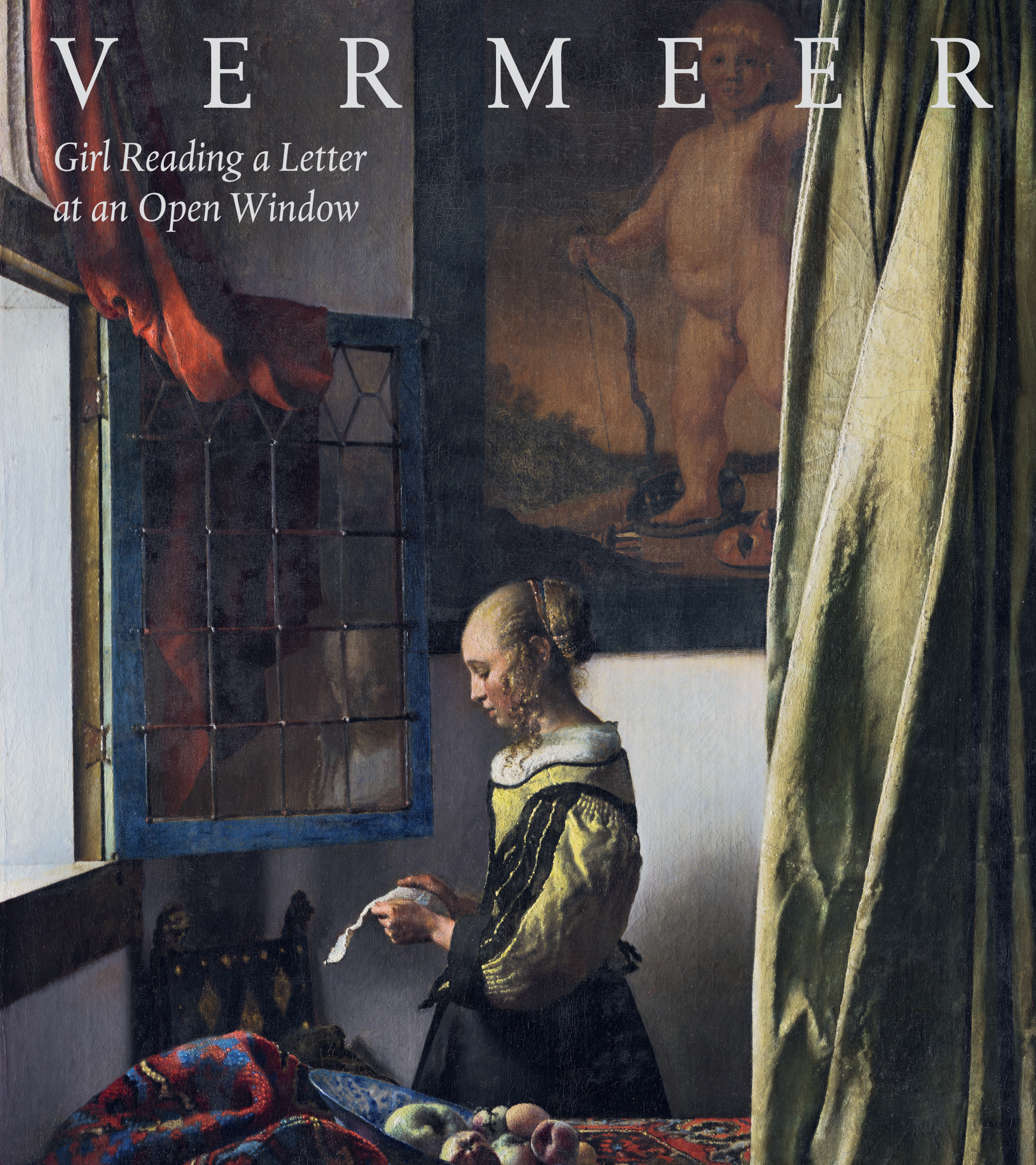


VERMEER

*Girl Reading a Letter
at an Open Window*





JOHANNES VERMEER

*Girl Reading a Letter
at an Open Window*

Restoration and Studies
in Painting Technique

Edited by
Staatliche Kunstsammlungen
Dresden, Uta Neidhardt
and Christoph Schölzel

Sandstein Verlag

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Uta Neidhardt

Fig. 1
Johannes Vermeer
*Girl Reading a Letter at
an Open Window*
c. 1657–59, oil on canvas,
83 × 64.5 cm, Staatliche
Kunstsammlungen Dresden,
Gemäldegalerie Alte Meister,
inv. no. 1336

“... UNE JEUNE FILLE QUI LIT VIS À VIS
D’UNE FENÊTRE ...”¹

The Painting *Girl Reading a Letter at an Open Window* by Johannes Vermeer in Dresden Following Its Restoration between 2017 and 2020

I

Johannes Vermeer’s painting *Girl Reading a Letter at an Open Window* (c. 1657–59) in Dresden is familiar throughout the world (fig. 1). Following its recent restoration, which has significantly altered its appearance, it is still as admired, revered, and cherished a work of art as it had been for centuries in its previous state.² The suggestive allure of this painting is explained by Vermeer’s extraordinary artistic ability to render everyday scenes in impressively lifelike detail. Dresden’s *Girl Reading a Letter* is the first in a string of works, made from the late 1650s onwards, in which Vermeer created interiors peopled with lone figures or small groups and presented the cultivated occupations of an elegant Dutch upper-middle class with seemingly perfect realism.

The ostensibly true-to-life depiction of everyday life in the Republic of the United Netherlands constituted a particular form of bourgeois genre painting in the middle and second half of the 17th century. With unprecedented technical perfection, attention to detail, refinement, and ingenuity, painters such as Gerard ter Borch, Gabriel Metsu, Gerard Dou, Jan Steen, Pieter de Hooch and – most notably – Johannes Vermeer produced scenes of bourgeois life with a convincing illusion of reality. However, when Vermeer’s paintings are compared with those of his fellow artists, it is clearly evident how much they differ (fig. 2).³ With their profound serenity, harmony, and concentration, Vermeer’s interiors featuring a solitary figure go far beyond the narrative-drive, sometimes anecdotal works by his contemporaries, and usually carry a more strongly sym-



Fig. 2
Pieter de Hooch, *Woman Weighing Coins*
c. 1664, oil on canvas, 61 × 53 cm,
Staatliche Museen zu Berlin, Gemäldegalerie,
inv. no. 141B

bolic or allegorical meaning. As we now know since the recently completed restoration, this is particularly true of the *Girl Reading a Letter at an Open Window*. Since the exposure of the Cupid picture on the rear wall of the room, it has become abundantly clear that in this work, as in several other of his paintings, Vermeer has woven a statement about love into a seemingly innocuous everyday situation.



The famous Dresden painting was for centuries firmly inscribed in the collective visual memory and public imagination, albeit in its previous (falsified) form – with the overpainting of the background picture executed by another hand (fig. 3). The portrayal of the delicate female figure in strict profile in front of a bare, light-coloured wall enhanced the impact of the composition, lending it an icon-like quality and imbuing the painting with an almost meditative effect. The countless reproductions of this painting – in its falsified form – in German living rooms have long borne testimony to its great appeal and popularity. For about three years, the public has been confronted with a restored painting⁴ whose transformation has evoked both approval and enthusiasm, on the one hand, and disappointment and incomprehension on the other. A statistical survey⁵ by the website *Essential Vermeer 3.0* revealed that 44 percent of the more than 6,000 users who responded to the question, “What are your feelings about the restored *Girl Reading a Letter at an Open Window*?” stated that they still preferred the earlier inauthentic composition and/or did not believe our findings, which led to the overpainting being removed. Nevertheless, just over half of them accepted the removal of the overpainting since it was the result of comprehensive scientific analyses and the decision of an international committee of ex-

perts. It would appear that the painting in its earlier, falsified form corresponded more closely to our modern-day visual conventions than the original version revealed by the restoration – presumably that was one reason for the disapproval on the part of many viewers. The aforementioned statistics are also interesting as regards people’s readiness to trust in the scientific and artistic analyses of the experts involved (fig. 4).⁶ After all, 56 percent of all the participating users – and hence a slight majority of those surveyed – were confident that despite the new, unfamiliar visual experience, the decision taken in Dresden was right, since it accorded with Vermeer’s intentions.

During the Dresden exhibition *Johannes Vermeer. Vom Innehalten* (“Johannes Vermeer: On Reflection”) in 2021, we also made another important observation: Visitors who initially expressed disapproval or doubt concerning the removal of the overpainting on the *Girl Reading a Letter* gained a new outlook on the restored painting thanks to its direct comparison with other works by Vermeer (fig. 5).⁷ In this they were especially helped by a small parallel presentation featuring in-depth educational and multimedia displays showing the discoveries made during the restoration process and the scientific basis for deciding to remove the overpainting. In addition, there were further media-based, in-depth educational offerings on the subject (fig. 6).⁸ Against this background, it now seems appropriate and worthwhile to provide a more comprehensive discussion and commentary on this extraordinary restoration than was originally possible in the exhibition catalogue of 2021.



Fig. 3
Johannes Vermeer
Girl Reading a Letter at an Open Window
before restoration

Fig. 4
Members of the expert commission
examining the painting, September 9,
2021

Fig. 5
Exhibition “Johannes Vermeer.
On Reflection”, September 10, 2021 –
January 2, 2022 in the Gemäldegalerie
Alte Meister, Staatliche Kunstsamm-
lungen Dresden, view of the exhibition



Fig. 6
Weborello, accompanying the
exhibition “Johannes Vermeer.
On Reflection”. Digital, interactive
information medium for preparation
and follow-up of the exhibition visit



For decades, art historians assumed that the previous state of Vermeer’s *Girl Reading a Letter* in Dresden was the result of alterations made by the artist in the course of a lengthy working process, and that every step of that process had been executed by his own hand.⁹ Neither in Dresden nor among international experts were there any doubts about the then-visible composition, which was roundly admired as the consummate pictorial invention of a gifted young painter.¹⁰ The present publication therefore contains research and investigation findings that consider the restored painting from the perspective of scientists, conservator-restorers, art historians, mathematicians, and IT experts from multiple European and American institutions, working together in a project that began in 2017. It is intended to describe Vermeer’s painting even more comprehensively, to shed light on the process of its

creation, thus providing transparency and enabling both fellow professionals and the public to understand the Dresden decision to remove the later overpainting.

II

The first reference to the arrival of the painting *Girl Reading a Letter at an Open Window* in Dresden is found in a letter dated 1742 from the secretary of the Saxon legation and official art agent in Paris, Samuel de Brais, to the prime minister of Saxony, Count Heinrich von Brühl. De Brais announced to the prime minister the shipment of a consignment of 30 paintings that had been assembled through the services of the Parisian art dealer Noël Aignon for the collection of the Elector of Saxony and King of Poland, Augustus III. De Brais added that the dealer was sending along, as a complimentary “bonus”, a work by Rembrandt, which he described as follows: “Dans le nombre des tableaux que Votre Excellence recevra il y en a un Rembrandt représentant une Jeune fille qui lit vis à vis d’une fenêtre [...]”,¹¹ in short: a “young girl reading in front of a window”. That this must have been a very generous bonus indeed, both from the point of view of donor and recipient, is indicated by the (false) attribution to Rembrandt, which is quite understandable con-

sidering Vermeer's relative obscurity at the time and the falsified appearance of the *Girl Reading a Letter*. The brief description of the painting makes no mention of a picture of Cupid on the wall – which is an indication that the overpainting of such a large part of the background may have been executed before the work arrived in the painting collection of Augustus III.¹²

In accordance with the high esteem in which it was held, the painting was initially placed in the private *Bilderkabinett* of the Elector of Saxony in the Dresden palace.¹³ After the dissolution of these private chambers in 1816, the painting was transferred to the Royal Picture Gallery in the Mews (former stable building) on the Jüdenhof.¹⁴ This means that *Girl Reading a Letter* is one of the very few Vermeer works that were already publicly accessible in the early 19th century, when the artist had long been forgotten. From the time of the opening of the new gallery building designed by Gottfried Semper in 1855, the painting was included in the permanent exhibition¹⁵ and remained there until the outbreak of the Second World War. The *Girl Reading a Letter* survived the war years unscathed, being held initially at Albrechtsburg Castle in Meissen and later in a secure storeroom at Königstein Fortress. From there the painting was taken to the USSR as war booty, along with nearly all the works of art of the now-defunct Staatliche Sammlungen für Kunst und Wissenschaft Dresden, and only returned to East-Germany in 1955. In June 1956 the Gemäldegalerie Alte Meister reopened in the Semper Building at the Dresden Zwinger and the painting has been one of the key works on show in its permanent exhibition ever since.

III

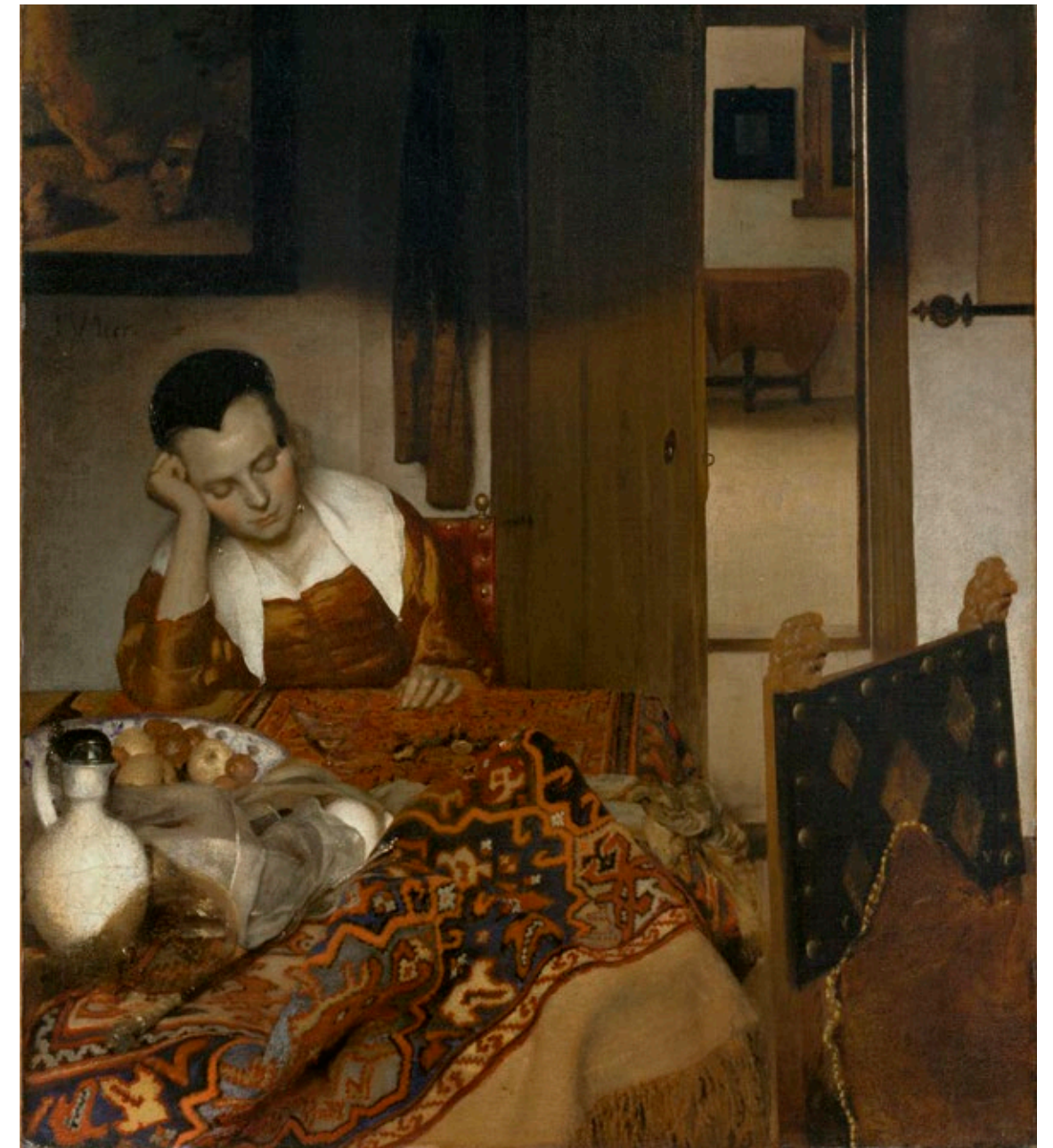
The restoration of the *Girl Reading a Letter*, which took place from 2017 to 2021, has fundamentally changed not only the composition of the painting and the mood conveyed by its lighting and colouration, but also its appeal and its artistic message. Thanks to its excellent state of preservation, this early masterpiece by Vermeer now appears in a form that corresponds more closely to the intention of its creator than has been the case for probably three centuries.

Vermeer depicted a young woman reading in front of an open window in the corner of a richly furnished room. An illusionistic green curtain covers almost a third of the picture space on the right.

A broad table, lavishly decked with an oriental carpet and a Chinese porcelain bowl filled with fruit, is positioned across the picture space in such a way that the edge of the table appears along the lower edge of the painting. As a visual barrier, it impedes access to the girl's intimate, private space. On the wall hangs a large-format picture with a broad black frame. It shows a winged boy standing upright and leaning on his bow, with his left arm raised. The decorative Cupid picture occupies most of the rear wall in the picture space. On either side of the horizon line, each half of the painting is dominated by one of the two figures. The image of the naked chubby Cupid is almost equal in size to the three-quarter figure of the girl visible behind the table. The young woman in profile has turned towards the open window to read the letter in good light, holding it with both hands. Her silhouette-like figure stands out against the whitewashed wall, while the outline of her slightly tilted head is emphasised by the dark-brown patch of ground in the bottom left-hand corner of the Cupid picture (fig. 8). Her style of dress – neat bodice in striking yellow and black, white neckerchief, her head with its gently curved forehead and neck line, her smooth, beautiful face with lowered gaze, and elaborately pinned hairstyle held in place by two narrow ribbons and set off with long ringlets – all combines to make her a graceful figure of simple elegance.

Compared with the state of the painting prior to restoration, the composition has now become considerably more compact. This has the effect that the delicate figure of the girl appears fixed in place, sandwiched between the blue frame of the leaded, inward-opening window, the dark frame of the picture on the wall, the Spanish chair in the corner, and the broad table in the foreground. This almost oppressive abundance of furnishings has the effect of both holding her in place and constricting her movements. While her position directly opposite the window is precisely defined, Vermeer remained vague in his depiction of the rear-left section of the room. It is concealed by the window pane, the red curtain hanging above it, and a Spanish chair placed at an angle in the corner. Only after the restoration has it now become visible that the blue window frame slightly overlaps the broad black picture frame on the rear wall. The interplay of unusually overlapping heavy forms and accentuated edges is a recurring stylistic device found in Vermeer's interior paintings from the time of his *A Maid Asleep* onwards (c. 1656/57, New

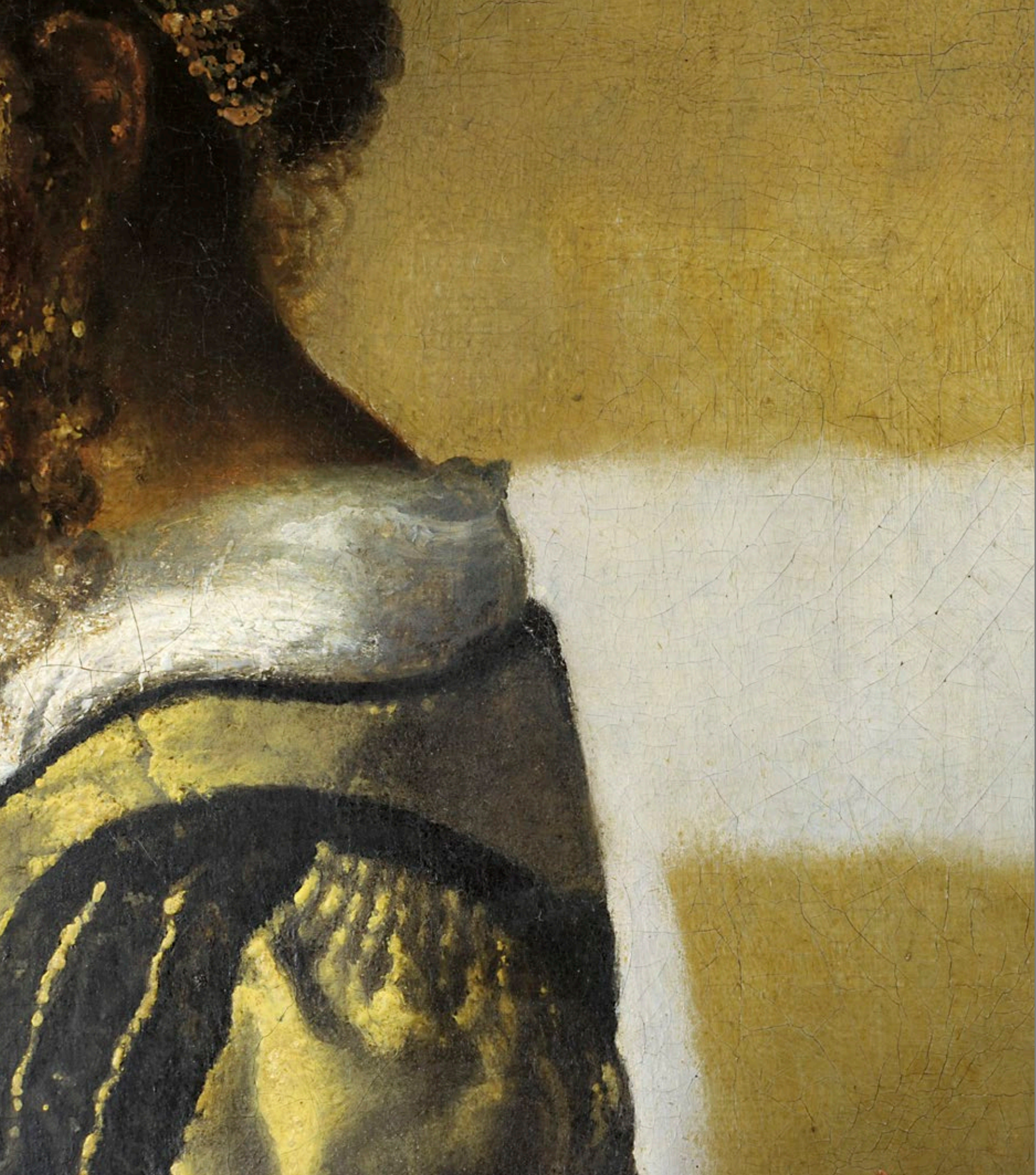
Fig. 7
Johannes Vermeer
A Maid Asleep
c. 1656/57, oil on canvas,
87.6 × 76.5 cm, New York,
The Metropolitan Museum of Art,
Gift of Benjamin Altman 1913,
Inv. no. 14. 40. 611



York, The Metropolitan Museum of Art; fig. 7).¹⁶ Vermeer introduced a strong element of concealment into his composition through the illusionistic green curtain on the right. One length of fabric appears to have been pulled over the other, partly covering it. Suspended from a rod, the fabric not only prevents the beholder from seeing a considerable part of the room, it also obscures the right-hand part of the Cupid picture on the wall.

Already in this early genre scene, Vermeer shows himself to be expert at rendering light falling on ob-

jects within a space. Through his convincing use of light and shade, he portrayed everyday objects in such a way that they appear real. The light reflected on the tufted carpet pile, which is rucked up into a mountain of folds, creates a veritable blaze of colour combining luminous dots of red, blue, yellow, black, and white. With its characteristic central medallion and blue scrolling tendrils on a red ground, the carpet has been identified as a Turkish medallion Ushak carpet.¹⁷ The sunlight brings a gleam to the cool blue-and-white painting on the Chinese



The Restoration of the *Girl Reading a Letter at an Open Window* by Johannes Vermeer

Christoph Schölzel

Introduction

Until the most recent conservation treatments, the appearance of *Girl Reading a Letter at an Open Window* in Dresden – a work documented by sources from the 18th century onwards and described in numerous gallery catalogues and countless art-historical publications – gave no cause for doubt as to the authenticity of its composition.

Setting aside the general uncertainty regarding the work’s attribution that lasted until the mid-19th century and the ‘rediscovery’ of Vermeer in general, in the records on its conservation history there is just one sentence which, looking back from what we know now, may express doubt as to the technical condition and state of preservation of the painting. One treatment in 1838 is documented with a short handwritten note, both in a copy of the gallery catalogue belonging to the gallery’s director, Friedrich Matthäi, and on a slip of paper, very damaged today, on the rear of the frame. In Matthäi’s copy of the catalogue, the entry for no. 603 – titled “Junges Mädchen am Fenster” (Young Girl at the Window) and believed at this point in time to be the work of “Peter de Hooghe” (Pieter de Hooch) – is annotated with the words: “In 1838, 603 was carefully cleaned, as well as repaired and varnished in several damaged areas; but had certainly been in the hands of a restorer previously”¹ (figs. 2, 3).



Fig. 3
Remains of a restoration note on the rear of the frame

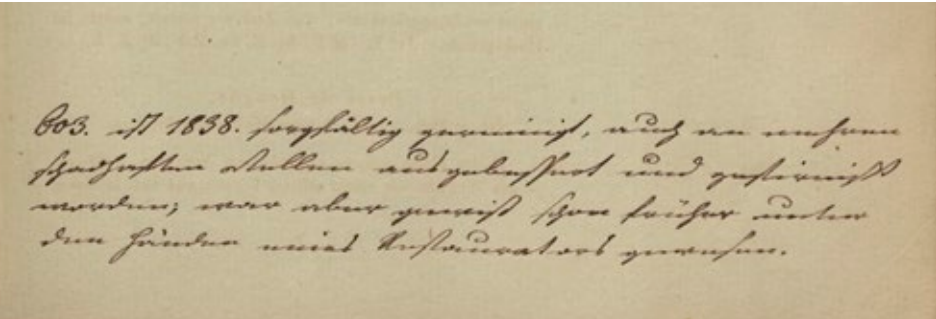
The note is too short to be able to interpret from it whether the restorer at the time (the two *Galerie-inspektoren*, or ‘surveyors’ of the collection, Johann August Renner and Carl Martin Schirmer, were both active in the gallery in this period) had noticed that a significant part of the picture was overpainted and did not reflect the artist’s original composition.

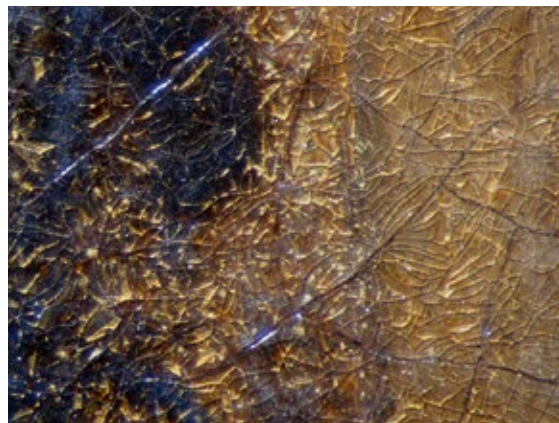
No suspicions were raised during the documented minor treatment in 1868 “on the curtain and on the window side,”² nor did the chemist Hermann Kühn, working one hundred years later, doubt the presumed authenticity of the paint layers while investigating Vermeer’s primers and colours after having taken selected paint samples, including from overpainted areas. Kühn prepared nine samples, whereby three of the samples could have contained information on the border situation at the margins.³

It was not until 1979 that an X-radiograph produced of the painting during an exhibition of Dresden masterpieces in San Francisco provided insights into deeper-lying layers of paint. The large Cupid figure was now seen in the background, as was the oversized roemer with its similarly forceful presence in the lower right-hand corner of the painting. A slight turning of the girl’s position could also be discerned from the X-ray image. These interesting

Fig. 1
Johannes Vermeer, *Girl Reading a Letter at an Open Window*, Detail during varnish removal

Fig. 2
Friedrich Matthäi, *Verzeichnis der königlich Sächsischen Gemälde-Galerie zu Dresden*, Dresden 1835, p. 116, handwritten entry for catalog no. 603





findings were published at almost the same time by Annaliese Mayer-Meintschel of Dresden and Arthur Wheelock of Washington.⁴ Both could only explain the presence of the background picture and the roemer by suggesting that these belonged to an earlier painting stage, and by attributing the green curtain, which partially covers these details, to a later stage of execution. At the same time, Mayer-Meintschel offered an explanation for these findings by summarising: “Vermeer then overpainted both attributes, the Cupid and the roemer.”⁵ As a common trope, these exciting discoveries subsequently found their way into the literature on Vermeer and were more widely publicised than, for example, the knowledge of a hidden map in the picture *Woman with a Pearl Necklace* in Berlin.⁶

Investigations into the *Girl Reading a Letter* that followed, such as that by Marlies Giebe and Uta Neidhardt in 1994⁷ and by the present author in 2009/10⁸ accepted the customary interpretation and raised no questions as to the originality of one quarter of the painting’s surface. Over the centuries, people had become so familiar with the then-visible composition of Dresden’s *Girl Reading a Letter* that no pictorial analysis, no matter how thorough, could possibly find fault with it.

Restoration

Besides the analyses, a complex conservation of the painting had long been on the agenda of the conservation studio responsible for the collection. In 2003 the painting was loaned to Madrid for a special exhibition. In preparation for the transport (as would again be the case two years later for a second loan, to Japan), it was necessary to consolidate and secure small areas of the paint layer and to rein-

force the bonding between the original canvas and the lining canvas along the margins.

A meeting of five experts, invited to Dresden in March 2017, marked the beginning of the restoration process and thus the start of a fascinating metamorphosis of Vermeer’s work.⁹ That initial meeting of the expert committee focused on discussing the state of preservation of the *Girl Reading a Letter* and a plan for its conservation-restoration.¹⁰ These evaluations were based on preceding assessments and a study of its known conservation history.¹¹ In addition, it was possible to draw on the paint analyses by Herman Kühn,¹² the X-ray image, the infrared reflectography of 2009/10,¹³ the microscopic analyses, and a special analysis of the canvas weave.¹⁴ The meeting ended with the committee voicing unanimous approval of a comprehensive conservation, and thus essentially supporting the decision made for this undertaking by the gallery’s management (fig. 5).

Aside from the extensive photographic documentation that had already begun,¹⁵ the first work undertaken in the conservation studio consisted of removing the varnish – a layer of natural resin, which may have derived from the conservation treatment undertaken in 1838 and which had been regenerated several times during the subsequent 170 years (fig. 4). For this we employed cotton swabs soaked in organic solvents, applied in a rolling motion over the surface, with which we were able to take up the dissolved varnish particles. The cleaning began on the left-hand edge of the *Girl Reading a Letter* and continued, strip by strip, to the right (figs. 6–8).



Fig. 4
Detail with decomposed varnish,
condition in 2009

Fig. 5
Meeting of the expert commission,
May 6, 2019

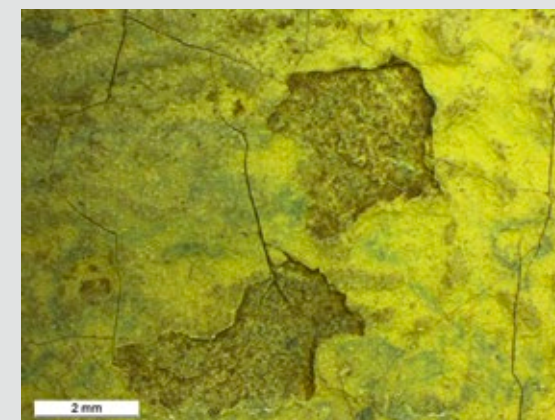


Fig. 9
Detail, white light edge of the curtain
with paint loss

Fig. 6–8
Johannes Vermeer, *Girl Reading a Letter
at an Open Window*, conditions during
varnish removal



Fig. 10 a + b
Detail, yellow robe with layer separation



By removing the comparatively thin layer of varnish, which showed considerable signs of typical brownish discolouration, Vermeer's paintwork emerged with astounding freshness. The cleaning also revealed to us that the *Girl Reading a Letter* was in a largely undamaged state of preservation. There were only a few small areas of paint loss, for example in the separation of the paint layers in the chest area of the girl's yellow jacket (figs. 10 a + b) and in the upper right-hand corner directly below the curtain rail. Along the edge of the foremost strip of green curtain, rendered as catching the most light and thus broadly highlighted with white, a small piece of impasto paint had become detached some 11 centimetres from the rail (fig. 9). There were further small areas of paint loss in the upper part of the window jamb just below the curtain rail, on the upper-left part of the window frame, and the left-hand edge of the rug. Above the blue window casement, an area in the red curtain, 2 × 2 centimetres in size, showed signs of abrasion, which may perhaps stem from an earlier sample removal. Curiously, the paint layer is heavily abraded in the area of Vermeer's signature, which the artist placed to the right of the girl's skirt. This may be an indication of tampering or the result of earlier, alcohol-based authenticity tests on the lettering (figs. 11, 12). Moreover, there is minor damage to the paint layer in other passages, which were perhaps caused by an earlier restorer's actions, for example, in the black skirt, in the background behind the girl, and especially on the darkened wall above the open window. In order to complete a full inventory of damage to the paint layer, we should also point out here the areas that would subsequently come to light during the removal of the overpaint layers: In the background Cupid picture there is an old scratch in the paint layer, which stretches for 2.5 centimetres, running parallel to the figure's right shoulder and unraised upper arm (fig. 13). The removal of two colour samples in 2017 in the background of the picture-within-a-picture to the left of the Cupid's head and in his groin area have likewise resulted in small losses in the paint layer. At the edges of the *Girl Reading a Letter*, we find further isolated areas of paint loss (see overall photograph in the Atlas, p. 118, fig. 3). On the left-hand border, these areas appear in a cluster starting some 10 centimetres from the bottom, with the losses so extensive that they go through all paint layers, leaving the canvas support exposed in places. In the lower left-hand corner, we find several more losses, while in the upper left-

hand corner, the abrasion is so noticeable that it would appear that the paint layer was deliberately sanded down to the canvas. Along the lower and upper margins of *Girl Reading a Letter*, there are only a very small number of minor losses, while in contrast, larger areas of abrasion and heavy paint loss occur on the right-hand edge of the painting. These damaged areas start 10 centimetres from the bottom edge – in a strikingly similar manner to the losses on the opposite side – and extend over a length of approximately 7 centimetres. On a rather unresolved passage in the carpet, to the right by the fruit bowl, the upper paint layers show similar signs of damage (see p. 95, fig. 11). Here, the painter initially depicted a lion's head finial that would have obscured the carpet behind it. The finial was intended as part of a second Spanish chair conceived for the space in front of the table. When Vermeer discarded this idea, he covered the passage rather hastily by integrating the finial's form into the rug pattern. Today, as a result of the aging of the paint layers, two small highlights that were originally meant to gleam on the left-hand side of the lion's head now appear on the peach lying to the right, in a manner that defies the logical fall of light in the interior scene.¹⁶

Some of the points in this damage survey, described here in detail, became visible to the naked eye with the removal of the varnish. This initial



Fig. 11
Detail with remnants
of Vermeer's signature

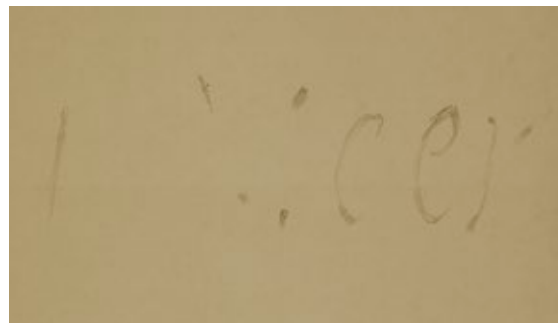


Fig. 12
Tracing of Vermeer's
signature remains

Fig. 13
Detail with scratch on the Cupid's
shoulder

stage also included the removal of a scattering of older retouchings. Their removal revealed only very slight damage and paint loss beneath.

During the cleaning, the conservation team noticed that in the left-hand edge of the overpainted background, close to the curtain rail, the upper paint layers reacted very differently to the solvents than the original paint layers directly beside them. This was again observed at several sample sites in the area between window casement and curtain, and led to Christoph Herm of the Science and Archaeometry Laboratory at the Dresden University of Fine Arts being called in to conduct a series of scientific investigations.¹⁷ The results of these colour sample investigations were astonishing, for they called into question the previously roundly accepted assertion that Vermeer had himself carried out the overpainting of the background motif of the Cupid picture. Two samples in particular from the area of the background picture [samples H8-Q and H9-Q, see p. 52, scheme of the colour samples, fig. 3] proved decisive for this assessment. They showed that there were two layers of binding medium over the ivory-coloured ground coat and the thin original tinted imprimatura. In the sample H9-Q shown (see p. 56, fig. 9 a + b), a thin dark layer is visible between these layers of binding medium, and this could only be identified as a layer of (surface) dirt. Above these layers of binding medium, which mainly contain natural resin and thus should be interpreted as old layers of varnish, there are two layers of overpaint. Lying on top of these was one final layer, the uppermost layer, which represented the same varnish that had just been removed in the period of time since the taking of the sample. All eyes now turned towards the layers of binding medium between the original paint layer and the layer of overpaint. Since the cleaning had also revealed the presence of overpainting along all four edges of the *Girl Reading a Letter*, further paint layer samples [samples H18-S, H14-Q, H20-Q, H21-S, H22-S, H23-S, see p. 52, fig. 3] were taken in these marginal areas and compared with the findings of the background picture. Here, too, we saw that there were old layers of binding agent between the original paint layer and the overpaint. These new findings concerning the stratigraphy of the background picture were backed up by the macroscopic X-ray fluorescence scanning (MA-XRF) of the entire painting, whose results are discussed in detail in the chapter on painting technique (pp. 58–72).¹⁸ Added to this tests, such as solubility tests, establishing differences in the solu-



bility behaviour of the paint layers, and point analysis, examining the paint layers at isolated sample sites, a number of further observations were made. It was observed that the tone of the overpainted area changes from a warm grey at the lower edge to a dark brownish-grey higher up. This colour gradation is particularly conspicuous when compared to the white of the wall to the right of the girl's back. This difference in colour, which was greatly intensified by the removal of the varnish, could not have been a consequence of the natural ageing of the paint. It was due instead to the colour of the paint later used for the overpainting, which had been selected at the time to match the brownish-yellow tone of an already aged layer of varnish that lay over Vermeer's painting. These colour differences and inconsistencies in tonality were an indication that there was an interval of at least several decades between Vermeer's execution of the work, around 1658, and the application of the overpaint. During this intervening period the first (original) varnish layer dried and underwent significant yellowing as it aged. At the same time, a layer of surface dirt and debris settled on top of it. At some point a second varnish layer was applied. Finally, the overpaint layer was applied to the area of wall behind the girl, completely covering up the background Cupid picture for centuries until now (figs. 14–16).



Jørgen Wadum

Fig. 1
Johannes Vermeer
Mistress and Maid,
c. 1666–68, oil on canvas,
90.2 × 78.7 cm, New York,
The Frick Collection,
Henry Clay Frick Bequest,
Inv. no. 1919.1.126

Lost in Transformation The Altered Paintings of Johannes Vermeer

Introduction

In the second half of the 19th century, Johannes Vermeer became a sought-after artist rescued from apparent obscurity, and his works have been the subject of intense scholarly scrutiny ever since. Catalogues raisonnés have been compiled and the many undated works arranged in well-argued, yet no less arguable chronologies.¹ Often these were based on impressions of stylistic development or apparent technical improvements over time. Some of the proposed chronologies by earlier scholars were based on the idea that a painter's development as an artist necessarily follows a linear progression. Reality, however, is often much more nuanced, as artists may return to earlier techniques to reconsider their visual impact under new circumstances. For instance, upon seeing an as-yet-unfinished work in the artist's studio, a connoisseur collector or amateur may voice a preference for a certain artistic trope or symbolic reference and the artist may accordingly take these into account. Recent examinations of Vermeer's canvases have demonstrated that some paintings tentatively dated as seven to eight years apart appear to be painted on pieces of canvas from the same bolt.² This and other discoveries, such as partial overpaint of Vermeer's compositions in later centuries, seem to have sparked a wish for a fresh look at how the 17th century Delft artist created his tantalising and magnificent works of art.

What may fool our present appreciation of a painting are changes that have taken place over time, long after the work left the studio. One such may be different ageing properties of the artist's materials, which often depend on the quality of the pigments or binding media as well as on past environmental conditions in the private houses where the paintings once hung. Such issues may cause one painting to have a markedly different appear-



Fig. 2
Johannes Vermeer, *Mistress and Maid*,
infrared image, © Courtesy the Department
of Paintings Conservation, The Metropolitan
Museum of Art, New York

ance from another from the same period, even when both were made by one and the same hand. For example, exacting scientific analysis of the *Girl with a Pearl Earring* (Den Haag, Mauritshuis) revealed not only that the girl would have once had eyelashes, but also that the now almost monochrome background was in fact originally a dark curtain with folds.³ Similarly, examination of Vermeer's *Mistress and Maid* (New York, The Frick Collection) recently revealed that the faint-brown curved folds of a curtain behind the figures was originally translucent dark-green in colour and is an overpainting, by the artist's hand, over the representation of a large-scale Flemish-style tapestry which itself featured multiple figures (figs. 1, 2).⁴ The visual effect would thus have presumably been more akin to that of Vermeer's *Girl with a Red Hat*



Fig. 3
Johannes Vermeer, *Girl with a Red Hat*,
c. 1665/66, oil on panel, 22.8 x 18 cm,
Washington DC, National Gallery of Art,
Andrew W. Mellon Collection,
Inv. no. 1937.1.53

(Washington DC, National Gallery of Art), whose background similarly features the abstracted designs of a tapestry (fig. 3).⁵

Pentimenti and Later Revisions

When studying alterations in the appearance of a painting, we must always remember that the artist him or herself may have made compositional changes during the work's execution, as was the case with the *Mistress and Maid* mentioned above. Here, the artist not only changed his mind about the background, deciding in the end against the tapestry and instead for a curtain painted in richly contrasting tones representing light and shadows, so that it was much more noticeable than it appears today. Further, we have since learned that the now-blue tablecloth was originally green as well, although lighter and richer in colour.⁶ Thanks to early use of X-radiography, many of the changes in Vermeer's body of work have long been documented, such as the presence of a man in a hat, accompanied by a

Fig. 4
Johannes Vermeer, *A Maid Asleep*,
c. 1656/57, oil on canvas,
87.6 x 76.5 cm, New York,
The Metropolitan Museum of Art,
Bequest of Benjamin Altmann
1913, Inv. no. 14.40.611



Fig. 5
Johannes Vermeer, *A Maid Asleep*, X-radiograph



Fig. 6
Johannes Vermeer, *View of Delft*,
Detail with man, painted-over

dog, in the adjacent room behind the maid in *A Maid Asleep* (New York, Metropolitan Museum of Art) – ancillary background figures that Vermeer subsequently abandoned, choosing instead to add a chair to the right-hand foreground (figs. 4, 5).⁷ In the majestic *View of Delft* (Den Haag, Mauritshuis), meanwhile, the artist initially included a large male figure wearing a broad-brimmed hat in the right-hand foreground, a figure that an intrepid restorer from a bygone age excavated with near archaeological rigour, only to cover it up again – just as Vermeer himself had already decided on doing (figs. 6, 7).⁸ Vermeer also made changes to the design of *Young Woman with a Water Pitcher*, once believed to be by Gabriël Metsu (1629–1667) and now in the Metropolitan Museum of Art New York.⁹ Here, the *Map of the Seventeen Provinces of the Netherlands* on the back wall initially extended further to the left, behind the woman's head, and a sec-

ond Spanish chair with lion-head finals was positioned in the foreground (figs. 8, 9).¹⁰ Vermeer shifted the map towards the right and overpainted the repoussoir chair, decluttering the interior to give more room to the domestic act that is underway. A map initially hung on the back wall in the Berlin *Woman with a Pearl Necklace* (figs. 10, 11), just as it does in Amsterdam's *Woman in Blue Reading a Letter* (fig. 12) and was only abandoned after already being worked up to a high degree of finish and detail.

In *Woman with a Pearl Necklace* Vermeer covered up the map to arrive at an image of serenity with a bare bright wall, maybe to avoid too much of a repetition with the other, slightly earlier painting of the *Woman in Blue Reading a Letter* that displays the Map of Holland and West-Friesland.¹¹ In the latter painting this map was also slightly repositioned further to the right before Vermeer was pleased with the composition.



Fig. 7
Johannes Vermeer, *View of Delft*,
c. 1660–63, oil on canvas,
98.5 x 117.5 cm,
The Hague, Mauritshuis,
Inv. no. 92



Christoph Schölzel
Christoph Herm
Annegret Fuhrmann

Fig. 1
Johannes Vermeer, *Girl Reading
a Letter at an Open Window*, Detail
Chinese plate

On the Painting Technique of *Girl Reading a Letter at an Open Window* by Johannes Vermeer

Introduction

The restoration of Johannes Vermeer's *Girl Reading a Letter at an Open Window* enabled us to gain special insights into the stratigraphy of the painting. These insights are supported by scientific investigations yielding information on the colours used by the artist, as well as the binding media and, above all, the distribution of the colours in the painting. These findings can be compared with the extensive body of research data that now exists concerning other pictures by Vermeer.¹ The uncovering of the background picture and removal of the overpainting along the margins of *Girl Reading a Letter* have made us partly revise previous descriptions of Vermeer's painterly practice for this work.² For this reason, we set out here to describe, in its complexity, the painting technique and genesis of the final composition.

It has to be pointed out that the technical investigation, based on the microscopic survey of the surface, non-invasive measurements, and in-depth analysis on samples taken for stratigraphic survey, primarily served to achieve an overview of the structure and condition of the painting prior to its restoration. As the pigments had already been analysed by Hermann Kühn in 1965,³ additional data was gained from cross-sections of samples taken mainly from the edges of the painting as well as from non-invasive macro-X-ray-fluorescence analysis (MA-XRF)⁴ of the whole painting. A limited number of new samples were extracted and analysed in the later phase of the project for the purpose of determining the binding medium and certain pigments. Figures 2 and 3 show all sites where samples were taken during these investigations (figs. 2, 3).

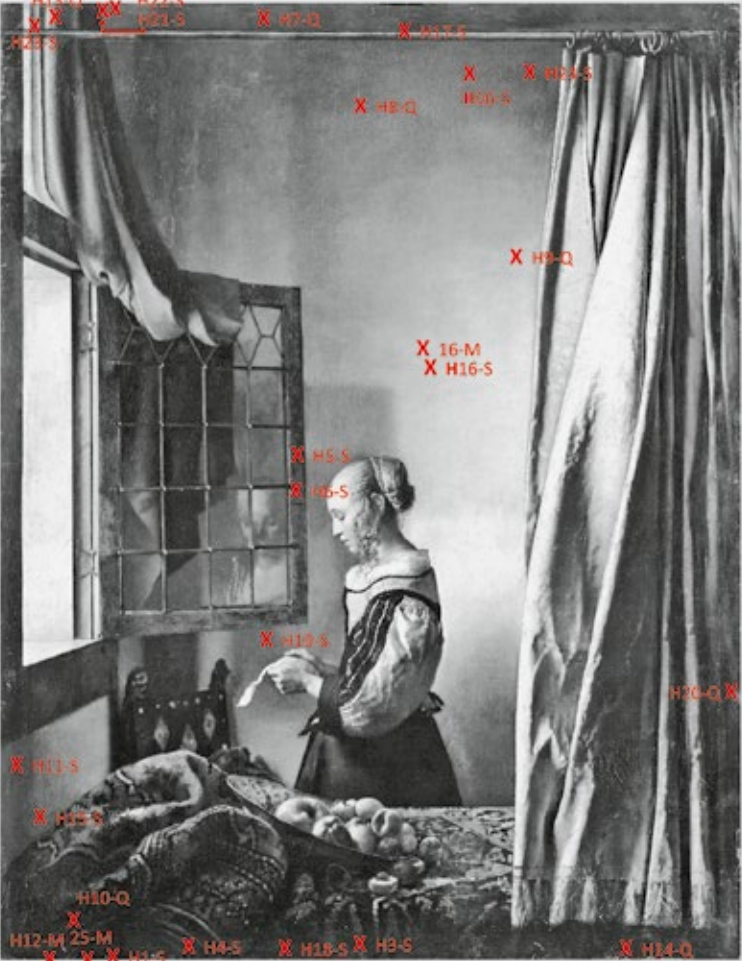
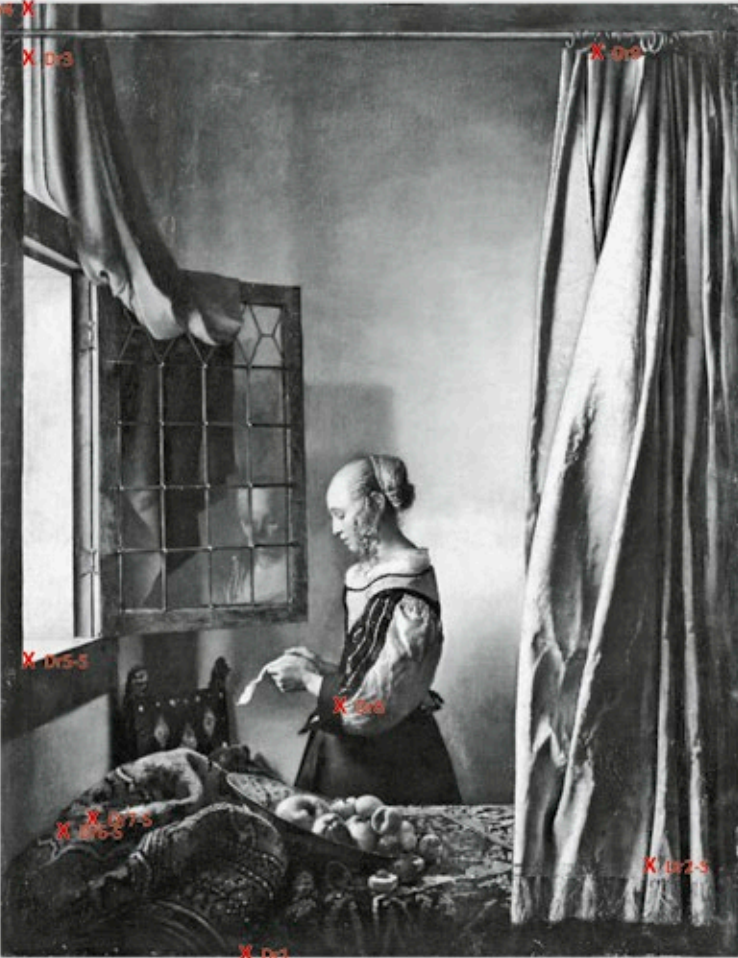
The Canvas

The fabric measures 83 × 64.5 centimetres. However, the measurements of the painted image itself are 77.5 × 60 centimetres. We are dealing therefore with an extended portrait format, one rarely used by Vermeer, with a height-to-width ratio of 1.29 : 1,⁵ a ratio only seen again later, around 1666, with the *Girl with the Red Hat*⁶ (Washington DC, National Gallery of Art) and *The Lacemaker* (Paris, Musée du Louvre), dated to around 1669/70. The comparison of the canvas measurements with the units of measurement common in Holland at the time (although these varied from city to city) shows only an approximate conformity with the width of a Delft ell (*Delfsche el*) of 68.3 centimetres. By contrast, when we account for a narrow tacking margin, the height of the painting roughly corresponds to three Amsterdam feet (*Amsterdamse voet*), equivalent to 84.9 centimetres.⁷

Comparable to other canvases used by the artist,⁸ the thread count ranges from 13 (average 12.64) to 15 (average 14.62) threads per square centimetre in both weaving directions.⁹ The fluctuations in the thread counts, in line with the manual production process, are determined by the differences in the thread thickness, which are between 0.2 and 1 millimetres. Spun with a Z-twist, the threads were woven in a simple linen weave, whereby due to the fluctuating thread thicknesses, areas with a more condensed fabric structure occur alongside smaller portions with a somewhat looser weave characterised by small gaps.

One special feature of the *Girl Reading a Letter* canvas is the pronounced distortion of the weave. Drifting for up to 1 centimetre out of true in both directions, these cusps in the fabric mostly likely arose when the handloomed canvas was first put on a strainer to prepare it for sizing. Created during this vigorous stretching action, this primary cusping is

Fig. 2
Johannes Vermeer, *Girl Reading a Letter at an Open Window*, Scheme of the colour samples taken by Hermann Kühn in 1965



Q – cross section
S – scraping sample
M – material sample

Fig. 3
Scheme of the colour samples taken by Christoph Herm and Annegret Fuhrmann 2017–2022

| Sample/No. | Description | Results |
|------------|--|---|
| Dr1 | brown with ground from the lower edge of the painting | reddish-brown, manganese-rich ochre with titanium-impurities, plant-black, small amounts of led-tin yellow and lead white |
| Dr1a | white – ground from sample 1 | chalk, lead white (protein binding agent) |
| Dr2-S | greenish white from the lower part of the curtain | lead white (containing copper and silver), green earth pigments, a bit of lead-tin-yellow |
| Dr3 | reddish white with ground from the upper window reveal | lead white (containing copper and silver), reddish-brown, manganese-rich ochre (contains titanium) |
| Dr4 | greenish-brown white with ground from the upper window reveal (upper edge) | lead white (containing copper and silver), reddish-brown, manganese-rich ochre (containing titanium), small amounts of lead-antimonate yellow |
| Dr5-S | white from the lower part of the window reveal | lead white (containing copper and silver) |
| Dr6-S | blue from the tablecloth | natural ultramarine blue (heterogeneous particles), small amounts of lead white |
| Dr7-S | red from the tablecloth | cinnabar, small amounts of lead white |
| Dr8 | yellow from the sleeve | lead-tin yellow |
| Dr9 | green from the upper end of the curtain | azurite, lead-tin yellow |

Table 1
Summary of the analysis results by Hermann Kühn, 1965

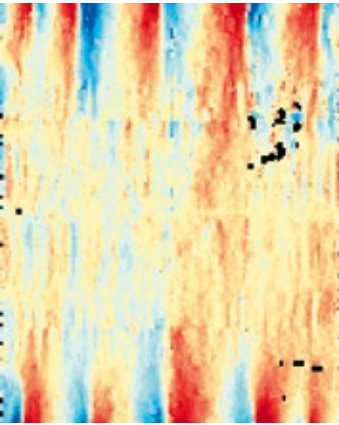


Fig. 4a
Johannes Vermeer, *Brieflesendes Mädchen am offenen Fenster*, Canvas structure analysis, wave map report by Rick Johnson and William Sethares 2017, horizontal thread angels

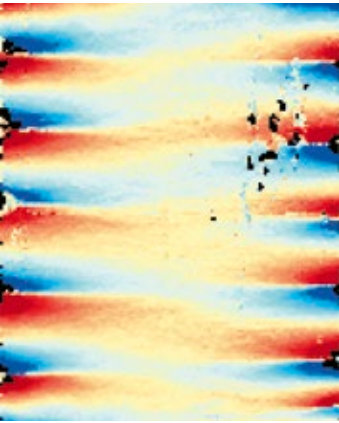


Fig. 4b
Canvas structure analysis, wave map report by Rick Johnson and William Sethares 2017, vertical thread angels

an indication of widely spaced tacking points placed at intervals of 12 to 16 centimetres along the tacking margins.¹⁰ We can surmise that there were five tacking points on the horizontal edges and seven tacking points along the vertical edges. The tacking points in the corners lie conspicuously close to the (subsequently cut-off) outer edges of the canvas. If ones adds up the distances between the inferred tacking holes to these outer tacking holes, one arrives at a hypothetical canvas format approximately 6 centimetres longer on each side. This suggests that, at the time of stretching and immediately prior to sizing and priming, the original canvas format was 6 centimetres longer. The strong vertical distortion of the textile, which continues up to 15 centimetres towards the centre of the painting, could be an indication that this canvas was not prepared by a so-called *witter*,¹¹ the specialist commercial primer documented in Holland in the 17th century.¹² Such broad primary cusping is evidence that the sizing and priming occurred individually, and that the canvas was not cut to measure from a larger, already prepared strip of fabric. It cannot be ascertained whether the fabric was affixed to a narrow wooden framework using wooden pegs, as was the case with the still-preserved original tacking margins of the *Guitar Player* (c. 1670–72, London, Kenwood House), or whether the wide spacing of the tacking holes suggests the use of the so-called Dutch stretching method, in which canvases were pulled taut by cords that were laced through tacking holes and wound around somewhat larger strainers.¹³ The format of today’s picture was cut out of the prepared canvas exactly, so that no tacking edges remained. On all four sides, the limits of the ground layer have been cut off, too. The foot of the roemer now revealed as standing very

close to the lower edge of the image raises the question as to whether the original format of the picture was somewhat larger. Analysis of the canvas structure has revealed nothing to suggest that this was the case. In fact, a comparison of the lengths of the cusping marks on the upper and the lower side shows that they are generally of similar length, and that they do not become noticeably shorter at the bottom, which would have been an indication that the work had been shortened along the bottom edge (figs. 4 a+b; see X-radiograph in the Atlas).

The Ground

For the *Girl Reading a Letter*, as for *A Maid Asleep* (c. 1656/57, New York, The Metropolitan Museum of Art)¹⁴ created around the same time, Vermeer chose, probably after initially sizing the canvas,¹⁵ a light or “warm” grey colour for the ground, typical of this period. In addition to filling and flattening over the canvas pores, this mainly served the function of providing a reflective surface of underpaint for the colours that would be applied on top. After experimenting with coloured grounds – yellowish-brown in the early *Diana and Her Companions* (1653/54, Den Haag, Mauritshuis),¹⁶ a double ground with a reddish-toned upper layer in *Christ in the House of Mary and Martha* (1656/57, Edinburgh, National Gallery of Scotland),¹⁷ and a bright whitish primer in *The Procuress*¹⁸ in Dresden – he settled on light-grey grounds from about 1657 (fig. 5).

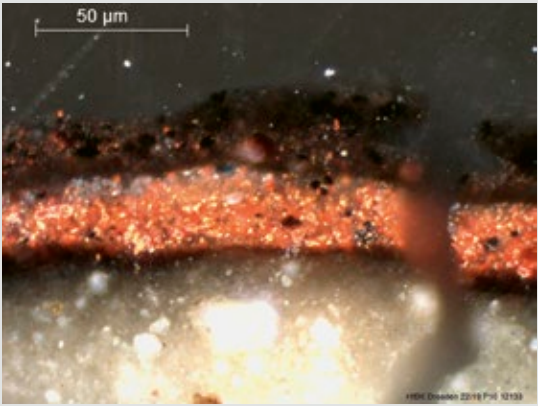
By removing the overpainting, the layer of ground on the upper marginal strip of the *Girl Reading a Letter* is now clearly visible. In 1968 Kühn had already demonstrated the presence of chalk and a quantity of lead white in the smooth ground layer,



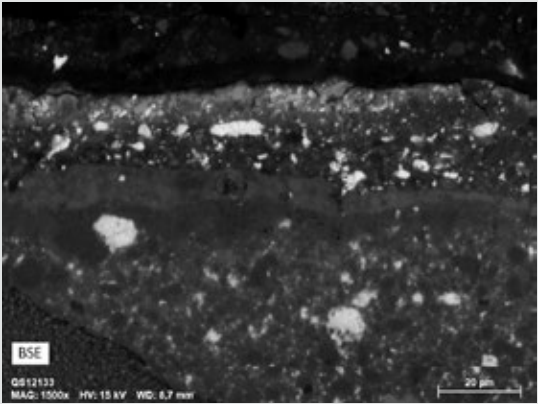
Fig. 5
Johannes Vermeer, *Girl Reading a Letter at an Open Window*, detail, upper-right edge with priming

Fig. 6 a – d
Microscopic images, cross-section of sample H10-Q from the lower edge, left.

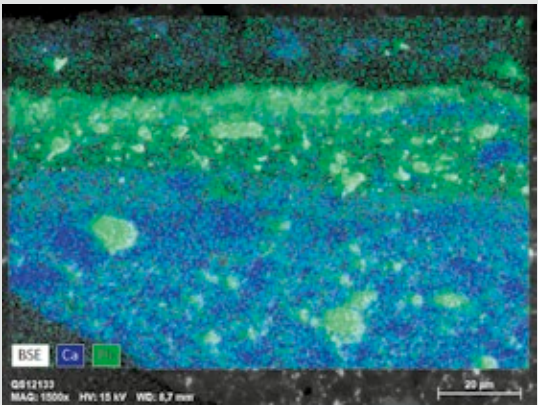
a)
Incident light, layer sequence from bottom to top:
white primer – black underpainting – red paint layer, top lighter with blue pigment – binding agent – dark brown overpainting



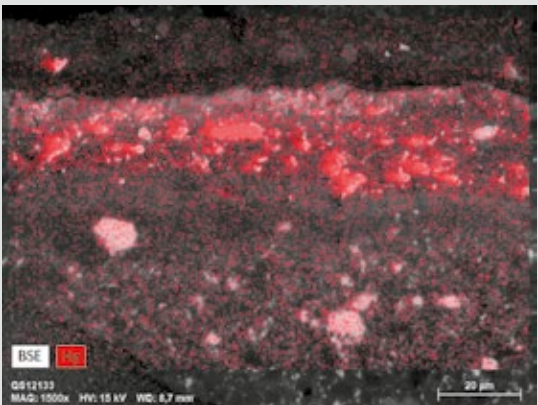
b)
Electron microscope image (back-scattered electron image), section not identical to fig. a



c)
Element distribution (SEM-EDX),
primer: Ca (chalk) +Pb
(lead white, aggregates)



d)
red colour layer: Hg + S (cinnabar),
upper side Pb (lead white/red lead)



0.15 millimetres thick,¹⁹ which did not, however, completely even out the structure of the canvas and was probably applied as a single layer. The elemental composition of the ground layer, as revealed from nine analyses using scanning electron microscopy with energy-dispersive X-ray analysis (SEM-EDX) [samples Dr1, Dr3, Dr4, H7-Q, H8-Q, H9-Q, H10-Q, H14-Q, H20-Q] indicates lead and calcium which subsequent Fourier-transform infrared spectroscopy (FTIR) showed to be a mixture of lead white with calcium carbonate (chalk), [samples H7-Q, H22-S] (see fig. 7). Polarised light microscopy (PLM) revealed that the ground layer [sample H22-S] shows a uniform particle size below approximately 5 micrometres (μm), both for chalk (no microfossils were detected) and lead white. The lead white is mostly aggregated in lumps of up to approximately 20 micrometres in diameter (see fig. 6 c). A mixture of lead white and chalk in a ratio of 1:1 is already mentioned in 1620 by Theodore Turquet de Mayerne as “ceruse” or “cerusa”.²⁰ De Mayerne also describes a mixture of the same substances at a ratio of 2:1.²¹

The observed light grey-beige hue of the ground layer was achieved by an admixture of earth pigments, as indicated by minor amounts of aluminium and silicon (from clay minerals) as well as iron and traces of titanium. These elements could be detected in cross-sections by SEM-EDX [samples H10-Q, H14-Q, H20-Q]. Iron oxide-hydroxide and needle-shaped silicates observed under PLM [sample H22-S] support this conclusion. Minor traces of manganese detected by SEM-EDX in the cross-sections [samples H14-Q, H20-Q] indicate a little umber, which is confirmed from very few particles of pyrolusite (manganese dioxide) under the polarising microscope [sample H22-S] (fig. 7).

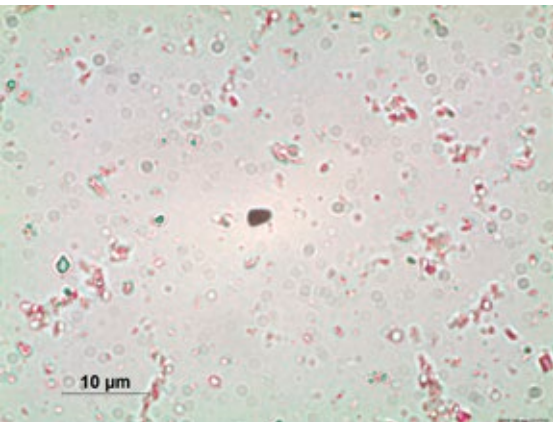


Fig. 7
Microscopic image (PLM, 1 polariser), sample H22-S from the upper edge of the image, primer: lead white, calcite (no coccoliths detectable), iron oxide hydroxide, silicate (needles), very little pyrolusite (center of image)

Underdrawing

Traces of the first steps of the creative process are seldom evident in Vermeer’s pictures. In keeping with the 17th-century concept of *inventio*, these preparatory steps involved drawing, usually directly on the canvas, to work out fundamental decisions about the compositional design and probably also the distribution of light and shadow. In discussing Vermeer’s painterly process, scholars often look to his *The Art of Painting* (c. 1666 – 68, Vienna, Kunsthistorisches Museum) which shows an artist sitting at his easel working on a painting. In the early laying-out stage of that depicted work, we see the lines of an underdrawing executed in white. However, we should be wary of jumping to the conclusion that Vermeer executed his own underdrawings in white chalk. At least in the case of *Girl Reading a Letter* this scenario is highly unlikely, since white chalk marks would have been barely visible on the light-grey ground and thus of little use to him. In Vermeer’s *Girl with a Pearl Earring* (c. 1665 – 67, Den Haag, Mauritshuis) black outlines applied in short strokes with a fine brush were detected by multispectral infrared reflectography (MS-IRR).²² A similar underdrawing in black could not, however, be detected in the painting *Girl Reading a Letter*.

Even if there is no evidence of underdrawings or similar marks or notations to assist in a preparatory design, one of the first compositional decisions may have been the perspectival arrangement of objects in the pictorial space, in particular the window jamb. It was necessary to define the central main point, which denotes the horizontal axis between the artist’s eye and the back wall, which is assumed to be parallel to the picture plane.²³ Unlike many of his other compositions, which the painter laid out with architectural exactitude, using needles pinned into the canvas and coloured threads to make perspectival constructions,²⁴ the lines of recession in *Girl Reading a Letter* do not converge on a single point and instead form a row of points near to the left-hand edge of the green curtain. These main points divide the horizontal line approximately in the ratio 2:1.²⁵

The perspectival construction and calculated spatial relationships between objects within the pictorial space²⁶ are evidence of a precise planning of the pictorial design, for which a ruler and compass were more likely to have been used than a camera obscura.



Anna Krekeler
Annelies van Loon
Ige Verslype

Fig. 1
MA-XRF scanning set-up of Johannes
Vermeer's *Girl Reading a Letter at an
Open Window*, August 2017

Opening a Window

What Macroscopic X-ray Fluorescence Imaging (MA-XRF) Reveals about the Materials, Condition and Genesis of Vermeer's *Girl Reading a Letter at an Open Window*

Introduction

In August 2017, at a crucial stage of its recent conservation treatment (2017–21), *Girl Reading a Letter at an Open Window* (c. 1657–59), painted by Johannes Vermeer (1632–1675), was examined using macroscopic X-ray fluorescence imaging spectroscopy (MA-XRF) – at that time a relatively new diagnostic technique for research on paintings. This technique goes a step further than traditional X-radiography. While the latter only shows a contrast image between light and heavy elements, MA-XRF imaging maps the separate chemical elements across the painting. From the resulting elemental distribution maps, it can be inferred which pigments were used in the painting and where. In the case of *Girl Reading a Letter at an Open Window*, this revealed more specific information about Vermeer's palette, the painting process, and, most importantly for the treatment, the condition of the picture of Cupid hidden in the background by layers of later overpaint. This information supported the decision-making process behind removing the overpaint and unveiling the Cupid. MA-XRF also visualised changes, made during the painting process by the artist himself. Past research, making use of X-radiography and infrared reflectography, had already revealed that Vermeer made some remarkable changes while developing the composition. However, the MA-XRF research from 2017 provided new insights, allowing us to follow, for the first time, Vermeer's creative process step by step by placing the numerous changes into chronological order.

Macroscopic X-Ray Fluorescence Imaging Spectroscopy (MA-XRF)

Principles of the technique

MA-XRF is a non-invasive, analytical imaging technique that was specifically developed for the investigation of paintings. The history of its application in conservation science starts in 2007, when a painting by Vincent van Gogh, *Patch of Grass* (1887), was taken to the DESY Photon Science lab in Hamburg, site of a large particle accelerator. Back then, the researchers scanned an area, 15 by 15 centimetres in size, over a period of three days, producing elemental distribution maps that enabled them to visualise an underlying portrait, on top of which *Patch of Grass* was painted.¹ The use of this technology was revolutionary at the time and received a lot of media attention. It inspired the development of mobile macro-XRF scanners, which made it possible to chemically image an entire painting directly *in situ*, in the museum's gallery or conservation studio. The Bruker M6 Jetstream is the first commercially available mobile macro-XRF scanner. Launched in 2012, it has since found its way into museum conservation studios worldwide.²

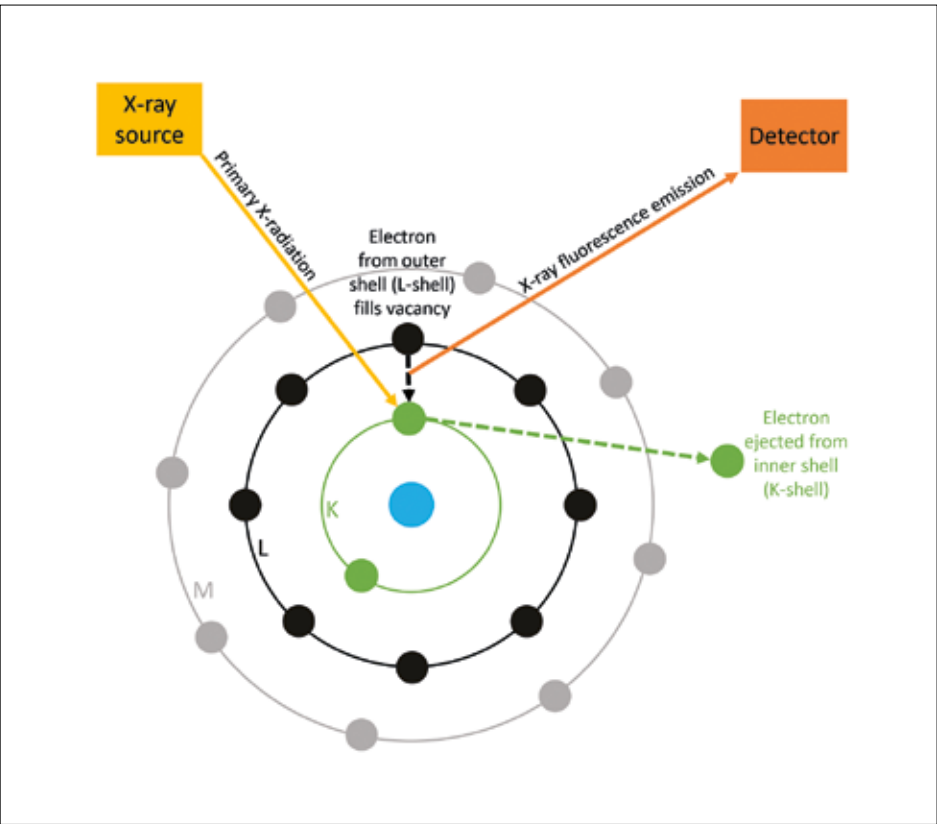
How does the technique work? Like X-radiography, MA-XRF also works with an X-ray source. The X-rays can penetrate all paint layers of the painting and expel electrons from the inner shells of the material's atoms. This brings the atoms in an excited state. To stabilise the atoms, electrons from the outer shells fill the vacancies created in the inner shells, in a process that is accompanied by the

emission of secondary or fluorescent X-rays with a fixed energy that is characteristic of the respective element (fig. 2). By detecting these fluorescent X-rays, the elements in a material can be identified. It must be noted that MA-XRF imaging can only detect those elements which have an atomic number (Z) greater than or equal to that of phosphorus (Z≥15).

The MA-XRF scanner consists of a motorised x-y stage onto which a measuring head is mounted, containing an X-ray source and one or more detectors. The painting under investigation is unframed and secured on an easel in front of the scanner. While ensuring that no actual contact is made, the scanner is positioned close to the surface of the painting, at a distance of approximately 1 centimetre between the measuring head and the surface. By slowly moving the measuring head on the x-y stage, the painting is then scanned ‘line by line’ at a constant speed (fig. 1). The detector can read out the energy lines for each chemical element for each measuring point on the painting. As output, it generates distribution maps of the different elements, usually displayed as grey-scale images (see MA-XRF maps in the atlas). The light areas of the maps represent areas in which the element is present in relatively high abundance.

Interpretation of MA-XRF elemental maps

The historic pigments typically consist of certain characteristic chemical elements. If the scanner detects lead, for instance, this usually indicates the pigment lead white, a lead carbonate: the principal white pigment of Vermeer’s time (see MA-XRF, Pb maps in the atlas). Meanwhile, the presence of mercury indicates the use of vermilion, a bright-red mercury sulphide, in the case of *Girl Reading a Letter* used in the carpet, red curtain, and the figure’s lips and cheek (see MA-XRF, Hg and S maps in the atlas). Some pigments are made up of several detectable characteristic elements. The pigment smalt, for example, is a ground potash-silica glass coloured blue with cobalt. Apart from the cobalt signal, MA-XRF can pick up signals from nickel, arsenic, and bismuth associated with the cobalt ore (see MA-XRF, Co, Ni, and As maps in the atlas). Even if the pigment is heavily degraded, as is the case in some passages of the carpet, cobalt and the other associated elements can still be detected. The combination of lead and tin points to lead-tin yellow, an oxide of lead and tin (also called lead stannate). Here it is used in, for example, the



yellow jacket and fruit bowl (see MA-XRF, Pb and Sn maps in the atlas). The black piping and trim of the young woman’s jacket and black skirt show up in both the maps of calcium and phosphorus, its co-presence is characteristic of bone (or ivory) black (see MA-XRF, Ca and P maps in the atlas). Thus, based on the identified chemical elements, conclusions can be drawn about which pigments were used and where they occur in the painting. Table 1 gives an overview of the pigments that were identified in *Girl Reading a Letter*. In some cases, MA-XRF can detect pigments that originate from ‘hidden’ paint layers and visualise forms that were either discarded by the artist during the painting process or covered by overpaint later in the painting’s history. Both of which are the case in *Girl Reading a Letter*.

Although MA-XRF scanning can provide a wealth of information, the interpretation of the elemental distribution maps can be challenging, and the technology has its limitations. For example, it is not capable of mapping organic (carbon-based) pigments, such as charcoal black or the blue colourant indigo³ (identified in other paintings by Vermeer),⁴ since the elements they contain are too

Fig. 2
Diagram showing process of X-ray fluorescence excitation and emission inside atom

Table 1
Indication for Pigments Based on Elements Detected with MA-XRF in *Girl Reading a Letter at an Open Window*

| Pigment | | Origin | Chemical Composition | Elements Detected |
|---------|-----------------------|---|--|-------------------|
| White | lead white | Synthetic | Basic lead carbonate (hydrocerussite: $Pb_3(CO_3)_2(OH)_2$) and neutral lead carbonate (cerussite: $PbCO_3$) | Pb |
| | Chalk | Mineral | calcium carbonate ($CaCO_3$) | Ca |
| Black | Bone or ivory black | Synthetic | 70–80 % hydroxyapatite: $Ca_5OH(PO_4)_3$, approx. 10–20 % carbon | Ca, P |
| Blue | Smalt | Synthetic | Mainly silica (SiO_2) with smaller amounts of oxides of potassium (K_2O), cobalt (CoO), and impurities from the cobalt ore | Co, Ni, As, Bi, K |
| | Azurite/blue verditer | Mineral/synthetic | Basic copper carbonate: $Cu_3(CO_3)_2(OH)_2$ | Cu |
| | Ultramarine | Mineral | Main component: lazurite, a sulphur-containing sodium, calcium aluminosilicate: $(Na,Ca)_8(AlSi_4)_6(SO_4,S,Cl)_2$ | Ca, K |
| Green | Verdigris | Synthetic | Can contain several forms of copper acetate | Cu |
| | green earth | Mineral | Glauconite and celadonite: $K[(Al,Fe^{III}), (Fe^{II},Mg)](AlSi_3Si_4)O_{10}(OH)_2$ | Fe, K |
| Red | Vermilion | Mineral/synthetic | mercury sulphide (HgS) | Hg, S |
| | Red earth pigments | Mineral | Contain varying amounts of iron oxides, mostly hematite ($\alpha\text{-}Fe_2O_3$), in addition to quartz and clay | Fe |
| | Red lake | Red dyestuff from cochineal insect, roots of the madder (<i>Rubia tinctorum</i>), or brazilwood | Organic dyestuff precipitated on an inert inorganic substrate, usually alum | K, (Ca) |
| Yellow | lead-tin yellow | Synthetic (prepared by heating oxides of lead and tin to 650–800°C) | Lead-tin oxide (Pb_2SnO_4) | Pb, Sn |
| | Yellow earth pigments | Mineral | Contain varying amounts of iron oxides, mostly goethite ($\alpha\text{-}FeOOH$), in addition to quartz and clay | Fe, (Ti) |
| | Yellow lake | Yellow dyestuff from weld (<i>Reseda luteola</i>) or unripe buckthorn berries | Organic dyestuff precipitated on an inert inorganic substrate, usually a combination of chalk and alum | Ca, K |
| | Naples yellow | Synthetic | Lead antimonate ($Pb_2Sb_2O_7$), or lead-tin antimony yellow ($Pb_2SnSbO_{6.5}$) | Pb, Sb, (Sn) |
| Brown | Umber | Mineral | manganese oxides ($MnO(OH)$, MnO_2) in addition to iron oxides | Fe, Mn |



9 | Die ganze Welt in einem Bild The whole world in one picture

Mit dem »Brieflesenden Mädchen am offenen Fenster« malte Vermeer eine seiner ersten stillen Innenraumszenen. Im Ergebnis eines komplexen Entstehungsprozesses fand er zu einer Gestaltungsform, in der er die Realität seiner unmittelbaren optischen Erfahrung zu einer idealen, ausbalancierten Komposition wandelte. Die Wiedergewinnung des Hintergrundbildes mit der Darstellung eines Liebesgottes bringt den intendierten symbolischen Gehalt des Gemäldes wieder zu Tage. Das Motiv geht auf einen Kupferstich in einem damals populären Emblembuch zurück, der Amor mit Bogen und Maske zeigt. Die Bedeutung des kleinen Bildes: Die aufrichtige Liebe überwindet Betrug und Heuchelei – kann in diesem Sinne mit der Figur der Briefleserin verknüpft werden. Die junge Frau ist in ihrem Privatraum von verschiedenartigen Ausstattungstücken umgeben, die in intensiver Farbigkeit hervortreten. Ihre zeittypische schwarzgelbe Miederjacke findet sich auch in vier weiteren Gemälden des Künstlers. Der zu einem Faltenberg aufgeworfene Teppich konnte als türkischer Medallion-USchak, die Obstschale mit einem unterglasurblauen figürlichen Dekor als importiertes chinesisches Kraak-Porzellan identifiziert werden. Ebenso wie der Spanische Stuhl in der linken Raumecke gehörten diese zu den wertvollen, weitgereisten Luxusgütern des Künstlerhaushaltes.

Christoph Schölzel
Daniel Lordick
Christoph Herm

Johannes Vermeer's *Girl Reading a Letter at an Open Window* in a Peepshow Box – an Experiment

The edges of the painting

Uncovered in the second stage of the restoration, the edges of *Girl Reading a Letter at an Open Window* suggest that the functional context of the Dresden painting was different from that of other Vermeer paintings. Since the aforementioned findings¹ on the approximately 2.5-centimetre-wide edges are very heterogeneous, it remains a matter of speculation whether any of the possibilities presented below can explain these strips at the margins. The broad edges, which contain unfinished pictorial elements whose development was evidently broken off at different stages of the painting process, may have been part of the compositional scheme as it was originally conceived. It is possible that they reveal developmental stages of the underpainting which played no further role in the execution of the painting – perhaps because by then they had already been covered over.

The foot of a large roemer glass in the bottom right-hand corner,² which came to light when the layers of overpainting were removed, also raises the question of why the glass had been positioned so close to the lower edge of the painting. When the painting was placed in a decorative frame, as was customary, the foot of the glass would definitely have been covered by the frame rebate at the lower edge. The tension garlands on the canvas, however, would seem to indicate that the picture support cannot have been significantly trimmed.³ The question therefore arises as to whether the roemer glass might have been part of a different, discarded composition.

Main motifs

When attempting to determine the functional context of the painting, it is logical to take the motifs used in the painting as the starting point: The main motif, that of the girl reading the letter, is not so dissimilar to other Vermeer genre paintings as to suggest that its intended display context differed significantly from that of comparable paintings by the same artist. The motif of the open window on the left also appears in four other interiors painted by Vermeer. It is hardly conceivable that the window extended into the broad border strip on the left-hand side.

The table with the fruit bowl, as well as the Spanish chair in the foreground, which had already been created with a reserve,⁴ function(ed) as a pictorial barrier. This separation of the foreground from the main scene was a technique used by Vermeer in other works from the same period, albeit in a way that filled a much larger portion of the pictorial space, for example in *The Procuress* (1656, Dresden, Gemäldegalerie Alte Meister) and *A Maid Asleep* (c. 1656/57, New York, The Metropolitan Museum of Art); these two paintings do not, however, feature painted strips at the margins comparable to that of the *Girl Reading a Letter*.

A further motif is the green curtain, which, with its fringes and the row of holes at the upper hem, is clearly meant to give the impression of a real-size picture curtain, even if some authors have interpreted it as part of the scene and as being actually located in the corner of the girl's room.⁵ The intended illusionism of the curtain has since been established beyond doubt as a result of observations made in a life-size reproduction of the pictorial situation carried out in collaboration with the Dresden University of Fine Arts.⁶ The quasi extra-pictorial curtain links the *Girl Reading a Letter at an Open Window* with numerous paintings by contemporaries of Vermeer, many of whom adorned archi-

Fig. 1
Watching Vermeer's painting
Girl Reading a Letter at an Open Window in the peep-box, Jörgen Wadum on September 9, 2021



Fig. 2
Cornelis Boel, *Inconscusa fide* (*Oprecht*), emblem from: Otto van Veen, *Amorum emblemata*, Antwerp 1608 [28], [motifs: posture of Cupido, foot on a mask, bow erected]

tectural motifs, still lifes, portraits, and genre scenes with such trompe l'oeil curtains.

The cut-off upper segments of the rings from which the curtain hangs, and the absence of brackets holding the curtain rod, on the other hand, may perhaps indicate a special context in which these details were continued on a frame or wooden surrounding. This *bedriegertje*, or 'little trickster', could conceivably have been mounted in a blind window or wall niche,⁷ and it might have provided entertainment for guests in a similar way to the picture of a maid that Rembrandt is said to have placed in the window of his house for passers-by.⁸

The question arises whether the large background picture of Cupid uncovered during the restoration, which is comparable to the Cupid pictures in *Young Woman Standing at a Virginal* (c. 1670–72), London, The National Gallery), *Girl Interrupted at her Music* (c. 1658/59, New York, The Frick Collection) and *A Maid Asleep* (fig. 6–9), might provide clues regarding the possible context in which the Dresden painting was displayed in Vermeer's time. While searching for a precedent to the Cupid painting-within-a-painting, the suggestion arose that it might be based on formerly existing works by the artists Caesar Boetius van Everdingen (1616/17–1678) and Jacob van Loo (1614–1670).⁹ Their paintings were



Fig. 3
Cornelis Boel, *Perfectus amor non est nisi ad unum* (*Een alleen*), emblem from: Otto van Veen, *Amorum emblemata*, Antwerp 1608 [2], [motifs: raised left arm, bow raised]



Fig. 4
Cornelis Boel, *Auro conciliatur amor*, emblem from: Otto van Veen, *Amorum emblemata*, Antwerp 1608 [65], [motifs: quiver with arrows on the ground]



Fig. 5
Unknown Flemish artist, *Cupid holds up the ring of Gyges and steps on a mask*, around 1670, oil on oak, Bunte Kammer im Herrenhaus Ludwigsburg bei Eckernförde, picture no. L 29

probably modelled on the basis of prints in the emblem book *Amorum emblemata* (figs. 2–4) by Otto van Veen, which was first published in 1608.¹⁰ Stylistic similarities to extant paintings by these artists would still have been clearly apparent in their translations of van Veen's prints into the medium of painting.¹¹

Assuming this conjecture to be correct, little consideration has so far been given to existing Cupid images found in different functional contexts.¹² For example, there are paintings with thirteen depictions of love emblems integrated into an Antwerp cabinet,¹³ as well as a series of 36 paintings as part of the interior décor of the Bunte Kammer (Colourful Chamber) in the manor house of Kohöved (now Ludwigsburg) near Eckernförde, which were painted by an unknown Flemish artist and contemporary of Vermeer after prints from Van Veen's emblem book (fig. 5).¹⁴

Vermeer would probably not have seen those pictures. Nevertheless, they attest to a certain popularity of such reproductions after the emblem book, which went through numerous editions.

Whereas in Ludwigsburg the whole spectrum of possible iconographic images after Van Veen's Cupid motifs is laid out for the elevated discourse of the landed aristocracy, Vermeer has taken up only a few of those motifs in his four known background Cupid pictures. Moreover, he has adapted them: In Vermeer's work, unlike Van Veen's, Cupid, equipped with a bow, is depicted standing on an upturned

mask, with another lying on the ground at his feet along with a quiver of arrows. This quiver motif appears in several engravings by Van Veen. Vermeer's London Cupid holds up an unidentified card in his left hand. In Van Veen, it is, in one case, a number board showing the number 1, and, in another, the ring of Gyges that Cupid is shown holding in this posture.

Given the existence of these variations on the Cupid motif, it seems questionable whether Vermeer had recourse to only one Cupid painting or sculpture; perhaps he was also familiar with the Van Veen book or knew of other painters' adaptations of the prints in the emblem book, and took inspiration from them in order to vary the attributes of his Cupids. The painter must have been aware of the emblematic, iconographic context of the Cupids with their different attributes when he incorporated the Cupid pictures, which are by no means modest in size, into the background of his interiors.¹⁵

Vermeer paintings in "kastjes"

Another consideration derives from the knowledge that Jacob Abrahamsz. Dissius, who was married to Juffr. Magdalena van Ruijven, daughter of the Vermeer collector's couple Pieter Claesz. van Ruijven and his wife Maria de Knuijt, owned three Vermeer paintings in 'kastjes' – as is evident from the post-mortem inventory of his estate drawn up in April 1683.¹⁶ Specifically, it is recorded that at an auction

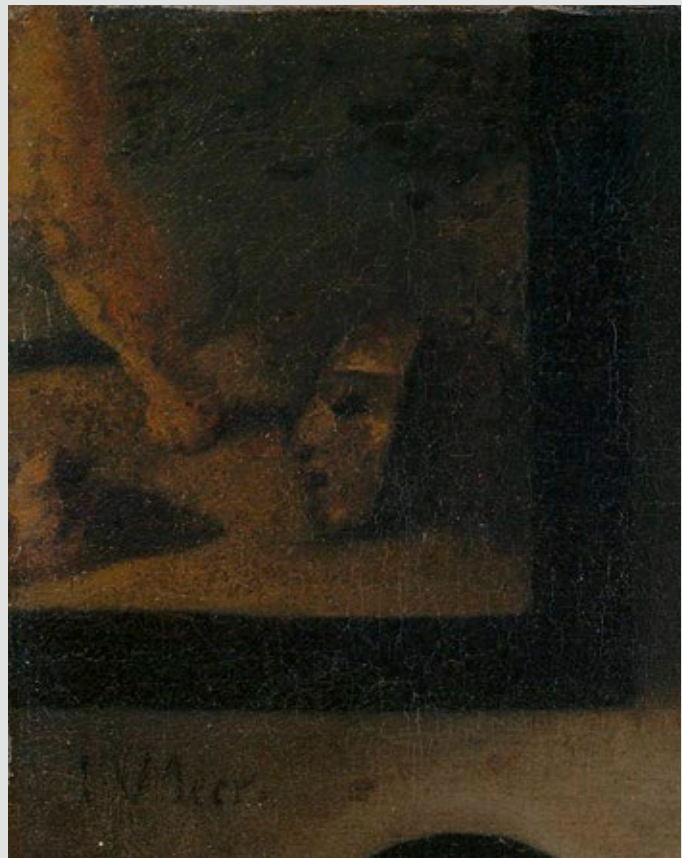


Fig. 6
Johannes Vermeer, *A Maid Asleep*,
detail of upper-left corner containing
the truncated picture on the wall



Fig. 7
Johannes Vermeer, *Girl Reading
a Letter at an Open Window*, detail
Cupid picture in the background



Fig. 8
Johannes Vermeer, *Girl Interrupted at
Her Music*, detail Cupid picture in the
background



Fig. 9
Johannes Vermeer, *A Young Woman
Standing at a Virginal*, detail Cupid
picture in the background

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