



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Looking in the mirror of Renaissance art

Citation for published version:

Warwick, G 2016, 'Looking in the mirror of Renaissance art' *Art History*, vol 39, no. 2, pp. 255-281. DOI: 10.1111/1467-8365.12237

Digital Object Identifier (DOI):

[10.1111/1467-8365.12237](https://doi.org/10.1111/1467-8365.12237)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Art History

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



Looking in the Mirror of Renaissance Art

Genevieve Warwick

Art History, 39.2, Spring 2016, special issue,
Art and Technology in Early Modern Europe,
eds. Richard Taws and Genevieve Warwick

Abstract: This paper has a dual focus concerning the use of the mirror in making and viewing Renaissance art. It considers the mirror both as an instrument of artistic practice, and as an emblem of pictorial representation within painting. Inaugurated by Brunelleschi's great experiment staged at the door of Florence Cathedral on the one hand, and Van Eyck's *Arnolfini Double Portrait* on the other, a Renaissance art of mimetic resemblance was predicated on a deeply-worked approximation between the mirror reflection and the theory of painting. This close affinity between the mirror and the painting's surface, as Leonardo's notes make manifest, underpinned both the theory and practice of Renaissance art as constituted in the studied imitation of visual observation. Thus the mirror reflection became, both within the workshop and within representation, the instrument and the definition of what a painting was.

In his 1568 biography of the Venetian painter Giorgione, Giorgio Vasari described a now-lost or possibly fictive painting by this artist composed of a series of mirrored effects, apparently depicting a male nude seen from behind:

at his feet, a limpid stream of water bearing his reflection.

To one side was a burnished cuirass that the man had taken off, and this reflected his left profile since the polished surface of the armour revealed everything clearly.

On the other side was a mirror reflecting the other profile of the nude figure. This was a very fine and fanciful

idea.... greatly praised and admired for its beauty and ingenuity.¹

While the Venetian critic Paolo Pino had twenty years earlier identified the figure as a St George clad in armour, by 1590 G.P. Lomazzo would alter the identity of the figure yet again, transforming it into a female as an allegory of painting: “Giorgione represented Painting as a nude, reflected in a stream... with a mirror behind her to show her from the back, and a polished cuirass at her side that reflected her in profile.”² Whether fiction or the description of a lost work of art, the conception fits well into a historical trajectory of pictorial, as well as critical, concerns of the period. For at this moment Renaissance art saw an efflorescence of paintings concerned precisely with the effects of mirrored reflection, represented by mirrors themselves and in a further range of reflective surfaces – armour, pools of mirroring water, and decorative objects such as glass vessels and jewels.³ As Lomazzo’s transformation of the figure’s identity into an allegory of *Pittura* makes manifest, the mirror reflection in Renaissance art was to become an emblem of the art of painting itself.

Indeed, the depiction of mirrors within Renaissance painting may be said to have articulated a pictorial declaration of art’s very powers of illusion. These inset mirror-images served to remind the viewer that a painting, however persuasive

in its imitation of nature, was in fact a flat surface covered with coloured pigments. As such, the inset mirror within the image acted as an “*abrégé du tableau*” – a painting in reduction - even as it underscored the analogy between the two.⁴ The mirror within the painting was nothing other than the representation of painting within itself, and a metonymy of its own art. It thus acted as a reflexive ‘doubling’ of art, a return of painting on itself. This modality of self-reflection within the work famously defined Michel Foucault’s view of early modern cultural production. In the mirror-within-the-painting Foucault recognized what he termed ‘the enchantment of the double’, which in his view constituted the structuring sign of early modernity. Such emulation of the mirror was, for Foucault, not only a literary preoccupation of the period (the ‘play within the play’), but also a lodestone of its mimetic art, manifest above all in “*les miroirs-tableaux*”, those works that explicitly displayed their conceptualisation of painting as specular.⁵ Further, as Lucien Dällenbach famously argued in a study of the specular double in literature, the painted mirror image in early modern art may be understood as a representation of the art of painting itself.⁶ In this regard it was a recollection, within the illusion of the painted surface, of what André Chastel would term “the scenario of painting’s own production”, that is, a depiction of the art of art.⁷

During this same period, the mirror as object became an increasingly common workshop tool, with a range of uses within artistic practice. Chief among these was as an instrument of mimesis. In the pursuit of an ever-more accurate pictorial representation of nature, Renaissance artists turned to the growing supply of mirrors as a means of reflecting, and so pictorializing, the world around them. In the studio, the mirror served as a practice-based device to facilitate the transposition of the visible world of three dimensions into the flat plane of a painting. Its reflected image offered a simulacrum of painting's field of visible observation to the painter's study of his subject, already translated into a two-dimensional, pictorial format. Moreover, it rendered the scene in reduced scale, just like a painting. Thus the mirror reflection was both an instrument and a model of the visible world for the painter's brush.⁸ The increasingly prevalent workshop use of the mirror as a mimetic tool may thus be tied to what has been analysed as a greater mechanisation of artists' methods from the fifteenth century on.⁹ This is linked to the changing paradigms of visual imitation that scholars identify as 'Renaissance', in which painting was admired for its proximity to a mirror-reflected field of vision. In this context the mirror was but a technology of imitation, to be sure, yet its visual effect was recognized as an equivalent to painting itself.

This essay therefore takes a double focus, between making and viewing, to argue that a Renaissance art of mimetic resemblance was predicated on a deeply-worked approximation between painting and the specular image. The analysis proceeds by singling out particularly pronounced historical manifestations of the mirror analogy in Renaissance and early modern painting, weaving them together with accounts of pictorial experiments with mirror reflections and their elaboration in critical and theoretical treatises of the period. It moves from Brunelleschi's lost but celebrated reflection-painting at the door of Florence Cathedral (c. 1413-20) to the great Galerie des Glaces at Versailles (1678-84), to argue for an early modern elision of the picture plane with the mirror, which drew together the surface of a painting with the technological means of its own production.

Mirrors and Mimesis

The pictorial trope of the mirror's reflective surface as the sign of painting was, in a Renaissance historiography of art, famously tied to the developing technology of perspective and optics in the story of Brunelleschi's celebrated experiment at the door of the Florentine cathedral. Standing inside the Duomo looking out at the Baptistery, Brunelleschi painted a panel of the scene framed by the doorway. The panel's square shape – reported to have been a half *braccio* along each side – was designed to correspond in reduced scale to the view of the

Baptistery as seen through the Cathedral's double doors, and to match the size of a mirror he used to reflect the scene back to himself. Brunelleschi clearly conceived of the painted panel and the mirror as a pair.¹⁰ To further the correlation between the panel and the mirror reflection as parallel representations of the view itself, Brunelleschi burnished the sky of his panel with silver. In this way the panel's upper section was also a reflective surface which, when placed inside the Duomo's doorway facing outward, would reflect the actual sky with its passing clouds and changes of atmospheric effects. With the mirror in front of the panel and facing towards it, its reflective surface mirrored the painting of the Baptistery and its doubled reflection of the actual, moving, sky. At the centre of his panel Brunelleschi made a small peephole. When the viewer stood inside the Cathedral doors facing out at the view of the Baptistery, as Brunelleschi had done when painting it, and peered through the panel's peephole from the back, s/he saw the panel's reflection in the facing mirror, made to look just like the view itself.

In this pictorial experiment, Brunelleschi's claim was that painting could perfectly reproduce the visible world like a mirror reflection. His motive was to demonstrate the representational accuracy of a mathematically-derived perspective system in painting. He deployed mirror technology to advance that claim through a visible demonstration of it. It allowed the viewer to compare the view through the doorway

with the painted view seen through the peephole, and to find them fully equivalent. The overriding historical importance of the early fifteenth-century development of perspectival rendering in painting has inclined the scholarly literature to subsume Brunelleschi's great experiment wholly within the narrative of one-point perspective. While acknowledging the central importance of the historic development of perspective for Renaissance art, my interest here is in Brunelleschi's instrument, the mirror, and its role as a technology of mimesis in the story of Renaissance painting. For the claim that painting could represent the fiction of space on a two-dimensional surface was made by analogy with the mirror.

<Line Break>

The history of the glassed mirror as a material object is long and diffuse, marked by incremental technological changes in the history of glass production and in the application of different combinations of liquid metals to a glass surface.¹¹ Early Renaissance mirrors were made from blown glass which was then silvered and cut to form half-globes. The means of making even small flat panes of glass which could then be silvered into mirrors did not become prevalent until the early sixteenth century, and large sheets of flat glass awaited technological developments in glass-making in the mid to late seventeenth century.¹² Yet a much longer tradition of small, flat reflecting surfaces of polished metal, both circular and square, constituted

the mirrors of the ancient world, as was known across the Renaissance. Steel gave a particularly clear and colourless reflection, and could be tempered into sheets of considerable size. These metal mirrors might also be silvered to increase the reflectivity of the surface finish, as was seemingly the case with Brunelleschi's panel in its reflection of the sky. Thus the metaphor of the flat squared surface of a painting as mirror-like that Brunelleschi appealed to in his view of the Baptistery was well known across the period. The Renaissance ushered in a newly-insistent approximation between painting and the mirror, yet this drew on a much longer history of their analogy and comparison.

<Line Break>

The typology of painting as a mirror already present in Brunelleschi's experiment deepened with the increased production of mirrors during the fifteenth and sixteenth centuries. This progressed alongside a growing diffusion of oil paint, whose reflective surface also served to heighten the approximation between a painting and a mirror. The early use of oil sought to form a glistening pictorial surface out of light-reflecting glazes, much like the brilliance of a mirror's sheen. This new-found specularity of painting was prescient above all in the work of Jan Van Eyck, as Vasari acknowledged, noting its heightened mimetic possibilities particularly in the rendering of lustre and gleam.¹³ It is epitomized in his *Arnolfini Double*

Portrait (1434) whose celebrated perspectival centre concludes in a convex mirror of tondo form. The painted mirror 'reflects' conversely between its pictorial and viewing spaces (*plate 1*).¹⁴ This small circular mirror rises towards its centre, typifying the blown glass manufacture of the early Renaissance. We see the couple from the front in the painting, while the mirror reflection behind shows them in reduction from the back. In the depths of the mirror we also see another pair of figures facing them, which is somehow strangely us, for they stand in what must be our position as viewers. At the same time, it must also have been Van Eyck's position as he painted the work, so conflating the painting's production with its new-found specularity. A metonymy of painting's art as founded in the study of light and reflection, the Arnolfini mirror is surrounded by a succession of objects that amplify this theme: glass beads, a brass chandelier, the small glass roundels of the mirror's frame, all studies in the painter's art of reflection. The detail of the mirror may be seen as an artistic reflection, both literally and metaphorically, on what painting is. Yet it must also have been the means of the painted mirror's making, Van Eyck surely studying from a mirror reflection in order to paint it. This is further corroborated by the use of oil as a binding medium, so deepening the identification between the pictorial and the specular. Here Van Eyck apparently plays with the nature of the illusion of art, fusing viewer space with the fictive space of the painted mirror.

This most celebrated of mirror images within painting thus reflects on its own status as pictorial representation. The motif of artistic self-reflection is further amplified in Van Eyck's subsequent depiction of a tiny figure standing at an easel, thought to be himself as he painted, in the shield of St George in his *Virgin and Child with Canon van der Paele* (1436).¹⁵ It is noteworthy that painters and mirror-makers belonged to the same guild in Van Eyck's Bruges, providing an easy point of transfer between their respective crafts of illusion. It is perhaps also significant that the Dutch term for shield – *schilder* – was commonly used to refer to painting, as Carel Van Mander's 1604 book on painting titled *Het Schilderboeck* would later make manifest, and which might underlie Van Eyck's representation of himself painting in the shield of his St George.

According to some scholars the Arnolfini double portrait may have had a painted cover, also attributed to Van Eyck, of a bathing female nude reflected in an inset mirror to show her figure from the side and the front. Now lost, perhaps separated from the double portrait by Arnolfini's wife herself before her death, the image of this possible painted cover for the portrait is known from copies (*plate 2*).¹⁶ Here a small convex mirror shaped of blown glass, as in the Arnolfini portrait, mirrors the figures as if in a globe. This reflected image was, perhaps, like Giorgione's lost work of reflections, designed to "confound the sculptors" by showing the figure from multiple viewpoints as if

in the round. For the sculptors had claimed this as proper to their art alone in the great debate of '*paragone*' or comparison of the arts that structured much Renaissance art criticism.¹⁷ Conversely the painters argued that their art required greater knowledge in order to represent the effects of space, volume, light fall and reflection in a two-dimensional medium. Thus, in his lost work depicting multiple reflecting surfaces with which this essay began, Giorgione used the motif of the mirror to represent the art of painting. For the surface of a painted canvas was just like a mirror, as Brunelleschi had demonstrated, reflecting back to the viewer all that is visible. Thus the painted mirror image was, in this sense, a painting within a painting, both the model and the instrument of its art.

<Line Break>

As Van Eyck painted his Arnolfini portrait, Leon Battista Alberti was writing his great theorisation of the art of painting, *De Pictura* of 1435. Indelibly bound up with the development of one-point perspective as the new structuring logic of the picture plane, Alberti's treatise famously conceived of painting as an open window "through which I see what I want to paint".¹⁸ This analogy between painting and an open window is already at play in the depiction of the window within the Arnolfini portrait, and repeated in the reflection of the same window within the painting's inset mirror. The simile is also at work in Brunelleschi's conceptualisation of painting as the view through

a doorway, transposed into the reduced size of a mirror. The widespread adoption of the window motif within the Renaissance, as an Albertian paradigm of the nature of painting, would become a parallel to the metaphor of the mirror and an equivalent definition of painting's art.

At the same time, like his friend Brunelleschi to whom Alberti dedicated the Italian edition of his book, Alberti also understood the picture plane in terms of the technology of its making. He theorized the plane as what he termed the 'intersection' between the viewer and subject depicted, which he characterized as a perspectival grid standing at a midpoint between, and intersected by, on the one side the viewer's rays of vision and on the other the converging lines of pictorial space. In his practice he advocated the use of a framed grid or squaring device to embody his conceptualisation of the intersection, which in effect became the technological means of conceptualising a work of art. Standing between the artist's eye and the object to be depicted, this grid was just like a window. By this means the artist could frame the composition, using it to transpose her/his perception of the world into two dimensions. S/he constituted this workshop-based device out of a transparent veil of very finely woven cloth like muslin, marked out by parallel lines in a larger thread:

Nothing can be found, so I think, which is more useful than that veil which among my friends I call an intersection. It is a thin veil, finely woven, dyed whatever colour pleases you and with larger threads [marking out] as many parallels as you prefer. This veil I place between the eye and the thing seen.... This veil can be of great use to you.... The veil will greatly aid you in learning how to paint....¹⁹

Like Brunelleschi's mirror, Alberti's intersection was both an instrument of artistic production, and a virtual simulacrum of the work of art in the making. The conflation of the picture plane with the workshop instruments of a mimetic art heightened the proximity between painting as representation, and the processes of its own production. The inset mirror, as both a metaphor and an instrument of the art of painting, directly articulated this correlation.

Elsewhere, like Brunelleschi, Alberti also conceived of painting as a mirror, for he traced the invention of painting to the myth of the beautiful youth Narcissus who fell in love with his own reflection in a watery pool. Becoming so enamoured that he reached out to embrace this image of himself, he was pulled into the water which, in Ovid's poetic version of the story in the *Metamorphoses*, was the origin of the narcissus plant. In

Alberti's retelling, the myth refers instead to the origins of painting, where the boy's reflection was the sign of art:

I say among my friends that Narcissus who was changed into a flower, according to the poets, was the inventor of painting. Since painting is already the flower of every art, the story of Narcissus is most to the point. What else can you call painting but a similar embracing with art of what is presented on the surface of the water in the fountain?²⁰

Long after Alberti, Caravaggio would pictorialize the myth of Narcissus and his embrace of the mirror reflection in the surface of the shimmering pool. The canvas in question represents both the boy and the reflection he gazes at (*plate 3*).²¹ The love that Narcissus sought was more than an image, it was a mimetic translation of his three-dimensional self onto a two-dimensional surface. In this lay its art as well as its lure – it looked just like him, yet was in fact a composition of glistening ribbons of colour on the flat surface of the water, as if a painting. The mirroring effects within Caravaggio's work stand as an emblem of this painter's art of realism, advancing the claim of this artist who famously purported to 'paint what I see'.²²

In terms of both representation and of process, Caravaggio's *Narcissus* was bound up with the analogy of painting as a mirror. Like Brunelleschi's panel, Caravaggio's

Narcissus would also appear to have been conceived through the use of mirrors as the technology of its artistic production. Here the artist seemingly worked from a model placed before two flat mirrors situated with one perpendicular to the other. One mirror was laid flat to capture the reflection of the boy in the ‘water’, the other upright for the depiction of the youth leaning over the ‘pool’. Among his otherwise meagre possessions listed in an inventory of Caravaggio’s property dating to 1605 were two mirrors, one large, and one convex.²³ Giovanni Baglione, an artist himself and one of Caravaggio’s early biographers, observed that this artist commonly painted his figures by studying his own reflection in a mirror. This testimony regarding the use of mirrors within Caravaggio’s working practice is one that scholars of the period acknowledge as widespread.²⁴

Since the cleaning of Caravaggio’s Uffizi *Bacchus* in 1922 the fine detail in the reflections depicted in the carafe have become clearly visible (*plate 4*). Mina Gregori here observed “the reflected head... of a male who wears a contemporary costume with a white collar; there also seems to be a painting seen from the back, as though on an easel.”²⁵ Both versions of Caravaggio’s *Boy bitten by a lizard* similarly suggest the reflection of a window in the carafe of water, with the intimation of the room in which the work was painted, as in the Arnolfini mirror image of the room depicted in the painting. In

Caravaggio's attentive art of visible realism, he seemingly rendered a reflection of himself and his surroundings as he worked on the Uffizi *Bacchus*. Through the prism of the reflective glass carafe, Caravaggio pictorialized his own artistic process in front of a mirror whose reflection he could then transpose onto the canvas. This suggestion furthers the intimation of a heightened proximity between painting and specularly, both in representation but also, crucially, in painting's depiction of its own production. The reflected images in *Boy bitten by a lizard* also suggest the painter's studio, lending further credence to Caravaggio's use of the mirror as a technology for translating visual observation into art. Thus Alberti's story of the origins of painting in the pool of Narcissus had its practice-based counterpart. In the studio, the mirror was the artist's instrument for transposing the visible world into the two-dimensional surface of painting. In representation, the mirroring surface inset within the painting became the locus for the reflected depiction of its own production.

The study of mirror reflection in the art of Vermeer is most clearly defined in his *Music Lesson* (plate 5). The mirror that hangs above the virginals reflects not only the face and bust of the woman who plays the instrument but also, at the top of the image, the legs of the artist's easel. Thus the reflection intimates the painter's presence. Vermeer's *Allegory of Painting* and his *Allegory of Faith*, like the *Music Lesson*, also

pictorialize the ‘scenario of their own production’, albeit in very different ways. This is explicit in the *Allegory of Painting* (plate 6) where the painter stands at his easel in the act of painting the model before him; while in the *Allegory of Faith* (plate 7) we also see the artist at work before a canvas, but here in the miniaturising reflection of the blown globe of clear glass that hangs from the timbered ceiling.²⁶

<Line Break>

The practical use of the mirror as a mimetic aide in painting surely adopted by Vermeer was one that Leonardo had much earlier counselled in the notebooks he kept throughout his working life.²⁷ With the intention of assembling them as a series of treatises on various aspects of his art, these included a discussion of the mirror as a simulacrum of painting, but also of its instruction:

How the mirror is the master of painters:

You should take the mirror as your master, that is a flat mirror, because on its surface things in many ways bear a resemblance to a painting. That is to say, you see a picture which is painted on a flat surface showing things as if in relief: the mirror on a flat surface does the same. The picture has but one surface and the mirror the same.²⁸

Leonardo so fused painting with the reflection of the mirror that elsewhere he urged the painter to “liken his mind to its surface”.²⁹ Across his notes, made over many years, his thoughts encompassed a wide-ranging and varying analogy between the mirror and the canvas. Most profoundly he understood the mirror as a parallel form to painting in its ability to render the illusion of all visible things in its reflecting sheen. Vasari had noted Leonardo’s extensive experiments with mirrors as part of his interest in science and technology, and also his extraordinary use of reversed or ‘mirror’ writing throughout his notebooks made over some twenty-five years.³⁰ In his artistic practice and scientific experiments, as in his writing, the mirror served Leonardo as an instrument and as a model to transpose the world into the visual field.

Elsewhere, Leonardo touched on the related issue of artistic memory, predicated on imitation, which he understood as a compendium of ‘mirror’ reflections. That is, he advocated training the artist’s visual memory through repeated copying. This he advised through the use of an “exemplar traced on to a thin flat plane of glass. Place this on top of the drawing you have done without the exemplar, and note carefully where the tracing does not match up with your drawing.”³¹ Leonardo’s glass exemplar was made from a flat pane, like a window or a sheet mirror, on which he could trace the outlines of what he saw, to compare with his drawing on paper. A sketch among his

notes in the Codex Atlanticus illustrates the technological means of this form of artistic translation (*plate 8*). Here an artist draws after an armillary sphere by looking through a transparent pane of glass. By this means he transposes the perception of the third dimension into two-dimensional representation.³² Collectively, Leonardo's notes on the mirror and the glass pane theorize their conceptual equivalence with painting in relation to their practical use as technologies of imitation. This in turn drew on his larger interests in optics, the science of reflected light, and the relationship between reflection and vision.³³ Through his practice and in his notes, Leonardo thus drew together by analogy the window with the mirror, likening them both to painting.

The Picture Plane

As Leonardo was collecting his notes for an intended treatise on painting, Dürer was preparing his multi-volume work on artistic measurements, the *Underweysung der Messung*, (1525).³⁴ This treated the geometry of figural forms in art, and specifically the representation of complex volumes, in the two-dimensional medium of drawing. Aptly described as a revolving door in its accommodation of theory with practice, it familiarized “coopers and cabinet-makers with Euclid and Ptolemy... [and] professional mathematicians with what may be called workshop geometry.”³⁵ As with Brunelleschi's mirror, Alberti's grid, and

Leonardo's glass exemplar, which Dürer surely knew, this technological apparatus was the means for translating the appearance of volumes into two dimensions. At the close of the volume he included a plate depicting an artist drawing after a three-dimensional object through the use of various glass pane instruments (*plate 9*). In the first illustration, a draughtsman draws the outline of a vase onto an upright sheet of glass framed like a picture, or indeed a window, using also a sighting device to keep the position of the viewing eye constant. Like a preparatory drawing, the outline on the glass forms the first stage in the artistic translation of the world into the flat field of a painting. As with Leonardo's description and sketch of his glass exemplar, Dürer's illustrations visibly demonstrate the use of a range of optical devices in Renaissance artistic practice to facilitate the translation of observed volume and space into the illusion of drawing or painting. This would culminate in the extensive range and development of optical and perspectival devices described by Galileo's friend and fellow artist-mathematician Ludovico Cigoli in his *Trattato pratico*, which illustrated the growing complexity and elaboration of artists' technologies originating in Dürer's glass and grid.³⁶ In this vein Dürer's second illustration is particularly instructive. It shows a draughtsman seated at a table with a large sheet of squared paper before him on which he has begun to draw. However his eyes do not follow his hand at this moment; rather, he looks through a

sighting device onto an upright framed grid surely similar to Alberti's 'intersection', whose squares correspond to those on the artist's sheet of paper below. Looking through the grid to what lies beyond it, we/the artist observe a life-size female nude awkwardly recumbent across the further half of the table, seemingly a sculpture. Clearly, the artist is using the framed grid to establish within its squares where each part of this female anatomy lies, in order to transpose it onto the squares of his paper. Again, the framed viewing device – in this instance a grid – acts as the method of artistic translation from three into two dimensions. As Dürer stressed in his notes, the framed grid enabled the artist to alter the scale, rendering the imitation either larger or smaller, as wished.³⁷ Here Alberti's celebrated metaphor of the picture plane as a 'window' or intersection becomes a working instrument.³⁸ The workshop technologies of Dürer's craft are thus fully entwined with the broad conceptualisation of painting as a window or mirror, as Brunelleschi had demonstrated, and Alberti and Leonardo had theorized.³⁹ What we witness in Dürer's prints is the practice-based, technological counterpart to a Renaissance theory of mimesis.

Elsewhere Alberti advocated the use of a mirror as a controlling/corrective device, as Leonardo later also did, understanding it as a kind of surrogate or heightened reproduction of the work under judgment:

A good judge for you to know is the mirror. I do not know why painted things have so much grace in the mirror. It is marvellous how every weakness in a painting is so manifestly deformed in the mirror. Therefore things taken from nature are corrected with a mirror.⁴⁰

If Alberti's story of Narcissus represented painting's claim to the mimetic powers of the mirror, the use he advocated within practice was related in concept but different in its practical orientation. Here he commended the mirror as an instrument of comparison and judgment, using it to reflect back the painting in progress so as to make adjustments and corrections. Renaissance workshop technologies such as the mirror were commonly deployed as a means of verifying, even authenticating, a mimetic paradigm of art.⁴¹ Alberti's concern was to test through comparison with the mirror reflection the depiction of relief in painting, rendered through the judicious application of white and black to give the illusion of highlight and shadow and so of volume. Leonardo also advocated using the mirror this way, but he integrated it more profoundly into the ongoing development of a painting, deploying it to reflect the subject of representation in order to transcribe it onto the canvas in much the same way that Alberti and Dürer's artists worked from what they saw through the squaring device. In Leonardo's practice the mirror

would increasingly come to take the place of the grid. Further, the dimming reflection of the Renaissance mirror offered the artist a reduction of local colour into a unifying scale of tonal gradations. This specular shift in means and technology may be joined to Leonardo's broader reconceptualization of perspective as atmospheric as well as linear, and so of the art of painting itself.⁴²

The Self Portrait

The conjoined functions of the squaring device with the mirror in the years around 1500 take on a particular significance with the historical emergence of self-portraiture. Here the use of the mirror as the technology of a mimetic process was clearly instrumental to the development of the genre. Dürer and Parmigianino's early self-portraits brilliantly seed this historical trajectory. These works have long been recognized as pivotal not only for the history of art but for the definition of Renaissance culture itself.⁴³

Dürer's earliest self-portrait drawing as a child, to which, forty years later, he ascribed a date of 1484 (*plate 10*), inaugurated a sequence of portrayals of himself in both drawing and painting that span his career. In his mature annotation of the drawing Dürer ascertained not only its status as a self-portrait, but also that the technology of its making was a mirror reflection: "This I fashioned after myself out of a mirror in the

year 1484 when I was still a child. Albrecht Dürer.”⁴⁴ The drawing itself is the size of a Renaissance mirror, further testament to the implied equivalence between them. By this means Dürer sought to ensure the drawing’s transmission to historical memory, as Joseph Koerner has argued, in an act of *gedächtnus* long subsequent to the drawing itself. For the destiny of this drawing by a child was not foreseen at the moment of its making; it may rather be linked to a portrait of the same year of Dürer’s father, the Nuremberg goldsmith.⁴⁵ While Dürer the Elder holds a small silver statuette as the emblem of his art, the young artist’s hand is instead held in what is surely an act of ‘sizing’. With his fingers he gauges the dimensions of a detail of his body as seen in the mirror to capture it accurately in his drawing.

Parmigianino’s early self-portrait of 1525 (*plate 11*) is, like the Dürer drawing, the work of a young adolescent, dating to the same moment as Dürer’s later inscription of 1484. Vasari tells us that the young Parmigianino painted it as an artistic introduction to papal circles in a display of skill in the observation of reflections.⁴⁶ Here Parmigianino rendered his image on a convex panel he had fabricated to the same dimensions as the convex mirror in which he studied his face, so reinforcing the visual equivalence between them. The image meticulously observes the distortions of the mirror’s reflection caused by the rise of the blown glass. This is particularly

pronounced in the lozenge-shaped window on the upper left, recognisably that of a reflection in a spherical mirror; and in the exaggerated size of the artist's hand in the foreground. Thus the image conflates the mirror, which constitutes the technology of the painting's production, with the material form of the panel on which it is painted. In a doubled play with this conceptualisation of the painting as a mirror image, it also severs the two. To the right side of the painting we see the edge of a tondo-shaped frame, surely the mirror from which Parmigianino, according to Vasari, had worked. This has the effect of recalling to mind the temporal processes of the painting's production, for we seem to witness the artist studying the canvas on which he paints having just turned from looking in the mirror to observe what he means to depict. The painting is both the reflection in Parmigianino's round mirror, and the canvas that he has just completed, caught between viewing and making in what Michael Fried has identified as a core modality of the reflexive structure of early modern art.⁴⁷

A red chalk self-portrait drawing by Pontormo that dates from the same time as the Parmigianino and the Dürer inscription shows a similar pictorial fusion between the mirror and the drawing, between viewing and making (*plate 12*).⁴⁸ Here Pontormo stands in a three-quarter profile pose. With his lower arm he draws himself on a sheet of paper directly in front of him, placed just outside the image to the right. The other hand

extends forward towards the surface of the picture plane, seemingly touching it with the tips of his fingers. The lower fingers are loosely curled into the fist, while the index finger and thumb extend forward in a gesture of sizing. His gaze is directed towards the tips of those fingers. Like Dürer's early self-portrait drawing, Pontormo is apparently measuring what he sees in a mirror, his fingers spanning a detail in a kind of judgment of hand and eye. Pontormo would seem to practice Michelangelo's famed *giudizio dell'occhio*, that the artist's true compass should lie in the judgment of the eye, rather than depending on the devices and grids that Dürer had elaborated for craftsmen in his treatise on measurement, also of 1525.⁴⁹ As the study of a reflection in a flat mirror Pontormo's image is reversed, with the consequence that the drawing hand appears to be left but in fact would have been right. Like the Parmigianino, a bifurcation is at play in the pictorial logic of the composition. On the one hand, there is an elision of the drawing with the mirror, in its representation of what Pontormo saw. On the other hand, we understand the drawing as a process occurring to the right of this sheet as we regard it. Thus its temporal structure moves from mirroring to drawing, so pictorializing the means of its own production. We find a similar pictorial strategy in Artemisia Gentileschi's *Self-portrait as an Allegory of Painting* of the late 1630s, which speaks to the continuing significance of this specular conception of painting, in both representation and

process, across the century divide (*plate 13*).⁵⁰ The image shows Artemisia in the act of painting. The canvas is before her, her right hand holding a brush raised and about to mark the surface, while in her left hand she holds a palette. But like the Pontormo drawing, her gaze is directed beyond the edge of the canvas to what is surely a mirror in which she studies her reflection before applying her paint. Here too, the absent mirror is both the instrument and the matrix of representation. Artemisia paints the process of her portrait's own production.

The Mirror of Venus

Turning back to an earlier historical moment in the relation between painting and its conceptual resemblance to the mirror, circa 1500 marked a newly intensified approximation between them that extended beyond self-portraiture to other genres. Weaving together the history of mirror-making with the representation of mirrors in art, both saw a distinct increase in production in the early years of the sixteenth century, and particularly in Venice, long the centre for glass-making on which mirror manufacture depended.⁵¹ The expanding production of mirrors as a luxury commodity in Venice had a direct parallel for the theory and practice of *cinquecento* painting, where the representation of mirrors also flourished.

Representation of a mirror within painting was most often coupled with a depiction of the female form, and particularly the

female nude. Two closely related paintings stand at the inception of the genre, a late work by Giovanni Bellini on a small wood panel, and a somewhat larger canvas by his pupil, the young Titian, that scholars have dated to the same moment. Bellini painted a young woman holding a small looking glass through which she views her hair by means of a further mirror on the wall behind her (*plate 14*).⁵² The view of the back of the head reflected in the mirror on the wall is, of course, the view that the subject herself observes in the small glass she holds in front of her. Like Brunelleschi's lost panel, the picture calls into play the motif of the mirror as an instrument of observation and as a 'painting within a painting', that is, both a direct reflection on artistic practice and a metaphor of painting's specular art. The force of the picture lies precisely in its doubled structure, signifying both its status as representation and the mirror technology of its own production.

In turn Titian depicted a young woman whose loose hair falls across her shoulder to her waist, which she also tends by means of a doubled mirror reflection. At her side a young man steadies a gilt-framed convex mirror with his left arm while holding up a smaller rectangular mirror in his right hand (*plate 15*).⁵³ The woman gazes at her face in the small mirror which, as with the Bellini, is seen only from the reverse side. Here she must also see her reflection from the back, like the viewer. In the mirror we can trace the dim outline of her head and

shoulders set just under the strong reflection of what appears to be a window, casting its light on her face from the left. To her side in the reflection-image is the profile of the man holding the mirrors, with his arms extended to suggest both an embrace and the act of painting.

Sometimes simply termed paintings of *belle donne*, these works of the Venetian *cinquecento* of female beauties enhanced by their mirror reflection approach the typology of a Toilet of Venus. This subject also new to *cinquecento* art similarly connected the mirror reflection and the female nude as conjoined allegories of the beauty of art.⁵⁴ The rich issue of this pictorial tradition also lies behind Lomazzo's re-attribution of Giorgione's lost work of reflections as a female nude, and the allegory of *pittura*, with which this essay began.

<Line Break>

Such play with the viewer's attention by means of the painted mirror reflection was something that Velazquez, some 150 years after Giorgione, also observed in paint. His study of Venetian painting, through his travels in Italy and through his position as keeper of the Spanish Royal collections, included a now-lost Toilet of Venus and her mirror reflection by Titian.⁵⁵

Velazquez's knowledge of this pictorial tradition, and of Titian in particular, informed his own great painting of Venus at her mirror c. 1650 (*plate 16*).⁵⁶ A reclining female nude seen from behind, Velazquez's rendition is unusual as a Venus without

jewels, her identity instead manifest in the beauty of her form and colour alone. At the heart of the painting's composition lies the reflecting surface of a mirror, its frame echoing that of the painting itself. The mirror captures the face of Venus centrally within its shimmering surface, depicting this female body from the front which the spectator would not otherwise see. Yet the mirror reflection remains the least-resolved aspect of this celebrated painting, presenting the viewer with a series of optical conundrums. The reflection is apparently misaligned, for the angle of the mirror should properly reflect us rather than Venus. As this is so, this image within its courtly viewing context suggested a flattery of the viewer as either a Venus herself, or as the goddess's lover. The ambiguity was surely intended, with the intimation that the circuit of gazes include Venus regarding the viewer as well as the viewer regarding Venus. Notable also are the differences in paint surfaces. While a rich creamy impasto is consistently applied across the majority of the canvas, in comparison the mirror is rendered with a thinner, more fleeting application of paint through which the mid-tone of the ground and the canvas weave remain visible.⁵⁷ Its sketchy surface finish is that of a painting in progress. Thus the mirror reflection becomes a further variation of the artist's subject – his art. But the mirror is also the painter's viewing instrument, as this painting so brilliantly declares. If this is so then Velazquez's contrast between the smoothly modelled

surface of the body and the sketchiness of the mirror suggests a considered critical engagement with a theory of practice. The polished body figures painting as representation, while the *alla macchia* reflected image of the face stages the mode of its production. Like the reflection of the studio in Caravaggio's *Carafa*, this reflective image represents both the acme of early modern pictorial illusion and a view into its making. As court art, the painting's conceit is its artfulness, and it is in this, the play of its pictorial illusionism, that its status as a meta-image resides. Nowhere might this be more so than in a rendition of *Venus and her mirror* as conjoined signs of the beauty of art and the technology of its making, and thus a commentary on what a painting is.

<Line Break>

The early modern preoccupation with a mirroring art, in which paintings acted as if reflections of themselves, was to become a leitmotif of the seventeenth-century court. Within the early modern palace interior, display of art in princely galleries would, over the century, include ever-larger mirrors alongside painting and sculpture, as equivalent pictorial fields of vision. In the mirror the surrounding artworks would be seen again in reflection. Improved mirror-making technology now made possible the manufacture of extensive flat mirrors that could occupy the place of painted wall panels. This new decorative order of the early modern court would culminate in Versailles'

most celebrated *Galerie des glaces* (plate 17).⁵⁸ Here, facing mirrors produced a cascading play of reflection that Foucault famously recognized as the cultural paradigm of early modernity. New to the scale and grandeur of the palace interior, the unfolding reflections of facing mirrors was an effect that Leonardo had of course already noted in his study of optics some 150 years before:

Now the first [mirror] being reflected in the second carries to it its own image together with all the images reflected in it, among these being the image of the second mirror, and so it continues from image to image on to infinity, in such a way that each mirror has an infinite number of mirrors within it, each smaller than the last, and one inside another.”⁵⁹

If Versailles was the magnificent culmination of this genre of display, decoration with mirrors of ever-greater dimensions was already diffuse in early modern palace decoration. The Alcàzar then had a Hall of Mirrors, (destroyed by fire in 1734) whose decoration with paintings Velazquez had orchestrated in the 1630s, as visible in a portrait by Juan Carreño de Miranda of Charles II of Spain depicted in front of a mirror in this hall (plate 18).⁶⁰ Presumably the portrait intentionally mirrored the actual décor of the hall with its depiction of richly ornamented

mirrors framed by gilt lions and eagles as the symbols of kingship. Within the hall the representational force of the portrait would have worked like a further mirror, seemingly reflecting back the room in which it hung and so multiplying the effects of its surroundings. In this regard it manifests a further type of portrait, in addition to the example of the self-portrait, that is bound to the motif of the mirror. It extends the genre to encompass the study of the mirror reflection within painting more broadly, in a specular doubling of both painted and architectural space, and of the production of painting within its own representational field.

<Line Break>

Some five years after the Rokeby Venus Velazquez painted his great court portrait and culminating mirror image work, *Las Meninas* (plate 19). At a first level of signification it represents the Spanish infanta or princess at play with her maids of honour while Velazquez paints. The room depicted in fact served as the artist's studio at the Alcàzar palace.⁶¹ Much of the painting's renown, however, rests on its conceptualisation as a mirror-image that multiplies the artifice of its reflexive illusion serially, the study of which has dominated the extensive scholarly literature on this work.⁶² At the same time it reflects on its own production, and on the central place of mirrors within that process. An inventory of Velazquez' possessions housed in his rooms at the Alcàzar at his death includes not only a library with

a substantial number of books on optics, perspective and the sciences of projection, but also a number of optical devices used in artistic practice, including glasses, and ten mirrors of various sizes and types.⁶³ Undoubtedly, *Las Meninas* drew on the Arnolfini double portrait with its inset mirror, a painting Velazquez would have known well as it was then part of the Hapsburg collection in Madrid and under his aegis as keeper of the royal paintings.⁶⁴

On the back wall of *Las Meninas*, displayed alongside a group of paintings, hangs a mirror, picked out by the shimmer of light across its surface and most intensely at its bevelled edge. In the reflecting surface of this mirror we see what Velazquez's fellow court artist Antonio Palomino identified for us as the King and the Queen.⁶⁵ The reflection implies the presence of the royal couple before the canvas, in the space of the viewer, but also of Velazquez as he painted this work. They are surely the subject of Velazquez' large easel painting within the painting. As viewers, however, we see this canvas from the back. Through the mirror Velazquez reveals to the viewer what he also withholds – his art. The complexity of mirror images at play pulls the viewer into the labyrinth of reflections that this painting seems to contain within it. As well as the mirror depicted within the painting, there is also the implication of a further mirror within this work – the mirror that Velazquez used to paint his self-portrait. By means of a mirror, Velazquez paints

a mirror-as-painting within the painting, which reflects the painting's subjects along with the easel on which he works.⁶⁶ As a portrait of the artist at work in the company of the Infanta, the mirror reflection that *Las Meninas* holds within it is a portrait-within-a-portrait, as the canvas-within-the-canvas on which Velazquez paints must also be. The painted mirror that is at the same time a royal portrait hangs on a wall of further paintings-within-the-painting, which makes of it a picture gallery-within-a-gallery of the royal collection in which, then as now, it surely hung. If the paint surface of this mirror reflection double portrait is sketchy in comparison with the rest of the canvas, it is fitting, for it reflects a painting in the process of its making. Here reflecting what is apparently represented on the artist's canvas, the metaphor of the inset mirror within the painting is direct. Distinct from the miniaturised details of Caravaggio's carafe or Vermeer's glass globe, this reflexive vision of art as a mirror is central to the work. As a summation of the pictorial trajectory of the Renaissance '*miroire-peinture*', *Las Meninas* declares itself the mirror of art. Thus *Las Meninas* recalls the long history of the painted mirror reflection to argue that a painting may indeed be a perfect double with the mirror technology of its own production.

Illustrations



1. Jan van Eyck, *Arnolfini Double Portrait*, 1434, oil on panel, 82 x 60 cm, National Gallery London.



2. Willem van Haecht, *Gallery of Cornelis van der Geest*, 1628, oil on panel, 100 x 130 cm, Rubenshuis Antwerp



3. Caravaggio, *Narcissus*, c 1597-99, oil on canvas, 110 x 92 cm, Galleria Nazionale d'Arte Antica, Palazzo Barberini, Rome

4. Caravaggio, *Bacchus*, c. 1595, oil on canvas, 95 x 85 cm, Uffizi Gallery, Florence





5. Johannes Vermeer, *Music Lesson*, 1662-65, oil on canvas, 74.6 x 64.1 cm, Royal Collection, London

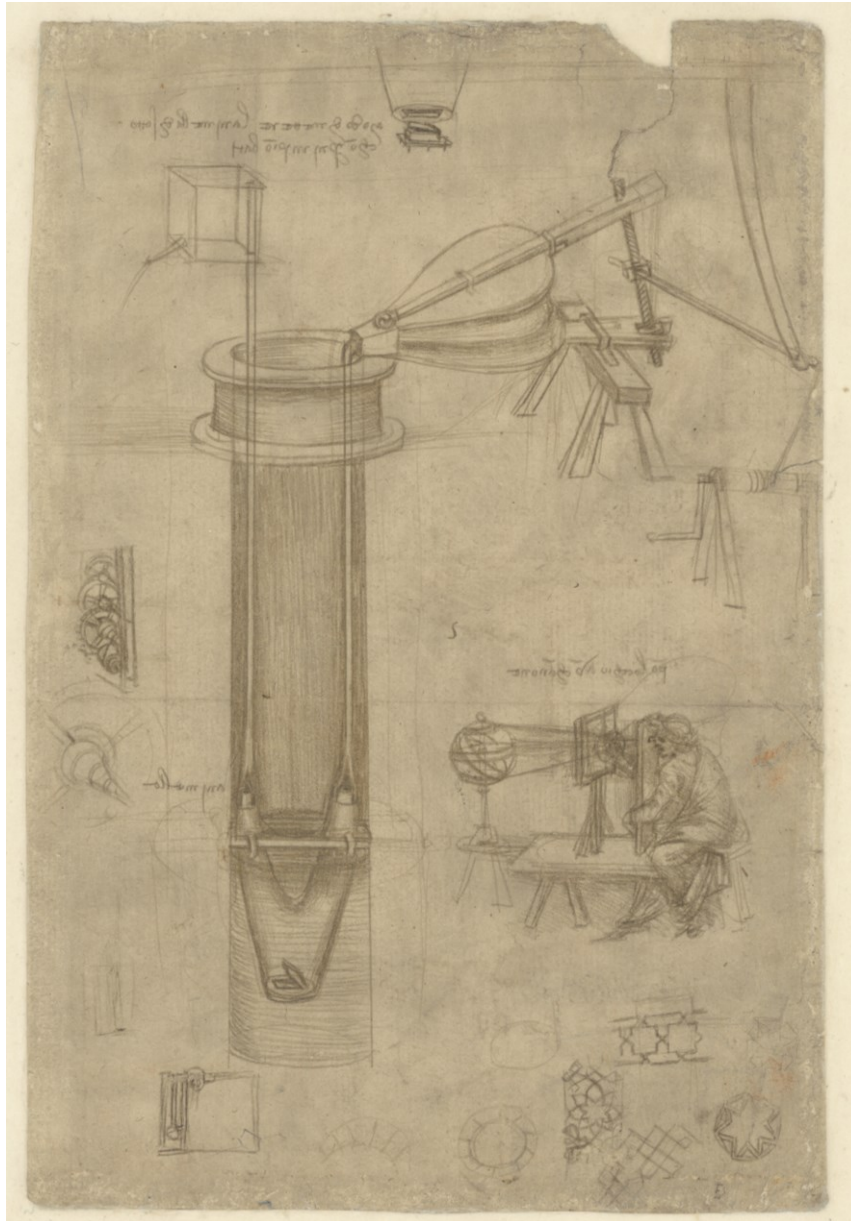


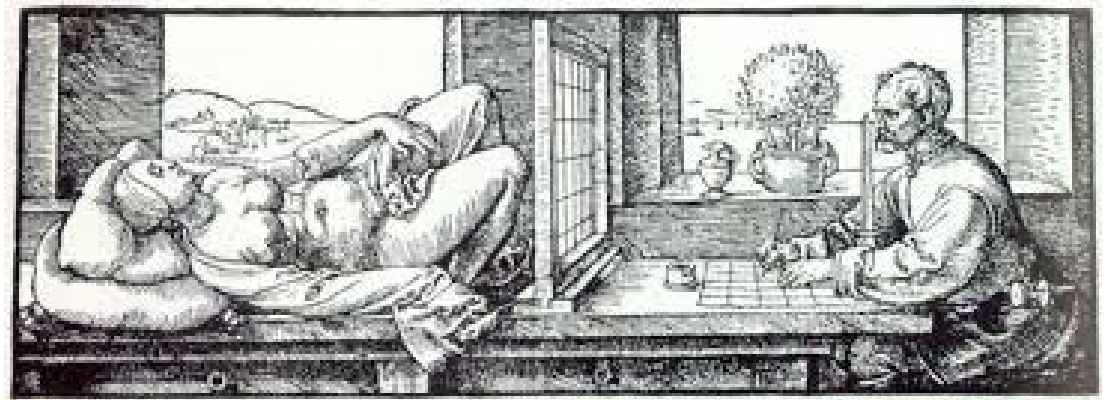
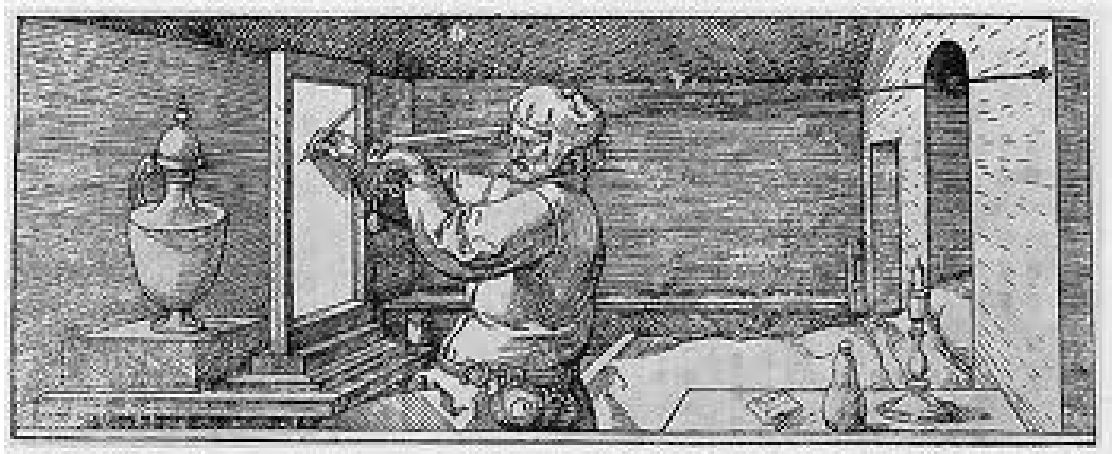
6. Vermeer, *Allegory of Painting*, 1665-68, oil on canvas, 130 x 110 cm, Kunsthistorisches Museum, Vienna

7. Vermeer, *Allegory of Faith*, c. 1670-72, oil on canvas, 114.3 x 88.9 cm, Metropolitan Museum of Art New York



8. Leonardo, sketch, silverpoint on prepared paper, 297 x 198 mm, Codex Atlanticus, Biblioteca Ambrosiana, Milan, fol. 5r

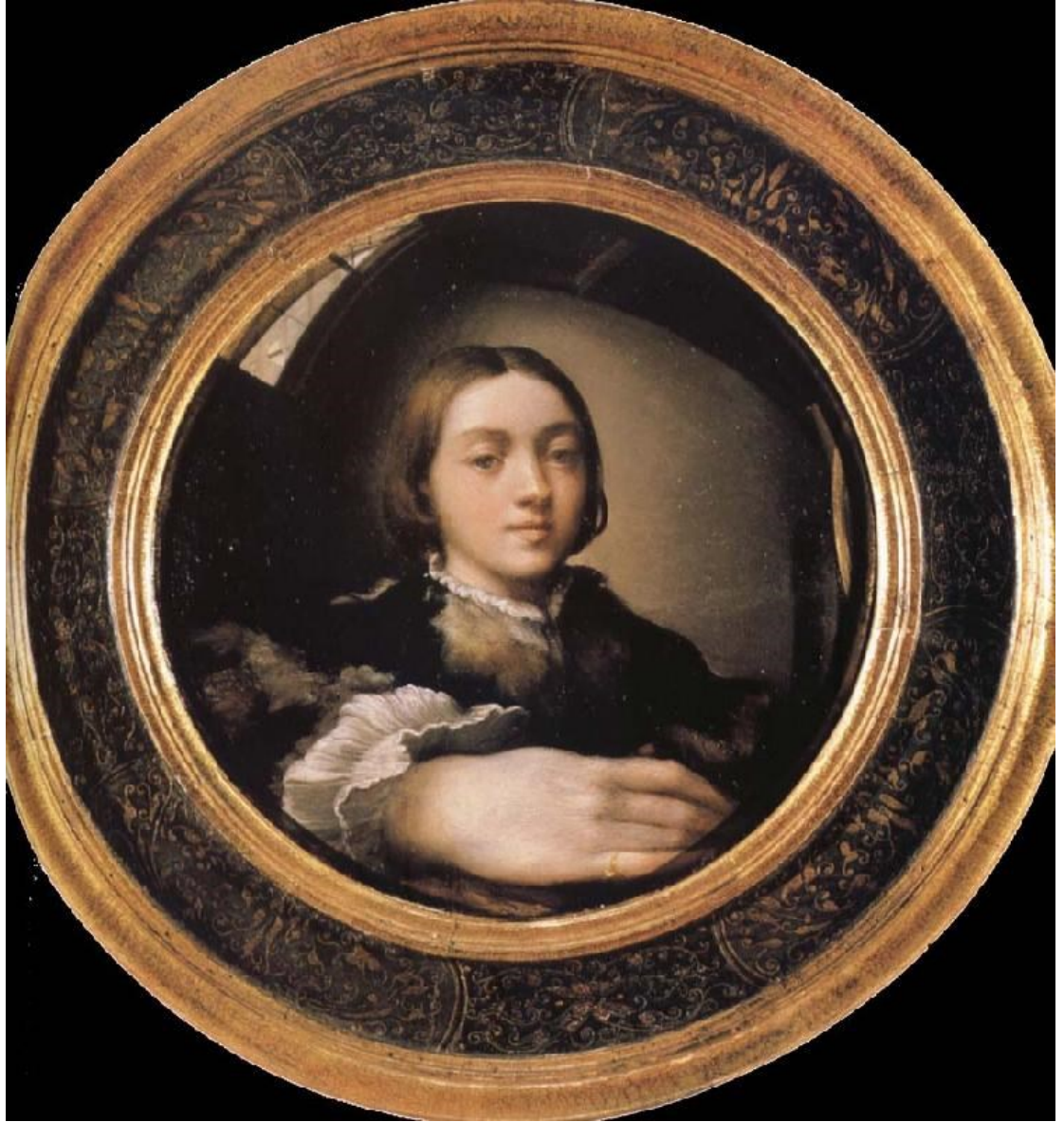




9. Albrecht Dürer, *Underweysung der Messung mit dem Zirckel und Richtsheyt*, rev. ed., Nuremberg, 1538



10. Albrecht Dürer, *Self portrait age 13*, 1484,
silverpoint on prepared paper, 27.5 x 19.6 cm,
Albertina Vienna.



11. Parmigianino *Self portrait* c.1525, oil on convex panel, 24.4 cm diameter, Kunsthistorisches Museum, Vienna.



12. Pontormo, *Self portrait drawing*, c 1525, red chalk on buff paper, 284 x 202 mm, British Museum, London.



13. Artemisia Gentileschi, *Self portrait as an Allegory of Painting*, 1638, oil on canvas, 96.5 x 73.7, inscribed: A.G.F., Royal Collection Trust.



14. Giovanni Bellini, *Woman with looking glass*, signed and dated 1515, oil on panel, 62 x 79 cm, Kusthistorisches Museum, Vienna.



15. Titian, *Woman at her Toilet*, c. 1515, oil on canvas,
99 x 76 cm, Louvre Museum, Paris



16. Velázquez, *Rokeby Venus*, c 1650, oil on canvas, 122 x 177 cm, National Gallery London



17. Jules Hardouin Mansart, Galerie des glaces, Palais de Versailles, 1678-84



18. Juan Carreño de Miranda, *Charles II in the Hall of Mirrors at the Alcázar Palace*, c. 1673-75, oil on canvas, 204 x 142 cm, Prado Museum, Madrid.



Velázquez, *Las Meninas*, 1656, oil on canvas, 318 x 276 cm,
Prado Museum, Madrid.

Notes

The research for this essay was funded by the AHRC. My thanks to Sam Bibby, Sam Cohn, Richard Taws and Jack Warwick for their thoughts and comments.

¹ Giorgio Vasari, *The Lives of the Artists*, (1568), George Bull trans., London, 1965, 276. On Giorgione's lost painting see especially Rona Goffen *Renaissance Rivals: Michelangelo, Leonardo, Raphael, Titian*, London & New Haven, 2002, 60-64 & notes.

² Paolo Pino, *Dialogo di Pittura* (1548), *Trattati d'arte del Cinquecento, fra Manierismo e Controriforma*, ed. Paola Barocchi, Bari, 1960, I:131; G P Lomazzo, *Idea del Tempio della Pittura*, Milan, 1590, ed. Robert Klein, Florence, 1974, I, 151.

³ On mirrors in painting, Jonathan Miller, *On Reflection*, exh. Cat. National Gallery London, London & New Haven, 1998; and with specific reference to the Renaissance the seminal essay by Daniel Arasse, "Les miroirs de la peinture", *L'Imitation: Aliénation ou source de liberté?*, *Rencontres de l'Ecole du Louvre*, Sept. 1984, 63-94; Rossella Vodret, "Riflessioni sugli specchi nell'arte", *Donna allo specchio: Tiziano a Milano*, eds. Valeria Merlini & Daniela Storti, Milan, 2010, 127-138.

⁴ André Chastel, "Le tableau dans le tableau", *Stil und Überlieferung in der Kunst des Abendlandes: Akten des 21. Internationalen Kongresses für Kunstgeschichte in Bonn 1964*, vol. I, *Epochen Europäischer Kunst*, Berlin, 1967, 19.

⁵ Michel Foucault, *Les mots et les choses: une archéologie des sciences humaines*, Paris, 1966, 7; Victor Stoichita's *L'instauration du tableau: Metapeinture à l'aube des temps modernes*, Paris, 1993. The implication of the mirror reflection is at the centre of Michael Fried's *The Moment of Caravaggio*, A.W. Mellon Lectures in the Fine Arts, Princeton N.J., 2010.

⁶ Lucien Dällenbach's much-cited *Le récit spéculaire: essai sur la mise en abyme*, Paris, 1977, opens with André Gide's journal reflection of 1893 on the mirror in early modern painting alongside Shakespeare, 15.

⁷ Chastel, 1967.

⁸ Mirrors would also come to play a key role in the development of early modern scientific instruments of vision – the telescope, the microscope, binoculars – where small mirrors were used to cast reflected light and to magnify the object under scrutiny. These instruments were, of course, also deployed by artists as, for example, with Lodovico Cigoli in his collaboration with Galileo. On the interface between early modern instruments of vision, art, and science see especially Horst Bredekamp, *Antikensehnsucht und Maschinenglauben: Die Geschichte der Kammern und die Zukunft der Kunstgeschichte*, Berlin, 1993; and Bredekamp, ed., with Vera Dünkel and Birgit Schneider, *Das technische Bild: Kompendium für eine Stilgeschichte wissenschaftlicher Bilder*, Berlin, 2008; Barbara Maria Stafford and Frances Terpak, object list by Isotta Poggi, *Devices of Wonder: From the World in a Box to Images on a Screen*, exh. Cat., Los Angeles, 2001; and Alina Payne, ed., *Vision and its Instruments: Art, Science, and Technology in Early Modern Europe*, University Park PA, 2015.

⁹ Patricia Falguières, "Poétique de la machine", *L'art de la Renaissance entre science et magie*, ed. Philippe Morel, Collection d'histoire de l'art de l'Académie de France à Rome, 5, 2006, 401-49; and for a different view on this development, Pamela H. Smith, *The body of the artisan: Art and Experience in the Scientific Revolution*, Chicago, 2004. David Hockney, *Secret Knowledge: Rediscovering the lost techniques of the Old Masters*, London, 2006, posited the use of the mirror as a copying device, on which see the corrective A M Smith, "Reflections on the Hockney-Falco Thesis: Optical Theory and Artistic Practice in the fifteenth & sixteenth centuries", *Early Science and Medicine*, 10:2, 2005, 163-85, and the larger special issue edited by Sven Dupré on the question of optics in artistic practice. See

Alberti, *On Painting*, Spencer ed., 1966, 68-69: : “Nor will I hear what some may say, that the painter should not use these things, because even though they are great aids in painting well, [they] may perhaps be so made that he will soon be able to do nothing without them. I do not believe that infinite pains should be demanded of the painter, but paintings which appear in good relief and a good likeness of the subject should be expected. This I do not believe can ever be done without the use of the veil. Therefore, let us use this intersection, that is the veil, as we have said.” Filarete also defended the artist’s uses of visual technologies, Antonio di [Piero Averlino, Filarete’s *Treatise on Architecture*, 2 vols., trans. & ed. John R Spencer, New Haven, 1965, I, 305-6: “If you should desire to portray something in an easier way, take a mirror and hold it in front of the thing you want to do. Look in it and you will see the outlines of the thing more easily, whatever is closer to you, and that which is farther away will appear to diminish. Truly I think it was by this method that Pippo di Ser Brunellesco discovered this perspective”.

¹⁰ As described c. 1480 in Howard Saalman ed., *The Life of Brunelleschi* by Antonio di Tuccio Manetti, trans. Catherine Enggass, University Park PA, 1970, 42-44. See Samuel Y. Edgerton Jnr, *The Renaissance Rediscovery of Linear Perspective*, New York, 1975; and his *The Mirror, the Window, and the Telescope: How Renaissance Linear Perspective Changed Our Vision of the Universe*, Ithaca & London, 2009, 44-53; and Martin Kemp’s corrective “Science, Non-Science and Nonsense. The Interpretation of Brunelleschi’s Perspective”, *Art History*, I, 1978, 134-61.

¹¹ Jurgis Baltrušaitis, *Le Miroir: Essai sur une légende scientifique: Révélations, science-fiction, et fallacies*, Paris; Sabine Melchoir-Bonnet, *The Mirror: A History*, trans Katharine H Jewett, prefaced by Jean Delumeau, London & New York, 1994; *Miroirs: jeux et reflets depuis l’antiquité*, Paris, 2000; M. Anderson, *The Book of the Mirror: An Interdisciplinary Collection exploring the Cultural Story of the Mirror*, Cambridge, 2007.

¹² W. Patrick McCray, *Glassmaking in Renaissance Venice: The Fragile Craft*, Aldershot, 1999.

¹³ Vasari, at the opening of his life of Antonello da Messina, (eds. Luciano Bellosi & Aldo Rossi, Turin, 1986, 360) See the summary of the problem by Ashok Roy and Raymond White, "Van Eyck's Technique: The Myth and the Reality, I & II, *Investigating Jan Van Eyck*, eds. Susan Foister, Sue Jones & Delphine Cool, Turnhout, Belgium, 2000, 97-106; and the useful discussion by Francis Ames-Lewis, "Sources and Documents for the Use of the Oil Medium in Fifteenth-Century Italian Painting", *Cultural Exchange between the Low Countries and Italy (1400-1600)*, ed. Ingrid Alexander-Skipnes, Turnhout, 2007, 47-62.

¹⁴ On the Arnolfini double portrait and its mirror see, from an extensive literature, Lorne Campbell, *The Fifteenth Century Netherlandish Paintings, National Gallery Catalogues*, London, 1998, 174-211.

¹⁵ See D.G. Carter, "Reflections in armor in the *Canon van der Paele Madonna*", *The Art Bulletin*, 36, I, 1954, 60-62; D. Farmer, "Further reflections on a van Eyck self-portrait", *Oud Holland*, 83, 1968, 107-09.

¹⁶ The connection between the two panels is disputed by Campbell, 1998, 174-211, who notes that the portrait had shutters by 1516. See Margaret L. Koster, "The Arnolfini double portrait: a simple solution", *Apollo*, 158, 499, 2003, 3-14, for an alternative interpretation of the evidence.

¹⁷ See Paola Barocchi's edition of Varchi and Vincenzo Borghini on the *paragone*, *Pittura e scultura nel Cinquecento*, Leghorn, 1998; Claire Farago, *Leonardo da Vinci's Paragone: a critical interpretation with a new edition of the text in the Codex Urbinas*, Leiden, 1992.

¹⁸ Leon Battista Alberti, *On Painting*, trans. John R Spencer ed., rev., New Haven CT, 1966, 56.

¹⁹ Alberti, *On Painting*, 1966, 68-69. See Edgerton's discussion of Alberti's window or *velum*, *The Mirror, the Window and the Telescope*, 2009, 126-32

²⁰ Alberti, *On Painting*, 1966, 64. See further Ulrich Pfisterer, “Künstlerliebe. Der Narcissus-Mythos bei Leon Battista Alberti und die Aristoteles-Lektüre der Frührenaissance”, *Zeitschrift für Kunstgeschichte*, 64, 2001, 308, 324-28.

²¹ Rossella Vodret, “Il Narciso di Caravaggio: ritratto di artista allo specchio”, *Art e dossier*, 11, 109, 1996, 9-13, for a discussion of the painting’s composition by means of mirrors. On Caravaggio’s use of mirrors more generally see also Roberta Lapucci, ed., *Caravaggio and Optics*, Florence, 2005

²² As related by G P Bellori, *Vite de pittori, scultori et architetti moderni*, Rome, 1672, 212 with reference to Caravaggio’s depiction of a gypsy. On the larger question of Caravaggio’s art of visible realism see especially Ferdinando Bologna, *L’incredulità del Caravaggio e l’esperienza delle ‘cose naturali’*, Turin, 2006

²³ Published in S Corradini and M Marini, “Inventarium omnium et singulorum bonorum mobilium di Michelangelo da Caravaggio ‘pittore’”, *Artibus et historiae*, 14, 28, 1993, 161-76

²⁴ Giovanni Baglione, *Le vite de’ pittori, scultori, et architetti...* Rome, 1642, 136-39. This has been taken to mean that Caravaggio painted his self-portrait within these early mythological works, on which see the helpful corrective by Mina Gregori, *The Age of Caravaggio*, (exh. Metropolitan Museum, New York & Capodimonte Naples) Milan, 1985, 241-42: “What Baglione records is the widespread practice of employing a mirror as an aid in achieving a realistic representation – a method that, as a painter, he was certainly familiar with.”

²⁵ Fried, *Caravaggio* 2010, 60. See also the useful summary by Gregori, *The Age of Caravaggio*, 1985, 236-41.

²⁶ Daniel Arasse, *Vermeer: Faith in Painting*, trans. Terry Grabar, Princeton N.J., 1994, 22-39. On the contested question of Vermeer’s use of a camera obscura see Philip Steadman, *Vermeer’s Camera : Uncovering the truth behind the masterpieces*, Oxford, 2001 ; and the corrective H. Perry

Chapman, "The Imagined Studios of Rembrandt and Vermeer" in *Inventions of the Studio, Renaissance to Romanticism*, eds. Michael Cole & Mary Prado, Chapel Hill SC & London, 2005, 108-146.

²⁷ On the various critical editions of Leonardo's notes see Martin Kemp, ed. *Leonardo on Painting*, New Haven & London, 1989.

²⁸ *Leonardo on Painting*, ed. Kemp, 1989, 202; and the brilliant discussion by Michael Baxandall in *Shadows and Enlightenment*, London & New Haven, 1995, "Three Notes on Leonardo and Early Renaissance Shadow", 146-155.

For a recent discussion of the intellectual and practical foundations of Leonardo's working methods issuing from conservation research see Larry Keith, "In pursuit of perfection: Leonardo's Painting Technique", *Leonardo da Vinci: Painter at the Court of Milan*, Luke Syson with Larry Keith et al, National Gallery London, 2012, 54-79

²⁹ Kemp ed., *Leonardo on Painting*, 1989, 205: "And above all he must liken his mind to nature, giving it a surface like a mirror".

³⁰ Vasari, *Vite*, 1986 ed., 554, 559.

³¹ Kemp ed., *Leonardo on Painting* 1989, 206

³² Martin Kemp, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat*, London & New Haven, 1990, especially 170-71. See also the compendium of Leonardo's notes on painters' aids in Kemp, ed., *Leonardo on Painting*, 1989, 191-217.

³³ For example, transl. Irma A. Richter, *The Notebooks of Leonardo da Vinci*, Oxford, reprint 1986, 122, Leonardo noted that: "if you look into the eye of anyone you will see your image there.... Your own image mirrored in the eye."

³⁴ Albrecht Dürer, *The Painter's Manual of Measurement*, Facsimile ed. & trans., Walter L. Strauss, New York, 1977.

³⁵ Erwin Panofsky, *The Life and Art of Albrecht Dürer*, Princeton N.J., 1943, 257.

³⁶³⁶ Ludovico Cardi detto Il Cigoli, *Trattato pratico di prospettiva di Ludovico Cardi detto Il Cigoli: Manoscritto MS2660A del Gabinetto dei disegni e delle stampe degli Uffizi*, ed. Rodolfo Profumo, Rome, 1992; and Filippo Camerota, *Linear Perspective in the Age of Galileo: Ludovico Cigoli's Prospettiva pratica*, Florence, 2010; and the useful summary in Kemp, *The Science of Art*, 1990, 167-88.

³⁷ Dürer, *The Painter's Manual*, 1977, 435.

³⁸ Edgerton, *The Mirror, the Window and the Telescope*, 2009, 126-132; and Kemp, *Science of Art*, 1990, 167-88.

³⁹ Erwin Panofsky, *Dürers Kunsttheorie: Vornehmlich in ihrem Verhältnis zur Kunsttheorie der Italianer*, Berlin, 1915. P. 41 references also Leonardo showing his use of both the grid and the glass pane method.

⁴⁰ Alberti, *On Painting*, Spencer ed., 1966, 83

⁴¹ Falguières, "Poétique de la machine", 2006, 401-449.

⁴² From a vast literature see Kemp, *Leonardo on Painting*, 1989, on the ordering of Leonardo's notes around themes of perspective and the relation between linear, colour and atmospheric perspective, 47-116.

⁴³ Joseph Koerner, *The Moment of Self-Portraiture in German Renaissance Art*, Chicago, 1993.

⁴⁴ The translation is taken from Koerner, *Self-Portraiture*, 1993, 43. Vasari, *Vite*, 1986 ed., 356, relates that Alberti had made a self-portrait from a round mirror.

⁴⁵ Koerner, *Self-Portraiture* 1993, 43-44. The portrait of Dürer the Elder, also in the Albertina collection, has been identified both as a self-portrait, and as a portrait by the young Dürer of his father; in both cases it is seen as linked to Dürer's 1484 self-portrait drawing.

⁴⁶ See David Ekserdjian's discussion of Vasari's slightly differing accounts of the painting from the 1550 to the 1568 edition of his *Vite...* in *Parmigianino*, New Haven & London, 2006, 130. See also Sylvia Ferino Pagden, "L'autoritratto del Parmigianino: La consistenza (im)material

dell'autoritratto di Vienna”, *Parmigianino e il manierismo europeo* (Atti del convegno internazionale di studi, Parma, 2002), ed. Lucia Fornari Schianchi, Milan, 2002, 67-82.

⁴⁷ Fried, *Caravaggio*, 2010, 96

⁴⁸ Carol Plazzotta in *Renaissance Faces: Van Eyck to Titian*, exh. Cat., National Gallery, London, 2008, 256.

⁴⁹ On Michelangelo and the *giudizio dell'occhio* see especially the discussion by David Summers, *Michelangelo and the Language of Art*, Princeton NJ, 1981, 332-79.

⁵⁰ Judith Mann, “The myth of Artemisia as chameleon: a new look at the London ‘Allegory of Painting’”, *Artemisia Gentileschi*, ed. Judith Mann, exh. Cat., St Louis Art Museum, 2005, 51-77.

⁵¹ McCray, *Glassmaking*, 1999.

⁵² See especially Sylvia Ferino Pagden’s summary of a complex literature on the ‘belle donne’: “Pictures of Women, Pictures of Love”, *Bellini, Giorgione, Titian and the Renaissance of Venetian Painting*, David Alan Brown and Sylvia Ferino–Pagden, National Gallery of Art Washington and Kunsthistorisches Museum Vienna, London and New Haven, 2006, 190-99 & 219-223. With regards to Bellini there is also his earlier, small panel usually termed an *Allegory of Prudence* (Galleria dell’Accademia Venice) which depicts a standing female nude on a pedestal, as if a sculpture, holding a convex mirror up while gesturing to its reflection of a torso, which is by implication the viewer. This has been the subject of much varying interpretation on which see *Tiziano: Amor Sacro e Amor Profano*, exh cat., Rome, 1995, 241-2.

⁵³ On this painting see the recent *Donna allo specchio: Tiziano a Milano*, eds. Valeria Merlini and Daniela Storti, exh. Cat., Paris, 2010.

⁵⁴ Hubert Damisch, *Le Jugement de Paris: Iconologie analytique*, Paris, 1992, on the theme and its Renaissance expansion as an allegory of art.

⁵⁵ Fernando Checa Cremades, *Tiziano/Rubens: Venus ante el espejo*. Contextos de la Colección in permanente, no. 13, (exh. Museo Thyssen-Bornemisza), Madrid, 2002. Titian's lost work is known through another autograph version now in the National Gallery of Art, Washington, and through Rubens's imitation of it on his visit to Madrid, now in the Thyssen Bornemisza Museum, which Velazquez would also have known.

⁵⁶ Andreas Prater, *Venus at her Mirror: Velazquez and the Art of Nude Painting*, Munich, London, New York, 2002.

⁵⁷ On Velazquez' paint handling more generally see especially *Examining Velazquez*, eds. Gridley McKim-Smith, Greta Anderson-Bergdoll, Richard Newman, London & New Haven, 1988.

⁵⁸ See Nicolas Milovanovic & Alexandre Maral, *La Galerie des Glaces: Charles Le Brun, maître d'oeuvre*, exh. Versailles, Paris, 2007; Nathalie Volle & Nicolas Milovanovic, *Galerie des glaces après sa restauration*, Rencontres de l'Ecole du Louvre, 26, 2013.

⁵⁹ Transl. Irma A. Richter, *The Notebooks of Leonardo da Vinci*, Oxford, reprint 1986, 111-12.

⁶⁰ See Steven N Orso, *Philip IV and the decoration of the Alcàzar of Madrid*, Princeton, 1986; and Fernando Checa, *El Real Alcàzar de Madrid: Dos Siglos de Arquitectura y Coleccionismo en la corte de los Reyes de España*, Madrid, 1994.

⁶¹ See Serrera, J M, "El palacio como taller y el taller como palacio. Una reflexion más sobre la meninas" Marias, F, ed., *Otras meninas*, Madrid, 1995, 231-246.

⁶² From an extensive and celebrated bibliography, Michel Foucault's introduction to *Les mots et les choses*, 1966; John R Searle, "Las Meninas and the paradoxes of pictorial representation", *Critical Inquiry*, 6, 1980; Leo Steinberg, "Velazquez' Las Meninas", *October*, 19, 1981, 45-54.

⁶³ Francisco Javier Sanchez Canton, "Como vivá Velázquez: inventario discubierto por d.f. Rodriquez Marin", *Archivo español de arte*, XL, 1942, 69-91.

⁶⁴ For discussion of the sources regarding Velazquez' interest in the Arnolfini double portrait see especially Madlyn Millner Kahr, "Velazquez and *Las Meninas*", *Art Bulletin*, 52.2, 1975, 225-46.

⁶⁵ Antonio Palomino, *El museo pictórico*, 3 vols., Madrid, 1796, III, 508-10.

⁶⁶ Whether the mirror reflects the King and Queen as they sit for the painting, or whether it reflects what is painted on Velazquez's canvas, has been greatly debated, with a general though by no means universal consensus for the former, but see also Joel Snyder, "Las Meninas and the Mirror of Princes", *Critical Inquiry*, 11.4, 1985, 539-72.