The Art Bulletin

Routledge Taylor & Francis Group

ISSN: 0004-3079 (Print) 1559-6478 (Online) Journal homepage: https://www.tandfonline.com/loi/rcab20

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To cite this article: Caroline Fowler (2019) Technical Art History as Method, The Art Bulletin, 101:4, 8-17, DOI: 10.1080/00043079.2019.1602446

To link to this article: https://doi.org/10.1080/00043079.2019.1602446

Published online: 11 Nov 2019.

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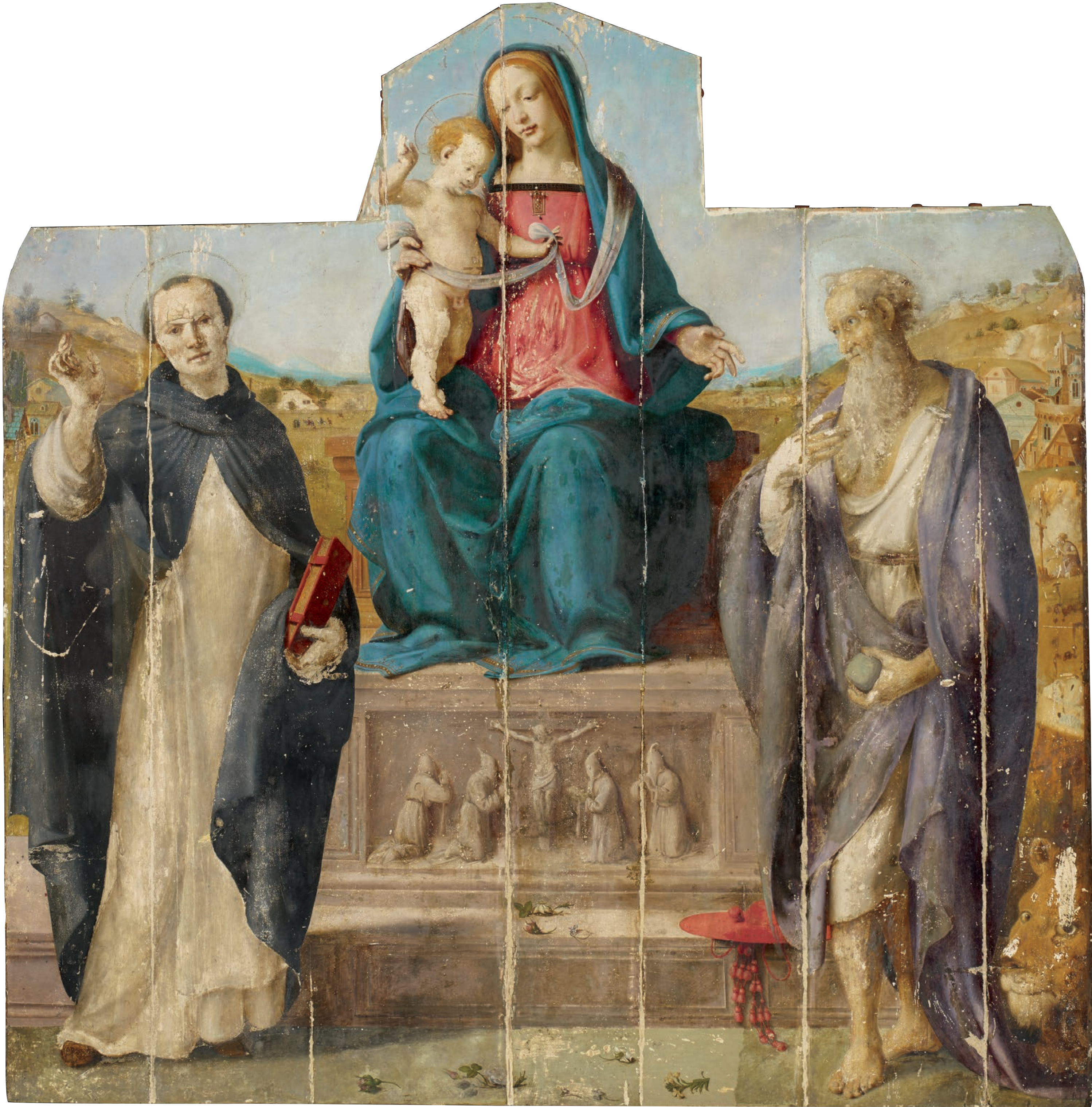

Technical Art History as Method

CAROLINE FOWLER

In *Piero di Cosimo: The Poetry of Painting in Renaissance Florence*, a monographic exhibition of the Italian painter Piero di Cosimo (1462–1522) at the National Gallery of Art in Washington, DC, the curators included an altarpiece in the process of its conservation treatment. The work, *Virgin and Child with Saints Vincent Ferrer and Jerome*, had suffered extensive losses due to both an abrasive cleaning and the inherent vice of time (Fig. 1).[1] Paint had cracked along the joins of the wood, and discoloration and abrasion diminished its vibrant colors and meticulous brushstrokes. As Anthony Grafton remarked in a review of the exhibition, the installation of this altarpiece "daringly makes one point—one that curators rarely emphasize—brilliantly clear." The "daring point" was the reminder that the past remains mediated in the space of the museum, whether by loss or physical reconstruction. Grafton remarked that the theme of "metamorphoses" guided not only the subjects of Piero's work but also the paintings themselves "in the restorer's workshop."[2] The inclusion of this altarpiece reminded visitors that just as fifteenth- and sixteenth-century artists received antiquity through incomplete objects, so, too, the "Renaissance" is handed down in works marked by loss and reconstruction.

The exhibition also inadvertently staged two distinct relations to monumentalizing and preserving the past: the Renaissance immersion in antique fragments, and our contemporary fascination with matter and its decomposition. As Alois Riegl stated in his now seminal essay on monuments, the unintentional (*ungewollte*) monument began in the Renaissance when the surviving texts and images from antiquity became memorials: fragments made monumental through their perpetuation of an earlier period. In turn, Riegl identified another phase defined by an acute interest in matter and degradation, what he termed a fascination with "age-value" (*Alterswert*), or the manifestation of nature as it decomposes.[3] Riegl described age-value as a recognition that "as soon as the individual entity has taken shape (whether at the hands of man or nature), destruction sets in, which through its mechanical and chemical force, dissolves the entity again and returns it to amorphous nature."[4] Riegl observes that this attention to the aesthetic and memorial decomposition of form cannot be divorced from the desire to fix works of art in a particular time, noting that this interest in age-value develops from and conflicts with the guiding principle of "historical-value." Although the exhibition of the Piero altarpiece displayed the threat of destruction to the work, the panel was exhibited midtreatment and would hardly dissolve into its "amorphous nature." The conservators were in the process of recovering the painting's historical-value, "to maintain as genuine as possible a document for future art historical research."[5] In choosing to exhibit the work while it was in the process of conservation, the curators and conservators suggested that it could be valued in terms of both "historical-value" and "age-value."

In an oblique way, the monumentalization of Piero's *Virgin and Child with Saints Vincent Ferrer and Jerome* showed that older artworks are equally affected by the problem of obsolescence and degradation of media as more modern materials, such as video and digital art. The installation staged the ways in which panel paintings are constructed from primarily organic materials that will decay. Although Riegl did not portend our current technological age, the pressure that technological obsolescence and time-based media place on the philosophy of conservation has introduced an acute awareness of age-value that manifests in unexpected places, such as the exhibition of the Piero altarpiece.[6] This installation revealed

1 Piero di Cosimo, *Virgin and Child with Saints Vincent Ferrer and Jerome*, ca. 1508, oil on panel, 82¼ × 80¾ × 1⅜ in. (208.9 × 205.1 × 3.5 cm). Yale University Art Gallery, New Haven, University Purchase from James Jackson Jarves (artwork in the public domain; photograph provided by Yale University Art Gallery)

as much about our contemporary relation to the past as it did about Piero, a realization of Riegl's foresight that age-value would become a defining feature of future conservation methods. The exhibition *Piero di Cosimo: The Poetry of Painting in Renaissance Florence*, therefore, also conveyed that the Renaissance is a salient period through which to address our contemporary ideas about conservation.

Although Riegl's writings on historical preservation illustrate the integrality of conservation to the historiography of art history, this body of literature remains peripheral to methodology seminars. Traditionally, X-radiography, macrophotography, infrared reflectography, macro-X-ray fluorescence (XRF) scanning, and cross-section imagery of paint samples have been fields of analysis restricted to specialists. Recently, however, both museums and academic institutions have formed a dialogue between the sciences and the humanities through conservation. In a move to build a bridge between technical art history and the foundations of the discipline, the Andrew W. Mellon Foundation has funded a series of initiatives to integrate conservation and museum studies into graduate curricula.[7] These programs demonstrate a shift in the mapping of art history, indicating that methodology surveys, such as Donald Preziosi's *The Art of Art History*, will have to reckon with literature produced from a field often seen as subsidiary to the established systems of iconography and semiotics, formalism and social art history.[8]

The contemporary attention to conservation as a mediating voice within the discipline differs remarkably from the opinion expressed by Erwin Panofsky, who explicitly separated the scientific work of technical art history from humanist inquiry. For Panofsky, the museum laboratory only offered tools for the connoisseur. Panofsky's dismissal of technical art history also explicates its strange position in the discipline today as graduate programs attempt to find a place for it. In his canonical essay "The History of Art as Humanistic Discipline," Panofsky distinguishes between the sciences and the humanities and relegates technical art history to connoisseurship:

> Devices such as chemical analysis of materials, X rays, ultraviolet rays, infrared rays and macrophotography are very helpful, but their use has nothing to do with the basic methodological problem. A statement to the effect that the pigments used in an allegedly medieval miniature were not invented before the nineteenth century may settle an art-historical question, but it is not an art-historical statement. Based as it is on chemical analysis plus the history of chemistry, it refers to the miniature not *qua* work of art but *qua* physical object, and may just as well refer to a forged will.[9]

Panofsky presents the analysis of materials through X-ray or macrophotography as a method that may settle authorship but cannot further the theorization of artistic practice. He suggests that the technical study of a work reduces it to an artifact—no different from a legal document—that can be analyzed to answer a yes-or-no question: Is this a forgery? In turn, he argues that the historian must transcend the matter of historical artifacts in favor of "an intuitive aesthetic recreation."[10]

Panofsky's argument for the transcendence of the material object becomes complicated, however, by a footnote in which he reflected that works of art can be "difficult to isolate from their physical surroundings and always subject to the physical processes of aging."[11] In musing on the "weathered sculptures of Chartres," Panofsky admitted that he had to separate "the creative experience of the accidental values imparted to a piece of aged stone by the action of nature."[12] Panofsky maintained that the sciences establish "static laws," whereas the humanities bestow "dynamic life" on the past.[13] Nonetheless, as organic and nonorganic materials deteriorate or mutate into new states, it becomes the conservator's role to enliven a

work while allowing it to retain a material connection to the historical past.[14] It is conservators who decide the measured effect of time that will be perceived by the viewer. They make these decisions based on the methods that Panofsky dismissed as connoisseurial tools, from X-rays to macrophotography. Often a work's duration unfolds for a viewer, such as Panofsky's pleasure in Chartres Cathedral's patinated stones, through debates and conversations carried out in conservation studios, an oral history that remains absent from archives, libraries, and periodicals.

Panofsky's analysis looms large over the recent turn toward incorporating object study into the graduate curriculum. For the questions raised by the imaging techniques of technical art history have yet to be integrated into the history of optics and sensory perception that already inform the discipline. Conservators advise that conditions for an X-ray (such as exposure time) must be accounted for in order to interpret it.[15] Panofsky, however, argued that an X-ray is no different from wearing spectacles; it merely enhances our vision. This position on technical imaging in the conservation lab contradicts Panofsky's ideas about photographic reproduction in the facsimile debate of the 1920s. In this heated exchange about the value of sculptural casts and other types of facsimiles, Panofsky professed a preference for audio recordings because he believed that there was less human interference between the mechanical device and the performance. In contrast, he argued that photographic reproduction suffered from the mediating hand and eye of the photographer, and therefore imprinted the viewpoint of the present onto the past.[16] But he did not apply this same consideration to the photographic archives preserved in museum conservation files. And today, technical images are reproduced in articles and catalogues raisonnés with little attention to the epistemological problems that they raise, or to the consideration that the ability to interpret this body of evidence is opaque to scholars who lack the necessary training.

Despite these obstacles, a new style of photography now permeates articles and PowerPoint presentations. Artworks are increasingly displayed in raking and transmitted light, revealing surface abrasions, granular paint pigments, and invisible-to-the-naked-eye textures. Such attention to viewing paintings as objects that occupy space, as opposed to two-dimensional images, was presaged by X-rays in the early twentieth century. As one of the earliest practitioners remarked: "The problem presented to the observer of such a photograph [an X-ray] is of a three-dimensional character projected into one of two dimensions. Otherwise expressed, one is confronted with something like several layers of print superimposed upon each other, and the task is that of disentanglement."[17] The ability to read an X-ray and deploy its evidence in the interpretation of a painting requires a cognitive grasp of the work as three-dimensional, defined by its frame, often a cradle, and stratifications of pigments. The facility to analyze ultraviolet or X-ray fluorescence images is a form of visual analysis never imparted in art history seminars. The increasing proliferation, however, of these images has created a cognizance that paintings are dynamic objects that exist beyond the surface, containing material worlds invisible to the naked eye. The turn toward materiality, artists' materials, and technique in art history is impossible to conceptualize without the groundwork established over a century ago by advances in conservation science.[18]

Despite the perceptual complexity raised by the imaging techniques of technical art history, this body of work remains relegated to the status of unmediated scientific evidence. In turn, the role of perception in the production of this "evidence" is often negated, overlooked, or denied. As Ernst Gombrich wrote: "The objective validity of the methods used in the laboratories of our great galleries is as little in doubt as the good faith of those who apply them. But it may well be argued that restorers, in their difficult and responsible work, should take account not only of the chemistry of pigments, but also of the psychology of perception—ours and that of the chicken."[19] In this passage, Gombrich refers to the cleaning controversy at the National Gallery in London, a furious public and scholarly outcry over

the total cleaning of old master pictures.[20] He maintained that the conservators invasively stripped varnish, patina, and dirt from the surface without due attention to the color balance within the paintings. For Gombrich, the conservators ruined the delicate harmonies of tonal interaction: "What we want of them is not to restore individual pigments to their pristine color, but something more infinitely tricky and delicate—to preserve relationships."[21] This description presents one view of conservation, although Gombrich was a proponent of another, practiced by his contemporary: Cesare Brandi.[22]

The first director of the Central Institute for Restoration in Rome (Istituto Superiore per la Conservazione ed il Restauro), Brandi impacted the approach of twentieth-century conservation from architecture to time-based media with a system founded on perceptual awareness. In his theorization of the relation between the image and the viewer, he was influenced by Edmund Husserl and the concept of art as the embodiment of a *world of life* (*Lebenswelt*).[23] Brandi trained as an art historian and not a conservator, but as the leader of a conservation institute he was formative in establishing and codifying twentieth-century conservation practice. Many of his students, such as Paul Philippot, led the profession into the next generation. While the import of Brandi's work is often absent from scholarship on Renaissance art,[24] his philosophy was central for dictating *how paintings should look* in the latter half of the twentieth century, particularly in Italy. This is not to say that all museums adhere to Brandi's principles. As the cleaning controversy of the National Gallery demonstrated, institutions differ in their approaches to cleaning and restoration. Nevertheless, over the past thirty years his ideas have entered the lexicon of Anglophone practice. During this time, technical essays have become standard in monographic exhibition catalogs. Early exemplars of this genre include the National Gallery volumes on its Italian and northern European paintings, in which essays on "technique" cover the history of panels, canvases, frames, underdrawings, grounds, gilding, pigments, and binders.[25] These material overviews of Renaissance painting written by conservators provide the foundation for the subsequent historical analysis.

Yet Brandi's impact extends beyond a renewed interest in technique and materials. One of the most important facets of his philosophy engaged with *lacunae*, the intervals of missing material that destroy the perceptual unity of a work. Following Gestalt psychology, he maintained that perception was a process of spontaneously making patterns. Lacunae, therefore, interrupt this perceptual activity. An example of lacunae would be a painting marred by missing areas of paint, disrupting the unity of form, color, and composition. When the beholder encounters the painting, the marked absences stand out against the original composition. As Brandi argued, these voids become figures that interfere with the viewer's ability to perceive the painting. A viewer looking at a painting with lacunae will automatically turn these absences into figures. For Brandi, they are intrusive because they reverse the figure-to-ground relation.[26] The original painted composition becomes the ground while the disruptions on the surface become the figures. For Brandi, a lacuna was "an unjustified, even painful interruption in the form."[27]

Brandi's philosophy, as put into practice, may be seen in a small devotional panel of the Virgin and Child at the Yale University Art Gallery, New Haven. In the pretreatment photograph, the paint loss across the Virgin's robe dominates to such an extent that the Virgin and Child seem to recede (Fig. 2). The viewer vacillates between the abstraction of the surviving vestiges of paint and the iconic figures.

In the treatment of the panel, curator Laurence Kanter and conservator Irma Passeri retained the presence of significant losses, acknowledging an inability to reproduce these sections of the painting without adding traces of their own stylistic or temporal sensitivity.[28]

2 Ugolino di Nerio, *Virgin and Child Enthroned with Four Saints* (pretreatment), ca. 1305–10, tempera on panel, 46¾ × 29¾ × 1¼ in. (118.6 × 75.7 × 3.3 cm). Yale University Art Gallery, New Haven, Gift of Hannah D. and Louis M. Rabinowitz (artwork in the public domain; photograph provided by Yale University Art Gallery)

3 Ugolino di Nerio, *Virgin and Child Enthroned with Four Saints* (posttreatment). Yale University Art Gallery, New Haven, Gift of Hannah D. and Louis M. Rabinowitz (artwork in the public domain; photograph provided by Yale University Art Gallery)

However, they mitigated the jarring perception of the voids to allow the image to emerge from the ground (Fig. 3). With the use of *tratteggio*, finely modulated lines of varying hues, Passeri tempered the lacunae so that they recede as the figures of the Virgin and Child come into view. She also replicated the effect of craquelure across the Virgin's robe, filling in the defined mass while integrating into her treatment the interval of time expressed in the cracked surface. In her approach to this panel, Passeri engaged with two methods of inpainting.[29] While the *tratteggio* marks the passages of loss, retouching in the craquelure rebuilds the image to an approximation of an earlier state.

The panel's treatment incorporates an understanding of temporality articulated by Brandi that presents an idea of how the Renaissance should be mediated to the contemporary viewer. For the Italian theorist, pictorial unity creates three modes of temporality: the *duration* in which the work of art took shape, the *interval* between its making and our present, and the *instant* when it "strikes consciousness."[30] In their attention to drawing the Virgin and Child out of the lacunae, Kanter and Passeri sought that "instant" of encounter. In turn, through the craquelure patterning, Passeri attended to preserving the interval that extended between the work's completion and the present moment. The renewed legibility of the central figures allows for both an appreciation of the painting's construction and an acknowledgment of the work's own duration. Brandi's practice of conservation embodies not only a mode of inpainting but also a theorization of how to mediate time.

Brandi remains unrecognized for his influence on the generation of scholars writing about Renaissance art in the latter half of the twentieth century. Even Georges Didi-Huberman, one of the most dynamic theorists, reduces conservation to the same didactic practice that Panofsky described. In *Confronting Images*, Didi-Huberman compares the conservator with the historian who believes that loss may be eliminated:

> Like the conservator who goes over with his own hand every brush stroke of a picture that he "restores to like," and about which he has a feeling of being its quasi-creator, so *knowing everything* about it—likewise the historian will place the words of the past in his mouth, the dogmas of the past in his head, the colors of the past before his eyes . . . and thus will proceed in the hope of knowing it carnally, this past, even, in a sense, of anticipating it.[31]

Didi-Huberman argues that actions such as "preserve," "catalogue," and "restore" can never "eradicate all 'loss.'" He maintains that they offer a false ability to know the past.[32] Instead, historians must recognize themselves as inextricably alienated from the object of their study. But Brandi also argued for the visible articulation of loss, an inescapable estrangement from the past articulated in the areas of absence mitigated by the fine, barely perceptible strokes of *tratteggio*. Moreover, Brandi's acute attention to the figure-ground relation in the process of perception bears a strong affinity to Didi-Huberman's own readings of certain paintings. Through a reconsideration of the relation between the figure and the ground, Didi-Huberman stages his analysis of Fra Angelico's *Annunciation* fresco in San Marco, Florence (Fig. 4). He transforms the whitewashed wall into the central figure, while the Angel Gabriel and the Virgin recede. This interpretation is founded on the same logic as Brandi's, which is a reconsideration of what remains visible and the ways in which the formal interaction of colored planes on the surface create suspended moments of apprehension. Whereas Brandi finds the disruption of the surface by lacunae painful, in these vacuums Didi-Huberman creates fecund sites of figuration.

4 Fra Angelico, *Cell 3: Annunciation*, 1438, fresco, 69¼ × 58⅝ in. (176 × 149 cm). Museo di San Marco, Florence (photograph by Erich Lessing, provided by Scala/Art Resource, NY)

In his discussion of the Angel Gabriel and the Virgin Mary, he posits that only "the two faces have been emphasized: heightened lightly with white, worked with crimson. The rest is but contempt for details, the rest is but strange lacunae, from the fleet pictography of the angel's wings to the unlikely chaos of the Virgin's robe to the mineral vacuity of the simple place that here comes to confront us."[33] Yet within this vacuum, a figure emerges that makes visible the mystery of the incarnation. The ground of the wall becomes primary: "It is the phenomenon of something that does not appear clearly and distinctly. It is not an articulated sign; it is not legible as such. It just offers itself: a pure

‘appearance of something’ that puts us in the presence of the chalky color, long before it tells us what this color ‘fills’ or qualifies.” This description accords with Brandi’s concern with lacunae: sites in which the legible articulation of the figure is disrupted in favor of matter, pigment, “pure appearance.”

The deployment of the term *lacunae* by each scholar fundamentally differs in several respects. For Brandi, these interruptions in the composition are due to material decomposition, and he believed they had to be reduced through optical mediation. For Didi-Huberman, the phenomenological possibility of these voids allows him to articulate Fra Angelico’s relationship to the divine. Despite these differences, Brandi’s and Didi-Huberman’s concept of the *lacuna* intersects within their mutual fascination with perception, as both employ the category to engage with how the beholder of a work negotiates the relation between figure and ground. For both theorists, the apprehension of a painting is founded on the bare awareness of color and form before signs are recognized, named, and identified. An engagement, therefore, with the literature of technical art history reveals not only an overlooked methodological structure but also a body of work to be read in conjunction with more established theoretical texts.

The ability, however, to account for the impact of conservators remains limited, as many did not leave a written record. The most significant traces of their contributions are embedded in the objects themselves.[34] Perhaps the current turn toward “the object” and a greater awareness of conservation will allow for a historiographical reconsideration of the discipline. For the history of conservation is not peripheral, and technical art history offers more than a mode of connoisseurship. Both the written and visual worlds of the conservator reveal a method of thinking about objects that is central to the practice and philosophy of art history. It also fundamentally impacts what is visible and what remains invisible.

A generation of historians, particularly of Renaissance art, has produced a body of scholarship that argues for the lives of objects, interpreting works through temporality.[35] One of the most formative contributions, Alexander Nagel and Christopher Wood’s *Anachronic Renaissance*, demonstrates how shifting practices in the repair of painting, architecture, and sculpture reflected the emergence of secular time and the artwork. In their chapter “Icon Maintenance,” they refer to icon painters as “restorers” and often describe the preservation of icons as a “restoration practice.”[36] Nagel and Wood maintain, as did Riegl, that there was a “complete reversal of restoration policy” in the mid-fifteenth century. While Riegl discussed the Renaissance’s relation to antiquity, Nagel and Wood pivot to late medieval panel paintings.

In the mid-fifteenth century, older panel paintings were framed to retain their representation of a distinct historical style. As a prominent example, they cite Giotto’s *Coronation of the Virgin* (ca. 1334) in the Baroncelli Chapel, Church of Santa Croce, Florence. Whereas trecento “restorers” of panel paintings might have repainted the work so that it would accord with a more modern taste, this fourteenth-century painting was left untouched. Instead, it was reframed with a fifteenth-century tabernacle, placing into juxtaposition two distinct historical styles. This act of conservation perpetuated the work as a relic of the past, from a period in the history of painting. At this point, paintings “*picture* history by pointing to a gap in the historical sequence of representational conventions.”[37] As Nagel notes, changes in the processes of conservation were central to the formation of art history as “a secular and academic discipline.”[38]

On the one hand, *Anachronic Renaissance* deftly illustrates the import of restoration to the history of art as a discipline. On the other hand, the complex views of temporality

in contemporary conservation and their impact on the exhibition and installation of Renaissance painting remain absent from Nagel and Wood's narrative. Yet Brandi was one of the most influential theorists of time and Renaissance painting of the twentieth century, although his impact was realized in the manual craft of the conservator's studio as opposed to the art historian's *studiolo*. Nevertheless, the centrality of conservation for defining the temporality of artworks has become paramount in the current debates about the perceptions maintenance of time-based media and obsolescent technology, an awareness that is changing perceptions not only of contemporary art but also of Renaissance panel painting. Just as the artists and theologians in fifteenth-century Italy did not conceive of themselves as taking part in the emergence of a "secular and academic" discipline known as art history, our current fascination with canonizing age-value, process, and matter portends a story for future art historians (although it is doubtful such a category will exist) to unearth.

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NOTES

This article came out of my time as the A. W. Mellon Postdoctoral Fellow in the Physical History of Art at Yale University, and I thank the Andrew W. Mellon Foundation for its support. I am grateful to Tim Barringer for championing this fellowship, as well as his commitment to integrating conservation science into the graduate curriculum. Ian McClure was endlessly generous with his time and knowledge. Larry Kanter was an invaluable interlocutor on conservation, treatment, and the history of conservation at Yale. And Irma Passeri, with whom I shared conversations about loss, deeply impacted my perception of painting. My interest in this material evolved and deepened through the seminars that I taught at Yale and the intellectual engagement of the students who questioned, critiqued, and engaged with the history and philosophy of conservation. This article is dedicated to them: Tara Contractor, Asia Del Bonis-O'Dell, Ayham Ghraowi, Anne Grant, Victoria Hepburn, Kristen Herdman, Gavi Levy Haskell, Kyle Mancuso, Maria Muzdybaeva, Julia Rooney, Naina Saligram, Zachary Smithline, Judith Stapleton, Rebecca Straub, Stephen Urchick, and Pierre Von-Ow.

1. Gretchen Hirschauer and Dennis Geronimus, eds., *Piero di Cosimo: The Poetry of Painting in Renaissance Florence* (Washington, DC: National Gallery of Art, 2015), 207–8, cat. no. 34. For a historical account of why Italian panel paintings were aggressively cleaned in the mid-twentieth century, see Cathleen Hoeniger, "The Restoration of Early Italian 'Primitives' during the 20th Century: Valuing Art and Its Consequences," *Journal of the American Institute for Conservation* 38, no. 2 (1999): 144–61; and Patricia Sherwin Garland and Elisabeth Mention, "Loss and Restoration: Yale's Early Italian Panel Paintings Reconsidered," *Yale University Art Gallery Bulletin*, 1999, 32–43.

2. Anthony Grafton, "The Ravishing Painting of Piero di Cosimo," *New York Review of Books*, May 7, 2015.

3. Alois Riegl, "Der moderne Denkmalkultus, sein Wesen, seine Entstehung" (1903), in *Gesammelte Aufsätze* (Vienna: WUV-Universitätsverlag, 1996), 139–84. For a version in English, see "The Modern Cult of Monuments: Its Character and Its Origin," trans. Kurt W. Forster and Diane Ghirardo, *Oppositions* 25 (1982): 21–51. On Riegl's discussion of monuments, see Sandro Scarrocchia, *Alois Riegl: Teoria e prassi della conservazione dei monumenti; Antologia di scritti, discorsi, rapport 1898–1905, con una scelta di saggi critici* (Bologna: Accademia Clementina di Bologna, 1995). See also Margaret Rose Olin, *Forms of Representation in Alois Riegl's Theory of Art* (University Park: Pennsylvania State University Press, 1992), 175–80; and Kurt W. Forster, "Editor's Introduction: Monument/Memory and the Mortality of Architecture," *Oppositions* 25 (1982): 1–19.

4. Riegl, "Modern Cult of Monuments," 32. Riegl is quick to caution that the Baroque fascination with ruins expresses a *pathos* marked by the grandeur of antiquity and contemporary decay that is distinct from his category of "age-value."

5. Ibid., 34.

6. On contemporary obsolescence, see Babette B. Tischelder and Sarah Wasserman, eds., *Cultures of Obsolescence: History, Materiality, and the Digital Age* (New York: Palgrave Macmillan, 2015). For a history of conservation and time-based media, see Julia Noordegraaf et al., eds., *Preserving and Exhibiting Media Art: Challenges and Perspectives* (Amsterdam: Amsterdam University Press, 2013).

7. Examples include the Chicago Objects Study Initiative between Northwestern University, the University of Chicago, and the Art Institute of Chicago; a "Mellon Graduate Seminar in Object Analysis" at the University of California, Berkeley; an award to establish a Summer Institute for Technical Studies in Art for graduate students at Harvard University; an initiative at the University of Pennsylvania and the Philadelphia Museum of Art to hold workshops on specific topics such as panel painting and paper; and the Andrew W. Mellon Postdoctoral Fellowship in Physical Art History at Yale.

8. Donald Preziosi, ed., *The Art of Art History: A Critical Anthology* (Oxford: Oxford University Press, 2009).

9. Erwin Panofsky, "The History of Art as Humanistic Discipline," in *Meaning in the Visual Arts: Papers in and on Art History* (Woodstock, NY: Overlook Press, 1974), 14.

10. Ibid., 14.

11. Ibid., 15n11.

12. Ibid.

13. Ibid., 24.

14. For an overview of the interventions made by conservators in prime objects, see David A. Scott, "Art Restoration and Its Contextualization," *Journal of Aesthetic Education* 51, no. 2 (2017): 82–104.

15. F. Ian G. Rawlins, "Physical Factors in X-Ray Photography," *Technical Studies in the Field of the Fine Arts* 7, no. 2 (1938): 73–79.

16. On Panofsky and the facsimile debate, see Erwin Panofsky, "Original and Facsimile Production," trans. Timothy Grundy, and Megan Luke, "The Photographic Reproduction of Space: Wölfflin, Panofsky, Kracauer," *RES: Anthropology and Aesthetics* 57–58 (2010): 331–38, 339–43.

17. F. Ian G. Rawlins, "The Physical Laboratory at the National Gallery," *Science Progress* 30, no. 118 (1935): 239–40.

18. To take just one example of the prominence of "materiality" in art history, see the texts by Martha Rosler, Caroline Walker Bynum, Natasha Eaton, Michael Ann Holly, Amelia Jones, Michael Kelly, Robin Kelsey, Alisa LaGamma, Monika Wagner, Oliver Watson, and Tristan Weddigen, in "Notes from the Field: Materiality," *Art Bulletin* 95, no. 1 (2013): 10–37.

19. E. H. Gombrich, "From Light into Paint," in *Art and Illusion: A Study in the Psychology of Pictorial Representation* (New York: Bollingen Foundation, 1960), 54–55.

20. This controversy was publicly carried out in a series of articles and letters published in the *Burlington Magazine* between 1947 and 1963. For some of the central contributions, see Cesare Brandi, "The Cleaning of Pictures in Relation to Patina, Varnish, and Glazes," *Burlington Magazine* 91, no. 556 (1949): 183–88; Ernst Gombrich, "Dark Varnishes: Variations of a Theme from Pliny," *Burlington Magazine* 104, no. 707 (1962): 56–59; and Joyce Plesters, "Dark Varnishes—Some Further Comments," *Burlington Magazine* 104, no. 716 (1962): 452–60.

21. Gombrich, "From Light into Paint," 54–55.

22. Brandi, "The Cleaning of Pictures," 183–88; and Helen Glanville, "Cesare Brandi, Newton and Aspects of the Controversies of the 1950s and 1960s at the National Gallery, London," in *Il pensiero di Cesare Brandi dalla teoria alla pratica: A 100 anni dalla nascita di Cesare Brandi; Atti dei seminari di München, Hildesheim, Valencia, Lisboa, London, Warszawa, Bruxelles, Paris*, ed. Giuseppe Basile (Padua: Associazione Giovanni Secco Suardo, 2008), 209–16.

23. Edmund Husserl articulates his concept of *Lebenswelt* in *The Crisis of European Sciences and Transcendental Phenomenology* (Evanston, IL: Northwestern University Press, 1970), originally published in 1936. Cesare Brandi explicitly uses the term "world of life," or "lifeworld" (*mondo della vita*), in his work on lacunae: "I will limit myself to considering 'a work of art only as an object of experience in the *world of life*' as Husserl would say." Brandi, "Postscript to the Treatment of Lacunae," in *Theory of Restoration*, trans. Cynthia Rockwell and Dorothy Bell (Florence: Nardini Editore, 2005), 91. Brandi, "Postilla al trattamento delle lacune," in *Teoria del restauro* (Turin: Einaudi, 1977), 72.

24. On why Brandi has been omitted from the canon of Anglophone art historical research, see Laurence Kanter, "The Reception and Non-Reception of Cesare Brandi in America," *Future Anterior: Journal of Historic Preservation, History, Theory and Criticism* 4, no. 1 (2007): 30–43; and Helen Hughes, "Brandi and His Influence on Conservation in the United Kingdom," in Basile, *Il pensiero di Cesare Brandi*, 201–3.

25. See Jill Dunkerton et al., "Techniques," in *Giotto to Dürer: Early Renaissance Painting in the National Gallery* (New Haven: Yale University Press, 1991), 152–204; and Jill Dunkerton, Susan Foister, and Nicholas Penny, "Preparing the Panel" and "Original Developments," in *Dürer to Veronese: Sixteenth-Century Painting in the National Gallery* (New Haven: Yale University Press, 1999), 211–36, 265–92.

26. Brandi, "Postscript to the Treatment of Lacunae," 92.

27. Ibid. Although I am discussing lacunae in relation to painting, Brandi explicitly articulates his theory in regard to all media, including architecture.

28. For the conservation history of this panel, which also provides a good historical overview of twentieth-century conservation practices, see Laurence Kanter, "Some Early Sienese Paintings: Cleaned, Uncleaned, Restored, Unrestored: What Have We Learned," *Yale University Art Gallery Bulletin*, 2010, 46–65.

29. The literature on inpainting and retouching is extensive. For an overview, see Kim Muir, "Approaches to the Reintegration of Paint Loss: Theory and Practice in the Conservation of Easel Paintings," *Studies in Conservation* 54 (2014): 19–28. See also P. S. Garland, ed., *Early Italian Paintings: Approaches to Conservation; Proceedings of a Symposium at the Yale University Art Gallery, April 2002* (New Haven: Yale University Press, 2003); and Craig Hugh Smyth, ed., "The Aesthetic and the Historical Aspect of the Presentation of Damaged Pictures," in *Studies in Western Art: Acts of the Twentieth International Congress of the History of Western Art* (Princeton: Princeton University Press, 1963), 137–86. The other dominant form of inpainting developed in Italy (as opposed to *tratteggio*), known as *selezione cromatica*, was advanced in the 1970s and 1980s by Umberto Baldini. Perhaps the most canonical application of this procedure may be seen in Cimabue's *Crucifix* in the Santa Croce Museum, Florence; see Umberto Baldini and Ornella Casazza, *Le crucifix de Cimabue* (Rome: Olivetti, 1982).

30. Cesare Brandi, "Time in Relation to the Work of Art and Restoration," in idem, *Theory of Restoration*, 61.

31. Georges Didi-Huberman, *Confronting Images: Questioning the Ends of a Certain History of Art* (University Park: Pennsylvania State University Press, 2005), 37.

32. Ibid., 50.

33. Ibid., 15. Didi-Huberman's work is an important predecessor for the current generation of Renaissance historians who are attending to the material presence of grounds as a site of figuration, whether in panel painting, painting on copper, paper, or other media.

34. Diane Dwyer Modestini, "John Brealey and the Cleaning of Paintings," *Metropolitan Museum Journal* 40 (2005): 27–36. There is recent work toward establishing an oral archive; see Joyce Hill Stoner, "Vignettes of Interdisciplinary Technical Art History Investigation: Supplemented by the FAIC Oral History Archive in Honor of Roger H. Marijnissen," CeROArt, HS, *Mélanges en l'honneur de Roger Marijnissen*, June 2015, accessed February 26, 2018, http://journals.openedition.org/ceroart/4508.

35. Alexander Nagel and Christopher S. Wood, *Anachronic Renaissance* (Brooklyn, NY: Zone Books, 2011). Nagel and Wood's work builds on Cathleen Hoeniger's, which is openly indebted to Brandi; see Hoeniger, *The Renovation of Paintings in Tuscany, 1250–1500* (Cambridge: Cambridge University Press, 1995). See also Alessandro Conti, *Storia del restauro e della conservazione delle opere d'arte* (Milan: Electa, 1988).

36. Nagel and Wood, *Anachronic Renaissance*, 71.

37. Ibid., 83.

38. Alexander Nagel, "Fashion and the Now-Time of Renaissance Art," *RES: Anthropology and Aesthetics* 46 (2004): 42.