. 4 and 5**).

9. Around the same time, the Saint George chapel in the Clermont-Ferrand Cathedral in Auvergne was adorned with scenes from the saint's life in distemper on a light orange ground containing red lead.[16] Nearby, a frieze of six canons and other clerks from the De Jeu family presented by an angel (ca. 1275–1302) was painted over a red-brown ground.[17] The presence of multiple ground colors in both the Loire valley and Auvergne during the twelfth and thirteenth centuries suggests the practice was more widespread than previously assumed.[18]

10. Yellow ocher grounds seem to have appeared a little later and were common in fourteenth-century northwestern France, as the *Liber de coloribus illuminorum sive pictorum*, an Anglo-Norman treatise on painting (ca. 1300–1340), testifies.[19] In the *Crucifixion* from the same period in the Bayeux Cathedral treasure room, a yellow ocher layer was applied over the standard white chalk and glue ground.[20] Yellow grounds frequently accompanied vermilion backgrounds, particularly in the International Gothic style, as in the *Angels Playing Instruments* (ca. 1367–1385) on the vaults of the Virgin Mary chapel in Le Mans Cathedral, attributed to Jan Boudolf (act. 1368–1381) from Bruges.[21] By the end of the fourteenth century, colored grounds had also reached Burgundy, as seen in the yellow ocher ground of the wall paintings at Germolles Castle in Mellecey (Saône-et-Loire), painted around 1389–1390 by Jean de Beaumetz (ca. 1335–1396).[22]

Spreading to Easel Painting and Most French Provinces (ca. 1400–ca. 1530)

11. Only after three centuries of use in wall painting do we find surviving examples of colored grounds on panels, although the third book of Heraclius's *De coloribus et artibus Romanorum* confirms that they already existed in thirteenth-century France.[23] Dating to about 1390 to 1400, two wings from an altarpiece showing saints on red backgrounds in the Angers Museum of Fine Arts reveal a brown preparatory layer (**fig. 6**).[24] Around 1410, cantor Pierre de Wissant commissioned a triptych for his chapel in Laon Cathedral (Aisne). The left wing, depicting the Angel Gabriel with Mary Magdalen introducing the donor (**fig. 7 inside and fig. 7 outside**), was prepared with two layers containing yellow ocher (**figs. 8 and 9**).[25] Recent analysis of the oldest known oil painting on canvas in France, the *Virgin and Child with Butterflies*, most likely painted in Burgundy around 1415 by Johan Maelwael (1370–1415) or Henri Bellechose (died 1440), revealed a yellow ground of chalk and yellow ocher.[26]

12. In Angers Cathedral, the tomb decoration for Louis II of Anjou (ca. 1425–1450) also used a yellow ground, but here the paint layers were bound with gum lac.[27] The same binder and ground color appear in the chapel of Montreuil-Bellay Castle (Maine-et-Loire), around 1480–1485, whose wall paintings depict saints and angels surrounding the Crucifixion. They are usually attributed to Coppin Delf (1456–1482), a Netherlandish painter from Delft in the service of Duke René d'Anjou.[28]

13. Along with the new Eyckian style coming from the Low Countries in the 1430s, a taste for illusionism appeared in Western Europe, and painters strove for a more exact imitation of nature, human complexions, and the sheen of luxurious materials like fabric or gold. This approach relied on the use of a white ground combined with transparent layers of both oil and varnishes.[29] While most French artists, including Jean Fouquet, followed this trend, the traditional Loire valley recipe for a yellow ocher ground persisted, as, for example, in the altarpiece for the Saint Hippolyte Priory in Vivoin, near Le Mans (**figs. 10, 11, 12, and 13**). Around 1480–1490, the Master of the Beaussant Altarpiece, perhaps Pierre Garnier, also used a yellow ground.[30]

14. In the later fifteenth century, yellow grounds continued being used in Burgundian wall paintings. This can be seen in the *Crucifixion* in Notre-Dame Church, Dijon (after 1472); the *Tree of Jesse* at the Church of Saint-Bris-le-Vineux (1500); and the *Passion of Christ* in the Saint-Anne chapel, Saint-Fargeau cemetery, Yonne (ca. 1502).[31] From the Loire valley, the technique was also in use further west; the *Baptism of Christ* in Saint-Mélaine, Rennes (ca. 1460–1470) is painted on a yellow ground.[32] Conservator Geraldine Fray identified similar yellow grounds in several wall paintings commissioned by the Rohan family in southern Brittany around 1500.[33]

15. The mid-fifteenth century saw a revival of the gray grounds seen in twelfth- and thirteenth-century frescoes. The Netherlandish painter Barthélemy d'Eyck used this color in his *Annunciation* (**fig. 14**) while working in Aix-en-Provence under the patronage of Duke René of Anjou.[34] A gray ground has also been found in the chapel at Hôtel Jacques Cœur in

Bourges (ca. 1450), whose angels are attributed to Jacob de Litemont (d. ca. 1474), another Netherlandish artist, active at the court of King Charles VII.[35] Around 1475, a dark gray ground was applied to the *Seven Liberal Arts* fresco in Le Puy-en-Velay Cathedral (Haute-Loire), recently attributed to the Spanish master Pedro Berruguete.[36] And in his depiction of the ancient Greek painter Irene from Boccaccio's *On Famous Women*, Robinet Testard depicted her making a black underdrawing over a gray ground (**fig. 15**). The manuscript must have been illuminated in Cognac (Charente) between 1488 and 1496.[37]

16. In 1506, the Master of Antoine Clabault, perhaps Riquier Haurroye, painted sibyls in a chapel of Amiens Cathedral with a double-colored ground: yellow ocher on top of white chalk and red lead.[38] Thus, even before the arrival of Italian artists at Fontainebleau in 1530, the full range of colored grounds familiar to scholars of the seventeenth century—red-brown, orange, yellow, gray, and double-colored—had already been used in French paintings, on various supports, for generations.

Colored Grounds and the School of Fontainebleau (ca. 1530–ca. 1610)

17. When Rosso Fiorentino was invited to join the court of King Francis I in 1530, he designed frescoes for the main gallery of the Château de Fontainebleau and delivered a monumental depiction of Bacchus, Venus and Cupid. It was once an oval canvas, glued to panel and set among stucco ornamentation at the eastern end of the gallery. The painting has a white lead and oil ground beneath a dark gray second ground, now visible in the worn shadows of the gods' naked bodies.[39] Rosso's *Pietà* for the Montmorency family (ca. 1530–1540) has a dark gray ground, used both to suggest the tomb in the background and to cover an earlier composition that the painter reworked.[40] Its white first ground was partially lost when the paint layers were transferred from panel to canvas.[41]

18. Very few paintings with colored grounds survive from the 1530s to the 1550s, which may explain why researchers did not think to survey the previous centuries. Yellow ocher grounds continued in Burgundy into the sixteenth century, as, for instance, in the Church of Chambolle-Musigny, which has inscriptions dating from 1534 to 1539.[42] By midcentury, the new Fontainebleau style often blended with traditional French techniques. Italian masters were often asked for designs, while the execution could be divided among Italian and French assistants, hence the label "School of Fontainebleau."[43] Three midcentury cases are especially relevant for their colored grounds and clear awareness of Fontainebleau stylistic innovations: the *Story of Troy* wall paintings at Château d'Oiron (Deux-Sèvres; ca. 1546–1549; **fig. 16**), the mantelpieces of Château d'Écouen (Val d'Oise; ca. 1550), and a panel from Amiens attributed to Geoffroy Dumonstier from Rouen, who came to Fontainebleau in the late 1530s. At Oiron, the wall was first covered with casein-based mortar, and then a red ocher ground was applied underneath the oil layers (**fig. 17**).[44] At Écouen, the mantelpieces were painted with a mixture of oil and resin on a light orange ground of yellow ocher on limestone.[45] Cross-sections from the Queen of Sheba mantelpiece (**fig. 18**) revealed a gray layer over the yellow ground (**figs. 19 and 20**). The Amiens panel, *Exquisite Triumph of the*

Faithful Knight (1549), has a red lead and red earth ground that is visible at the limit of the painted surface in the curved upper part (**fig. 21**).[46]

19. When Nicolò dell'Abate from Modena arrived at the French court in 1552, his compatriot Dosso Dossi had already been using red-brown grounds in Ferrara for several years. Laura Pichard proposed that Nicolò introduced this practice into French painting, pointing to a landscape attributed to his circle, possibly by his son Giulio Camillo dell'Abate, with a red-brown ground (**fig. 22**).[47] Yet pigment analysis shows that these red-brown grounds were not necessarily the norm for Italian painters at Fontainebleau. Certain paintings securely attributed to Nicolò's French period, such as the *Continence of Scipio and Pandora* (Musée du Louvre), are painted on a white ground. *The Death of Eurydice* in the National Gallery of London has a white gesso first ground with a gray second ground.[48] Another Italian artist, Ruggiero de Ruggieri from Bologna, did not use a red-brown ground for his 1569 copies of Primaticcio's *Story of Ulysses*; his *Ulysses Protected from Circe's Charms*, now in Fontainebleau, has white ground containing bits of red lead.[49]

20. While Jean and François Clouet employed white chalk grounds, their imitators started using colored grounds. The anonymous *Lady at Her Toilette* (Dijon Museum of Fine Arts), probably made in Paris or Tours around 1560, has a white chalk ground with particles of red and black pigments.[50] *A Lady at Her Bath*, after François Clouet, has two gray ground layers, the first light gray and the second dark gray (**fig. 23**).[51] Since this is a copy after the famous panel at the National Gallery in Washington, DC, it is hard to date precisely, but it was likely made between 1571 and 1610. Around 1580–1590, an unknown artist painted *The Woman Between the Two Ages* on a red-brown ground (**fig. 24**). The painter seems familiar with the art of François Clouet and was likely active in Paris; if not Nicolas Leblond himself, he must have worked in his circle.[52] Another picture from this decade, the anonymous *Ball on Occasion of the Duke of Joyeuse's Wedding* (ca. 1581), has a gray ground.[53]

21. From the end of the sixteenth century, there seems to have been a decline in yellow ocher grounds, though they do still appear, as in the *Portrait of a Man* (1593, Reims Museum of Fine Arts) attributed to Flemish artist Joris Boba.[54] Gray grounds became common in the Second School of Fontainebleau, under the reign of Henry IV (1589–1610). In 1596, the probate inventory of Toussaint Dubreuil's wife described an unfinished picture in his Paris workshop as "primed with gray."[55] His fellow painter Ambrosius Bosschaert (Ambroise Dubois) also used gray for his ground in *Allegory of Painting*, painted on canvas around 1600 for the Cabinet de la Volière at Fontainebleau.[56]

22. A notable variation, the double-colored ground—yellow ocher on top of white chalk and red lead—already seen at Amiens in 1506 and Écouen around 1550, appears in *Vertumnus and Pomona*, once attributed to Toussaint Dubreuil but perhaps a copy after Nicolò dell'Abate (ca. 1580–1600; Louvre).[57] The anonymous *Venus Mourning Adonis* (ca. 1600–1610; Louvre),[58] Ambrosius Bosschaert's *Chariclea Nursing the Wounded Theagenes* (ca. 1600–1605; château de Fontainebleau),[59] and the *Last Judgment* by Jacques Le Pileur (**fig. 25**) also have double-colored grounds (**figs. 26 and 27**).[60]

23. The evidence shows that colored grounds—especially yellow ocher and red grounds—have a very long history in French wall painting, and that from at least the fourteenth century they

were also used in easel painting, on panel as well as canvas. The arrival of Italian artists at Fontainebleau in 1530 played only a limited role in disseminating the technique. Red-brown grounds were mainly used in court painting under Henry III (1574–1589), while double-colored grounds gained popularity in the Second School of Fontainebleau under Henry IV, though earlier examples are known from the beginning of the sixteenth century.

Around Color Recipes, Pictorial Effects, and Authorship Issues

24. For each main ground color used around 1600 described by Élisabeth Martin, we now have examples in French paintings before 1500.[61] Moreover, a survey of medieval and early modern French technical literature reveals recipes for all these grounds. While these sources often suggest specific ground recipes for specific painting supports, analysis shows that artists experimented with different combinations of binding media and supports, as trade regulations allowed. Most painters working in France had a versatile practice, including ephemeral decorations for celebrations; easel paintings in oil, glue, or tempera; book illumination; wall paintings; polychromy; and sometimes even stained glass or ceramics.[62] Colored grounds could be a timesaving way to achieve pictorial effects, especially chiaroscuro.

Red-Brown Grounds

25. Red-brown grounds for paintings are as old as the Romanesque era. Although they may seem strange in frescoes, since lime-bound paint layers are not translucent, examples such as those in Vendôme show a red ocher ground under ultramarine, likely to create a purple tone from a distance (**see fig. 1 and fig. 2**). The painter clearly worked from dark to light: on a pink flesh tone, he painted the faces of his figures using red ocher for the main features, green earth in the shadows, and white highlights. At Saint-Jacques-des-Guérets, however, the purpose of the full red-brown ground under a white background remains unclear—though ocher could have served as a sealer for porous stones.

26. From the thirteenth century, red-brown grounds were used in oil wall paintings, as in Ronceray Abbey in Angers, and on panels, such as the Angers Museum altarpiece wings (ca. 1390), where the ground complements a vermilion background (**see fig. 6**). A recipe for such red grounds on wood was collected by Jean Lebègue in 1431: "If you wish to redden tables or other things. Take linseed, or hemp-seed, or nut-oil and mix it with minium or cinople on a stone without water; then with a pencil, illuminate what you wish to redden with this."[63] Here "Cynople" or "sinople" referred to red earth or hematite, originally coming from Sinop, Turkey. More famous under its Italian name, *sinopia*, the word, in French context, could also mean a red lake pigment.

27. After a gap of a century and a half, another red ocher ground appears at Château d'Oiron (**see figs. 16 and 17**). The attribution of the gallery of the *Story of Troy* has been much discussed. A now-lost notarial document recorded that a painter called Noël Jallier was paid for painting fourteen scenes at Oiron in 1550; however, the Louvre recently acquired a

preparatory drawing for one of them, the *Sacrifice of Iphigenia*, and curators noted its many Italian influences.

28. Red-brown grounds became widespread in France from the 1580s, with the growing taste for chiaroscuro. Even before Caravaggio, French aristocrats started collecting religious compositions and genre scenes with night effects made by Jacopo Bassano, and later his sons Francesco and Leandro. At the Saint-Germain-des-Prés fair around 1600, merchant painters such as Nicolas Baullery, Nicolas Leblond, and Moïse Bougault would sell serial copies in the manner of the Bassano family.[67] Another Frenchman, Jacob Bunel, a painter from Blois, also contributed to this trend.[68] His *Flute Player*, now in the Louvre, bears a handwritten inscription at the back of the canvas that has been read "Giacomo Bunel F.[ecit] 1591 Venetia." The same character also appears in larger concert scenes displaying an obvious Venetian inspiration.[69] An anonymous *Vision of Constantine* (ca. 1600; Château d'Azay-le-Rideau) possibly from his circle associates a twill canvas—another Venetian trend of the time—with a red-brown ground.[70] Caravaggio's friend, painter and art dealer Lodewijk Finson, probably helped spread the technique during his stay in Provence (1613–1614) on his way back from Rome. During the first half of the seventeenth century, under the effects of a developing art market, painting techniques in France tended toward oil on canvas atop a colored ground.

29. Technical analysis mostly reveals the use of red ocher and hematite, sometimes umber and clay, for these red-brown grounds.[71] Pierre Lebrun's *Recueuil des essay des merveilles de la peinture* (1635) also mentions "potter's earth" among possible ingredients for red-brown grounds: "The canvases are covered with parchment glue or flour paste before they are primed with potter's earth, yellow earth or ocher ground with linseed or nut oil. The priming is laid on the canvas with the knife or *amassette* to render it smoother, and this is the work of the boy."[72]

Orange Grounds

30. In the Middle Ages, the color that we call orange had no specific name and was considered a red hue. In manuscripts, a title painted in red (*rubrica*) could be made either of vermilion or red lead. Two main groups of orange grounds are found in paintings as well as recipes: a light orange, made from a mixture of red lead and white, and a darker, stronger version based on red lead. In the thirteenth century, the third book of Heraclius provided a recipe for the first type on panels, advising a preparation of lead white, wax, and ground bricks.[73] A similar light orange has been identified in late thirteenth-century oil paintings on walls at Angers Cathedral, where the brick was replaced with tiny bits of red lead mixed with chalk and sand. The result proved unsatisfactory, as flaking is evident in these areas (**see fig. 3**). Elsewhere, the same painter used a lead white ground, and the paintings remain in much better condition. As Marie Pasquine Subes-Picot noted, this type of white and red lead ground has been found in the wall paintings of Saint Stephen Chapel in Westminster Abbey (ca. 1300), now in the British Museum, London.[74] Although their styles are quite different, a similar technique was being used on both sides of the English Channel, where the lands were ruled by the House of Plantagenet. Moreover, in 1301 the Earl of Artois's accounts

record the purchase of one hundred pounds each of red lead and white to prime the new addition to the chapel at Hesdin Castle.[75] A seventeenth-century manuscript from Orléans also records this composition, recommending it as a double-colored ground for wall paintings.[76] As noted earlier, this practice had been transferred to easel painting by at least the sixteenth century.

31. A darker shade of orange, mostly made of red lead, also seems to have been tried. As mentioned above, Jean Lebègue gave a recipe to "redden" panels with red lead and oil. An example of this red lead (with red earth) priming can be seen on a panel titled *Exquisite Triumph of the Faithful Knight*, commissioned to adorn Amiens Cathedral in 1549 (**see fig. 21**).[77] Contrary to other "Puy d'Amiens" panels, this work retains its original support, with the barbe still visible at the paint edges. The recent attribution to Geoffroy Dumonstier remains debated.[78] From a distance, the group portrait in the foreground resembles the art of Corneille de Lyon, yet the flesh tones of the characters are based on an opaque pink layer modeled with brown glazes, whereas Corneille preferred a white ground that allowed the light to shine through the complexion. Dumonstier employed such layering in some of his miniatures, including a portrait. The only other painting known so far with this red lead first layer was commissioned in 1604 from Jacques Le Pileur, who trained in Rouen like Dumonstier.[79] Red lead was available either from lead mines in the Armorican Massif in northwestern France or imported from Britain, and its siccative properties in oil painting were well known to artists.[80]

32. Yellow grounds were usually made of yellow ocher and used for wall paintings, as noted in *Liber de coloribus illuminatorum sive pictorum* from Sloane Ms. 1754, a treatise on illumination and painting from about 1300–1340: "But you must know that ocher is needed only by painters of mural-decorations, except that, when you wish to make a letter of gold, you lay it in first with fine ocher and gypsum."[81] According to the same source, yellow ocher was abundant in the Loire valley in the Middle Ages, and its quality was especially prized: "There is also another yellow from a different shade, called ocher, and it is found in many places; but that which is brought from the city of Tours is more desirable than the others."[82] Important yellow ocher quarries were located in Saint-Georges-sur-la-Prée (Cher); from there, pigment was shipped in barrels down the river Cher and stored in Tours.[83] Red (or burnt) ocher found in other northwestern and Auvergne paintings may have the same origin. The Puisaye area, west of Auxerre in Burgundy, also contained yellow ocher deposits, though whether they were mined in this period remains uncertain. In 1390, when Jean de Beaumetz was decorating the castle of Germolles for the Duchess of Burgundy, he was supplied with "ocre de Berry," not local ocher.[84] Yellow ocher was sometimes combined with lead-based pigments, used both for their tone and drying properties. In the *Baptism of Christ* from the Church of Saint-Mélaine in Rennes (ca. 1460–1470), the oil painting is on a ground of yellow ocher and lead-tin yellow, determined both by cross-sections and laser-induced breakdown spectroscopy (LIBS).[85] The popularity of these yellow ocher grounds in French wall paintings is unexplained, though they provided a warm tone to build on and were often associated with vermilion backgrounds. In the *Last Judgment* from Ennezat (Puy-de-Dôme), dated 1405, the painter went a step further, working from dark to light in multiple layers and leaving parts of the yellow ocher layer visible (**fig. 28**).[86]

33. Four examples of wall paintings with yellow grounds have been attributed to Netherlandish court artists: Jan Boudolf in Le Mans Cathedral (ca. 1367–1385);[87] Jacob de Litemont in the Hôtel Jacques Coeur's chapel in Bourges (ca. 1450);[88] an anonymous painter of the *Crucifixion* and *Noli me tangere* wall paintings in the Breuil Chapel in Bourges Cathedral (**figs. 29 and 30**);[89] and Coppin Delf in the chapel of Montreuil-Bellay castle (Maine-et-Loire; ca. 1480–1485). The French court's presence in these areas during the fourteenth, fifteenth, and early sixteenth centuries likely exposed these foreign artists to local users of colored grounds. In Bourges Cathedral, the painter may not have been familiar with yellow grounds, since his upper layers of drapery flaked away due to insufficient adhesion, revealing the ground underneath. The likeliest identity for this painter is Henri de Vulcop, from Vuijlcop in the Netherlands (now in the town of Houten near Utrecht), who was still active in Bourges in 1472 and died before 1479.[90]

34. Cross-cultural exchanges continued with the Italian Wars (1494–1559), this time with Italian artists. Around 1500, the chapel walls of the Hôtel de Cluny in Paris, once the Parisian home of the Abbots of Cluny in Burgundy, depicts Mary Cleophas and Mary Salome mourning the dead Christ in a carved *Descent from the Cross*, no longer in place. Timothy Verdon attributed the project to the Italian sculptor Guido Mazzoni da Modena, who is known to have worked for members of the Amboise family, here Jacques d'Amboise, Abbot of Cluny.[91] The paint layers are applied on a pink ground, mostly made of yellow ocher.[92] The attribution of the wall paintings to Mazzoni has been criticized by François Avril, who made interesting comparisons to contemporaneous manuscripts from Burgundy.[93] Indeed, the motifs are Italianate (putti, garlands, shells, etc.) and the female saints look monumental, as Mazzoni's carved characters did, but the technique may well support the idea of an Italian design executed by a French artist.

35. The traditional Loire valley yellow ground for wall paintings persisted into the seventeenth century. Sebastien de Saint-Aignan's treatise on painting titled *The Second Nature* (Orléans, 1644) advises: "After the walls are prepared with lime and sand, you need to soak them with siccative oil, or common oil with a bit of ocher and red lead to dry it."[94] The author advised painting on walls as little as possible, as wall paintings would flake away and a white veil could appear with age—as seen, for instance, in Amiens Cathedral or Château d'Oiron. This veil might be related to the use of organic materials in the mortar, for which Saint-Aignan also provided a recipe made of chalk, sand, and lanolin rather than casein. Although he was not a professional painter, the fact that he combined old-fashioned, local knowledge with a more up-to-date recipe for canvas painting makes his testimony valuable.[95]

36. By the late fourteenth and fifteenth centuries, artists had begun using yellow preparations for easel paintings. Johan Maelwael (or Henri Bellechose?) may have adapted Jean de Beaumetz's wall painting technique in the Berlin *Virgin and Child with Butterflies* (ca. 1415; Gemäldegalerie, Berlin).[96] The Master of Vivoin mixed yellow ocher and red lead to prepare the panels of his *Saint Hippolyte Triptych* (ca. 1460; Tessé Museum, Le Mans), while the Laon panel painter (**see figs. 7 (inside) and 7 (outside)**) used yellow ocher and lead white.[97] Colart de Laon, an artist mostly active in Paris in

the service of King Charles VI and Duke Louis of Orleans, may have introduced this practice into Picardy.[98] Although the Master of Vivoin shows a visual knowledge of Netherlandish art in his atmospheric perspective and rendering of fabric, using lead-tin yellow highlights for gold embroidery, he employed a red lead and yellow ocher ground that is fully covered with paint layers. Charles Sterling proposed to identify him as a local artist around 1460.[99]

37. A French recipe book from about 1580, claiming information from Parisian painter Jean Cousin the Younger, records a yellow-tinted ground using *stil de grain* yellow to prime panels.[100] A few pages later, the author suggests lead white, yellow ocher, and a little lead-tin yellow: "It is good to do it with ceruse, yellow ocher, and a little massicot, and make it not very thick in order that it does not crack."[101] This source confirms that yellow grounds must have been more common than historians have long thought, even in easel painting. Pierre Lebrun's later recipe for red-brown grounds also included yellow ocher, indicating a wide range of personal mixtures.

Gray Grounds

38. Gray grounds were usually made of carbon black and lead white or chalk, with hues ranging from light gray to nearly black. Apart from one Romanesque fresco in Brioude, they appear mainly in paintings from the fifteenth century on, as in a miniature by Robinet Testard (**fig. 31**).

39. Recipes for gray grounds were often more elaborate than just blending black and white pigments. Saint-Aignan (1644) describes a mixture of sheep bone black, charcoal, umber, and red lead.[102] Several sources mention *or couleur* (color for gold), a gray mixture of old oil and pigments from the brush-cleaning pot that was commonly used as a size layer for oil gilding, hence its name. The recently published French manuscript from the sixteenth century, BnF Ms. Fr. 640, warns that one should avoid including corrosive pigments such as verdigris into this mixture.[103] Pierre Lebrun does not include this warning: "The *pinceliere* is a vase in which the brushes are cleaned with oil, and of the mixture of oil and dirty colors is made a gray color, useful for certain purposes, such as to lay on the first coats, or to prime the canvas."[104] Saint-Aignan also refers to this practice.[105]

40. Ashes were another readily available material. The author of Ms. Français 640 recommends using them to make a light gray suitable for both panels and canvas. For panels, the author recommends common ashes with oil to eliminate irregularities in the wood.[106] As for canvas: "In a painting in oil on canvas, one applies only one preparatory layer, and the same ashes can be used there."[107]

41. While such grounds are difficult to identify through technical analysis, their pictorial effects are evident in the works of two Netherlandish painters active in France in the mid-fifteenth century: Barthélemy d'Eyck and Jacob de Litemont. In the Aix *Annunciation* (**see fig. 14**), cross-sections taken in 1993 by Johan Rudolf Justus Van Asperen de Boer revealed a gray ground.[108] Barthélemy d'Eyck used it as a midtone in

the faces and in the architectural background, harmonizing with the setting of a church nave with monochrome statues, and enhanced it with glazes to suggest light on stone and to heighten the trompe-l'œil effect. The *Holy Family* from Le Puy-en-Velay, attributed to this master by Nicole Reynaud, shows a similar approach on canvas (**fig. 32**).[109] Worn passages in the faces reveal a gray layer beneath the paint, although without cross- sections it is uncertain whether it is the same gray ground as the Aix painting. This ambiguity also applies to the 1456 *Portrait of a Man* on parchment in the collection of the Prince of Liechtenstein, again attributed to Barthélemy d'Eyck, which also has a dark gray layer under the sitter's complexion. Manuscripts illuminated by the master in his maturity, such as the *Livre du Cœur d'amour épris* (ca. 1460–1469; Austrian National Library) display virtuoso use of gray brushwork for modeling, raising questions about where and how the artist learned this technique.[110]

42. Jacob de Litemont also used a gray preparation in the Hôtel Jacques Cœur chapel in Bourges (ca. 1450). While most of the vault in the chapel is painted on a yellow ground, areas with a blue background sit atop a gray one, according to the cross- sections analyzed by Bernard Callède.[111] The artist may have worried that blue on top of a yellow ground might render a green tone. Without extant easel paintings by this master, it is impossible to know whether he employed this method more broadly.[112]

43. Gray grounds are mentioned frequently in late sixteenth-century sources such as Ms. Français 640. Around 1580, the Flemish artist Hieronymus I Francken used a gray layer in his self-portrait (**fig. 33**), barely covered with brown glazes and white lead highlights to suggest a doublet and ruffled-collar shirt, producing a sketchy, intimate look.[113] But again, without a cross-section, it is uncertain whether this gray layer is the ground layer.

Double-Colored Grounds

44. The earliest known example of a double-colored ground appears in wall paintings from Amiens Cathedral in 1506, with yellow ocher applied over white chalk and red lead.[114] No contemporaneous source mentions this layering, but a seventeenth-century recipe collection, probably made by a surgeon from Orleans around 1649, advises the same pigments in reverse order, using lead white instead of chalk: "To paint on walls, first you should soak the wall with oil two or three times and add yellow ocher and a little red lead to allow it to dry. The best primer is made of white lead and a little red lead or another suitable color."[115]

45. At Écouen (ca. 1550), at least some of the twelve painted mantelpieces have a dark gray over yellow double-color ground (**see figs. 18, 19, and 20**).[116] The compositions give the impression that the work was divided among several painters in order to complete the decoration faster. Just like in Anne de Montmorency's Book of Hours of the same period (Chantilly, Musée Condé), the elaborate, rare biblical iconography corresponds to a variety of styles in the execution. For the mantelpieces, Sylvie Béguin suggested the names of artists involved in the royal entry of 1549 in Paris—Charles Dorigny and Jean Cousin (along with sculptor Jean Goujon)—and interpreted these paintings as a French

response to the new Fontainebleau frescoes, which seems consistent with the painting technique observed.[117] They were also compared to rare, archival evidence about the château itself.[118] More recently, the *Hunt of Esaü* in Constable Anne of Montmorency's bedroom has been attributed to the Master of the *Diana Tapestry*, probably Charles Carmoy.[119] The profile of this painter from Orléans in the Loire Valley interestingly matches the painting technique described, but there are at least three other hands to be identified.

46. By the late sixteenth century, such layering was more common. A recent case study is the *Last Judgment* by Jacques Le Pileur (**see fig. 25**). Born in Rouen to a painters' family, Le Pileur may have continued his training as a journeyman in the Low Countries, as his composition recalls Raphael Coxie's *Last Judgment* (1588–1589; Museum of Fine Arts, Ghent). After settling in Paris, Le Pileur received this commission in 1604 but had to quit due to health issues. The second painter who completed the work in 1605 remains unknown.[120] Scientific imagery was critical in distinguishing the two phases. Conservation analysis revealed a first layer of red lead and chalk, overlaid with white lead and some particles of carbon black.[121] Here, the traditional red lead ground of northwestern France was topped with a fashionable gray color, enabling subtle half-tones in the flesh. This is the method that Bloemaert, Ketel, and Cornelis Cornelisz van Haarlem may have seen in France in the 1580s and imported to the Netherlands. By the time Pierre Lebrun wrote his manuscript treatise (1635), such grounds had become the norm. Although the author describes red-brown and gray in separate passages, he may have intended them to be used in combination.[122]

47. A few years later (1644), Saint-Aignan provided a three-layer recipe to prepare canvas paintings:

> Once the canvas is prepared with glue, left to dry, then pounced, you can add 2 or 3 preparatory layers. The first one can be made with the old oil from the brush pot mixed with Spanish white, red lead and yellow ocher; the second one using good colors like yellow ocher, red-brown, umber, red lead and some parts of white lead; the third one: white lead, sheep feet bone black, charcoal black and a bit of umber and red lead in order to make a gray that is close to flesh tone. You should not use either Flanders black, *id est* soot black, or Spanish white, because they would make your colors die.[123]

48. This treatise is the earliest known French source to indicate why a colored ground might be advantageous.

49. In sum, colored grounds in French paintings before 1610 fall into four main families: red-brown, orange, yellow, and gray. All of these colors have been identified before 1500. They were therefore not introduced by Italian artists working at Fontainebleau, and the prevailing assumptions about their origins require revision.

Conclusion

50. This research shows that colored grounds were already known to painters of Romanesque wall paintings and were used in easel painting from at least the fourteenth century. Some recipes mention specific supports, but scientific analysis reveals that nearly every type of ground composition was tried on a wide variety of supports. Painters chose their ground color depending on their pictorial intent, rather than on the properties of the material they wished to cover. Binding media also varied: most often oil, valued for its transparency and suitability for layering, but also lime in frescoes, and gum lac for a more opaque effect. As seen in paintings attributed to Jacob de Litemont, the dell'Abate family, and Ambrosius Bosschaert, an artist might change ground colors depending on his project. Indeed, the absence of specialization in France during this time made it a crucible for technical innovation.

51. Comparable creativity is evident in other domains—for example, the colors of size layers for gold leaf in Gothic illuminated manuscripts—suggesting fruitful areas for further comparison. Colored grounds are a striking example of how, in the medieval and early modern periods, style often evolved more quickly than painting techniques. Layering methods used to achieve chiaroscuro effects persisted for centuries, meaning that seventeenth-century recipes can still help interpret cross- sections from thirteenth-century paintings.

52. Collaboration between foreign and local artists is a common thread throughout the present study. France welcomed numerous foreign painters in the Middle Ages and the early modern period—some during their training as journeymen and others who settled for a longer time. Netherlandish court artists, such as Jan Boudolf, Johan Maelwael (or Henri Bellechose), Barthélemy d'Eyck, Jacob de Litemont, Coppin Delf, and possibly Henri de Vulcop all engaged with colored grounds while in France, but there is no evidence that they ever went back home and shared that workshop practice, unlike Bloemaert and other Netherlandish painters active in the 1580s. The networks linking Netherlandish artists who traveled to France deserve further investigation to better understand their contribution to the use of colored grounds in paintings.

53. This article brings together, for the first time, evidence of the rise and spread of colored grounds in France, beginning with their use in wall painting and tracing their adoption in easel painting. Once the phenomenon has been mapped at a large scale, it will be necessary to focus more closely on individual artists and stylistic groups in order to interpret the evidence with greater precision. Considering preparatory layers alongside other stylistic and technical clues will not resolve authorship or date questions on its own, but it can illuminate the cultural contexts in which artists worked.

Table 1 – Cases of Colored Grounds in French Paintings before ca. 1610

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
1	12th century	Unknown artist	*Scenes from the Old Testament, the Life of Christ and some saints (Peter, Martin)*	Église Saint Jacques, Saint-Jacques-des-Guérets (Loir-et-Cher)	fresco	red-brown (red ocher) ground	cross-sections (Champs-sur-Marne, LRMH)
2	12th century	Unknown artist	*Christ in glory and the Tetramorph; Saints*	Église Saint-Genest, Lavardin (Loir-et-Cher)	fresco	red-brown (red ocher) ground	cross-sections (Champs-sur-Marne, LRMH)
3	12th century	Unknown artist	*Scenes from the Life of Christ*	Église Saint Martin, Nohant-Vic, (Indre)	fresco	red-brown (red ocher) ground, some yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
4	12th century	Unknown artist	*Last Judgment*	Église Saint-Julien, Brioude (Haute-Loire)	? on wall	dark grey ground	cross-sections (Champs-sur-Marne, LRMH)
5	ca. 1246-1250	Unknown artist	*False-stones, geometrical motifs and coats of arms*	Abbaye du Ronceray, Angers (Maine-et-Loire)	oil on wall	red-brown (red ocher) ground	cross-sections (Champs-sur-Marne, LRMH)+ LIBS (Strasbourg, Epitopos)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
6	ca. 1270-1280	Unknown artist	*Scenes from the Story of Saint Maurille*	Cathédrale Saint-Maurice, Angers (Maine-et-Loire)	oil on wall	light orange (chalk, sand, red lead)	cross-sections (Champs-sur-Marne, LRMH)
7	ca. 1270-1280?	Unknown artist	*Scenes from the Life of saint Georges*	Cathédrale Notre-Dame, Clermont-Ferrand (Puy-de-Dôme)	distemper on wall	light orange (chalk, red lead)	cross-sections (Champs-sur-Marne, LRMH)
8	ca. 1275-1302	Unknown artist	*Six clerks from the de Jeu Family and an angel*	Cathédrale Notre-Dame, Clermont-Ferrand (Puy-de-Dôme)	distemper on wall	red-brown (red ocher) ground	cross-sections (Champs-sur-Marne, LRMH)
9	ca. 1367-1385	Ascribed to Jan Boudolf from Bruges	*Angels playing some music*	Cathédrale Saint-Julien, Le Mans (Sarthe)	oil on wall (casein-binded mortar)	yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
10	ca. 1389-1390	Jean de Beaumetz and workshop	*M and P on a green background (initials of Margaret of Flanders and Philip the Bold)*	Château de Germolles, Mellecey (Saône-et-Loire)	oil on wall	yellow ocher ground	cross-sections + LIBS (Champs-sur-Marne, LRMH)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
11	ca. 1390	Unknown artist	Altarpiece wings showing saints (St Bernard/St Denis and the Virgin Mary; St Eloi/St John, and St Christopher	Musée des beaux-arts, Angers, (Maine-et-Loire), inv. MBA 1143	oil (?) on oak	red-brown ground	no analysis, seen under microscope by Élisabeth Martin from C2RMF, Paris
12	ca. 1410	Anonymous, maybe Colart de Laon	*Angel Gabriel from the Annunciation, St Mary Magdalen introducing donor Pierre de Wissant; back: Apostles and Prophets (right wing from an altarpiece)*	Musée d'art et archéologie, Laon (Aisne), inv. 990.17.31.	oil on oak	double yellow ocher ground	cross-sections (Paris, C2RMF)
13	ca. 1415	Johann Maelwael or Henri Bellechose ?	*Virgin and Child with butterflies*	Gemäldegalerie, Berlin, inv. 87.1	oil on canvas	yellow ocher ground	XRF+ seen under microscope (Berlin, Gemäldegalerie

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
14	ca. 1442-1450	Unknown artist	Tomb decoration for Louis II d'Anjou and Yolande d'Aragon	Cathédrale Saint-Maurice, Angers	murals with oil and gum binders	orange ground with red ocher	cross-sections (Champs-sur-Marne, LRMH)
15	ca. 1443-1444	Barthélemy d'Eyck	*Annunciation*	Église de la Madeleine, Aix-en-Provence (Bouches-du-Rhône)	oil on poplar	grey ground	cross-sections (The Hague, RKD)
16	ca. 1450	ascribed to Jacob de Litemont	Angels on the vault of the chapel	Hôtel Jacques Cœur, Bourges (Cher)	oil on wall	some with a yellow ocher ground, others (under blue tones) with a grey ground made of lime and carbon black	cross-sections (Champs-sur-Marne, LRMH)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
17	ca. 1460	Master of Vivoin	2 wings from an altarpiece from St Hippolyte priory in Vivoin near Le Mans: Martyrdom of St Hippolytus, Adoration of the Magi, Descent from the Cross; Virgin and child with St Benedict	Musée de Tessé, Le Mans, (Sarthe), inv. 10	oil on oak, both sides divided into 2 panels, one panel transferred on canvas (Martyrdom)	orange yellow ocher + red lead ground	cross-sections (Paris, C2RMF)
18	ca. 1460	Unknown artist	*The Baptism of Christ*	Église Saint Mélaine (once an abbey), Rennes (Ille-et-Vilaine)	oil on wall	yellow ocher ground	LIBS (Strasbourg, Epitopos)
19	after 1472	Unknown artist	*Crucifixion*	Église Notre-Dame, Dijon (Côte d'or)	oil on wall	yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
20	ca. 1475	Unknown artist (Pedro Berruguete?)	*The Seven Liberal arts*	Cathédrale Notre Dame, Le Puy-en-Velay (Haute-Loire)	mixed media (?) on wall	black / dark grey ground	cross-sections (Champs-sur-Marne, LRMH)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
21	ca. 1475	Anonymous (Netherlandish artist?)	*Crucifixion; Noli me tangere and donors from the Breuil family*	Cathédrale Saint-Étienne, Bourges (Cher)	oil on wall (with casein-binded mortar)	yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
22	ca. 1480-1485	ascribed to Coppin Delf and assistants	*Crucifixion, saints and angels playing instruments*	Chapel in Montreuil-Bellay castle (Maine-et-Loire)	pigments and gum lac on wall and vaults	yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
23	ca. 1480-1490	Unknown artist, maybe Pierre Garnier	*Crucifixion, Pietà, St Bernard and a Cistercian donor*	Cathédrale Saint-Maurice, Angers, treasure room	mixed technique (oil and proteins) on oak	yellow ocher ground	cross-sections+ amido black (Paris, C2RMF)
24	1500	Unknown artist	*Tree of Jesse*	Église Saint-Prix et Saint-Cot, Saint-Bris-le-Vineux (Yonne)	oil on wall	yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
25	ca. 1500	François Lheureux	*Scenes from the Story of St Meriadec*	Église Saint-Meriadec in Stival, Pontivy (Morbihan)	oil on wall	yellow ocher ground	LIBS (Strasbourg, Epitopos)
26	ca. 1500	Unknown artist	*Mary Cleophas and Mary Salome mourning the dead Christ*	Hôtel de Cluny, Paris (now the Musée national du Moyen Âge)	oil on wall	light pink yellow ocher-based ground	cross-sections (Champs-sur-Marne, LRMH)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
27	ca. 1500-1510	Unknown artist, maybe Jacques Thomas	*Scenes from the Passion of Christ and Family of St Anne*	Chapelle Sainte-Anne, Saint-Fargeau (Yonne)	animal glue distemper on wall (with casein-binded mortar)	yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
28	1506	ascribed to the Master of Antoine Clabault (Riquier Hauroye ?)	*8 Sibyls*	Cathédrale Notre-Dame, Amiens, chapelle St Eloi (Somme)	oil on wall	white, sometimes with a little red lead + second, yellow ocher ground	cross-sections (Champs-sur-Marne, LRMH)
29	ca. 1530-1540	Rosso Fiorentino	*Pietà*	Musée du Louvre, Paris, INV 594.	oil on wood transferred on canvas	dark grey ground on the second composition	cross-sections (Paris, C2RMF)
30	1534-1539	Unknown artist	*Prophets and saints*	Église Sainte-Barbe, Chambolle-Musigny (Côte d'or)	oil on wall	yellow ocher ground	no analysis, but condition report
31	ca. 1547-1550	Noël Jallier and workshop, maybe after an Italian artist?	*Scenes from the Trojan War*	Château d'Oiron (Deux-Sèvres)	oil on wall (with casein-binded mortar)	red ocher ground	cross-sections (Champs-sur-Marne, LRMH)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
32	1549	ascribed to Geoffroy Dumonstier	*Exquisite Triumph to the faithful knight ('Puy d'Amiens', poetical allegory dedicated to the Virgin Mary)*	Musée de Picardie, Amiens, inv. M.P. 5436	oil on oak	orange (red lead) ground	cross-sections (Paris, C2RMF)
33	ca. 1550	Unknown artists, among which maybe Charles Carmoy	*12 chimney mantlepieces with mainly scenes from the Old Testament*	Musée national de la Renaissance, château d'Écouen (Val d'Oise)	oil on wall	yellow ocher, with sometimes a bit of orange red lead grounds (some with a second, grey layer)	cross-sections (Champs-sur-Marne, LRMH)
34	ca. 1560	Unknown artist	*Lady at her toilette*	Musée des beaux-arts, Dijon (Côte d'or), inv. CA 118.	oil on canvas	orange ground	cross-sections (Paris, C2RMF)
35	ca. 1560-70?	Circle of Nicolo dell'Abate, maybe his son Giulio Camillo dell'Abate	*The Threshing of wheat*	Château de Fontainebleau (Seine-et-Marne), inv. F2474C, now on loan at Écouen château	oil on canvas	red-brown ground	no analysis, but condition report at C2RMF
36	1569	Ruggiero de' Ruggieri	*Ulysses protected from Circe's magic*	Château de Fontainebleau (Seine-et-Marne), inv. F1995-9.	oil on twill canvas	light orange ground with some red lead	cross-sections (Paris, C2RMF)

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
37	ca. 1571-1610?	Unknown artist after François Clouet	*Lady at her bath*	Les Arts décoratifs, Paris, inv. 15821	oil on canvas	double grey ground	Aubervilliers, INP lab
38	ca. 1580-1590	Unknown artist (probably made in Paris)	*The Lady between two ages*	Musée des beaux-arts, Rennes, inv. 803.1.1	oil on canvas	red-brown ground	no analysis, but condition report at C2RMF
39	ca. 1580-1600	Second school of Fontainebleau, once ascribed to Toussaint Dubreuil	*Vertumnus and Pomona*	Musée du Louvre, Paris, inv. RF 2007 8	oil on canvas	double red-brown + grey ground	no analysis, seen under microscope at C2RMF, Paris
40	ca. 1581	Unknown artist	*Bal on occasion of the duke of Joyeuse's wedding*	Château de Versailles (Yvelines), inv. MV 5636/RF 1574/V 358.	oil on canvas	grey ground	cross-sections (Paris, C2RMF)
41	ca. 1590-1600	Unknown artist	*The Vision of Constantine*	Château d'Azay-le-Rideau (Indre-et-Loire)	oil on twill canvas	red-brown ground	no analysis, but condition report at C2RMF
42	ca. 1591-1599	Ambroise Dubois (ascribed to Ambrosius Bosschaert, called)	*Gabrielle d'Estrées as goddess Diana*	Château de Fontainebleau (Seine-et-Marne), inv. 2002.2	oil on canvas	red-brown ground (red ocher, chalk and red lead)	cross-sections (Paris, C2RMF)
43	1593	Joris Boba (ascribed to)	*Portrait of a man aged 39*	Musée des beaux-arts, Reims (Marne), inv. 851.4	oil on canvas	yellow ocher ground	no analysis, but condition report at C2RMF

No.	Date	Artist	Title	Place (French Département)	Technique	Ground	Analysis
44	ca. 1600-1610	Unknown artist, second school of Fontainebleau? Flemish painter in France?	*Venus mourning Adonis*	Musée du Louvre, Paris, inv. DL 1970 20	oil on oak	double light pink ground with ocher and white lead+ grey ground	cross-sections (Paris, C2RMF)
45	ca. 1600-1605	Ambroise Dubois (ascribed to Ambrosius Bosschaert, called)	*Charicle a nursing the wounded Theagenes*	Château de Fontainebleau (Seine-et-Marne), inv. INV 4153/B 85	oil on canvas	double red-brown + grey ground	cross-sections (Paris, C2RMF)
46	1604-1605	Jacques Le Pileur (finished by an unknown painter)	*Last Judgment*	Église Saint-Étienne du Mont, Paris	oil on twill canvas	double orange (red lead) + grey ground	cross-sections (Pessac, CESAAR)

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Illustrations

Fig. 1 Unknown artist, *The Miraculous Draught of Fishes*, ca. 1096, fresco, Abbaye de la Trinité, Vendôme. © Ville de Vendôme

Fig. 2 Cross-section, Unknown artist, *The Miraculous Draught of Fishes* (fig. 1), ca. 1096, fresco, Abbaye de la Trinité, Vendôme

Fig. 3 Unknown Artist, *The Consecration of Saint Maurille by Saint Martin* (bay 1), from the Story of Saint Maurille, ca. 1270–1280, oil on wall, Cathédrale Saint-Maurice, Angers. © Archive of the author.

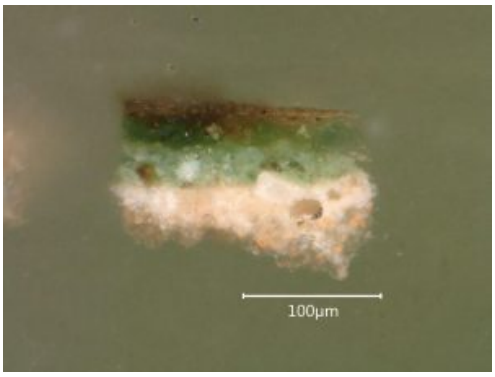

Fig. 4 Cross-section from *The Sleeping Man in the Boat Scene* (bay 6), Unknown Artist, *Scene from the Story of Saint Maurille* (fig. 3), © LRMH / Stéphanie Duchêne

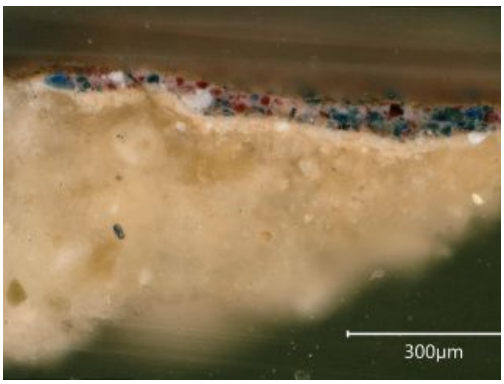

Fig. 5 Cross-section from The Purple Garment of a Character in the Boat Scene (bay 6), Unknown Artist, *Scene from the Story of Saint Maurille* (fig. 3), © LRMH / Stéphanie Duchêne

Fig. 6 Unknown Artist, Altarpiece wings from a *Crucifixion* triptych: *Saint Bernard* (outside left) / *Saint Denis and the Virgin Mary* (inside left); *Saint Eligius* (outside right) / *Saint John and Saint Christopher* (inside right), ca. 1390, oil (?) on oak, 48 x 41 cm each, Musées des Beaux Arts, Angers, inv. 1143. © Musées des Beaux Arts, Pierre David

Fig. 7-inside Unknown Artist (Colart de Laon?), Altarpiece right wing from a Triptych: *Angel from an Annunciation with Saint Mary Magdalen Introducing Donor Pierre de Wissant* (inside), ca. 1410, oil on oak, 93 x 100 cm, Musée d'Art et d'Archéologie, Laon, inv. 990.17.31. © C2RMF / Pierre-Yves Duval

Fig. 7-outside Unknown Artist (Colart de Laon?), Altarpiece right wing from a Triptych: Six Apostles and Four Prophets (outside), ca. 1410, oil on oak, 93 x 100 cm, Musée d'Art et d'Archéologie, Laon, inv. 990.17.31. © C2RMF / Pierre-Yves Duval

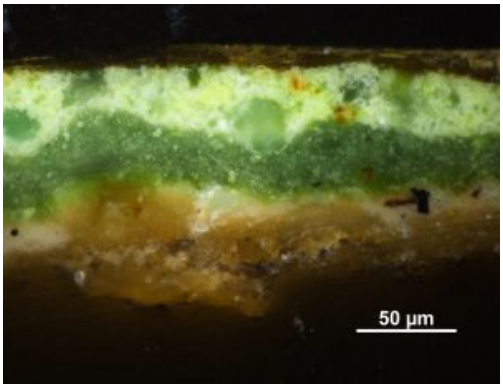

Fig. 8 Cross-section from Saint Bartolomew's Green garment, Unknown Artists, *Six Apostles and Four Prophets* (fig. 7-outside), © C2RMF / Myriam Eveno

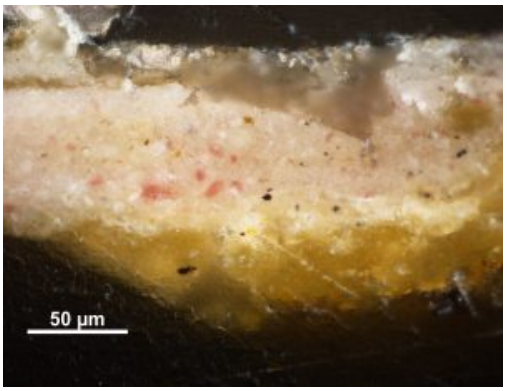

Fig. 9 Cross-section from the Arcades above the Apostles, Unknown Artist, *Angel from an Annunciation* (fig. 7-inside), © C2RMF / Myriam Eveno

Fig. 10 Master of Vivoin, *Deploration of Christ with an Abbot as a Donor,* former inside right wing from the *Triptych of the History of Saint Hippolyte* (figs. 10–13), after cleaning, ca. 1460, oil on oak, approximately 116 x 112 cm, Musée de Tessé, Le Mans, inv. 10-2. © C2RMF / Thomas Clot.

Fig. 11 Master of Vivoin, *Martyrdom of Saint Hippolityte*, former outside right wing from the *Triptych of the History of Saint Hippolyte* (figs. 10–13), after cleaning, oil on oak, approximately 116 x 112 cm, Musée de Tessé, Le Mans, inv. 10-4 © C2RMF / Thomas Clot

Fig. 12 Master of Vivoin, *Virgin and Child with Saint Benedict,* former outside left wing from the *Triptych of the History of Saint Hippolyte* (figs. 10–13), after cleaning, oil on oak, approximately 116 x 112 cm, Musée de Tessé, Le Mans, inv. 10-1 © C2RMF / Thomas Clot

Fig. 13 Master of Vivoin, *Adoration of the Magi,* former inside left wing from the *Triptych of the History of Saint Hippolyte* (figs. 10–13), oil on oak transferred on canvas, approximately 116 x 112 cm, Musée de Tessé, Le Mans, inv. 10-3 © C2RMF / Thomas Clot

Fig. 14 Attributed to Barthélemy d'Eyck, *Annunciation*, from a Triptych, ca. 1443–1444, oil on poplar, 155 x 176 cm, Église de la Madeleine, Aix-en-Provence © Philippe Biolatto / Ville d'Aix-en-Provence

Fig. 15 Attributed to Robinet Testard, *Irene Making the Underdrawing of a Mural*, in Boccaccio, *De mulieribus claris* (*The Famous Women*), ca. 1488–1496, Bibliothèque Nationale de France, Paris, Ms. Fr. 599, fol. 53v. © Gallica BnF

Fig. 16 Noël Jallier (possibly after an Italian artist), *The Horse of Troy*, scene 11 from *Story of Troy*, ca. 1546–1550, oil on wall, Château d'Oiron. © Jean-Luc Paillé, Centre des Monuments Nationaux.

Fig. 17 Cross-section from King Priam's red drapery on his shoulder, from Noël Jallier, *The Horse of Troy* (fig. 16), © LRMH / Stéphanie Duchêne

Fig. 18 Unknown Artists (possibly including Charles Dorigny), *Solomon and the Queen of Sheba*, ca. 1550, oil and resin on wall (chimney mantelpiece), Musée National de la Renaissance, Écouen. © GrandPalaisRmn (Musée de la Renaissance, Château d'Écouen) / René-Gabriel Ojeda.

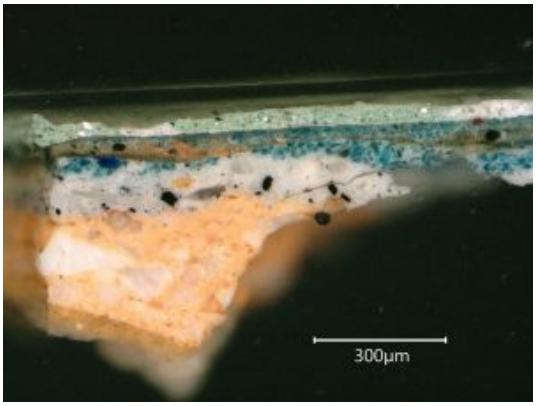

Fig. 19 Cross-section from the ground at the feet of Cupid in the border, Unknown Artists, *Solomon and the Queen of Sheba* (fig. 18), © LRMH / Stéphanie Duchêne

Fig. 20 Cross-section from the face of an old man in the left, Unknown Artists, *Solomon and the Queen of Sheba* (fig. 18), © LRMH / Stéphanie Duchêne

Fig. 21 Attributed to Geoffroy Dumonstier, E*xquisite Triumph to the Faithful Knight*, 1549, oil on oak, 190 x 122 cm, Musée de Picardie, Amiens, inv. M.P. 5436. © C2RMF / Thomas Clot

Fig. 22 Circle of Nicolò dell'Abate (possibly Giulio Camillo dell'Abate), *The Threshing of Wheat*, ca. 1560–1570, oil on canvas, 85 x 120 cm, Château de Fontainebleau, inv. no. F 2474C. © GrandPalaisRmn (Château de Fontainebleau) / Gérard Blot

Fig. 23 After François Clouet, *Lady at Her Bath*, ca. 1571–1610, oil on canvas, 110 x 86.5 cm, Musée des Arts Décoratifs, Paris, inv. 15821. © Paris, MAD / Jean Tholance

Fig. 24 Unknown Artist (possibly Nicolas Leblond), *The Woman Between the Two Ages*, ca. 1580–1590, oil on canvas, 117 x 170 cm, Musée des Beaux-Arts et d'Archéologie, Rennes, inv. 803.1.1. © C2RMF / Thomas Clot

Fig. 25 Jacques Le Pileur and an Unknown Artist, *Last Judgment*, 1604–1605, oil on canvas, 226 x 165 cm, Église Saint-Étienne-du-Mont, Paris. © Ville de Paris, COARC / Jean-Marc Moser

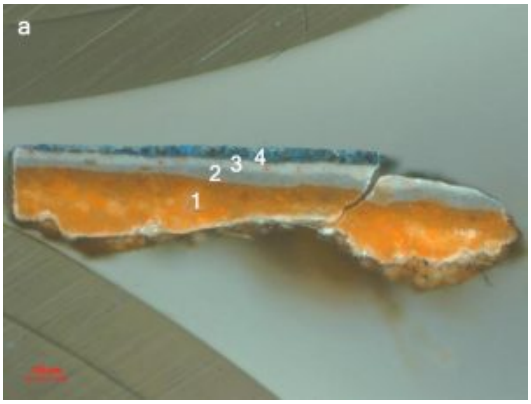

Fig. 26 Cross-section from the blue cuirass of Saint Michael in the center, Jacques Le Pileur, *The Last Judgement* (fig. 25), © CESAAR, Pessac

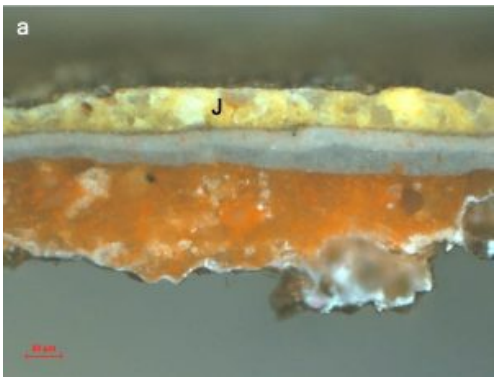

Fig. 27 Cross-section from the right knee of the standing angel dressed in yellow, Jacques Le Pileur, *The Last Judgement* (fig. 25), © CESAAR, Pessac

Fig. 28 Unknown Artist, *Last Judgment*, 1405, oil(?) on wall, Église Saint-Victor et Sainte-Couronne, Ennezat © Archive of the author

Fig. 29 Netherlandish Painter (possibly Henri de Vulcop), *Noli me tangere, with Donors from the Breuil Family*, ca. 1475, oil on wall, Cathédrale Saint-Étienne, Bourges. © Archive of the author

Fig. 30 Netherlandish painter (possibly Henri de Vulcop), *Crucifixion,* ca. 1475, oil on wall, Cathédrale Saint-Étienne, Bourges. © Archive of the author.

Fig. 31 Detail, Attributed to Robinet Testard, *Irene Making the Underdrawing of a Mural* (fig. 15)

Fig. 32 Attributed to Barthélemy d'Eyck, *Holy Family*, ca. 1435–1440, oil (?) on canvas, 207 x 181 cm, Cathédrale Notre-Dame, Le Puy-en-Velay, on long-term loan to the Crozatier Museum. © Ministère de la Culture, Luc Olivier

Fig. 33 Hieronymus Francken, *Self-Portrait*, ca. 1580, oil on canvas, 42 x 34 cm, Musée Granet, Aix-en-Provence, inv. 860.01.077 © B. Terlay

Endnotes

1. Hessel Miedema and Bert Meijer, "The Introduction of Colored Ground in Painting and Its Influence on Stylistic Development, with Particular Respect to Sixteenth-Century Netherlandish Art," *Storia dell'arte* 35 (1979): 79–98.
2. Alain R. Duval, "Les préparations françaises du XVIIe siècle," *Studies in Conservation* 37 (1992): 239–258. The need for such a study also came from conservation issues: French colored grounds on canvas from the first half of the seventeenth century were sometimes too weak and had to be replaced, from the mid-eighteenth century onwards.
3. Élisabeth Martin, "La technique des peintres français des XVIIe et XVIIIe siècles," in *Conservation-restauration et techniques d'exécution des biens mobiliers*, ed. Catherine Périer d'Ieteren and Nicole Gesche-Koning (Bruxelles: Editechnart, 2000), 65–84. Painting techniques in seventeenth- and eighteenth-century France are also described in Ségolène

Bergeon and Élisabeth Martin, "La technique de la peinture française des XVIIe et XVIIIe siècles," *Technè* 1, (1994): 65–78, grounds discussed at 69–70.

4. Élisabeth Martin, "Grounds on Canvases 1600–1640 in Various European Artistic Centres," in *Preparation for Painting: The Artist's Choice and its Consequences*, ed. Joyce H. Townsend, Tarnia Doherty, Gunnar Heydenreich and Jacqueline Ridge (London: Archetype, 2008), 59–67.
5. Maartje Stols-Witlox, "The Color of Preparatory Layers," chap. 7 in The Perfect Ground: Preparatory Layers for Oil Paintings, 1550–1900 (London: Archetype, 2017), 123–140, esp. 128. See also Smith et al., Secrets of Craft and Nature in Renaissance France: A Digital Critical Edition and English Translation of BnF Ms. Fr. 640 (New York: The Making and Knowing Project, 2020), https://edition640.makingandknowing.org.
6. Laura Pichard, "Les couches de préparation des peintures de chevalet en France au tournant des XVIe et XVIIe siècles" (master's thesis, École du Louvre, 2020).
7. Jill Dunkerton and Marika Spring, "The Development of Painting on Colored Surfaces in Sixteenth-Century Italy," supplement, *Studies in Conservation* 43 (1998): 120–130. Crivelli painted with tempera and oil on canvas; see Daphne de Luca, "La Madonna con il Bambino di Carlo Crivelli a Palazzo Buonaccorsi, Studio delle tecniche pittoriche e intervento di restauro," in *Il restauro della Madonna di Macerata di Carlo Crivelli*, ed. Francesca Coltrinari, Daphne de Luca, and Giuliana Pascucci (Rome: Tab Edizioni, 2023), 60–62.
8. Jilleen Nadolny, "European Documentary Sources Before c. 1550 Relating to Painting Grounds Applied to Wooden Supports: Translation and Terminology," in *Preparation for Painting: The Artist's Choice and its Consequences*, ed. Joyce H. Townsend, Tarnia Doherty, Gunnar Heydenreich, and Jacqueline Ridge (London: Archetype, 2008), 1–13.
9. Only the paintings where the first preparatory layer is colored are listed. The use of a colored, second ground was much more common.
10. Guy-Michel Leproux, Audrey Nassieu Maupas, and Élisabeth Pillet, *Les* Cinq Livres *de Marin Le Bourgeois* (Paris: Institut d'histoire de Paris, 2020); Stéphanie Deprouw-Augustin, "Une source foisonnante pour l'étude des techniques picturales anciennes en France: *La seconde nature* du frère Sébastien de Saint-Aignan (1644)," *Documents d'histoire parisienne* 25 (2023): 31–76.
11. For instance, in 1356, Jean Coste was asked to paint wall paintings and an altarpiece for Le Vaudreuil castle (Eure) under the supervision of royal painter Girard d'Orléans. Bernard Bernhard, "Devis des travaux de peinture exécutés dans l'ancien château royal de Vaudreuil en Normandie (25 mars 1356)," *Bibliothèque de l'École des chartes* (1845): 540–545. See also Philippe Lorentz, "Un peintre eyckien en France au milieu du XVe siècle: Le 'Maitre de Jacques Cœur' (Jacob de Litemont?)," in *Kunst und Kulturtransfer zur Zeit Karls des Kühnen*, ed. Norberto Gramaccini and Marc C. Schurr (Bern: Peter Lang, 2012), 177–202. Painters would also have been responsible for most sculpture polychromy, and there are probably colored grounds to be discovered in this field.
12. Reports by Marcel Stefanaggi and Bernard Callède, at Laboratoire de recherche des Monuments historiques (LRMH) in Champs-sur-Marne, 1972–1974. The ground was laid on a white, casein-bound mortar. Jean Taralon, "Les fresques romanes de Vendôme: 1. Étude stylistique et technique," *Revue de l'art* 53 (1981–1983): 9–22; Toubert, Hélène, ed., *Peintures murales romanes, Méobecq, Saint-Jacques-des-Guérets, Vendôme, Le Liget, Vicq, Thevet-Saint-Martin, Sainte-Lizaigne, Plaincourault* (Paris: Ministère de la culture et

de la communication, 1989). Hélène Toubert argued that the Vendôme paintings may have been made upon the occasion of pope Urban II's visit in 1096; Toubert, *Peintures murales romanes*, 29–39.

13. LRMH report by Marcel Stefanaggi and Paulette Hugon, 1975.
14. Géraldine Fray, "Rapport d'étude des décors peints, Angers, Abbaye du Ronceray," unpublished report for EPITOPOS (private lab in Strasbourg), 2023, with scientific analysis. This Benedictine abbey, which once welcomed noblewomen, is now a private property and is not open to the public. The decoration campaign was dated by Christian Davy after the coat of arms of Charles I of Anjou, who is likely to have commissioned it. Christian Davy, "Un programme héraldique royal peint à l'abbaye du Ronceray à Angers," *Revue française d'héraldique et de sigillographie* 62–63 (1992–1993): 15–29.
15. Marie-Pasquine Subes-Picot, "Peinture sur pierre: Note sur la technique des peintres du XIIIe siècle découvertes à la cathédrale d'Angers," *Revue de l'art* 97 (1992): 85–93, esp. 89n22 and related text; the cross sections were studied by Bernard Callède and Paulette Hugon at LRMH, 1984.
16. LRMH report by Sylvie Demailly, 1992. Anne Courtillé, *Histoire de la peinture murale dans l'Auvergne du Moyen Âge* (Brioude: Watel, 1983), 72–75.
17. LRMH report by Sylvie Demailly, 1992; Courtillé, *Histoire de la peinture murale*, 78.
18. As far as I know, the rare, extant thirteenth- and early fourteenth-century paintings on wood from Auvergne bear a white ground. Artistic exchanges between the ecclesiastical provinces of Tours and Bourges (to which Clermont belonged) would have been logical, as the two cities were only 150 kilometers away from one another.
19. Daniel V. Thompson, "*Liber de coloribus illuminatorum sive pictorum* from Sloane Ms. no. 1754," *Speculum* 1 (1926): 280–307. The excerpt is discussed below in the section on yellow grounds.
20. See LRMH report by Sylvie Demailly, 1991.
21. Christian Davy, *La peinture murale dans les Pays de la Loire* (Nantes: Éditions 303, 2023), 75–77. The paintings are dated thanks to the coats of arms of Bishop Gontier de Baigneux, who must have commissioned this décor from Jan Boudolf, called "Hennequin de Bruges" in other French sources. The painter is more famous for conceiving the cartoons of the *Apocalypse Tapestry* in the Château d'Angers.
22. LRMH report by Dominique Martos-Levif, Barbara Trichereau, et al., 2015; Christian Degrigny and Francesca Picqué, "Germolles' Palace Wall Paintings: An Interdisciplinary Project for the Rediscovery of a Unique 14th-century Decoration," in *Digital Techniques for Documenting and Preserving Cultural Heritage*, ed. Bentkowska-Kafel and Lindsay Mc Donald (Leeds: Arc Humanities Press, 2017), 67–86.
23. For the recipe, see n. 73; it was first published by Rudolf Erich Raspe, *A Critical Essay on Oil-Painting* (London: H. Goldney, 1781), 118, after British Library, London, Egerton Ms. 840A, once in Trinity College, Cambridge; Mary Merrifield then suggested that the first two books by Heraclius date from the tenth century and that the third one was added in the thirteenth century, judging from the vocabulary: Mary Philadelphia Merrifield, *Original Treatises Dating from the XIIth to XVIIIth Centuries on the Arts of Painting, in Oil, Miniature, Mosaic, and on Glass; of Gilding, Dyeing, and the Preparation of Colors and Artificial Gems* (1849; repr. New York: Dover Publications, 2003), 174–180; see also Mark Clarke, *The Art of All Colours: Mediaeval Recipe Books for Painters and Illuminators* (London: Archetype, 2001), 12–13.

24. Inès Villela-Petit, "Deux volets d'un retable médiéval au Musée d'Angers," *Revue du Louvre et des Musées de France* 3 (2002): 34–43. They were probably made for a Cistercian monastery from Anjou.
25. Laon, Musée d'art et d'archéologie, inv. 990.17.31. Élisabeth Martin and Inès Villela-Petit, "Le Maître du retable de Pierre de Wissant (Colart de Laon?): La technique d'un peintre français au début du XVe siècle," *Revue des musées de France* 3 (2008): 35–49.
26. See the catalogue entry by Sandra Stelzig in *Netherlandish and French Paintings, 1400–1480*, ed. Katrin Dyballa and Stefan Kemperdick (Berlin: Gemäldegalerie, Staatliche Museen zu Berlin, 2024), 42–44. The aluminium silicate and iron components detected in X-ray fluorescence point to yellow ocher.
27. LRMH report by Bernard Callède and Paulette Hugon, 1982.
28. Thomas Arnauldet, "Coppin Delf, peintre des rois René d'Anjou et Louis XI (1456–1482)," *Archives de l'art français* 6 (1858–1860): 65–76; Christine Leduc-Gueye, *D'intimité, d'éternité: La peinture monumentale en Anjou au temps du roi René* (Lyon: Lieux dits, 2007), 142–147.
29. On this technical turn, see Marjolijn Bol, *The Varnish and The Glaze*, *Painting Splendor with oil, 1100-1500*, Chicago:University of Chicago Press, 2023, especially chapter 6.
30. The panel, a mixed technique on oak, is now preserved in the treasure of Angers Cathedral. Isabelle Cabillic, "Le Retable Beaussant," *Art de l'enluminure* 27 (2009): 38–39; Frédéric Elsig, "Hypothèses sur René d'Anjou et l'*Ars nova* en Provence," in *À ses bons commandements . . . La commande artistique en France au XVe siècle*, ed. Andreas Bräm and Pierre-Alain Mariaux (Neuchâtel: Alphil, 2014), 135–146; Hortense de Reviers, "Le Maître du retable Beaussant, Redécouverte d'un peintre angevin du XVe siècle" (thèse d'École des Chartes, 2020).
31. Marie-Gabrielle Caffin, ed., *D'ocre et d'azur, peintures murales en Bourgogne,* exh. cat. (Dijon: Réunion des Musées Nationaux, Dijon, 1992), 274–275.
32. Géraldine Fray, Emilie Chekroun, and Fabrice Surma, "Approche analytique innovante pour l'étude d'une peinture murale du XVIe siècle à l'église Saint-Mélaine de Rennes," in *Peintures monumentales de Bretagne: Nouvelles images, nouveaux regards du Moyen Âge à nos jours*, ed. Christian Davy, Didier Jugan, Christine Leduc-Gueye, Christine Jablonski-Chauveau, and Cécile Oulhen, proceedings of the symposium organized by the Groupe de Recherches sur la Peinture Murale in collaboration with Conservation Régionale des Monuments Historiques, Rennes and Pontivy, October 6–8, 2016 (Rennes: Presses universitaires de Rennes, 2021), 135–139.
33. Among them, the *History of Saint Meriadec* in Stival Church (Pontivy, Morbihan), ca. 1500, has revealed a painter's signature, that of Etienne Lheureux; see Diego Mens, "Le cycle peint de la vie de saint Mériadec en l'église de Stival à Pontivy et Jean II de Rohan, proposition d'une nouvelle lecture," in Davy et al., *Peintures monumentales de Bretagne*, 187–196.
34. Johan Rudolf Justus van Asperen de Boer, "On the Underdrawing and Painting Technique of the Master of Aix," in *Le dessin sous-jacent et la technologie dans la peinture*, ed. Roger Van Schoute and Hélène Verougstraete with Anne Dubois, proceedings of the eleventh Colloque pour l'étude du dessin sous-jacent et de la technologie de la peinture, Louvain-la-Neuve, 1995 (Louvain-la-Neuve: Collège Érasme, 1997), 99–102.
35. Lorentz, "Peintre eyckien." The cross sections from LRMH were published by Bernard Callède, "Étude des peintures murales dans la chapelle de Jacques Cœur à Bourges

(France)," *Studies in Conservation* 20 (1975): 195–200. The paintings were heavily overpainted in the nineteenth century.

36. LRMH report by Marcel Stefanaggi and Paulette Hugon, 1975; Alejandro Cely Velasquez, Bernard Jollivet, and Pierre Présumey, *Les Arts libéraux du Puy-en-Velay, une œuvre en quête d'auteur* (Vals-près-Le-Puy: Hauteur d'homme, 2021).
37. Paris, Bibliothèque Nationale, Ms. Fr. 599, fol. 53v; see the catalogue entry by Maxence Hermant, last updated March 2019, https://archivesetmanuscrits.bnf.fr/ark:/12148/cc508491.
38. Ilona Hans-Colas, "Les sibylles de la chapelle Saint Éloi, XVIe siècle," in *Amiens: La grâce d'une cathédrale*, ed. Mgr. Jean-Luc Bouilleret, Aurélien André, and Xavier Boniface (Strasbourg: EBRA Éditions, 2012), 234–235; LRMH report by Stéphanie Duchêne, 2018.
39. Sylvie Béguin, Jean-Luc Koltz, and Jean-Paul Rioux, "Bacchus, Vénus et l'Amour": Redécouverte d'un tableau de Rosso Fiorentino, peintre de François Ier (Luxembourg: Kredietbank, 1989).
40. Cécile Scailliérez, Nathalie Volle, Annick Lautraite, Élisabeth Ravaud, and Jean-Paul Rioux, "La Pietà de Rosso restaurée," *Revue du Louvre* 63, no. 1 (1999): 63–81.
41. *The Challenge of the Pierides* in the Louvre has a white gesso under a light yellow ground; see Center for Research and Conservation (C2RMF) report by Élisabeth Ravaud, 2014.
42. Caffin, *D'ocre et d'azur*, 124–125.
43. For a general introduction in English, see Marian Davis and Sam Cantey III, The School of Fontainebleau: An Exhibition of Paintings, Drawings, Engravings, Etchings, and Sculpture, 1530–1619, exh. cat. (Austin: University of Texas, 1965); Henri Zerner, Renaissance Art in France: The Invention of Classicism (Paris: Flammarion, 2003); Ian Wardropper, "The Flowering of the French Renaissance," The Metropolitan Museum of Art Bulletin 62 (Summer 2004): 1–48.
44. Gilles Gauthier and Paulette Hugon, "La restauration de la galerie de l'histoire de Troie, Oiron: La technique d'exécution des peintures et leur restauration," *Monumental* 2 (2008): 28–31.
45. The cross sections analyzed by Bernard Callède and Paulette Hugon in LRMH reports dated 1979 and 1983 remain unpublished, but the technique has been described by Franziska Hourrière in Sylvie Béguin, Odile Delenda, and Hervé Oursel, eds., *Cheminées et frises peintes du château d'Écouen* (Paris: RMN, 1995), 116–119.
46. C2RMF report by Johanna Salvant, 2017.
47. Catalogue entries by Guillaume Kazerouni in *Nicolò dell'Abate: Storie dipinte nella pittura des Cinquecento tra Modena e Fontainebleau*, ed. Sylvie Béguin and Francesca Piccinini (Milan: Silvana, 2005), 451–452. See also Stols-Witlox, *Perfect Ground*, 123–140, esp. 128.
48. Dunkerton and Spring, "Development of Painting on Colored Surfaces," 128.
49. Catalogue entry by Danièle Véron-Denise in *Primatice, maître de Fontainebleau*, ed. Dominique Cordellier, exh. cat. (Paris: Musée du Louvre, 2004), 333–335, cat. no. 171. The contract was published by Emmanuelle Opigez, "L'intervention d'artistes parisiens et de Ruggiero de Ruggieri dans la galerie du château de Villeroy," *Documents d'histoire parisienne* 4 (2005): 33–37; anonymous C2RMF report, 1997.
50. Oil on canvas, Dijon, Musée des Beaux-Arts, inv. CA 188; unsigned C2RMF report, 1988.
51. Oil on canvas, inv. 15821. Christian Chatellier, unpublished conservation report from Institut français de restauration des œuvres d'arts (now Institut national du patrimoine in Aubervilliers), https://mediatheque-numerique.inp.fr/documentation-oeuvres/memoires-

diplome-restaurateurs-patrimoine/portrait-dune-dame-au-bain-musee-arts-decoratifs-etude-historique-dossier-restauration-etude-trois-couleurs-au-vernis-mastic-chez.

52. It may be a prototype, or at least a high-quality early version, of this popular genre scene, as the young man's garments are typical of the reign of King Henry III. Guillaume Kazerouni, *Peintures françaises des XVIe, XVIIe et XVIIIe siècles du Musée des beaux-arts de Rennes* (Gent: Snoeck, 2021), 28–33. Guy-Michel Leproux suggests that this composition must have been called a "Jalousy" and that the merchant painter Nicolas Leblond made some for the art market, according to his estate inventory dated 1610; he also owned original pictures and drawings by François Clouet. See Guy-Michel Leproux, "Nicolas Leblond et la production de tableaux en série sous le règne de Henri IV," *Documents d'histoire parisienne* 20 (2018): 21–45.
53. Oil on canvas, Musée national du Château de Versailles, inv. MV 5636/ RF 1574/ V358, C2RMF report by Élisabeth Ravaud, 2021.
54. C2RMF conservation report by Christian Chatellier, 2013. On Joris Boba, see Maxence Hermant, *Arts et artistes en Champagne du Nord entre Moyen Âge et Renaissance* (Rennes: Presses universitaires de Rennes, 2024), 329–337.
55. Georges Wildenstein, "L'activité de Toussaint Dubreuil en 1596," *Gazette des beaux-arts* 56 (December 1960): 333–340: "Item une grande thoille preste a fere tableaulx tandue sur son chassis de bois paincte de gris avecq une autre grosse thoille de canevas ou est comancé a paindre une Resurection, prisé ensemble 1 escu" (Plus a large canvas ready to make pictures, laid on its wooden stretcher and primed with gray, along with another coarse canvas where one has started to paint a Resurrection, estimated together 1 ecu).
56. Catalogue entry by Vincent Droguet in *Henri IV à Fontainebleau: Un temps de splendeur*, ed. Vincent Droguet, exh. cat. (Paris: Réunion des musées nationaux, 2010), 58–59, cat. no. 37.
57. C2RMF report by Élisabeth Ravaud, 2007.
58. Inv. DL 1970–20, oil on wood, with light pink ground made of yellow ocher. C2RMF report by Élisabeth Martin, 1988.
59. Oil on canvas, Château de Fontainebleau, on long-term loan from the Louvre, inv. INV 4153/B 85. C2RMF report by Myriam Eveno, 2017.
60. Gray on top of another colored ground became highly popular in French paintings from the second half of the seventeenth century. Claire Bételu, "Materials and Process for Ground Layers Observed in French Paintings Techniques in the Second Half of the 17th Century," in *Ground Layers in European Painting 1550–1700*, ed. Anne Haack Christensen, Angela Jager, and Joyce H. Townsend, proceedings from "Mobility Creates Masters: Discovering Artists' Grounds 1550–1700," international conference of the Centre for Art Technical Studies and Conservation, June 2019 (London: Archetype, 2020), 84–92.
61. Martin, "Grounds on Canvases," 59–67.
62. Philippe Lorentz, "La place du peintre dans les arts visuels en France au XVe siècle," in *Renaissance en France, Renaissance française?*, ed. Marc Bayard and Henri Zerner, proceedings of the conference held at the Villa Médicis, Rome, June 7–9, 2007 (Paris: Somogy, 2009), 21–36; Guy-Michel Leproux, *La peinture à Paris sous le règne de François Ier* (Paris: Presses universitaires de la Sorbonne, 2001), 28–32.
63. "*Se vous voulez rougir tables ou autres choses*. Prenez oile de lin ou de chanvre ou de noiz et mellez avec mine ou cynope sur une pierre et sans yaue puis enluminez a un pincel ce que vous voulez rougir." Jean Lebègue, 1431, Paris, BnF Ms. 6741, fol. 98v, ed. and trans. in

Merrifield, *Original Treatises*, 310–311. The word "table" could mean either a table or an altarpiece, later called a "retable."

64. Jean Guillaume, *La galerie du grand écuyer: L'histoire de Troie au château d'Oiron* (Prahecq: Patrimoines et médias, 1996), 20; based on a mention published by Benjamin Fillon, *L'art de terre chez les Poitevins* (Niort: L. Clouzot, 1864), 76. The preparatory drawing is inv. no. RF 54684 at the Musée du Louvre; see Dominique Cordellier and Cécile Scailliérez, "L'énigmatique maître d'Oiron," *Revue historique du centre-Ouest* 9 (2011): 263–286.
65. Gauthier and Hugon, "Restauration de la galerie," 28–31.
66. Simone Bonicatto, "Remarques sur les peintures du château d'Oiron," in *Peindre à Angers et Tours aux XVe et XVIe siècles*, ed. Frédéric Elsig (Cinisello Balsamo: Silvana Editoriale, 2022), 315–319. The author discusses the possibility that the painter active at Oiron was Italian.
67. Carel van Mander saw Baullery's night genre scenes: "Daer is noch eenen gheheeten Bolery, seer aerdigh van te schilderen Nachten, Mascaraden, Vastel-avonden, en sulcke feesten, oock alderley beestkens, seer op zijn Bassans: desen houdt hem heel trots, rijdende te Peerde met den knecht achter hem" (Moreover, there is a certain Bolery who paints night effects, mascarades and other parties, as well as herds in the manner of Bassano: he rides his horse proudly, with his servant behind him). Carel Van Mander, *Het Schilder-Boeck* (Haarlem: Paschier van Wesbusch, 1604), fol. 295v. Vladimir Nestorov, "Nicolas Baullery (vers 1560–1630): Enquête sur un peintre parisien à l'aube du Grand siècle" (master's thesis, École du Louvre, 2014).
68. Sylvie Béguin, "Pour Jacob Bunel," in *Claude Vignon et son temps*, ed. Claude Mignot and Paola Pacht Bassani, proceedings of the international colloquium at the University of Tours, 1994 (Paris: Klincksieck, 1998), 83–96.
69. Sale at Isbilya Subastas, Sevilla, December 18, 2019, lot 30. Sylvain Kerspern, "Revoir Bunel," *D'histoire et d'art* (blog), June 3, 2020, https://dhistoire-et-dart.com/approche/revoirjacobbunel.html.
70. The C2RMF report by Élisabeth Ravaud, 2011, has no analysis but includes a magnified detail showing the ground in the crackles.
71. Duval, "Préparations colorées," 239–258.
72. "Les toiles s'encolles avec colle de parchemin ou de farine auparavant que les imprimer; on les imprime avec terre de potier, terre jaune ou ocre broyés avec huille de noix ou de lin. La dite imprimure se couche sur les toilles avec un cousteau ou avec l'amassette pour les rendres plus unies, et c'est l'ouvrage du garçon"; Pierre Lebrun, *Recueil des essaies des merveilles de la peinture* (1635), Bibliothèque royale, Brussels, Ms. 15,552, in Merrifield, *Original Treatises*, 772–773.
73. "*Quomodo aptetur lignum antequam pingatur.* Quicumque aliquod lignum ornare diversis coloribus satagis, audi que dico. In primis, ipsum lignum multum rade equalem et planissimum radendo, et ad ultimum fricando cum illa herba que dicitur asperella. Quod si lignum materies talis fuerit ut non possis equare ejus asperitatem, vel non velis propter aliquas occasiones nec tum id cum corio velis cooperire vel panno, album plumbum teres supra caverniculas supra petram siccum sed non quantum si inde inpinge velis. Deinde ceram in vase supra ignem liquefacies, tegulamque tritam subtiliter albumque plumbum quod ante trivisses simul commisces, sepius movendo cum parvo ligno et sic sine refrigerari." Raspe, *Critical Essay*, 118, after British Library, London, Egerton Ms. 840A.

74. For a recent study, see Paul Binski, Emily Guerry, Lucy Wrapson, and Chris Titmus, "The Gothic Murals of Angers Cathedral," *Hamilton Kerr Institute Bulletin* 10 (2024): 7–34. About the Westminster wall paintings, see Helen Howard, Lloyd de Beer, David Saunders, and Catherine Higgitt, "The Wall Paintings at St Stephen's, Chapel, Westminster Palace: Recent Imaging and Scientific Analysis of the Fragments in the British Museum," *British Art Studies* 16, June 2020, https://doi.org/10.17658/issn.2058-5462/issue-16/oneobject.
75. "Pour C lb. de blanc et C lb. de mine pour emprimer l'alonge de le capelle au dehors et au dedans" (For 100 pounds white and 100 pounds red lead to prime the extension of the chapel, outside and inside). Chretien Dehaisnes, *Documents et extraits divers concernant l'histoire de l'art dans la Flandre, l'Artois & le Hainaut*, vol. 2 (Lille: L. Danel, 1886), 121.
76. Paris, BnF, Ms. Français 19078, fol. 71r.
77. C2RMF report by Johanna Salvant, 2017.
78. Stéphanie Deprouw-Augustin, "Nouvelles propositions d'attributions pour quatre puys d'Amiens à l'issue de leur restauration," *Revue des musées de France* 1 (2021): 18–30; Camille Larraz and Rafaël Villa, "Les Puys d'Amiens de 1546, 1547 et 1548: Nouvelles propositions," in *Peindre à Amiens et Beauvais au XVIe siècle*, ed. Frédéric Elsig (Cinisello Balsamo: Silvana Editoriale, 2022), 241–255.
79. See Guy-Michel Leproux, "Histoire de Paris," Annuaire de l'École pratique des Hautes Études (EPHE), Section des sciences historiques et philologiques 150 (2019): 332–334.
80. Red lead is mentioned in the anonymous English ms. ca. 1580, Paris, Bibliothèque Nationale, in Smith et al., *Secrets of Craft and Nature*, fol. 43r.
81. "Hoc scias, quod ocrum non est necessarium nisi pictoribus murorum, excepto hoc, quod cum litteram de auro facere volueris, prius facies eam de ocro sive de gipso." Thompson, "*Liber de coloribus*," 285. The manuscript is now at the British Library. The author probably came from the northwest of France or from England, judging by his vocabulary and specific information about the cities of Tours, Rouen, and Paris. The rest of the manuscript is a compilation of Anglo-Norman medicine and alchemy texts. Clarke, *Art of All Colours*, 88, cat. no. 1900.
82. "Item alius croceus color quem ocrum dicunt et in multis locis reperitur, sed illud quod a Turonensi urbe affertur preciosius est ceteris." Thompson, "*Liber de coloribus*," 296–297.
83. Jean-Yves Ribault, "Les carrières d'ocre de Saint-Georges-sur-la Prée (Cher), État des connaissances documentaires," in *Pigments et colorants de l'Antiquité et du Moyen Age*, proceedings from a conference organized by the Centre National de la Recherche Scientifique (CNRS), Orleans, France, 1988, 2nd ed. (Paris: CNRS, 2002), 207–212. The quarries probably operated from at least the twelfth century. From the fifteenth century onward, yellow ocher was excavated from mines rather than in the open and was much finer and less sandy, thus suitable for illumination and panels.
84. Henri Prost and Bernard Prost, *Inventaires mobiliers et extraits des comptes des ducs de Bourgogne*, vol. 2, part 2, *Philippe le Hardi, 1378–1390* (Paris: Ernest Leroux, 1913), 650. Berry meant the duchy of Bourges.
85. In this new technique, a laser is used on site to create a plasma; when the elements come back to their balanced state, they each emit a special wavelength, which is analyzed by a spectrometer. The action can be repeated for each layer down the stratigraphy. Fray, Chekroun, and Surma, "Approche analytique innovante," 135–139.
86. Marc Thibout, "Les peintures murales de l'abbaye d'Ennezat," *Revue des arts* 2 (1952): 85–90. No analysis or conservation report is known for that wall painting, according to

curator Samuel Giblat. Courtillé, *Histoire de la peinture murale*, 165–168, suggested the binder may be wax rather than oil; if so, it would be an isolated case.

87. Davy, *Peinture murale*, 75–77.

88. See Mens, "Cycle peint de la vie de saint Mériadec," 187–196.

89. Nicole Reynaud, "Quelques réflexions sur la chapelle des Breuil à la cathédrale de Bourges," in "En Berry, du Moyen Âge à la Renaissance: Pages d'histoire et d'histoire de l'art; Mélanges Jean-Yves Ribault," ed. Philippe Goldman and Christian Roth, special issue, *Cahiers d'art et d'archéologie du Berry* (1996): 287–292; LRMH report by Sylvie Demailly, 1993.

90. Françoise Gatouillat and Guy-Michel Leproux, "La peinture sur verre à Bourges du XIIIe au XVIIe siècle," *L'art du peintre-verrier: Vitraux français et suisses, XIVe–XVIIe siècle*, ed. Philippe Goldman, exh. cat. (Bourges: Le Parvis des Métiers 1998), 20–29; Jean-Yves Ribault, "Note sur le peintre Hayne de Vulcob et sa famille," *Cahiers d'archéologie et d'histoire du Berry* 152 (December 2002): 45–48.

91. Timothy Verdon, "Guido Mazzoni in Francia: Nuovi contributi," *Mitteilungen des Kunsthistorischen Institutes in Florenz* 34 (1990): 139–164. The Hôtel de Cluny is now the Musée National du Moyen Âge.

92. LRMH report by Paulette Hugon and Dominique Martos-Levif, 2007.

93. François Avril, "Le Maître d'Antoine de Roche, Italien ou Bourguignon," *Peindre à Dijon*, ed. Frédéric Elsig (Cinisello Balsamo: Silvana Editoriale, 2016), 108–129.

94. "*Murs enduits*. Les murs, il faut qu'ils soient enduits de chos et sable, ou plâtre, sur la chos et sable faut pour le dernier enduit le faire de blanc en boure, qui se fait de chos freschement estainte en laquelle on mesle de la bourre de laine de tondeux et un peu de colle, puis on l'aplique doucement et uniment avec la truelle et le laisser bien seicher devant que d'y peindre.
Imprimure à huille. Ce qui estant fait, il faut imbiber le mur une ou deux fois d'huille sécative, ou commune avec un peu d'occre et de mine pour la faire seicher. Il ne faut point encoler les murs à cause de l'humidité qui fait escailler. Il ne faut peindre sur les murs que le moins que l'on peut, d'autant qu'ils s'écaillent, chanssissent et égrenille. Les Antiens n'y vouloient point peindre pour ne faire plaisir à un seul (Pline livre 35)." Frère Sébastien de Saint-Aignan, *La seconde nature*, in Deprouw-Augustin, "Source foisonnante," 55–56.

95. See the section on double-colored grounds in this article.

96. See LRMH report by Martos-Levif et al., 2015; Degrigny and Picqué, "Germolles' Palace Wall Paintings," 67–86; and Stelzig in Dyballa and Kemperdick, *Netherlandish and French Paintings*, 42–44.

97. Laon, Musée d'art et d'archéologie, inv. 990.17.31; Martin and Villela-Petit, "Maître du retable de Pierre de Wissant," 35–49.

98. Inès Villela-Petit, "L'ange au chanoine: Fragment d'un retable laonnois du XVe siècle," Monuments et mémoires de la Fondation Eugène Piot 82 (2003): 173–212. María Pilar Silva Maroto preferred keeping Colart de Laon for Christ in the Olive Garden from the Museo del Prado (based on a white chalk ground). María Pilar Silva Maroto, La Oración en el huerto con el donante Luis I de Orleans (hacia 1405–1408): Una tabla Francesa descubierta (Madrid: Museo del Prado, 2013).

99. Charles Sterling, *Les primitifs français* (Paris: Librairie Floury, 1938), 86; C2RMF report by Suzy Delbourgo, 1980.

100. "Il fault tousjours imprimer sur le bois pour y paindre a huile pour boucher les trous & inégalités et imprimer avecq scudegrun & céruse destrempée a huile puys adoulcie avecq une plume, qui aplanist mieulx que le pinceau ou bien quand l'impression est seiche, racler fort avecq un costeau" (One always needs to apply imprimatura on wood to paint there in oil in order to fill the holes and unevenness, and make imprimatura with some stil de grain yellow and ceruse tempered in oil, then soften with a feather, which flattens better than a paintbrush. Or when the imprimatura is dry, scrape strongly with a knife). Smith et al., *Secrets of Craft and Nature*, fol. 56v.

101. "*Impression*. Il en fault estre bien curieulx et ne la faire pas comme quelques uns avecq l'or couleur qui se faict des laveures des pinceaulx à huile, pource que le verdegris et aultres couleurs corrosives qui y sont font en fin mourir les couleurs qui s'y couchent après. Il est bon de la faire avecq de la ceruse, de l'ocre jaulne et un peu de massicot, et ne la faire pas gueres espesse affin qu'elle ne s'esclate point" (*Primer*. You need to be curious about it and not to prepare it, as some people do, with the color for gold which is made using oil from the brush cleaning pot, because verdigris and other corrosive colors that are in it would make the colors that you lay afterwards die. It is fine to prime with white lead, yellow ocher and a little lead-tin yellow, and not to lay it thick in order to prevent crackles). BnF, Ms. Français 640 fol. 65v; for an English translation, see also Smith et al., *Secrets of Craft and Nature*. Please note that translating "or couleur" into "gold color" is a misunderstanding, as the oily mixture in question is not golden but gray.

102. This gray layer is a part of a more complex, double-colored protocol and is addressed in the section on double-colored grounds.

103. Smith et al., *Secrets of Craft and Nature*, fol.100r.

104. "La pincelière est un vase où l'on nestoie les pinceaux avec l'huile, et de ce meslange on fait un gris [propre] et bon à certains ouvrages comme à faire les premières couches ou imprimer la thoile," Lebrun, *Recueil des essaies*, in Merrifield, *Original Treatises*, 770. Later he added: "La couleur de la thoille imprimée se dit couleur mate, c'est-à-dire qui est comme mort, à cause de l'huile grasse, et l'or ne se met sinon sur une couleur mate, ce que l'on dit or couleur qui se fait de diverses couleurs, et est bonne pour recevoir l'or des dorures des corniches" (The color of the primed canvas is called *couleur mate*; that is to say dead, on account of the fat oil; and gold is applied only on a *couleur mate*, called *or couleur*, which is made of diverse colors, and is good for receiving the gold of gilding and cornices) (814).

105. See Deprouw-Augustin, "Source foisonnante," 56.

106. "Pour desgraisser les ma[r]bres, on y broye de la cendre commune, laquelle est bonne après pour faire la premiere impression d'un tableau, qui se præpare a huile affin de boucher les fissures et rimes du boys. Elle ha plus de corps que la croye et ha certaine graisse. On la mesle avecq ladicte croye ou avecq les couleurs ramassées du vaisseau ou l'on nettoye les pinceaulx. Elle est desiccative et espargne des couleurs. Ceste premiere impression faicte sur le boys, on racle avecq un costeau pour l'unir. Après on y faict une seconde impression de cérusse ou meschantes couleurs meslées. En un tableau a huile sur toile on ne faict qu'une impression et la mesme cendre y peult servir. Apres aussy qu'on ha broyé une couleur, on y broye de la mie de gros pain pour desgraisser le mabre" BnF Français 640, fol. 57r; for an English translation, see Smith et al., *Secrets of Craft and Nature*.

107. "En un tableau a huile sur toile on ne faict qu'une impression et la mesme cendre y peult servir." BnF Français 640, fol. 57r.
108. Nicole Reynaud, "Barthélemy d'Eyck avant 1450," *Revue de l'art* 84 (1989): 22–43. See also Asperen de Boer, "On the Underdrawing and Painting Technique," 99–102.
109. Reynaud, "Barthélemy d'Eyck," 22–43. The painting comes from the Poor Clares' convent in Le Puy, for which it may have been made.
110. Vienna, Österreichische Nationalbibliotheek, Codex Vindobonensis 2597, especially the night scene on fol. 2; http://data.onb.ac.at/rec/ac13951467.
111. See Mens, "Cycle peint de la vie de saint Mériadec," 187–196.
112. Lorentz, "Peintre eyckien."
113. Guy-Michel Leproux, "Hieronymus I Francken, peintre de la reine," in *La Dynastie Francken*, ed. Sandrine Vézillier-Dussart, exh. cat. (Cassel: Musée de Flandre, 2020), 30–37. This source includes no scientific analysis.
114. LRMH report by Stéphanie Duchêne, 2018. See also Hans-Colas, "Sibylles de la chapelle Saint Éloi," 234–235.
115. "Pour peindre sur murailles. *Primo* il faut deux ou trois fois imbiber la muraille avec de l'huile en y meslant un peu d'ocre et de mine pour faire sécher. La meilleure imprimeure se fait de blanc de plomb et fort peu de mine ou autre couleur compétente." Paris, BnF, Ms. Français 19078, fol. 71r.
116. See again the text by Hourrière in Béguin, Delenda, and Oursel, *Cheminées et frises peintes*, 116–119.
117. Béguin, Delenda, and Oursel, *Cheminées et frises peintes*, 58–83.
118. Thierry Crépin-Leblond and Guillaume Fonkenell, *Le Château d'Écouen, grand œuvre de la Renaissance* (Paris: L'Esplanade, 2018), 107–115.
119. Dominique Cordellier and Cécile Scailliérez, "Le maître de la tenture de Diane," in *Diane en son paradis d'Anet*, ed. Dominique Cordellier et al. (Paris: Le Passage, 2022), 78–79.
120. Leproux, "Histoire de Paris," 332–334. The contract for this painting confirms that the twill canvas support and preparatory layers are original.
121. Nicolas Poirier, unpublished reports for Conseils et Expertises Scientifiques pour l'Art et l'archéologie (CESAAR), 2023 and 2024.
122. See Lebrun, *Recueil des essaies*, in Merrifield, *Original Treatises*, 770, 772–773.
123. "*Imprimure à huille*. La toille, encollée et seiche, la poncer et couper les neufs, puis passer deux ou trois imprimure, la première peut estre des vielles coulleurs de pincelier avec du blanc d'Espagne, de la mine et ocre jone, la seconde de bonne coulleurs, occre jaune, rouge breun, terre d'ombre, mine et quelque parties de blanc de plomb. La 3, blanc de plomb, noir [fol. 89v] d'os de pieds de mouton, de cha[r]bon, et quelque peu de terre d'ombre et de mine, faisan[t] un gris approchant de la carnation. Il n'y faut point mettre de noir [de] Flandre, ou fumée, ny blanc d'Espagne d'autant qu'ils font mourir les coulleurs." Deprouw-Augustin, "Source foisonnante," 56.

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