Discoloration in Renaissance and Baroque Oil Paintings. Instructions for Painters, theoretical Concepts, and Scientific Data
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Discoloration or Chiaroscuro? An Interpretation of the Dark Areas in Raphael's *Transfiguration of Christ*

Raphael's *Transfiguration of Christ* (Fig. 1), was ordered some time before January 1517 by Cardinal Giulio de' Medici for one of the chapels in Narbonne Cathedral. Around the same time the cardinal also commissioned Sebastiano del Piombo to paint a *Raising of Lazarus* for the same church, presumably to pit the two artists against each other. After Raphael's sudden death in 1520, it was decided to keep the *Transfiguration* in Rome, and in 1523 the panel was placed in San Pietro in Montorio, where it hung until the end of the 18th century. At present, the painting is in the collection of the Vatican Museums. The unconventional treatment of the subject has made Raphael's last work one of the most discussed paintings in art history. The upper half depicts the event described in Matthew 17:1-13, Mark 9:2-13 and Luke 9:28-36, which was a popular theme at the time. Christ's Transfiguration, the moment on Mount Tabor when he reveals his divine appearance in conversation with Moses and Elijah, is observed by three of his disciples: Peter, James and John. Raphael's innovation, however, is in the curious combination of this event with the reference to another one that follows it in the Bible. The lower zone shows the remaining nine disciples vainly attempting to heal a youth possessed by an evil spirit.

Just why Raphael or his patron chose to conflate these two events into a single scene is a question that has fascinated critics and art historians down the ages. It has been suggested that Raphael added a highly dramatic scene below the Transfiguration so as not to be outclassed by Michelangelo's pupil, whose subject gave him the opportunity to depict an agitated group of onlookers and thus show off his talents to better effect than Raphael could do with a limited number of protagonists. However, the combination is also interpreted in thematic terms. The received view since the 18th century has been that the combination represents a conceptual antithesis. The divine miracle in the upper half symbolises grace and deliverance, contrasting with the human failure to heal in the lower half, which metaphorically demonstrates man's impotence. Various theological and political explanations have been put forward for this amalgam.

One key element in the way the painting has been interpreted is the view that the conceptual antithesis is reflected in the formal aspects. The two scenes are clearly separated, and their respective compositions are markedly different. In the lower scene a diagonal separates the disciples from the...
possessed youth and his family, in contrast to the frontal and simple, almost symmetrical structure of the upper scene centered on Christ. Likewise, the strained facial expressions and gesticulations of the crowd contrast with the sense of calm and dignity emanating from the figures at the top.

Art historians have repeatedly drawn attention to another antithesis, namely in the handling of light and colour. In the upper half of the painting, gradual transitions have been observed in the modelling of the draperies and flesh tones. Most of the shadows are not very dark and thus have an identifiable colour, and the shaded forms are easily read. The handling of light in the scene with the failed healing is very different. Here the modelling is dominated by strong tonal contrasts and abrupt transitions from light to shade. Very dark shadows, in which forms are difficult to distinguish, partly blend into a black background. Although many authors have demonstrated that Raphael's paintings and frescoes from 1513-14, such as those in the Vatican Stanza d'Eliodoro and the Stanza dell'Incendio, tend to have darker shadows than before, this effect is very conspicuous indeed in the lower half of the Transfiguration. Art historians, among them Von Rumohr, Burckhardt, Wölfflin and Fischel, have interpreted the dark shadows and abrupt transitions in various ways. Nowadays it is assumed that the difference in the handling of light in both parts of the painting has an expressive function. The common view, as expressed by Marcia Hall (1992), is that by the end of his life Raphael had begun to explore new ways of creating light and shadows 'in searching for a colour style appropriate to the content of the depiction.' The treatment of light in the upper scene, with softly coloured shadows, apparently sustains the idea of divine assistance, while Raphael deliberately opted for strong contrasts between highlights and shadows - which Hall dubs the chiaroscuro mode - to obtain a dramatic effect in the lower scene. She continues her interpretation of Raphael's pictorial means:

The shadows are blackish, dark and deep in tone. The lights are whitish, high in value, bleaching the local colour. The midtone is where one sees the colour, which may be quite strong and at, or close to, full intensity. The transitions are as a rule abrupt to maximise the drama.

According to Hall and many others, the strong contrasts between light and shadow served to accentuate the fruitless efforts of the disciples. These modern interpreters all believe, in one way or another, that Raphael deliberately adopted these deep shadows and chiaroscuro contrasts to underscore the dramatic metaphor of human frailty as opposed divine omnipotence. Raphael has accordingly been credited with an important role in the invention of the 'dramatic' chiaroscuro that is thought to have exerted such a profound influence on later painters like Caravaggio, whose 'theatrical' handling of light is said to be based on this specific effect in the Transfiguration. Given this interpretation of the treatment of light in the Transfiguration, it is odd that a remark by Vasari has been virtually ignored by modern authors. In the second, 1568 edition of his Vita, Vasari explained the dark shadows in the Transfiguration very differently:

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And if he had not on some whim or other used smoke black of the printers (which, as has often been pointed out, becomes gradually darker with time and spoils the other colours with which it is mixed) this work might have looked as fresh as when he painted it, whereas today it looks very different.\footnote{Vasari (1568); see Milanesi (1878-85), vol. 4, p. 378: ‘E se non avesse in questa opera, quasi per capriccio, adoperato il nero di fumo che stampatori, il quale, come più volte si è detto, di sua natura diventa sempre col tempo più scuro ed offende gli altri colori, col qual caso è mescolato; credo che quella opera sarebbe ancor fresca come quando egli la fece, dove oggi pure piuttosto inizia che ultimata.’ This observation comes in Vasari’s account of Raphael’s stylistic development, which is not mentioned in the 1550 edition. The English translation, emended where appropriate, is from Bull (1987), vol. 1, p. 319.}

Since most of the dark shadows are in the scene of the failed healing, this remark must be taken as applying primarily to the lower half of the painting. Vasari clearly thought that these black shadows had not been intended to appear the way he saw them and we see them today, but believed they were degraded by discoloration caused by the use of the wrong material, namely, printer’s black, now better known as lampblack. The almost total lack of interest in Vasari’s remark is probably because art historians have implicitly assumed that it was simply not relevant to the handling of light in the painting. Conti (1988) concluded that it therefore involves an attitude of taste which makes him [Vasari] attribute mistakes in the use of colour whereas actually they were above all chromatic choices that differed from his.\footnote{Conti (1988), p. 39: ‘Che si tratti, cioè, di una posizione di gusto che gli fa attribuire difetti di comportamento al color, dov, in realtà vi erano soprattutto delle cromatiche diverse dalle sue.’ Weil-Garris Parsons (1974), p. 12, has suggested that Vasari’s observation about lampblack in the Transfiguration should be regarded as an isolated remark, and that Vasari believed that the dark tonality was deliberate on Raphael’s part.}

To dismiss Vasari’s observation about the appearance of the painting as a mere matter of taste does him an injustice. Although biographical details in some of Vasari’s Vite are not always accurate, he is reliable as regards the genesis of the Transfiguration, as Mancinelli has shown.\footnote{Mancinelli (1977), p. 48.} If we presume that Vasari was well informed about the original appearance of the work, there is good reason to take his remark seriously and pay closer attention to changes that may have affected the dark shadows.

Did Raphael deliberately make the shadows dark, or are they the result of discoloration? The question of who is right here, Vasari or the modern authors, is very important, for it has far-reaching implications for the interpretation of the image in the context of Raphael’s stylistic development, as well as for the iconography, and it also impinges on the interpretation of the treatment of light and colour in 16th-century painting in general. Knowledge about the materials used and the way in which they age, together with an examination of the 16th-century sources, can shed light on Raphael’s intentions and clarify a centuries-old stylistic debate.

I. Views on the chiaroscuro in the Transfiguration

The Vasari camp

The accuracy of Vasari’s observation was not called into question until well into the second half of the 18th century. It was unanimously accepted that the dark shadows in Raphael’s last painting were caused by darkening, and the authors seem to have examined the painting themselves to check the validity of Vasari’s observation. There are windows behind the high altar of San Pietro in Montorio, which meant that the picture had to be inspected against the light, which would have made it even more difficult to read the darker passages. Kemp (1993) has pointed out that in past century’s viewers, ‘peering up against
the natural light, or seeking out what was visible in dim artificial light... must have had a greater tolerance for the deciphering of objects under low illumination.' So there seems to be no reason to believe that Vasari and later cognoscenti would have been more affected by the lighting in their assessment of Raphael's chiaroscuro than when examining other paintings.

Karel van Mander, who went to Rome in 1574 and stayed for more than three years, held up an admonishing finger in his Grundt der edel vry schilder-const of 1604.

For Raphael, famed throughout the world, in his last work in San Pietro in Montorio, the Transfiguration [which redounds] to his glory: the colours would look as if they had been freshly painted had he avoided lampblack. As time passes it spoils the colours above it or with which it is mixed.13

In 1657, the learned art-lover Francesco Scanelli assumed that the darkness of the colours that so debased Raphael's epilogue of perfection was caused by ageing.14 From the 18th century, authors began trying to work out how the shadows looked originally. The English connoisseur Jonathan Richardson supplemented the French edition of his An account of some of the statues, bas-reliefs, drawings and pictures in Italy (1728) with the observations of his son, who claimed to have examined Raphael's painting from very close quarters.

The shadows have all become a uniform black,... Yet it is perfectly possible that at first, before they altered, there was a great variety and gradation in the tones which delighted the eye, and that they flowed pleasingly one into the other.15

Charles de Brosses reported during his visit to Italy in 1739-40 that the shadows in Raphael's Transfiguration had aged to an almost uniform black, and believed that the gradations in colour and light and the reflections must have been far more apparent in the original modelling.16 It was also around then that people started suggesting that the light passages had also been affected. The German Romantic poet Wilhelm Heinse observed when he was in Rome in 1787: It is only a pity that the painting has lost its colour harmony [Haltung], that the shadows have all blackened, that the fine tints have disappeared, and that the effect of the sky is not good.17 Von Rohdhor agreed that very same year.18

13. Mander (1641), f. 40v: "Want Raphel vermaer in al s'woorlijs eren. In zijn laatste werk in Peter Montoor, De Transfiguratiët het zijnde glorie, De verwen souden versch ghesakken gedipt. Waert dat by had willen het lamp-swart wyckten. T' bedeelt die verwen daer 't onder oft meer vermeng di metter licht.'

14. Scanelli (1657), p. 165: '...la tavola gia menentata di S. Pietro in Montorio, la quale per essere rimossa la piü eccellente, e dalla Pittura, che a nostro giorno si rassa a palude, sarà bastante il dire, che sia l'ultimo operato della sempre crescente virta di questo supremo Maestro, e se un tal'epilogo di perfezione non fosse affatto in gran parte dall'occorita di ombra, goderebbe ancor un pretese di tal reta il virtuoso, come se da Pittor lodiamo fosse stata detinta; se sempre però avessi meno.' Scanelli knew many artists personally, among them Guerino and Guido Reni (see also Scanelli's remark in the use of extra white pigment by Guido Reni in chapter II, section 1) and advised on and bought works of art for Francesco d'Este, Duke of Modena and one of Italy's greatest collectors. Scanelli's book reveals that he was a painstaking observer who regularly discusses the physical condition of the paintings.

15. Richardson & Richardson (1728; 1772), vol. 3, p. 611: '...les ombres sont toutes devenues également noires... Cependant, il est très probable, que dans le commencement, et avant que les ombres eussent changé, il y avait une grande variété & graduation de tinta, qui deverrouront la vue & qui s'accroissent les uns aux autres agréablement.' That Richardson Jr had made a close study of the Transfiguration is clear from various details in his argument. He noted that the painting was executed in oils on a panel, which was quite thick and large, and that Raphael had executed it very delicately, with the hair and other details being painted with the tip of the brush. However, it was a less precise technique than that used for Raphael's smaller paintings.


Firsthand observations by 18th-century authors and the mosaic copy

In 1744, the Congregazione della Reverenda Fabbrica asked permission to make a mosaic copy of Raphael's painting for St Peter's in Rome. The commission was awarded to Stefano Pozzi, but the mosaic was not installed until 1768 (Fig. 2). The model for the mosaicists, whose copy was roughly twice the size of the original, was a large work in oil on canvas which still survives today, albeit in lamentable condition. It can be assumed that this copy was made after Raphael's painting had been cleaned, for experts who examined the Transfiguration in 1796 and 1798 got the impression that the painted surface had last been cleaned some 60 years before. It is taken for granted that the mosaic, a technique which does not discolor with age, gives a good idea of how Raphael's painting looked around the middle of the 18th century. A comparison of its tonal relationships with those in the painting reveals several obvious differences, particularly in the lower half. The shadows in the mosaic are not as dark, and details and reflections can be seen in the shadowed forms of the flesh tones, which make the transitions in the modelling less harsh. Raphael's figures loom up out of a dark background, but in the mosaic they emerge from relatively light and clearly defined surroundings. Another difference is that the light passages of several draperies, which are almost white in the painting, have a more saturated colour in the mosaic, particularly the pinks and reds, and the blue tunic of the apostle seated on the left.

The mosaic seems to show that 18th-century authors were exaggerating when they said that the shadows in Raphael's painting were almost black, that the fine tints had disappeared, and that the modelling displayed no variety or gradation in the tints. However, it turns out that the difference between the colours in the mosaic and the observations of the 18th-century writers is due to the fact that the colours that the copyists reproduced differed from those in Raphael's original. Giovanni Bottari noted in his edition of Vasari's Vite (1759) that the mosaic 'will necessarily differ greatly from the original.' He emphasizes that this was in no way due to any lack of skill on the part of the mosaicists, but simply because the mosaic technique was inadequate for imitating an oil painting, in which the tones can be blended into one another. The other reason for the difference was that the original had: already darkened in Vasari's time, has now become much darker, so that today one sees nothing in the depths of the painting but a deep and uniform black. The copy will therefore be the more praiseworthy. This remark implies that the original's darkened shadows were corrected in the mosaic. This was a not uncommon practice in the 17th and 18th centuries. As indicated in chapter II, in instructions for making copies in El museo pistorico.

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19. Di Federico (1983), p. 67; Boucher Desnoyers (1852), p. 40, confirms that the mosaic took more than 25 years to complete.
20. This copy is in the Benediction Hall of the Vatican Palace. The canvas is torn and the varnish badly yellowed. The paint is also severely discoloured, and the colours are very different from those in the mosaic. Since it was merely intended as a model for the mosaicists there would have been no need for durable colours.
23. Vasari, Vite de più nobiles pittori, scultori e architetti, ed. G. Bottari, 3 vols, Rome 1759-60. Bottari's commentary is mentioned in the edition by Guglielmo della Valle (1792), that I consulted: vol. 5, p. 316: "Ma necessariamente sarà molto lontano il mosaico dall'originale, non per difetto di chi ne ha lavorato, che anzi i mosaicisti sono eccellenti all'ultimo segno ma perché dovesi fare circa al doppio più grande e stretti i colori, questi debbono per necessità esser raggi da quelli di Raphael: e poi la materia stessa del mosaico non comporta che si copriano con tutta l'estremità che consiste in una parte quassù indifferibile. In altra esecuzione già annerisca a tempo del Vasari, adesso è molto più, onde ne'jodi non si vede altro che un nero visivo e tutto eguale. Sarà dunque tanto più pregiabile questa copia."
(1715-24), the Spanish painter Palomino y Velasco expressly advised against reproducing discolorations in the original. The report on the condition of the Transfiguration in 1798 shows that the copyists did indeed correct the effects of ageing. It states that parts of the picture, among them the beard of the pointing apostle in the red cloak, had been severely abraded when cleaned during a previous restoration (the campaign of around 1740 or an even earlier one). The mosaic shows the beard in full. The modelling was also corrected in order to match what was believed to have been its original appearance. The shadows were lightened and were given the pronounced effect of gradations and reflections which the original once possessed, according to Charles de Brosses who was quoted earlier. The light passages were corrected by giving them more forceful colours, which greatly reduced the glaring tonal contrast.

One result of the mosaicists' corrections was that some later connoisseurs felt that Raphael's original was inferior to the mosaic. Carl Justi, for example, wrote in 1870:

"...is bitterly disappointed in one's high expectations of the original... It is strange that the fourfold enlargement in the mosaic copy of the Transfiguration in St Peter's, which was made in 1768, gives a more favourable painterly impression on the whole than the unfortunate original."

Anton Mengs

The academician Anton Raphael Mengs (1728-79) was the first to suggest that the sharp tonal transition from the lit to the shadowed passages was due not to ageing but to Raphael himself. In his analysis of the work of Correggio, Raphael and Titian, published posthumously, he observed:

Moreover, Raphael had yet another defective basic principle, namely of diffusing a uniform bright light on the area of a garment, which should naturally have a pure colour. He fell into this error notably when he painted a blue garment that one sees on the apostle seated in the foreground of the Transfiguration, the lights of which are completely white, which could not be so, on the evidence of the shadows and mid-tones that he gave it. This has raised the paints to the highest white in the light passages and sunk them to the deepest black in the shadowed areas.

According to Mengs, Raphael employed very few reflections in the shadowed passages either, which resulted in too little variation between the different skin textures. Mengs' analysis covers precisely

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24. See chapter II, section I, Recipe for mixing colours in a lighter shade.

25. Mancinelli (1977), p. 15, took this to mean that the painting was cleaned again after the copy had been made. It is difficult to reconcile this hypothesis with the observation made in 1796 and 1798 that the painting had last been cleaned 60 years previously.

26. There are other corrections to the original in the mosaic. The two figures on the left of the Transfiguration scene are less pronounced, and the changeant effect in St James' attire has been toned down.

27. Justi (1870), p. 9: '...ist der hochgespannten Erwartungen gegenüber dem Original auf niederschlagende Weise iehrene... Er ist merkwürdig, dass die vierfach vergrosserte im Jahre 1768 vollende Mosaikkopie der Transfiguration in der Peterskirche im Grossen und Ganzen einen günstigeren malerischen Eindruck macht als das unglückliche Original.'


29. Ibid., p. 178.
those aspects, which the mosaicists had corrected because they believed them to be the result of ageing. When reading Mengs' stylistic critique, however, one must remember that painting had come a long way since the early 16th century, particularly as regards the 'natural' representation of shadows and flesh tones, and that Mengs was applying 18th-century criteria to the 16th-century Transfiguration.

Mengs felt that several other coloristic 'errors' were indeed due to ageing. He came to this conclusion on the basis of an anecdote in Joachim von Sandrart's Teutsche Akademie (1675-80). Giulio Romano had supposedly painted the head of the possessed youth very painstakingly and smoothly. Raphael found it too cautious, lacking soul and spirit, and brought it to life with a few masterly, multicoloured strokes. Mengs interpreted this as meaning that Raphael had left the underpainting of the Transfiguration to his pupils and had then merely retouched their work thinly, which had affected the durability of the painting in places. Mengs' explanation was that this was because layers of oil paint gradually become more transparent as time passes, allowing the underlying layers to play a greater role in the overall effect than was originally envisaged. Mengs' critique was widely accepted for a long time, with authors repeating his interpretation of the smooth execution of some of the flesh tones in the lower half until around the middle of the 19th century. They, too, reserved their severest criticism for the abrupt transitions in the modelling of the flesh tones and draperies, but they did not take Mengs' view that Raphael alone was responsible for this at face value.

Early 19th-century views

Napoleon's army carried the Transfiguration off to Paris in 1797. Experts who examined it, first in Rome in 1796 and in Paris two years later, came to the conclusion that the surface was damaged and was also extremely dirty, so the picture was restored before going on display in the Louvre in 1803. In that intervening period it was studied by Benito Pardo de Figueroa, the Spanish ambassador to the Prussian court. His influential Eixmen analítico del quadro de la Transfiguración de Rafael de Urbino, which was published in Paris in 1804 and was translated into French (1805) and German (1806), contains a detailed analysis of the chiaroscuro and use of colour in which one hears clear echoes of Mengs' critique. The Paris restoration involved the removal of the yellowed layers of varnish, which made the contrasts between light and shade in the modelling even more pronounced. When the painting was last restored, in 1972-76, it was discovered that several layers of varnish containing a transparent yellow pigment had been applied after this cleaning, probably to tone down the sharp contrast between light and shade. De Figueroa's interpretation of the chiaroscuro is a synthesis of Mengs' views and those of the other 18th-century writers. Like Mengs, de Figueroa thought that it was Raphael who had made the shadows so dark and without reflections. The abrupt transition from light to shade, however, he believed to be chiefly due to ageing:


31. Mengs (1786), pp. 179, 181. According to Mengs, Raphael had, fortunately, overpainted the apostles' heads with impasto (impastirte) brushstrokes, so they had retained their beautiful and lively colouring. The first explicit reference to the increased transparency of old paint-layers, is found in Gerard de Laforge's Gnoi Splénotroeb (1707); see chapter II, section IV.


Time, which has weakened the mid-tones of the relief and reinforced the deepest shadows has without doubt contributed to the exaggeration of their contrast with the lights. However, this effect must above all be attributed to the lampblack or printers’ black that Raphael employed for the shadowed passages, either as a trial or on a whim, as Vasari says, or because he did not really foresee that this type of black would reinforce itself at the extremes as time passed and would affect the other colours adjacent to it.\(^{35}\)

Raphael’s painting was also studied by Baron Boucher-Desnoy while it was in the restoration studio, and his findings are set out in the appendix of the 1852 edition of Quatremère of Quatremère de Quincy’s *Histoire de la vie et des ouvrages de Raphael*. The baron evidently saw the picture again when it was exhibited in the Louvre. It was returned to Rome in 1815, after the fall of Napoleon, and was installed in the Vatican Museum. Boucher-Desnoy studied it again there in the two successive rooms, in which it hung, and concluded that, the lighting, which differed in all four locations, dramatically affected the appearance of the work. In the restoration studio and in the first Vatican gallery, where the painting was strongly lit from above, it struck me as admirable, and with a marvellous effect; it was extremely luminous and transparent throughout. The lighting was far worse in the Louvre and the second Vatican room, and the baron could no longer detect those qualities in the work.

Vasari, R. Mengs, Benito Pardo de Figueroa, Quatremère and several other scholars and artists have written that the painting of the Transfiguration lacks transparency. This work, which is always being placed in gloomy surroundings, should be judged accordingly. I would probably have shared this opinion had not a happy chance enabled me to see this masterpiece illuminated from above.\(^{36}\)

When Boucher-Desnoy spoke of the extreme luminosity of the painting he was probably referring to the lightness of the Transfiguration scene. The mention of writers like Vasari, Mengs and de Figueroa means that their remarks about the lack of transparency must allude to the shaded passages. The baron had evidently seen that when the painting was fully lit the shadows were not a uniform black, but did indeed have a ‘transparent,’ differentiated detailing. Passavant pointed out in the French edition of his *Rafael von Urbino* (1860) that this phenomenon demonstrated that ‘the glares alone had caused the darkening, for when one placed the painting in a bright light it took on a luminous tone and shone in all its radiance.’\(^{37}\) When one shines a bright light on a very dark glaze applied over a lighter layer the passage will brighten because the light penetrates the transparent paint. Conservators are familiar with the phenomenon of extremely almost uniform passages displaying an unexpected wealth of gradations under a strong light.

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35. Pardo de Figueroa (1804), p. 49: ‘la degradacion de tintas desde los claros hasta los obscuros parece demasiado rapido, no porque falten matizes intermedios, sino porque los extremos, esto es, el mayor claro y la mayor umbra, estan fuertemente pronunciados. El tiempo debilitando las medias tintas de rebajo, y enfosando las ultimas sombras, ha contribuido sin duda al exagerar su contraste con los claros; pero principalmente debe este atribuirse al negro de lampara ó de imprenta, que Rafael empleó en este Quadro para las sombras, o por vera de ensayo, ó por capricho como dice el Vasari, ó porque realmente no pretendía que esta especie de negro llegara a cargarse en extremo con el discurso del tiempo, y manifestara los demas colores adyacentes.’

36. Boucher-Desnoy’s (1852), pp. 44-45: ‘il me parut admirable et d’un effet merveilleux; il était excessivement lumineux et transparent partout… Il est à regretter que ce chef-d’œuvre ne soit pas exposé de manière à ce qu’on puisse apprécier tous les genres de beauté qu’il réunit… Vasari, R. Mengs, Benito Pardo de Figueroa, Quatremère, et plusieurs autres savants et artistes, ont écrit que le tableau de la Transfiguration manquait de transparence. Ce curieux, ayant toujours été placé dans les localités sombres, devait être jugé ainsi; j’aurais probablement partagé cette opinion, si un hasard n’eût m’invité voir ce chef-d’œuvre éclairé par le haut.’

37. Passavant (1860), vol. 2, pp. 291-92: ‘les glares unis auraient pu croître au noir; car, lorsqu’on place le tableau en pleine lumière, il prend un ton lumineux et brillant de tout son état.’
Even today, Raphael’s painting reveals many nuances in the shadows when brightly lit (Fig. 3).

So when interpreting the treatment of colour and the handling of light and shade in the Transfiguration, all the late 18th and early 19th-century writers took into account that different passages had aged in different ways. They mentioned not only the darkening of the shaded areas, whether or not painted with glazes, but also the fading of delicate, light tints, as well as the impact of the increased transparency of the paint. It was also felt that Raphael did not have full mastery of certain aspects of the use of colour and chiaroscuro. One rarely encounters such views after the middle of the 19th century, partly because less and less attention was paid to the physical aspects of the painting. This resulted in authors simply repeating Vasari’s remark. In the course of the 19th century, though, people began taking a more critical view of Vasari’s Vita, with the result that his observation was not always taken as the basis for explanations for the dark shadows. Moreover, Raphael’s normative role in 19th-century art theory influenced writers to such an extent that they appear to have ruled out the possibility that he could have made either coloristic or technical mistakes. The upshot was a succession of widely differing theories about the harsh chiaroscuro.

The atmospheric explanation

Several authors believed that Raphael used the abrupt chiaroscuro to depict a specific type of light. According to Morgenstern (1822), the bands of red on the horizon and the long cast shadows are evidence that the event in the lower half of the painting is taking place as night falls—a time of day when there are abrupt transitions between light and shade. On top of that, he said, the shadows had darkened with age. Abraham Constantin (1840) maintained that shadows are simply darker in Italy, and Raphael depicted the lower group in bright sunshine. This light effect was supposedly evident from the sharply outlined shadows and the gold tint that predominates in the lights. He wrote that this effect could most clearly be seen in the chiaroscuro of the blue tunic of the apostle seated in the foreground, which had previously troubled Mengs. The latest restoration removed the gold tint in the lights, which in Constantin’s day would have been due to the layers of yellow-tinted varnish applied in 1803.

An error by Raphael’s pupils

Most 19th-century writers, could not reconcile the harsh chiaroscuro in the healing scene with Raphael’s style. This led to the idea that he could not have been solely responsible for the execution of his last painting. The theory was that after his sudden death his pupils Giulio Romano and Francesco Penni finished the picture without having grasped their master’s intentions. This was also the explanation for the inferior use of colour in some of the heads in the lower half, which had previously been attributed to ageing. Fiorillo (1798) adopted a cautious tone. He believed that it was not yet possible to say with absolute certainty whether the painting was completed by Raphael himself or finished by his pupils. Fiorillo’s pupil, Von Rumohr, was more categorical in his influential Italienische Forschungen (1827-31),

38. For example Speth (1821), pp. 378-79, Platerer (1829-42), vol. 2b, pp. 414-36, Ranalli (1856), vol. 2, p. 27. Burckhardt (1855), p. 906 mentioned just that the shadows had darkened.


40. Constantin (1840), pp. 7-8: ‘En Italie les ombres sont moines, et Raphael a représenté les figures du groupe inférieur éclairées par le soleil ce qui montre la force des ombres; la teinte claire qui règne généralement sur tous les clairs m’a donné l’opinion que je faisait là.’

41. Fiorillo (1798), vol. 1, pp. 104-06.
stating that large parts of the *Transfiguration* had not been painted by Raphael.42

Various 19th-century authors tried to distinguish between the hands of the various painters who were believed to have worked on the painting. The upper half, with its smooth transitions in the modelling, was considered to be by Raphael alone. The healing scene, on the other hand, was the work of pupils. Giulio Romano, in particular, was singled out as the perpetrator of the coloristic inaccuracies. In his biography of Raphael, Förster said that the artist had barely begun on the lower half, and that it was almost entirely Romano’s work.43 Most late 19th and early 20th-century authors agreed, and this view lives on even in quite recent studies, such as Bock von Wülfingen’s of 1956.44 It is typified by Justi in the famous lecture on the *Transfiguration* that he delivered in 1870.

He [Giulio Romano] cut out every figure with very sharp contours and rounded them with a glaring light resembling artificial light in a closed room. His lights burn but lack warmth, his shadows are impenetrable and dead, the mid-tones are missing... One cannot express how much damage this has done to the appearance of Raphael’s creation.45

The use of wrong materials

Other writers thought that the unbalanced chiaroscuro was not intentional on Romano’s part. Following Vasari, they believed that the lampblack was responsible for the harsh handling of light, but now it was Romano, not Raphael, who had applied it. According to Passavant (1860) Raphael had placed various figures in the lower half in a mid-tone to make them contrast with the radiance of the upper half.

Unfortunately, the admirable chiaroscuro which the *Transfiguration* had at first has vanished almost entirely, because Giulio Romano, when finishing the painting after Raphael’s death, used lampblack - a treacherous colour which gives a vigorous and transparent tone initially but darkens within a few years.46

Passavant’s explanation was endorsed by Crowe and Cavalcaselle, Dollmayer and others.47 Springer alone maintained that it was more likely that Raphael’s pupils had totally disrupted the radiant and luminous chiaroscuro with their dull black shadows and harsh contours while Raphael was still alive.48 Knackfuss interpreted the shadows in yet another way, believing that the artist’s death had prevented a

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42. Rumohr (1827-31), vol. 3, p. 133.
45. Justi (1870), pp. 8-9: ‘Er schneidet jede Figur aus in haarscharfen Contouren und rundet sie mitteht einern gerolligen Beleuchtung, die an das künstlüije Licht eines geschlossenen Raums erinnert. Seine Lichter sind brennend ohne warm zu sein, sein Schatten undumlassung und Todt, die Mittelsine fehlen. ...Es ist nicht zu sagen wieret durch diese Ausführung dem Eindruck der rapljaeliuhe Schöpfung geschadet werden od.’
46. Passavant, (1860), vol. 2, p. 291: ‘Malheureusement, l’admirable clair-obscure qui existait originellement dans la *Transfiguration* a presque entièrement disparu, parce que Jules Romain, en terminant le tableau après la mort de Raphael, a voulu le faire de même, couleur perdue, qui donne au premier moment un ton rigoureux et transparent, mais qui, au bout de quelques années, passe au noir.’
48. Springer (1895), p. 194. Crowe & Cavalcaselle (1882-85), p. 490, also believed that Giulio Romano had worked on the right half of the lower zone while Raphael was still alive.
few touches being applied which would have muted the over-harsh contrasts. It is amazing how ingenious everyone was in coming up with explanations for the chiaroscuro that was so at odds with Raphael’s style.

The darker style and rilievo

It is in three influential, late 19th-century monographs that one first comes across the idea that the harsh chiaroscuro in the healing scene was absolutely deliberate on Raphael’s part. This was matched by a more positive assessment of it. Eugène Müntz, like many previous writers, saw the chiaroscuro as a drawback which was undoubtedly largely due to Giulio Romano, but at the same time believed that Raphael had himself already painted the lower half as a zone of shrill contrasts and violence so as not to be outdone by Sebastiano’s Raising of Lazarus. Crowe and Cavalcaselle admired the splendid proportion of light and shadow in the old apostle seated in the left foreground and Herman Grimm believed that the dark shadows in the scene of the failed healing were necessary in order to accentuate the shadow-free radiance on the mountain. Taking a more positive approach to the chiaroscuro, various 20th-century authors discussed the different hands in the lower half of the Transfiguration and made a distinction between the harsh chiaroscuro on the one hand, and the bright colours and inferior quality of certain figures on the other. Like many earlier writers, they attributed these last two aspects to colorist errors made by Raphael’s pupils after his death. They approved of the chiaroscuro, however, and believed that it was fully in accord with Raphael’s intentions, even if it had been done after his death. Freedberg stressed that the purpose of the harsh fall of light in the lower half was to create a strong tonal contrast between light and shade in the modeling in order to lift the forms out of the painted surface. This idea was central to the studies of Kathleen Weil-Garris Posner, who argued that Raphael had made the shadows in the healing scene far darker than in his earlier work in order to depict the figures with a strong rilievo. This, a core concept in Italian art theory since the 15th century, can be construed as a convincing suggestion of the three-dimensionality of the figures on the flat plane. Weil-Garris Posner cited 16th-century sources to support her theory that this must have been based on Leonardo da Vinci’s ‘darker style,’ which embodied a marked tonal contrast between lit and shaded forms.

After the restoration of 1972-76

Nevertheless, the uncertainty about the autograph nature of the healing scene stood in the way of a widespread positive assessment of the chiaroscuro. The scientific examination that took place during the restoration campaign of 1972-76 revealed that parts of Raphael’s painting were unfinished. The forms there are sketchy, applied with just a single layer of paint, and lack the detailing characteristic of the other passages. This indicates that Raphael’s pupils had not tried to finish the Transfiguration in his

50. Müntz (1886), p. 323.
54. This despite the fact that Vogel (1920) had pointed out that it is clear from the correspondence of Pauluzzi, ambassador to the papal court, who visited Raphael’s studio regularly in 1519 and 1520, that the painting was already at a very advanced stage in the spring of 1520.
55. Mancinelli (1977), pp. 26-38. This sketchy manner is known from Raphael’s other unfinished works, like the Esterhazy Madonna (1508).
style. The competitive climate in which the painting was made also makes it unlikely that Raphael would have allowed anyone else to work on it. Numerous pentimenti, for example, in the positions of the hands and the shapes of the hair revealed by X-radiography show that all sorts of minor changes were made during the painting process. This ‘free’ method of working was seen as a clear indication that Raphael worked on the Transfiguration alone, which ties in with Vasari’s account of the work’s genesis: he then made up his mind to paint without the assistance of anyone else the altar-piece with the Transfiguration of Christ for San Pietro in Montorio, and he himself worked ceaselessly on this painting, which he brought to the highest degree of perfection.56 The removal of the varnish in 1972-76 showed that the use of colour was far brighter and more differentiated than had previously been thought (Fig. 4), and it also revealed differences in painting technique between the upper and lower halves. The Transfiguration scene was executed with paint rich in pigment that had been applied thinly. Glazes, too, had been used. The paint used in the healing scene was more smooth-flowing and thicker, with the various hues being blended into one another. Old and dirty layers of varnish had actually toned down the much-discussed tonal contrast in the lower half. Brown (1986) pointed out that the harsh handling of light in this part of the cleaned painting differed greatly from the chiaroscuro in works by Leonardo da Vinci, which have a far more gradual transition from light to dark. According to him, the differences in chiaroscuro between Leonardo’s work and Raphael’s painting were connected with the expressive function of this aspect of the Transfiguration—a notion that would have been totally unfamiliar to Leonardo.57 Raphael’s bright colours, which also differ from Leonardo’s muted treatment of color, are explained by Brown in the same way.58

The ‘expressive’ chiaroscuro

Now that there is a consensus on the autograph nature of Raphael’s last painting, the chiaroscuro in the lower half has been unanimously applauded. It was pointed out in the introduction to this chapter that the current view is that the contrast in the handling of light between the upper and lower halves is supposedly intended to express the conceptual antithesis between the Transfiguration and the apostles trying, and failing, to heal the possessed youth. It turns out that this view has its origins in a notion that has been evolving since the early 18th century, namely that Raphael’s painting depicts two scenes with contrasting content.

This is first expressed in Jonathan Richardson’s Account (1722), where the painting was experienced as a combination of two isolated scenes.59 Richardson found this conflation of two stories


58. Oberhuber (1982), p. 17, however, remarked that Raphael’s use of colour had its roots in the Umbrian school.

59. The idea that Raphael’s painting consisted of two separate scenes was voiced as early as J. Richardson, An essay on the theory of painting, London 1715, pp. 43, 56, 59, 60. It is elaborated in his An account of some of the statues, bas-reliefs, drawings and pictures in Italy, London 1722, pp. 313-14, and in the French edition of 1728, pp. 610-32. The combination of two actions had been criticised back in 1712 by A. Cowper, Earl of Shaftesbury, Second characters, or the language of form, Cambridge 1914. Unlike Richardson’s work, though, this book had little influence: Haberland (1993), pp. 139-40. On the critical history of the thematic contrast between the two scenes see; Lütgens (1929), pp. 26-60.
in one painting hard to take, and castigated Raphael for associating two events, which had occurred in different places and very probably at different times. To Richardson's Classicist mind, a painting should respect the Aristotelian unities of action, place and time. He did not see any thematic connection between the Transfiguration and the attempted healing of the youth, and felt that Raphael would have done better to depict the two events in two separate paintings. Richardson's book, which was translated into French and reprinted several times, had a great influence on 18th-century views of Raphael's last painting. One finds variants of his critique until late in the 18th century. There were others, though, who resolutely defended Raphael's depiction of the two events. However, those champions sought their arguments within the same conceptual framework used by the detractors. They set out to show that Raphael had not sinned against the unity of time by pointing out that the events could well have taken place simultaneously. However, none of the champions or critics felt that there was any thematic connection between the two episodes.

That changed at the end of the century when Goethe, in a celebrated passage in his "Italienische Reise" (which was written in 1787 but not published until 1817), pointed out the connection between the two scenes and expressed his abhorrence of the "senseless discussion" about the dual action.

Nevertheless I was surprised that anyone should dare find fault with the unity of such a great conception as this... What is the point, then, of separating the upper action from the lower? Both are one. Below are those who are suffering and need help; above is the active power that gives succour: both are inseparably related in their interaction.

At around the same time, Wilhelm Heine and Wilhelm Wackenroder found an inner connection in the form of the contrast between salvation and impotence, and posited that therein lay the painting's unity. This pronouncement by authoritative German Romantic writers silenced the discussion about the dual action, and that thematic antithesis has been the prevailing view ever since.

The German authors saw the contrast solely in the realm of content, and invoked neither the


61. The French sculptor and writer Etienne Falconet, who had turned against Classicist art principles in earlier essays, agreed in his "Notes sur le XXXV. Livre de Peinture" with Richardson's critique, see Falconet (1781; 1970), vol. 1, p. 391. Falconet also criticised the way in which Raphael depicted both scenes. Mount Tabor was so low that the disciples at the bottom must also have witnessed the miracle of the Transfiguration, which in his view made it utterly illogical that they were still concentrating on healing the possessed youth.

62. In order to counter the accusation that Raphael had made Mount Tabor so low that it appeared that both events were taking place at the same location (see the previous note), it was pointed out that if he had given the mountain its true proportions the painting would have been too elongated and that the Transfiguration itself would have become too small. Justifications of the dual action can be found in the French edition of Richardson's book in a letter to the author from the translator A. Rutgers; see Richardson & Richelson (1728; 1972), pp. 735-46, Brussels (1739-40); see Bezard (1931), pp. 145-47, Volkmann (1770-77), vol. 2, pp. 651-52.

63. According to Lütgens (1929), pp. 34-35, the letter from Rutgers mentioned in the previous note was the only exception to this. After a long series of arguments in defense of the dual action, which tie in with those of Volkmann and De Brosses, it is asserted that the painting is unified by the sublime contrast of the divine omnipotence of the Lord in the upper half and the impotence of the disciples below.


66. This is true not only of art-historical studies. Nietzsche (1872), p. 39, too, regarded the lower half of the Transfiguration as a "Widerspiegellung des erlangten Unheils," and the upper half as "ein leuchtendes Schweben in reinster Wonne und Schmerzkosem."
colour nor handling of light nor the expressions and gestures of the figures in their interpretations. It was only from the beginning of the 19th century that the thematic antithesis was gradually expanded to cover these aspects of the painting. De Figueroa (1804) was the first to describe the contrast in the gestures and facial expressions of the figures in the two scenes, which expressed the glory of the upper scene and to the earthly fear and suffering in the lower one. Quatremere de Quincy was the first to note a contrast between the composition of the lower half with the massed crowd and the sea of space above. Although there are indications that he regarded this contrast as a reflection of the antithesis in content, he felt that the main function of the scene of healing was compositional. If Raphael had only depicted the Transfiguration on the heights of Mount Tabor, a large part of the painting would have been left bare and empty, but instead he filled it up in an interesting way with the episode of the possessed youth. Scenes with the Transfiguration alone, such as the one by Raphael’s teacher Perugino, have a static, symmetrical composition. Oberhuber has suggested on the evidence of copies after preliminary studies for the Transfiguration that Raphael originally intended to paint just the Transfiguration. One factor which may have played a part in the decision to include the healing scene is that Raphael was in competition with Sebastiano del Piombo’s Raising of Lazarus—a dramatic scene with a mass of intermingled and gesticulating figures. The addition of the apostles and the unfortunate youth enabled Raphael to display his abilities in composing a scene packed with drama. It was only in the course of the 19th century that writers like Förster, Springer, Lübbe and Wölfflin laid increasing stress on the idea that the contrast between the symmetry and peace of the upper half and the tumult and sharp diagonals below reflected the painting’s thematic antithesis. The current interpretations of authors like Oberhuber and Hall regarding the composition of the Transfiguration are an extension of this.

Richardson, who was the first to construe Raphael’s painting as a combination of two different stories, was also the one who first described the two kinds of light that match the two actions. The bright and noble radiance surrounding the principal figure, which extends over everything in the top half of the picture, and the light in the lower half, is so judiciously disposed that the main subject [the Transfiguration] displays itself immediately. He did not, though, attach an expressive connotation to the handling of light. That only

67. Nor was a contrast perceived by any of the 18th-century authors who did discuss these aspects. Nothing is said about in the analyses of Richardson, (1728; 1972), pp. 610-31; Falconet (1781; 1790), pp. 391-94; or Ragueneau (1780), pp. 161-72.

68. Pardo de Figuera (1804), pp. 1-22.

69. Quatremere de Quincy (1852), pp. 363-79.

70. Pietro Perugino, The Transfiguration of Christ, fresco 266 x 229 cm, Perugia, Collegio del Cambio.


72. That Michelangelo provided drawings for the Raising of Lazarus was well known to Vasari. Vasari (1568); see Milanesi (1878-85), vol. 5, pp. 570-71, states that Sebastiano’s painting was carried out ‘sotto ordine e segno in alcune parti di Michelangelo.’ On Michelangelo’s share in Sebastiano’s painting see Harst (1981), pp. 66-75. See also Gombrich (1981).


74. Richardson & Richardson, (1728; 1972), p. 611: ‘Ce grand et noble éclat de lumière qui entoure la principale Figure, et se répand sur toutes celles de la partie supérieure du tableau, comme aussi le jour de la partie inférieure est si judicieusement disposé, que le sujet principal se présente le premier.’ This remark is not in the English edition of 1722.
came in the 19th century. De Figueroa wrote in his *Ecumen analítico* (1804) that the two contrasting kinds of light fitted the actions in the separate halves of the painting. Christ deserved to be surrounded by a radiant light, while the stark, harsh light below befitted the sad event taking place there.75 Braun (1815) was more explicit, mentioning aspects, which are found in the current interpretation of the lighting. Everything is bright and clear in the divine scene at the top, while the darkness and shadows below illustrate man’s weakness.76 The views of these early 19th-century authors found little favour with those who came after them, the reason being that for almost all of the 19th century the chiaroscuro was regarded as a shortcoming that Raphael could not have intended. It was only towards the end of the century, when a more positive attitude towards the modelling gradually evolved, that a connection was once again perceived between the handling of light and the thematic antithesis.77 Von Einsen (1966) and Weil-Garris Posner (1974) also combine approval of the dark colouring of the healing scene with the contention that the handling of light has an expressive significance.78 However, it was only when there was a consensus about the autograph nature of Raphael’s painting that the view formulated back in the early 19th century came to occupy a central position.79 Caron (1985), repeating the earlier opinions, believes that the figures were deliberately united by their shadows. ‘In the natural world contours are not always clear, lights not always displayed against darks, or the relationships among forms perfect, clear and visible, with all questions answered and all disease cured.’80 This is fully endorsed by Hall (1992): ‘The chiaroscuro mode here, by emphasizing the theatricality of their abortive efforts, makes ironic contrast with the upper zone.’81

II. *Rilievo* and the modelling in the *Transfiguration*

According to the modern writers, the use of the dramatic and theatrical fall of light in the lower half of the *Transfiguration* represented a new artistic phase in Raphael’s oeuvre, which was cut short by his death. Vasari had realised that the use of colour in Raphael’s last painting differed from that in his earlier work, but believed that this was due to radical changes in the dark paint, which according to him contained lampblack. In other words, he did not consider that Raphael had struck out on a new course as far as the handling of light was concerned. On the contrary, he regarded the painting as the highest degree of perfection (‘ultima perfezione’) of the master’s late style, his *maniera nuova*, a style appreciably

75. Paolo de Figueroa (1804), pp. 50-51. See also Toulorgeon (1803), p. b6.
77. See for example Voss (1920), vol. 1, p. 88; Stein (1923), pp. 173-74. Knackfuss (1899), p. 131, had already discussed the expressive function of the handling of light in the lower zone, although he believed that the overly harsh contrasts should have been toned down a little.
79. For example, Brown (1986), p. 241, saw ‘the enveloping darkness [as] a metaphor for the benighted state of the Apostles, the boy and his family. Such a complex: during use of light... anticipates works by Caravaggio.’ Mancinelli (1977), p. 21, has expressed similar views. The fall of light in the lower half, which he described as cool and theatrical, is supposedly associated with Raphael’s interest in theater, and plays a part in the symbolic unity of the work.
grander and more magnificent than his earlier manner, which he says began with the fresco paintings in the Chigi Chapel in Santa Maria della Pace (1513-14).

Raphael's late style and rilievo
It has often been pointed out that Raphael's work after 1513 has heightened tonal contrasts between illuminated and shaded forms. A connection has occasionally been made with his search for a stronger rilievo. A number of statements by Raphael's contemporaries demonstrate that a powerful rilievo was felt to be a key element in his late style. Their testimony leaves no room for doubt that the marked rilievo served for a more lifelike appearance, and that that effect came about through a pronounced tonal contrast between the lit and shadowed forms. Vasari, too, observed that the dark shadows in Raphael's work carve out the figures. In this way, one should put the shadows where they disturb less and give them a gradual transition in order to carve out the figures; as one sees in the paintings of Raphael of Urbino. As Vasari himself wrote, the work of Leonardo da Vinci and Fra Bartolommeo had a great influence on this development. He reports that Raphael spent much time with Fra Bartolommeo while in Florence because he admired the friar's work, which was known for its forceful use of dark shadows to achieve a greater rilievo. Vasari relates that Leonardo appended to the colouring with oil paint a certain darkness that enabled the moderns to endow their figures with great force and rilievo. Here Vasari relates the concept of rilievo to the use of oil paint, which is eminently suitable for producing dark tones without giving a flat, dull effect, as can easily happen with a water-based medium. Leonardo's writings clearly reveal the importance he attached to rilievo, as in the famous passage: The primary purpose of the painter is to make a plain surface display a body in rilievo, detached from the plane, which is precisely what Fra Bartolommeo's modelling does. According to Vasari, the figures in his Mystic marriage of St Catherine (Fig. 5), in

82. Vasari (1568); see Milanesi (1878-85), vol. 4, p. 340: 'Arendo dunque fatto Raffaello il cartone per la detta cappella, la quale è al entrata della chiesa di Santa Maria della Pace... la conduce lavorata in fresco della maniera nuova, alquanto più magnifica e grande che non era la prima.' Translation by Boll (1987), vol. 1, p. 298.


84. Paolo Giovio wrote in his Raffaello Urbinate Vita (c. 1527), that Raphael sometimes devoted too much attention to bringing out the rounding of the limbs, see Golzo (1936), p. 192. In a well-known letter to Michelangelo of 2 July 1518, Sebastiano del Piombo described the powerful tonal contrasts in the modelling of Raphael's St Michael and Raphael's The Holy family with St Elizabeth, the young S. John and angels or Holy family of France (1510). Music of Louvre, Paris, which he considered overdone; see Gnann & Oberhuber (1999), pp. 70-71: 'Chi crede non si possa immaginare avra comunque illusione a vedere quanto si evidenta l'effetto misterioso di tenebre e chiaro, tale che non si faccia alcuna relazione con il fango sottile della figura e che lucente, tanta chiare e tante mire.' Scientific examination has revealed that in this painting the shadows are very subtly nuanced: Bergeron (1990), pp. 51-53; Roux (1993), pp. 54-55. It is unlikely, though, that the modelling of this painting still matches Raphael's intentions, for it was transferred from panel to canvas in 1753.

85. Introduzione della pittura, in Vasari (1568); see Milanesi (1878-85), vol. 1, p. 181: 'Ed in questo modo si dovrà nel lavorare metter gli scarti dove meno offensano e facciamo divisione, per carve fuori le figure. Come si vede nelle pitture di Raffaello da Urbino e di altri pittori eccellenti che hanno innato questa maniera.'

86. Vasari (1568); see Milanesi (1878-85), vol. 4, pp. 376-77: 'Raffaello, adunque, fatto questa risoluzione, e annesso che Fra Bartolommeo di San Marco aveva un assai buon modo di dipingere, desiderò ben fondato, ed una maniera di colorire persino, anco che si volesse usare troppo gli scarti per dar maggiore rilievo.'

87. Vasari (1568); see Milanesi (1878-85), vol. 4, p. 50: 'Nell'arte della pittura aggiungere vuo si alla maniera del colorire ad ogn una certa ombra, donde hanno dato e moderno gran forza e rilievo alle loro figure.' See also p. 26.

88. Libro di Pittura (c. 1559); see McMahon (1956), vol. 2, no. 434: 'La prima intensione del pittore è fare d'in una superficie piana si dimenti corpo rilievo è spiccato da esse piano... ' This instruction is taken from Leonardo's original manuscript Libro A, which is dated 1504-10. Pedretti (1965), p. 136.

particular, are depicted with... such strong rilievo that they seem to spring forth from the picture. According to Vasari, Fra Bartolommeo achieved this effect by imitating Leonardo and making the strongest shadows even darker with black pigment. The scientific examination of paintings by Leonardo and Fra Bartolommeo have confirmed the accuracy of Vasari's remarks about their use of black pigments in the shadows.

This use of pigment differs from that of earlier artists, who painted their shadow tones with coloured pigments alone, or by applying several glazes. Leonardo's unfinished Adoration of the magi (1481-82; Fig. 6) and the Frate's unfinished Pala della Signoria (1512; Fig. 7) show that they both prepared the rilievo with a detailed monochrome underpainting which has pronounced tonal gradations in the modelling. Examination of their finished paintings has revealed that they, too, were underpainted in a similar way. The shaded passages in the underpaint remain partly visible under thinly applied layers of coloured paint and thus contribute to the modelling.

Technical examination has demonstrated that Raphael also used black and dark brown pigments in the shadowed passages of his late paintings--pigments which are only found sporadically in the shadows of his early work. The underpainting in his later easel paintings has a clear tonal contrast between the illuminated and shadowed passages. However, it is not monochrome. Raphael underpainted in colours, which could differ greatly from those applied over the, resulting in subtle colour effects. In the Holy family of Francis I (1518; Fig. 11), the shadows in St Elizabeth's green garment were obtained by painting a glaze of verdigris over a layer of pure red lake. With these transparent and almost complementary layers of colour Raphael produced dark and intensely coloured shadows. The use of pigment in the lower layer of the Transfiguration appears to be consistent with this technique, insofar as it served to yield a marked rilievo. Black pigments have been found in the shaded passages, and the modelling is indicated in the coloured underpaint with pronounced tonal contrasts, especially in the scene of healing.

For example, the blue tunic of the elderly apostle seated in the foreground is modelled with white and dark green, and his ochre-yellow cloak with brown and red. Some flesh tones are underpainted with white and cool, darker tones in the shadows, while others are in red ochre or more greenish brown hues.

As noted, modern authors like Weil-Garris Posner believe that the harsh chiaroscuro in the

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89. Vasari (1568); see Milanesi (1876-85), vol. 4, pp. 185-86: '...sun arte e con buon disegno e rilievo tanto grande che faccono spiccar di la tavola' and 'Some molte figure... ma colorite poi con una gialleggia maniera che facano di rilievo,' and 'E nel vero si vede usare d'immerite in questo colorito le cose di Leonardo, e massime negli occhi, dove adoperano fumo da stampatore e nero di avere abbrutito.' Translation by Bull (1987), vol. 2, p. 121.


94. The shadows in the blue robe in the Madonna della tenda (1513) in the Alte Pinakothek in Munich were thinly painted with azurite, brown ocher and carbon black: Sonnenburg (1990), p. 75. In Raphael's Saint Cecilia (commissioned in 1513), Pinacoteca, Bologna, the shadow area in St Paul's mantle consists of red ocher, black (possibly charcoal) and a little copper green pigment: Rossi Manaresi (1990), p. 131. For the results of the scientific examination of Raphael's early works: Plesters (1990), pp. 15-37.


96. Here, too, the colour of the underpainting sometimes differs markedly from the final colour effect. For instance, the pink robe of the kneeling woman is over a yellow-green underpaint; see Mancinelli (1990), pp. 152-53, Note iconica (n.d.), Brandi (n.d.), Brandi (1975).
modelling of the healing scene is characteristic of a powerful rilievo. However, it is clear from 16th-century texts that this modelling differs markedly from rilievo as it was defined in Raphael's day, which leave absolutely no doubt that the requisite, strong tonal contrast had to be indicated with gradual transitions, and that the shaded passages always had to remain legible.\(^97\) These views are most explicitly formulated in Leonardo's notes, which reflect his fascination with the mezzo, the area between light and dark, which according to him had an infinite number of gradations. Leonardo distinguished between two extreme types of light source. The first was lume universale, the light that came from a diffuse source and brought about soft transitions in the modelling. Its opposite was lume particolare, or specific light, called restricted (costretto) by Leonardo, which could come from various powerful, directed sources, such as bright sunlight or a fire at night.\(^99\) Leonardo knew that this light will display the greatest difference of light and shade, and as a result would produce the strongest effect of the curvatures of the muscles.\(^99\) Nevertheless, he warned on several occasions that it was better not to depict such a sharp light in paintings, because the works remain crude and ungraceful.\(^104\) The reason for this crudeness, he wrote, was that:

*the shadows cast by the sun or any other particular light are without grace for the body to which they adhere, because the parts remain confused, being divided by distinct outlines of light and shade. And the shadows are of equal strength at the end as at the beginning.*\(^103\)

This was not what he preferred. According to him, a modelling in which the edges of the shadows will not be sharp against the edges of the lights gave a much better rilievo effect.\(^102\) He also emphasised time and again about the need for reflections in the shadows in order to achieve a convincing rounding of forms.\(^103\)

The necessity for a gradual transition in the modelling to achieve a convincing and 'graceful' rilievo was also pointed out by Vasari. The deep shadows in Fra Bartolommeo's work were gradually blended, and he earned extraordinary praise for having introduced a method of blending the colour tones of his figures such that they impart a marvellous harmony to his painting, making them appear in rilievo and alive.\(^104\) In the remark quoted

\(^97\) These early 16th-century prescriptions clearly differ from the early 17th-century views about a strong rilievo. The latter are typified by the following description of the handling of light in Caravaggio's work in Mancini's Considerazioni apertamente alla pittura ... (1619-21), see Manucci (1956-57), vol. 1, p. 108: 'Proprio di questa scuola è di tempestare con lume unico che venga d'alto senza riflesso, come sarebbe in una stanza da una finestra con le pareti colorite di nero, che così, l'ombra che c'è intorno a l'ombra molto chiaro e molto oscura, vanno, a dar rilievo alla pittura.' Mancini goes on to emphasise that this form of lighting had not been used before: '...ma per il nuovo modo non naturale, né fatto, né pensato da altro secolo o pittore più antico, come Raffaello, Tiziano, Correggio et altri.'

\(^98\) Leonardo (c. 1510-16), (1504, 1508, after 1516), and (1492); see Richter (1883; 1970), vol. 1, nos. 118, 127 and 516, respectively.

\(^99\) Libro di Pittura (c. 1550); see McMahon (1956), vol. 2, no. 855. This instruction is dated 1513-14: Pedreti (1965), p. 214.

\(^100\) Leonardo (1492); see Richter (1883; 1970), vol. 1, no. 516. 'Quel corpo. Fara maggiore differenza da l'ombre ai lumi che o inversa essere visto da maggiore lume; come lume di sole o la mano il lume del foco: e questo è poco da usare: pittura, perché l'opere rimaggano crude e senza grazia.'

\(^101\) Leonardo (1492), see Richter (1883; 1970), vol. 1, no. 550. 'Come l'oree fatte da lumi particolari si dovesse fare che non si ben i fusi simili a' prati. L'ombre fatte dal sole o altri lumi particolari, non senza grazia del corpo che da quella è assai peggiora, perché sussidiamente lascia le parti chiare e evidente termino d'ombra da lume, e 'ombre son di pari posta in l'ultimo che nel primo.'

\(^102\) Libro di Pittura (c. 1550); see McMahon (1956), vol. 2, no. 136. This instruction is dated 1508-10: Pedreti (1965), p. 181.

\(^103\) Leonardo (1483-1518); see Richter (1939), vol. 1, no. 548. Libro di Pittura (c. 1550); see McMahon (1956), vol. 2, nos. 135, 576, 714. These instructions are dated 1510-45, respectively: Pedreti (1965), pp. 182.

\(^104\) Vasari (1560), see Milmari (1878-85), vol. 4, p. 186c: 'e tutta l'opera con un'ombra scura formatamente avvolta,' and 'Morti bell'e straordinarie, avendo introdotto un modo di sommergere le figure, in modo che all'arte aggiungono unione maravigliosa, salmente che paiono di rilievo e rilevo.' Translation by Bull (1987),
above about Raphael's use of colour that carved out the figures, Vasari wrote that the effect comes about by putting the shadows where they disturb less and [giving] them a gradual transition.\textsuperscript{105}

Raphael's late easel paintings executed in an oleaginous medium illustrate the aspects of earlier 16\textsuperscript{th}-century rilievo. The flesh tones in \textit{Pope Leo X with cardinals Giulio de'Medici and Luigi Rossi} of 1518 in the Galleria degli Uffizi, Florence (Fig. 8) are characterised by strong modelling in which curvatures and muscles are marked with lighter and darker shadows. The forms remain legible in the darker shadows, though, and reflections also play their part. The same applies to the figures in the fresco of the \textit{Fire in the borgo} of 1516-17 (Fig. 9). The face of Aeneas, who is carrying Anchises, is entirely in shadow, apart from a highlighted nose and cheek. Although the transition from light to dark is more abrupt here, the tonal difference is not so great as to produce a harsh effect. The shadowed areas are filled in very subtly. It is these characteristics that contribute to the powerfully three-dimensional look of the figures. Even in \textit{The liberation of St Peter} (1512-13; Fig. 10), which is a nocturne with several bright, directed light sources, reflections and forms remain visible in the deep shadows. These two frescoes are mentioned deliberately, despite the fact that the tonality of the shadows can differ from that in paintings with an oleaginous medium due to the nature of the technique. As regards the detail in the shadows—differentiation and reflections in other words—the frescoes are in my view a purer source for discovering Raphael's intentions than many of the late easel paintings. In the latter, the modelling appears to have altered greatly in places through the darkening of the paint or as a result of later interventions (Fig. 11).\textsuperscript{106}

\textit{The modelling in the lower half}

As in several of the frescoes, the lower half of the \textit{Transfiguration} has a powerful, directed source of light which makes the muscles, wrinkles and frowning foreheads stand out in the light and mid-tones of the flesh colours. In the extremely dark shadows, however, as mentioned before, it is barely possible to distinguish any modelling at all. In only a few of the flesh tones, such as those of the possessed boy, are the shadows lighter in tone and the reflections visible. The colour and folds are only recognisable in the shaded parts of a few draperies. In general, the modelling displays an abrupt transition from the illuminated to the shaded forms. This makes the light-handling look like the 'specific light' that Leonardo found unsuitable for paintings. Vasari, too, had problems with the abruptness of this modelling, but attributed it to Raphael's use of lampblack. This implies that he believed that the modelling originally would have had a convincing rilievo. As mentioned above, in the recent literature, Vasari's observation is supposed to illustrates nothing more than a difference in taste, or is evidence of Vasari's factual unreliability. Yet there is reason enough to take his observation seriously. Vasari shows in his \textit{Vite} that he was very well aware of the requirements of a strong rilievo. His discussion of this aspect of painting, which is a recurrent theme in the lives of Leonardo, Giulio Romano, Fra Bartolommeo and Raphael, is in complete accord with the definitions of his contemporaries.\textsuperscript{107} In his remarks on rilievo he distinguishes between intentionally dark shadows in which the nuances remain

\textsuperscript{105} Lomazzo in his \textit{Trattato dell'arte de la pittura} (1584; 1960), p. 237, also links the rilievo in Raphael's late work to gradual transitions in the modelling.

\textsuperscript{106} See note 84.

\textsuperscript{107} Vasari (1568); see Milanesi (1878-85), vol. 1, p. 18; vol. 4, pp. 26, 50, 183-86, 378; vol. 5, p. 533.
visible, and shadows that have darkened since they were painted in which effects were lost.\textsuperscript{108} He also made a distinction between paintings with these darkened shadows and works in which a painter had deliberately made the shadows too dark, which was apparently the case in some works by Leonardo and Giulio Romano.\textsuperscript{109} Since Vasari was well informed about the genesis of the Transfiguration, this is also probably true regarding the original colouring of the painting. After all, he knew Giulio Romano personally, who was a pupil of Raphael's while the latter was working on the Transfiguration. Vasari must have examined the picture soon after Raphael's death, and certainly in 1530/31, when he was studying in Rome. He may have noticed changes in the colouring in subsequent decades. It is very possible that Giulio Romano also told him about Raphael's use of lampblack. I will return to Raphael's use of pigments and media and the resulting material changes below.

There are two surviving descriptions of the modelling in the Transfiguration which were written shortly after the work was painted, at a time when it still retained much of its original appearance, and they confirm the accuracy of Vasari's observation.\textsuperscript{110} A few years after Raphael's death, Paolo Giovio (1483-1552), Bishop of Nocera and a favourite of Leo X, gave an account of Raphael's modelling in his Raphaelis Urbinatis vita (c. 1527) which undoubtedly refers to that in the Transfiguration.

For the rest, his work, in every type of painting, never lacked the beauty that men interpret as grace, although he sometimes paid over-due attention to bringing out the curvature of the limbs, when in his ambition he attempted to demonstrate the ability of his art, which transcended nature.\textsuperscript{111}

The phrase over-due attention to bringing out the roundings of the limbs is a clear description of the artists' term rilievo, which had obvious consequences for the rendering of the shaded passages as well. A letter of 1544 from Polidoro Papera to a painter who had copied fragments of the Transfiguration confirms that shadowed areas of the rilievo also contained distinguishable details. Papera's precise description of the heads painted by the copyist shows that the copies must have been made after figures in the healing scene. Papera was greatly impressed by the high quality of the copies, which according to him were barely distinguishable from the original. Finally, if they [the copies] had been cut out of their context and pasted into the actual painting [Raphael's] they would not have been discerned. And if they had been, they would have been ascribed to Raphael's own hand. Papera's description of the use of colour and the modelling in the copyist's

\textsuperscript{108} Ibid., vol. 4, pp. 185, 378; vol. 5, pp. 529, 533.

\textsuperscript{109} Ibid., vol. 4, p. 26, and vol. 5, p. 529.

\textsuperscript{110} Other early 16th-century writers praise the use of colour in the Transfiguration, although without specifying which particular aspects they admired; see Holland (1538, 1539) p. 89, M. Bianco, Delia nobissima Pittura, Venetia 1549; see Golzius (1936), p. 291, L. Dolce Arvina, Venetia 1557; see Ruskell (1969), p. 170, L'Anonimo Magliabechiano, see Ficarra (1968), p. 133.

\textsuperscript{111} I am grateful to Prof. C.L. Heesakkers of the University of Amsterdam for translating the following Latin into Dutch for me: Giovi (c. 1527); see Golzius (1936), p. 192: "CActive in lato picturae generi suntque quae opus renunciavit, quae grauis instrumentiari, quamquam in educendis membrorum tecti: aliquando nimium furenti, quam rem utroque naturae ambitio visendere somniatur." This characterization of the modelling must refer to the Transfiguration. Not only does it come immediately after a description of the scene of the painting, but it precedes a description of Raphael's style which seems to relate to the Transfiguration as well. The observation: 'Optimique plastico in dimensionibus etiostatique temper adumbrationem obtinent risus sapit, atque ad differentev viewpoints adopted for the two scenes and to the relatively oversized figures in front of the mountain. The remark: "...sem in diversis luis, quae commensuris colorum quantum menses terminate, et in mitigation, commensuraque rilievorum pigmentorum quantus diversitatem artifices aut alii de praestantissimae quod variet in Bonarola deputavit, ut et opere coloris erudite delineatis eius colorum aut commensurorum inferioris ut vi dehac et e miliarum arcanum accident' appears to be a reference to the conditions under which Raphael painted the Transfiguration, in competition with Michangelo's pupil Sebastiano del Piombo. Weil-Garris Pomper (1974), pp. 11-13, has argued convincingly that Raphael was trying to demonstrate the superiority of his work in oils in this indirect contest with Michelangelo.
work accordingly provides valuable insights into those aspects of Raphael's painting.

Not to mention the cheeks, the ears, the chins which are painted either round, a little protuberant or slightly hollow... Not to mention the flesh tones, be they white, red, pale or brown with soft and deep shadows, with the most [faces, skins] united by soft and clear lights such that each [of the faces] appears rounded and is marked with muscles, small defects and veins, allowing the softness and fineness of the skins to be seen, which truly appear to be flesh, and not painted."112

Here Papera mentions characteristics of a handling of light, which typifies Raphael's late period. His description of the modelling as the rounded, protuberant or hollow appearance of cheeks, chins and ears stresses the strong suggestion of three-dimensionality of the forms depicted, and we are told that this powerful suggestion of volume was achieved by means of a strong tonal contrast, varying from clear lights to deep shadows. There is no question, though, of the harsh specific light. In fact, Papera actually emphasises the gradual change in tonality. Clear lights were connected with soft lights which merged into soft shadows which finally ended in saturated shadows. These gradations of light and dark were such that each [of the faces] appears rounded and is marked. The result of all this was a deceptively lifelike impression. This characterisation indicates that in the early 16th century the transitions between the lights and the shadows were not sharp as they are at present. The faces were clearly defined, whereas now parts of them have disappeared in deep shadows.

III. Preliminary studies and 16th-century copies

Van de Wetering recently demonstrated how one can gain an insight into the original tonal relations in paintings by Rembrandt through the medium of drawn copies made in his studio.113 The surviving preliminary studies for and early copies of the Transfiguration likewise give an idea of Raphael's intentions as regards the detail in the shaded areas of the healing scene. When comparing the shadows in the preliminary studies and copies with those in the painting it is important to work from a relatively clean paint surface and 'representative' lighting. It was easier to meet the first condition, for the painting was restored 20 years ago, than the second. We still know little about the extent to which early 16th-century painters took account of the light intensity of the proposed locations of their pictures.114 My inspections of the Transfiguration were carried out under two different kinds of lighting. The most 'representative' was probably after the gallery was restored but before it was opened to the public. The painting was some way away from the wall, and was accordingly entirely lit by the light from a skylight.

112. Papera (1544); see Golzi (1936), pp. 289-90: 'la bontà con quanta verità rimasero le teste del quadro della Trasfigurazione di Cristo e del miracolo dell'andamento di costei, ma per le fer delle viste, sei in esercitato, forza di non minor lode delle sue. Voi imitate il beno gli ombreggiati, e sormaggiati capelli e degli uomini, e delle donne, e il crepito, il piano, e l'asticella delle fronti, le circondate ciglia, gli occhi rivolti, e aperti dello spirito fanciullino, e del padre, che della medesima specie furono essi ammessi a' bassi, e messi aperti degli altri, il profilo, ammazzato, e l'acquisto dei masi: le buache, e i labbi, che, con l'esser un poco più in fuori, al siottano del capretto, mostra...'


114. Gould (1981) has pointed out that the fall of light in 16th-century frescoes and altarpieces is often not the same as that in the location for which the work was painted.
Today the painting is lit by a series of powerful, uniform spotlights, which naturally reveal considerably more detail in the dark passages than was visible in daylight.

Preliminary studies

There are preliminary studies for the Transfiguration by Raphael and by his pupils. It is a varied group of drawings comprising modelli, nude and draped studies, and studies of individual heads, all covering different stages in the production of the painting.\(^1\) The large cartoon that would have been used for the Transfiguration has not survived,\(^2\) but there are six drawings in black chalk which Raphael made between the cartoon and the finished picture, and all are of apostles' heads the same size as the painted ones.\(^3\) Charcoal dots on the drawings show that they were made by pouncing the cartoon. The drawings themselves are not pricked. Fischel has convincingly argued that these drawings served as auxiliary cartoons for elaborating forms and light relations in greater detail,\(^4\) so they provide a superb opportunity for getting an idea of Raphael's intentions as regards the handling of light in the lower half of the Transfiguration. Although some of these auxiliary cartoons have been rubbed in places or were touched up later, the 'pristine' areas can give an insight into the modelling that Raphael wanted. This applies particularly to the drawing in Oxford of the young apostle leaning forward and the old apostle beside him, which is exceptionally well preserved (Fig. 12). The fall of light is from the same direction as in the painting, and comes from a localised source. Several of the drawn apostles' heads are loosely modelled with grey tones that differ little in tonal value. Other cartoons, though, display a more marked tonal contrast between the illuminated and shaded passages. Differences in the tonal values in the shadows in the drawings suggest forms and curves, with the reflections playing an important role. The modelling therefore fits the descriptions of the strong and at the same time rich rilievo found in the texts quoted above. The shadowed parts of the hands and faces in the Oxford drawing are indicated with delicate grey tones. As in the drawings of the sceptical apostle immediately to the right of the younger man leaning forward (Fig. 13), and the one in blue on the left (Fig. 14), there are reflections in the shadows by the eyes, nose and forehead. The drawings also show that although there is a directed light source, the shift from light to dark is not abrupt. The lit passages are bordered by a grey mid-tone on which the shadows were set down with firmer strokes in a hatching, which never extends to the illuminated area.

There are important differences between the modelling of the apostles in the drawings and in the painting as it appears today. They were immediately apparent when the painting was viewed in natural light, but even with the bright lighting in the renovated gallery most of the shadows contain far less information about the modelling than do the drawings. The shaded sides of the faces of the sceptical apostle and the one clad in yellowish green who is pointing at the boy vanish abruptly into the dark background (Fig. 15), whereas the borders of these areas are clearly demarcated in the drawings. (Figs. 12, 13). The drawing of the face of the old apostle with the book clearly indicates the shape of the forms and the reflections in the shaded passages (Fig. 16), but in the painting these details around

\(^1\) Oberhuber (1962).

\(^2\) There is a cartoon for the lower half of the composition in the storage vaults in the Vatican Picture Gallery (property of Monsignor Stanislav le Greve), but it probably dates from the 19th century and was made by Stefano Pozzi for the mosaic copy in St Peter's. Mancinelli, (1977), p. 15.

\(^3\) Joannides (1983), pp. 240-42.

\(^4\) Fischel (1937).
the ear and neck are so shadowed as to be barely visible (Fig. 17). With the lower light intensity under which the painting was viewed centuries ago, the shadows must have appeared as a completely impenetrable black. However, a photograph taken under very bright light during the latest restoration clearly shows that Raphael did indeed include these details (Fig. 3) yet further evidence that the shaded passages have darkened.

16th-century copies
A number of copies after the Transfiguration which were painted in Raphael's circle can also give an idea of the original handling of light. One has to treat them with caution, of course, because they too have aged. The Prado has a copy in oils by Giovanni Francesco Penni, who studied with Raphael when he was working on the Transfiguration (Fig. 18). Vasari states that this copy was made shortly after Raphael's death in order to be sent to France in place of the original.119 Penni made several striking changes. The draperies of the kneeling woman and the seated apostle on the left are pink, not blue, and the background trees are missing. However, he followed Raphael faithfully for the modelling in the draperies and the flesh tones, and the curves and the folds match right down to the details. The copy can thus contain clues to Raphael's intentions as regards the handling of the shadows. Almost all the shaded passages in Penni's painting are not as dark as in the original, and the contrast between them and the illuminated areas is not as striking.120 What is remarkable is the difference in tonality in the shaded parts of the draperies of Moses and Elijah, which indicates that shaded passages in the upper half of the painting have also darkened considerably (Figs 19, 20). The mountain behind the figures in the healing scene is also much lighter. As a result, the upper torso and back of the head of the apostle in yellowish green pointing at the possessed youth can clearly be distinguished from their surroundings in Penni's copy, whereas they merge with the background in the Raphael. The same applies to the two apostles in blue on the left (Figs 21, 22), and the elderly, sceptical apostle in the centre (Figs 23, 15). The transitions in the modelling of the faces are made more gradual in Penni's work, as in the faces of the young apostle leaning forward and the old one seated on the left, where there are clearly visible forms in the shadows (Fig. 23).

Another very faithful 16th-century copy, which is labelled 'school of Giulio Romano,' is in the Trasfigurazione church in the Monteverde district of Rome.121 It raises the suspicion that in addition to darkening, the Transfiguration has aged in other ways which contribute to the effect of what some writers call the theatrical lighting. The illuminated passages in the pinkish red drapery of Raphael's bearded apostle pointing up at the mountain are very light indeed, making them stand out sharply against the shaded passages in his attire. These illuminated areas in the copy have a more saturated red

119. Vasari (1568); see Milanesi (1878-85), vol. 4, pp. 333-34. The history of the copy is described in Passavant (1839-58), vol. 2, pp. 296-97.

120. This effect is, of course, partly due to the yellowed varnish on Penni's painting. However, the difference in modelling between the copy and the original is so great that it cannot be due solely to the varnish. This is also apparent from the fact that more details can be seen in Penni's shaded areas, even beneath the varnish.

121. The painting was formerly in the Chiesa San Rocco in Rome. The dirty and darkened varnish on the copy complicates comparison with the original, as does the fact that it hangs in a dark church. Some of the colours are also very different. The cloak of the seated apostle in the middle of the group is grey in the copy instead of orange, and Raphael's blue passages are almost black. These discolourations seem to have been caused by the use of cheap, unstable materials. Given the type of discolouration it would appear that the artist painted the orange with red lead and the blue with smalt. In the white, beige and grey parts of the garments, which were almost certainly painted with the stable lead-white and earth pigments, the modelling corresponds to that in Raphael's painting. It can be deduced from this that the copyist faithfully followed the modelling of the original.
Examination during the recent conservation revealed that Raphael painted these pink passages with a light-sensitive red lake which has partly faded. The colour was darker and more saturated in an area where the paint had been covered by accumulated dirt than in areas which had remained exposed to the light. From investigation of organic red pigments it appears that the addition of lead-white exacerbates fading. As a result, Raphael’s illuminated passages have faded more than the mid-tones and the shadowed areas, heightening the contrast between light and shade. It is conceivable that similar discoloration has occurred in other areas painted with red lake, such as the present white lights in the pink drapery of the kneeling woman. The fact that the light tones in the copy appear to be better preserved could be due to the use of a different, more lightfast red pigment, or to less exposure to light.

The many 16th-century drawings and prints made outside Raphael’s studio can only be used as a source for the tonality in Raphael’s picture with the utmost caution. For one thing, the copyist may have had different ideas about chiaroscuro than Raphael. In reproductive printmaking, moreover, forms that have very little emphasis in the painting are generally reproduced more explicitly due to the very nature of the graphic technique. The various drawings and prints, only two of which will be mentioned here, nevertheless confirm the impression conveyed by the auxiliary cartoons and Penni’s copy. A drawing by an anonymous artist after a study by Raphael’s pupil Perino del Vaga (1501-47) has a lighter modelling in which the shadowed forms are clearly defined (Fig. 24). The figures also stand out from a far less dark background. The same can be seen in an engraving by Cornelis Cort (1533-78; Fig. 25). Although the engraving, which is dated 1573, was made when Raphael’s painting had already started darkening locally, the modelling is closer to that in Penni’s copy than to the original. Another notable feature is that the foreground landscape is light in tone, which might indicate that the darkening took place relatively slowly, and that Cort and Vasari saw the painting when it was lighter than it is now.

IV. Light as a means of expression

Divine and earthly lights

The evangelists describe how Christ’s face first began to shine like the sun during his Transfiguration and how his robes became as white as light before a bright cloud cast a shadow on the group on Mount Tabor. The divine light radiating from Christ has an important spiritual meaning in the ecclesiastical literature. St Peter, in his second epistle (2 Peter 1:16-19), regards the Transfiguration as a symbol of the hope for Christ’s return and a prefiguration of the spiritual purification and healing in the hearts of the faithful: a light that shineth in a dark place, until the day dawn, and the day star arise in your hearts. It is logical to assume that Raphael took the Bible text as his basis and intended to depict the

122. The differences are so marked that they cannot be explained solely by the aged varnish on the copy.

123. Brandi (1975), and Brandi (n.d.).


125. The white lights in the pinkish red cloak, which are very different from the coloured, light passages in other draperies, are therefore not due to inconsistencies in Raphael’s modelling, as stated in Bell (1995), p. 144.

126. Various religious works which discuss the spiritual significance of light in connection with the Transfiguration are discussed in Weil-Garris Posner (1974), pp. 45-47.
intense brightness of Christ’s divine light as a radiant cloud.\textsuperscript{127} The forms illuminated by it are executed in light, bright tints with smooth transitions in the modelling. Even the shaded forms in this area bathed with the divine light are pale, but the forms facing away from the light, such as the shadowed draperies of Moses, Elijah and the disciples, are in darker colours which, as the comparison with the Penni copy (Figs 18, 19) shows, may have also darkened.

In addition to this divine radiance there is an earthly light entering from the left that illuminates the figures at the foot of Mount Tabor. Modern authors have suggested on the basis of the dark shadows in the lower scene that the painting should be regarded as a night scene with a restricted and directed source of light. The half-light on the horizon—a reference to the dawn mentioned by St Peter—is cited as further evidence for this.\textsuperscript{128} However, as will be clear by now, the nocturnal features of deep shadows and of figures swallowed up by a dark background are in fact due to ageing. In addition, Stumpel has demonstrated that the formal organisation of 16th-century paintings was based on an assemblage of discrete entities.\textsuperscript{129} There was a division between the figures (\textit{figure}) and the space around them (\textit{campo}). The latter part of the picture surface, which was regarded more or less as ornamentation, could be a uniform gold or a background with figurative elements like a landscape or architecture. A third element was the \textit{piano}, the plane on which the figures’ feet rested. Artists like Raphael composed their paintings from these isolated elements. Stumpel showed that one of the consequences of this approach was that the detailing of the \textit{campo}, with the laws of perspective that applied there, generally had no connection with the \textit{figure} and their \textit{piano}. This means that in paintings from the period, the atmospheric conditions depicted in a landscape in the \textit{campo} had no repercussions on the handling of light for the \textit{figure} and their \textit{piano}.\textsuperscript{130} The light coming from the left in the \textit{Transfiguration} may have had something to do with its planned installation in one of the side chapels of the Cathedral of Saint-Just et Saint-Pasteur in Narbonne. We do not know for certain which chapel had been selected, but it may have been the one opposite St Michael’s chapel, the location of Sebastiano del Piombo’s \textit{Raising of Lazarus}, in which the light enters from the right.\textsuperscript{131}

\textit{Function of light in early 16th-century painting}

We have seen that modern authors assume that Raphael used contrasting lighting for the upper and lower halves of the painting in order to express the thematic contrast in the painting.\textsuperscript{132} The problem is that this expressionistically tinged interpretation is based on assumptions about the original treatment of colour which we now know to be false. Moreover, the arguments with which it is buttressed are

\textsuperscript{127} Medieval and Renaissance writings on the divine light make a point of mentioning the pain caused by beholding the intense radiance. In the upper half of his painting, Raphael makes the perception of the divine light depend on the status of the figures. Elijah and Moses, who had been turned into heavenly souls, can stare at the light without even blinking, but the disciples show the effects of the pain of mortals, who are unable to withstand the glare. Kemp (1996).


\textsuperscript{129} Stumpel (1988).

\textsuperscript{130} As can be seen in Titian’s \textit{Sacred and profane love} (1514). Borghese Gallery, Rome, where the \textit{campo} is also in twilight.

\textsuperscript{131} On the installation of these altarpieces in Narbonne Cathedral: Gardner von Teuffel (1987). See also Gould (1981).

\textsuperscript{132} Here it is assumed that Raphael had already used different colour styles in earlier paintings. For instance, Hall and Caron state that the medieval miracle in the \textit{Mass of Bolsena} in the Stanza del Elookoro is depicted in the \textit{unione} mode, while the members of the Swiss Guard and the portraits of the papal courtiers are in the \textit{stumione} mode: Hall (1992), pp. 92-115, 131-36, esp. p. 132, and Caron (1985), p. 484. I, however, do not believe that there is any dichotomy in the conception of light and colour.
anachronistic.

In the first place there is the idea that has evolved since the 18th century that the contrasting handling of light corresponds to two scenes with contrasting content. In the 16th century, though, the handling of light was not experienced in that way. Vasari explicitly described the subject of Raphael's last painting as a single event. The scene shows Christ transfigured on Mount Tabor, with the eleven disciples waiting for him below. There is a young man, possessed by a devil, who has been brought so that Christ may heal him after he has come down from the mountain.\(^{133}\) Cornelis Cort's engraving of 1573 (Fig. 25) demonstrates which aspects of the treatment of light were considered characteristic of Raphael's painting in the 16th century. The figures are modelled as individual, isolated forms, each with the clear, rounded contours that indicate a strong rilievo. The bright, divine light emanating from Christ shines on the figures on top of the mountain. However, the tonality of the modelling of the figures outside this area is the same as that of the figures at the foot of the mountain. There is no question of any dichotomy in the handling of light, which would correspond with two separate scenes. The famous engraving of 1699 by Nicolas Dorigny (1658-1746) testifies to a very different conception (Fig. 26). Dorigny grouped the light and shadow in the lower zone into larger masses so that certain figures are spotlighted while others and parts of the landscape are made darker. The most remarkable alteration compared to Cort's print is that Dorigny introduced a marked difference in the handling of light in the upper and lower zones. The intense divine light now illuminates the entire upper half, so that the shadowed forms, which in Cort's print, are as dark as the shadows below, have become very light. The light tones and the smooth modelling contrast with the dark shadows and harsh, abrupt transitions in the lower zone. The outcome is two different ways of handling light, which correspond to the two actions as described by Richardson a few years later.

The second premise in the modern literature on Raphael's painting is that light and colour were being used to express the mood of the action even at this early date. It was widely accepted in the Italian Renaissance that expressive force was one of the most important aspects of a work of art.\(^ {134}\) An artist was expected to depict the mood of his figures or the nature of the action in order to communicate it to the viewer. It was assumed that the representation of emotions could be inferred from the way the human figure was depicted. Theoretical treatises of the period repeatedly state that the facial expression, pose and gestures enable the viewer to participate in the figure's *movimenti d'animo*, and through that in the meaning of the scene. In the early 16th century, however, colour, light and shadow were not yet being employed for that purpose.

Light, of course, did have a symbolic connotation. There is a tradition going back to classical times of cosmological, astrological and theological writings in which light is accorded diverse metaphysical meanings.\(^ {135}\) The divine light of Christ's Transfiguration was a well-known symbol of hope and salvation in religious texts, and this would have been the sense in which Raphael used it. 16th-century descriptions of his painting demonstrate that the radiant brightness of the divine light was regarded as an independent element, and quite distinct from the earthly light. Vasari discussed the effect of this divine radiance, writing that Christ was depicted *in the luminous air* and that Moses and Elijah were *bathed in light and... reflect his radiance*. The disciples on the mountain cover their eyes to protect

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\(^ {134}\) Baraš (1967), pp. 33-69.

them from the rays and the intense light of Christ's splendour.

16th-century descriptions of the Transfiguration show, however, that people considered that it was only the human body that expressed the mood of the scene. All the authors stress the exceptionally lifelike representation of the gestures, facial expressions and the skin textures, of the figures, which mirror their state of mind. This is typified by Paolo Giovio's description: 'in it one sees with admiration a boy tormented by an evil spirit, whose rolling and glassy staring eyes betray the condition of an agonised mind.' Vasari's description of the scene ties in with this. He about the possessed boy: his suffering is revealed in his flesh, his veins, and the beat of his pulse, which are all infected by the evil spirit.

The impression from the above texts that it was only the human figure that was seen as the vehicle for conveying the mood of an action is confirmed by the two main 16th-century theoretical works on light and colour, by Leonardo da Vinci and Lomazzo. Of the different types of light that Leonardo describes it is the lume particolare that corresponds to the lighting of the healing scene, to the extent that there is a powerful, directed source of light. Nowadays we experience light of this kind as theatrical and dramatic, possibly because the strong tonal contrast in the modelling conjures up an association with an actor pinned in the spotlights. It is doubtful, though, whether the 16th-century viewer saw any such association. Leonardo accorded no special significance to this or any other kind of light. That light and colour were not employed to express the mood of an action is also apparent from Leonardo's instructions for portraying dramatic events. When he speaks about painting a battle scene he goes into detail about how the painter must illustrate the states of mind of the fighting men by varying the facial expressions, skin colour and poses. However, the sole object of Leonardo's directions on the handling of light was to depict the figures and the circumstances of the battle as true to life as possible.

Barasch (1978) has pointed out that although there were numerous writings on the symbolism of colour in the Italian Renaissance, the art theory of the day did not attribute a suggestive power to

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136. Vasari (1568); see Milanesi (1878-85), vol. 4, p. 372: 'Arretrar colle chi vuole conoscere e mostrare in pittura Cristo raffigurato alla divinità, lo guardi in questa opera, nella quale egli le face sopra questo mondo, diminuto in un'area buia con Mosè ed Elia, che alluminati da una lucezza di splendore si fanno rivi nel lume sua. Sono in terra protostati Pietro, Toppo e Giovanni in varie e belle attitudini: che lui attesta il capo, e che son furo onoro affioci che con le mani si doppiano dai raggi e dalla immensa luce dello splendore di Cristo.' Translation by Bull (1987), vol. 1, p. 315.

137. Giovio (c. 1527); see Golaž (1936), p. 192: 'Sed urae et plummarum sunt in se fabula, quem Clitemnestra, Pontifex; in Ianuario ad aram Petri Montemori dedicante, in eum sem um admirationem venit pare a Casademone reserat, qui reserat, et uestigia sculit, commentum rite habent referit.' Papera spoke of the youth in a similar fashion, and emphasised how the superbly characterised facial expressions of the other figures reflected their mood of wonder and amazement; see note 113.

138. Vasari (1568); see Milanesi (1878-85), vol. 4, p. 371: '...il quale giovine... mostra il suo piaire dentro nella carne, nelle vene e ne'poli contaminati dalla malignità dello spirito.' Translation by Bull (1987), vol. 1, p. 314. Vasari describes the old man holding the youth as follows, pp. 371-72: 'Questo figure sostiene un retort, che abbracciatura e press anello, fatto gli occhi bendati con la luce in mezzo, mostra con la alzare il sigo ed incorrere la fronte, in un tempo medesimo e forza e puro; pure rivolto sul' Apeuldido figo, pure che, sperando in loro faccia umana a se stesso.'

139. As Sherman (1962), p. 13, has pointed out: 'Leonardo did not elaborate a theory of colour apart from his theory of light; where ever he treats of light he also treats of colour.'

140. Here I differ with Barasch(1987). On pp. 60-61 he assumes that the lume particolare 'also has an expressive character... Dramatic effects of illumination are especially related to specific light' probably because it produces the most vivid contrasts between bright and dark.' Barasch is here working from the fact that Leonardo recommended specific light for a scene with a blaze at night in which the figures near the fire will all be illuminated by the reddish light against a dark background. However, the purpose of this lume particolare is solely to depict the effects of the nocturnal source of light as realistically as possible. There is no question at all of Leonardo according the light a dramatic dimension.

141. Leonardo (1492), and (c. 1510-16); see Richter (1883; 1970), vol. 1, nos. 601-02, and 603, respectively. Leonardo wrote that in a melee of fighting soldiers, the clouds of dust and smoke left only a slight tonal contrast between the illuminated and shadowed passages.
colour in a painting.\textsuperscript{142} It is only in Lomazzo’s *Trattato dell’arte de la pittura* (1584) that one finds colour in paintings being explicitly described as a means of evoking certain emotions in the viewer.\textsuperscript{143} However, one does not find similar pronouncements in Lomazzo’s chapter on the representation of light and shadow in a painting. He does attribute various symbolic meanings to light, which echo Neoplatonic ideas about its metaphysical significance. Nowhere, though, is it suggested that the treatment of light in a painting can be used to give expression to a figure’s state of mind or the tenor of a scene.\textsuperscript{144} It lies outside the scope of this article to discover when the handling of light in a picture did acquire this function, but it was probably in the course of the 17th century. The earliest writings known to me which explicitly indicate how the treatment of light expresses the mood of a scene date from around 1670, and are part of the theory derived from music about the use of the modes within painting at the Académie Royale de Peinture et de Sculpture.\textsuperscript{145}

V. Possible causes of the darkening

Vasari believed that the darkening of the *Transfiguration* was due to the use of ‘printers’ black,’ or lampblack.\textsuperscript{146} Lampblack, which consists mainly of soot (carbon), is the product of the imperfect combustion of oil, tar, pitch or resin. It is a very fine, rather fatty, deep black pigment, which was used in book printing.\textsuperscript{147} Vasari had also noticed darkening in the shaded passages of easel paintings by other artists. He had the following remarks to make about Fra Bartolommeo’s *Mystic marriage of St Catherine* (the *Pala Pitti* (Fig. 5):

> And he was truly very successful in imitating the paintings of Leonardo in his colouring, especially in the shadows, for which he made use of lampblack and the black of burnt ivory. This panel has now become much darker than when he painted it, because of these blacks, which have grown markier and deeper.\textsuperscript{148}

The *Holy Family* altarpiece which Giulio Romano had painted around 1524 for a chapel in Santa Maria

\begin{itemize}
\item \textsuperscript{142} Baraš (1978), p. 166.
\item \textsuperscript{143} According Lomazzo (1584; 1568), p. 201: ‘Perché tutti i colori hanno una certa qualità diversa fra di loro, assai sono diversi effetti, a chiunque gli guardi.’ He continues describing the different emotions the various colours would evoke in the viewer.
\item \textsuperscript{144} Ibid., pp. 211-44. Baraš (1978), p. 142, says that the painters whom Lomazzo lists as models for the depiction of light suggest that he was aware of an expressive function of light, despite the fact that Lomazzo says nothing on the subject in his theoretical passages. Baraš cites Lomazzo’s description of Correggio’s *Nativity* in support of his argument. Lomazzo, however, mentions this work as an example of divine, not earthly light, which has a symbolic function in the painting and no expressive dimension at all.
\item \textsuperscript{146} Vasari (1568); see Milanesi (1878-85), vol. 4, p. 378.
\item \textsuperscript{148} Vasari (1568); see Milanesi (1878-85), vol. 4, p. 185: ‘E nel vero si sale assai d’immisurato in questo colore le case di Leonardo, e massime negli scuri, dove adoperò fumo da stampatori e nero di avorio abbruciato. È esso questo tovarla d’altrì neri molto ricensata più che quando la fecì, che sempre una diventarne più tinti e scuri.’ Translation by Bull (1987), vol. 2, p. 122.
\end{itemize}
dell’Anima in Rome elicited the view that:

if this picture, too, had not been so heavily tinged with black, making it very dark, it would have been much better. But the blackness has caused the loss or ruin of the greater part of the work put into it; and this is because black, even if varnished, ruins what is good, as it always has an arid effect, whether it is charcoal, ivory-black, smoke-black or burnt paper.\(^{149}\)

So in Fra Bartolommeo’s painting it was ivory-black as well as lampblack that was apparently responsible for the darkening, and in Giulio Romano’s case Vasari even warned that any black pigment could spoil a painting. Microscopic examination of paint cross-sections taken from the *Transfiguration* during restoration in the 1970s revealed that Raphael had used black pigments in the shaded passages, possibly vine-black.\(^{150}\) Lampblack was not encountered, possibly because this extremely fine pigment only shows up under very high magnification. Unfortunately, at the time the present study was carried out, it was not possible to re-examine and analyse the old cross-sections, nor could any new samples be taken.\(^{151}\) Giulio Romano’s painting has not been subjected to scientific examination. It has a layer of varnish, which is so dirty and darkened as to make the scene almost illegible. A recent examination of Fra Bartolommeo’s painting revealed the presence of only a carbon black pigment in the shaded passages, probably vine-black. Although the use of lampblack and ivory-black could not be ruled out, Fra Bartolommeo in any event did not give preference to those pigments.\(^{152}\) It would also have been difficult for Vasari to have known the details about Fra Bartolommeo’s use of pigment, for the artist had died back in 1517. He was probably better informed about Giulio Romano’s working method, for he knew him personally. It seems that it was Romano who told Vasari about Raphael’s use of black pigments. The presence of lampblack was recently demonstrated in the frescoes painted by Raphael and his studio in the Loggia di Psiche (1519) in the Villa Farnesina in Rome.\(^{153}\) As already noted, the question of whether Raphael also employed lampblack in his last painting must remain open. It should be borne in mind, though, that even if he did that does not mean that this pigment was responsible for the darkening. Lampblack is one of the most stable pigments; it is only if the soot has not been properly purified that fatty constituents remain which can cause discoloration.\(^{154}\) It has regularly been found in the shaded passages of paintings which have not darkened at all.\(^{155}\) Vasari was of course

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\(^{149}\) Vasari (1568), see Milanesi (1878-85), vol. 5, p. 533: ‘E se anco’ questa tavola non fuco stato tanto tinta di nero, onde è diventata scurissima, certo sarebbe stata molto migliore. Ma questo nero fa perdere o scontentare la maggior parte delle fatiche che si sono dette, conoscendo che il nero, ancora che sia venuto, fa perdere il buono, avendo in se sempre dell’alito, e sia carbonio o arveto abbrudato o nero di fumo o carta arsa.’ Translation by Bull (1987), vol. 2, p. 215-16.

\(^{150}\) Mancinelli (1990), pp. 152-53; Brandi (1975), Brandi (n.d.).

\(^{151}\) At the time the present research was carried out, it was not known where the samples were stored. Prof. A. Nesselrath, Direzione Generale Musei Vaticani, was prepared to allow the painting to be examined with non-destructive techniques, among them X-ray fluorescence, but that cannot determine the presence of lampblack. Only very recently the samples have been retrieved. Unfortunately, there was not enough time to examine these samples before finishing this Ph.D. thesis. Analysis of the cross-sections will be carried out in the summer of 2002. The results of this research will be incorporated in the published version of this thesis.

\(^{152}\) Buzzegoli et al. (1996), p. 309.


\(^{154}\) See chapter II, section 11, Methods for improving pigments in order to counter discoloration.

\(^{155}\) Noble & Wadum (1998), p. 69. I am grateful to Marika Spring for showing me several examples of well-preserved paint areas that contain lampblack in the collection of the National Gallery, London.
guessing why the paint had darkened. Even today it has not been explained why certain passages in oil paintings darken with age. Vasari had merely noticed that shadowed areas had darkened in paintings with a strong rilievo, and because he knew that black pigments had been used in the shadows of this kind of modelling, it is understandable that he assumed that they had caused the darkening.156

Although Vasari did not know precisely which black pigments Fra Bartolommeo had used, that does not necessarily mean that his observation about the darkening was incorrect.157 Seen under the museum-style lighting of the Palazzo Pitti, the modelling of the altarpiece, which has recently been cleaned, is marked by extremely dark, almost black shadows and abrupt transitions from illuminated to shaded forms. Many of the shadowed areas, such as those of the putto on the left holding up the baldachin and of the musician angel on the steps, can barely be made out from the dark background. As a result, the illuminated passagesloom up like ‘islands’, detracting from the rilievo effect that the artist was looking for. Modern authors assume that the present chiaroscuro in the *Pala Pitti* corresponds to Fra Bartolommeo’s intentions.158 The extent to which the modelling visible today departs from those aims is made clear by a comparison with the unfinished *Pala della Signoria* of 1512 (Fig. 7).159 This monochrome underpainting in ink for a scene comparable to that of the *Pala Pitti* shows that at this stage of his career Fra Bartolommeo prepared the modelling of the figures with smooth transitions between the illuminated forms and the shadows. The forms are clearly defined, and reflections can be made out in the shadows. It is inconceivable that the painter would have indicated these gradations in the underpainting only to cover them up in the finished work. Scientific examination has demonstrated that the Frate modelled the shaded passages in the *Pala Pitti* on a comparable monochrome underpainting with delicate, transparent, dark layers of paint rich with binding medium, so that the underpaint contributes to the finished effect.160 Under bright lighting it can be seen that the details in the shadows are still present, but under normal conditions they are barely visible.

**Examination of the paint surface**

The yellowing of the oil medium plays an important part in the process whereby certain passages in oil paintings appear darker after the passage of time.161 The effect is worst with paints made from pigments which absorb a great deal of oil, such as blacks, azurite, umber, red lake and most of the earth pigments. The yellowing of the oil medium takes place mainly in the dark. Siccatives can be added to accelerate the oxidative drying of oil paint. Siccatives can also be added to the paint itself. In either

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156. Vasari was not the only one to have this opinion of lampblack. 17th-century treatises on oil painting show that many painters also believed that this pigment discolored the paint with age; see note 158.


158. Padovani (1996), p. 97, feel that the effect of dark monochrome shadows disappears when aged varnish is removed. I find this difficult to reconcile with my own observations.

159. The underpainting has not been readied to the same degree everywhere: Buzzegoli *et al.* (1996), pp. 300-01.

160. Ibid., p. 303.

161. See chapter II, section 1, The oil binding medium’s tendency to turn yellow. Since the introduction of alkyd and acrylic paints, the paint industry has done little research into the causes of the darkening of oil paintings. The darkening phenomenon in 19th-century easel paintings and its underlying processes is currently investigated in the framework of the 19th-Century Project at the Netherlands Institute for Cultural Heritage (ICN), Amsterdam.
case, sometimes a too high a proportion of siccatives increases the darkening of the paint.\textsuperscript{162} Another cause of areas appearing darker is an increase in the refractive index of the medium during drying and ageing. As a result of this process, layers of oil paint can become more transparent, making them absorb more light and take on a darker appearance. Underlying layers of dark paint can also become more visible.\textsuperscript{163}

An extensive scientific examination of the Transfiguration could yield information on the extent to which the above processes have taken place in the dark passages. I was only able to study the paint surface and use the data obtained from the study done in the 1970s.\textsuperscript{164} Oil was identified as the main medium used. Raphael generally employed pigments for the shaded areas of the painting which require a great deal of oil to turn them into paint, such as umber, ochre’s and other earth pigments, black pigments, azurite and red lake. The high proportion of medium would accordingly have made the shadowed passages susceptible to darkening. Because Raphael underpainted the shadows with dark paint, these areas would also have taken on a darker appearance due to the increased transparency of the paint.\textsuperscript{165} The dark church of San Pietro in Montorio, where the Transfiguration was installed shortly after Raphael’s death and where it stayed for almost three centuries, would definitely have exacerbated the darkening of the oil. We also know from the testimony of Baron Boucher-Desnoyer cited above that the light intensity in the Louvre and the Vatican was also far from ideal.

Another phenomenon is encountered in the dark passages of the painting, which suggests that the paint in those areas may have been particularly prone to darkening. The paint surface in large parts of the shadowed passages has contracted into islets in a way typical of cracks which occur when paint contracts as it dries.\textsuperscript{166} Most of these cracks are visible in the shadows of the figures in the lower zone. There are conspicuous cracks, some several millimetres wide, in the dark passages of the azurite blue robes of the kneeling woman and the old apostle with the book on the left (Fig. 27, 3). Premature cracks or drying cracks in such areas are a well-known phenomenon in 16\textsuperscript{th}-century paintings. In the Transfiguration, though, many other colours have severe drying cracks. For example, the shadows in the ochre-yellow cloak of the old apostle with the book (Fig. 3). The shadows in the many of the flesh tones have premature cracks, such as the face of the apostle in blue at the extreme left (Fig. 22). In the Transfiguration scene itself there are drying cracks in parts of the darkened landscape and in the extremely dark passages of Elijah’s grey cloak and John’s blue tunic.

Drying cracks can be due to various causes. Painting with a quick-drying paint over layers, which have not dried out properly, is one, or the use of pigments, which slow down or even inhibit the drying process. An excessive use of siccatives can also cause premature cracking.\textsuperscript{167} Most of the cracks in the

\begin{itemize}
\item \textsuperscript{162} Nicolau (1999), pp. 163; personal communication, Dr L. Carlyle, Canadian Conservation Institute, Ottawa.
\item \textsuperscript{163} Nicolau (1999), pp. 162-63. See also chapter II, section IV.
\item \textsuperscript{164} Particularly valuable observations were made by L. Brandi, who examined the painted surface during the latest restoration campaign: Brandi (1975); Brandi (n.d).
\item \textsuperscript{165} There is no dark underpaint in the light passages, and the paint almost always contains lead-white, a pigment which requires very little medium for mixing into paint, so there is far less darkening in these areas. Lead-white paints can, though, yellow badly in the dark.
\item \textsuperscript{166} On the formation of drying cracks: Nicolau (1999), p. 165-74, Eibner (1920). That the cracks are due to the paint drying and not to later interventions, such as treatment with copaiva balsam (which was customary in the latter half of the 19\textsuperscript{th} century, mainly in German museums) is confirmed by mention of the cracks in a report from 1797 on the physical condition of the Transfiguration: Emilie-Male (1962), pp. 225-29.
\item \textsuperscript{167} Nicolau (1999); Eibner (1920).
\end{itemize}
Transfiguration are in areas where the paint was applied thickly, whereas the thin areas have generally been spared. Since the cracks are mostly in the dark passages, it seems that the drying problem is associated with the composition of these paints. Most of the dark passages in Fra Bartolommeo’s Pala Pitti also display serious premature craquelure, which is far less prevalent in the light passages. Here too, then, cracking appears to be connected with the composition of the dark paints and the sequence of the paint-layering.

It is striking that the two paintings in which Vasari detected darkened shadows also have severe shrinkage cracks in those areas. These cracks, which presumably occurred soon after the paintings were completed, suggest that adverse physical changes had taken place within a few decades. However, Vasari speaks of darkening, not craquelure, yet both phenomena can be associated. First, the painted modelling is less legible in the areas, which have been badly affected by cracks, giving them a uniformly undifferentiated appearance. In addition, it has been observed about 16th-century paintings (but above all about 19th-century ones) that it is the severely darkened passages that display premature cracking (Fig. 28). Both phenomena seem to be associated in these cases, and to have been caused by the same ‘errors’ in painting technique. In the case of Raphael and Fra Bartolommeo, the mistakes could have something to do with attempts to get the dark paints to dry more quickly. Most of the pigments they used in these areas yield slow-drying paints. Black pigments, in particular, can retard drying considerably. As later painters’ recipes advise time and again, the artists could have corrected this problem by using a pre-polymerized oil, possibly combined with siccatives. A few runs in the paint in the lower half of the Transfiguration point to the use of a fluent, treacly paint. A very small proportion of green copper pigment in a shadowed passage of a red robe might indicate the addition of siccatives. It is possible that the early 16th-century painters did not yet have sufficient experience with the proper proportion of siccatives to be added to their paints. It seems likely that the need for this had only arisen shortly before, when as a result of painters’ search for a more forceful rilievo they began making extensive use of dark paints containing black pigments. The consequences seem to have been serious darkening and shrinkage fractures.

168. The light passages, where the paint contains quick-drying lead-white, generally have no shrinkage cracks, but there are exceptions. The foot of the young apostle bending forward is heavily cracked, as is the area of light blue between the raised hands of the standing apostle on the far left. In these cases the premature cracks could be due to the application of quick-drying paint containing lead-white over a layer, which was not yet completely dry.

169. Since the premature cracks are mainly in the dark passages and are completely absent in paint that is almost pure lead-white, these cracks will not have been caused by a ground that was not completely dry. Drying problems with the ground appear to be the case with Fra Bartolommeo’s St. Vincent Ferrer, panel 130.6 × 118.3 cm, Museo di San Marco, Florence, which has severe premature craquelure over its entire surface.

170. An example of an early 16th-century painting wherein severely darkened passages display premature cracking is Orevoli’s (Giov. Batt. Benvenuti), Deposizione (c. 1520), Borghese Gallery, Rome. An example of a 19th-century painting is Jacob Maris’ The Merry (1888-99), Museum Boijmans van Beuningen, Rotterdam. Personal communication: Annetje Boersma (private restorer, Rotterdam) who examined the painting and who is a member of the 19th-Century Project, see note 165. The darkening and surface deformation in this and other 19th-century and early 20th-century easel paintings is described by Berg et al. (2001), Berg et al. (2002), Boistelle et al. (2001).

171. The preparation and use of prepolymerized oils and the addition of siccatives to the medium is described at length in the De Mayerne manuscript (1620-46), see Graaf (1958), pp. 72.

Conclusion

In this chapter the complex historiography surrounding the handling of colour and light in Raphael's last painting, with its many conflicting viewpoints, has been set against the background of the growing body of information about material ageing and the visual alteration that paintings can undergo in the course of time. In addition, the art theory of Raphael's day and subsequent centuries was examined in order to place anachronistic ideas, which have played such an important part in the historiography of the Transfiguration in their historical context. The modern interpretation of the handling of light in the Transfiguration has proved untenable. A comparison with studies and early copies reveals that the shaded areas have darkened a great deal. The darkening of the shadowed areas has had the effect of increasing the contrast between light and shade, leading to the suggestion of a theatrical, dramatic lightning. However, this effect, regarded in the literature as a significant feature of the work, and one with an expressive connotation, was not intended by Raphael. Furthermore, 16th-century Italian treatises show that in Raphael's day the lighting in a painting was not yet being employed as a means of expression. The treatment of light in the figures at the foot of Mount Tabor served solely to create a strong relief with the aim of producing a lifelike effect. Contemporary viewers, however, did distinguish two different kinds of light in the Transfiguration: the divine and the earthly, but did not perceive any dichotomy in the handling of light which would correspond with a difference in mood between the two events.