

MICHELANGELO BUONARROTI: RESTORATION OF THE FRESCOES ON THE VAULTED CEILING AND THE LAST JUDGMENT IN THE SISTINE CHAPEL

Gianluigi Colalucci*

Restorer, Conservazione e Restauro S.n.c.
Rome, Italy

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1. Introduction

When restoration of Michelangelo's frescoes in the Sistine Chapel began in June 1980, conservation, on the whole, had reached very high standards. Intervention techniques had steadily evolved and the use of diagnostics had become common practice.¹

It should be remembered that in Italy, from a historical point of view, the development of diagnostics in this field dates back to 1939, year of the foundation of the Central Institute for Restoration, even though scientific technologies such as X-rays, ultraviolet rays and chemical analyses, had occasionally been used in the past, especially in the examination of easel painting (movable art).

In addition to the technical and scientific apparatus, another element of fundamental importance was Cesare Brandi's *"Il fondamento teorico del restauro"*, published in 1950 in the N.1 Bulletin of the ICR - *Istituto Centrale per il Restauro* (Central Institute for Restoration). In this publication, known today as the "Theory of Restoration", he lay down a theoretical framework for restoration; it was considered a fundamental doctrine, which for the first time (and most importantly) dealt with the restoration of paintings, in complete contrast to previous theories that had been developed by architects exclusively for architectural restoration.

Even today, Brandi's theory is a handbook for younger generations, and is the doctrine that guided the restoration of Michelangelo's frescoes in the Sistine Chapel. As a result, the old concept that viewed restoration more as an aesthetic operation, which ultimately led to the addition of materials to embellish the paintings, such as brighteners, varnishes, heavy retouching and repainting, was completely overturned by the concept of retrieving the original pictorial text. As a consequence, all material that is foreign to the art work (except in specific cases), that is to say, anything that has been added during past restoration work, nowadays, tends to be removed.

Thanks to the concept of recovering the original and also to the more than fifty years of scientific research in the field of cultural heritage, it is now possible to study in depth the materials constituting the work of art and its execution technique.

The case in point, the restoration of Michelangelo's frescoes in the Sistine Chapel, is an emblematic example. Its cleaning has helped bring to light the true colors of Michelangelo's masterpiece and at the same time provided a fundamental moment to

* Corresponding author: g.colalucci@virgilio.it

study this work of art. Over the centuries it has undergone such severe tampering with that the impression was that the '*buon fresco*' ('true fresco', technique on wet plaster) used to decorate the Sistine Chapel was nothing more than a '*fresco-secco*' (fresco technique on dry plaster) with unidentified variants [1].

2. Case study

2.1. The artifact

The Sistine Chapel was built by Pope Sixtus IV Della Rovere on one side of the Vatican hill using part of the foundations of a demolished Medieval chapel known as the Cappella Magna. Unfortunately, the foundations were too weak to support the great weight of the new building (the walls are three meters wide) and their collapse, together with the instability of the terrain, soon produced serious lesions in both the walls and the vault, which at the time was still decorated with the star-studded sky by Pier Matteo d'Amelia [2].

In 1504, after the insertion of 12 iron chains on the vault and the area of the Chapel foundations, which should have stopped the advance of a visible crack that stretched across the vault, Pope Julius II ordered the starry sky of the vaulted ceiling to be destroyed, and convinced – or compelled – Michelangelo to paint the huge space (1508-1512).² After some years, as a result of several warning signs and the subsequent collapse of the architrave of the main entrance which, on Christmas Eve of 1522, fell on the papal procession killing a guard next to Pope Adrian VI, further repair work was carried out.

The vault is painted to imitate a polycentric architecture whose space gives the impression of real architectural breadth and depth, both in its solid parts and its voids, as well as in the spatial dimension of the Last Judgment.

Michelangelo abandoned his first idea of a faux decorative coffering with figures of the twelve Apostles, to design a virtual form of architecture conceived as a large hall open to the sky, inside which sat Prophets and Sibyls; in its breached vault, punctuated by slender arches, appear the theophanies, visible manifestations of divinity, which here, relate to episodes from the Old Testament. The small strips of sky seen at the opposite ends of the vault suggest and confirm this idea. Thus, the virtual architecture engages with the real architecture, raising it towards the sky of the vaulted ceiling.

The lunettes and spandrels depict Christ's ancestors, while the four corner pendentives depict: David and Goliath, Judith and Holofernes, the Punishment of Haman and the bronze Serpent. In the center, between bronze nudes, young naked figures (the '*Ignudi*') and golden *tondos*, there are scenes from the Old Testament.

Michelangelo's Last Judgment (1534 -1541) was commissioned by Pope Clement VII, followed by his successor Pope Paul III. It covered the whole altar wall where there were two windows and other frescoes, including two lunettes by Michelangelo and the altarpiece with the "*Assumption of the Virgin*". Iconographically diverse from all the others, the Last Judgment of the Sistine Chapel caused a great scandal due to its many nudes and its iconographic interpretation, which veered towards heresy. Over the centuries, it risked being destroyed several times, but fortunately, in the end went no further than the order of the Council of Trent, which simply stated that the more scandalous parts of the nude figures were to be covered (1564).

2.2. Conservation state

The damage to Michelangelo's frescoes derived primarily from problems associated with the statics of the building. After installation of the 12 "chains" in 1504, Michelangelo painted the vault, but the collapse of the architrave in 1522 damaged several parts, which meant the problem of structural restoration needed to be resolved once more.

This, however, did not resolve the problem of the statics. Consequently, cracks continued to appear in the architectural structure even after Michelangelo had finished painting the entire vaulted ceiling to replace the previous star-studded sky. Nevertheless the vault, a segmental arch, did not collapse, as its compactness remained so, due to the rubble masonry structure, or Roman method of construction, used and which at its apex had a thickness of 80 cm. It was not until 1564 however, when the building was finally entrusted to the architects Vignola and Pirro Ligorio, that three extremely solid buttresses were constructed against the Chapel, thus preventing its ultimate collapse.

Because the lesions in the vault had also damaged Michelangelo's frescoes, their restoration was entrusted to the painter Domenico Carnevali, who redid two figures in fresco that had been lost in the scene of Noah's sacrifice, a small part of Adam's hand in the scene of the creation of man, the hand of God the father in the separation of the land from the water, a portion of the neck of Jeremiah the prophet and the figure of the young man behind him, as well as two figures in the pendentive showing the "*Punishment of Haman*" and other less important parts.

But the most visible and continuous damage over the years was due to the infiltration of rainwater from the roof and the endless smoke from candles, torches and braziers which constantly rose toward the ceiling and along the walls of the Chapel, as Wolfgang Goethe wrote on 16 February in 1787, in his famous "Italian Journey": "... February 2nd we went to the Sistine Chapel, to attend the ceremony of the blessing of the candles. But it was not for me, and I soon left with some friends. Indeed, I think: here are the actual candles which for three centuries have blackened these beautiful frescoes, and here is the incense which, with such shamelessness, has not only enveloped the brightest sun in art, but year after year has made it darker and darker, and will finally lead to its burial in total obscurity".

In this passage Goethe shows he is fully aware of the real problem of these frescoes which had become black for reasons beyond Michelangelo's control and contradicted what was common opinion at that time; it was thought that this dark painting, almost devoid of any color scheme, and believed to be the original, correctly interpreted the myth of the tormented Michelangelo who was prey to black melancholia: a myth that was exalted throughout the romantic period and beyond. In 1936, Biagio Biagetti³, then director of the Painting Restoration Laboratory of the Vatican Museums, during a campaign for the consolidation of the plaster in the vault, had already written: "*If and when I am able to work on it, it will not be too difficult for me to prove that we see the polychromatic tones of the Sistine Chapel as though it were through a smoked glass*" (Figure 1). What misled the observer was the heavy, uneven, dark film of dust and candle smoke, and above all the animal glue with oil, gum arabic and ox gall that had been repeatedly applied to the frescoes by restorers in the past, mainly to hide the white-colored salt efflorescence produced by the frequent infiltration of rainwater and to brighten up the colors.

The Last Judgment had also suffered much damage; some had been caused by the ladders used to mount the canopy above the altar and some by the greasy candle

smoke and dust, the latter, in this case too, having caused the colors to become so dark as to believe it was a monochrome painting, as shown in an interesting film documentary by Raggianti from the fifties.

Precisely because of the strong accumulation of soot, many attempts have been made to clean the Last Judgment, which, however, have been unsuccessful, as they inevitably ended with the artificial “fouling” of the clean portion. The blue sky (lapis lazuli), in particular, had been damaged as a consequence of using the *a secco* technique too heavily and was subsequently the subject of a singular eighteenth century cleaning operation, probably carried out using acid, perhaps with a strong base, that left a large number of fine light-colored streaks on the sky which are quite evident in old photographs (Figure 2). The technique of execution together with previous cleaning efforts, has meant that much of the lapis lazuli, applied *a secco*, has been lost. As a result, what has come down to us is only the preparatory color.



Figure 1. The scene of “God separating the light from the darkness” during cleaning. The uncleaned part, seen as if through a smoked glass.



Figure 2. "The Last Judgment": detail of the sky before cleaning. The light-colored streaks on the sky are the result of an 18th century cleaning intervention.

2.3. Censorship [3]

Inaugurated on 31 October, 1542, the Last Judgment immediately provoked mixed feelings among the people of the time. It was even called the "painting of a thousand heresies" and, for this reason, was inserted by the Council of Trent, which ended in 1563, among the 33 paintings that were to be "corrected" without delay. After Michelangelo's death, on February 18 in 1564, Daniele da Volterra was commissioned to paint drapery on many of the nude figures held to be obscene. On Daniele's death the task was given to Girolamo da Fano, and then to Carnevali. The fierce censorship was taken up once again in the eighteenth and nineteenth centuries, so that the total number of naked figures covered by various cloths reached forty-two. Tempera was used to paint the drapery, except for the group of Saint Blaise and Saint Catherine which was repainted using fresco.⁴ The copy of the Last Judgment, now in the Capodimonte Museum in Naples, painted by Venusti for Cardinal Farnese around 1549, therefore before the censorship, shows us how the figures originally appeared (Figure 3, 4).



Figure 3. "The Last Judgment": "Saint Blaise and Saint Catherine" as they appear today, after being censored by Daniele da Volterra.



Figure 4. Capodimonte Museum, Naples: “Saint Blaise and Saint Catherine” in Venusti’s copy as they appeared in the original before being censored.

3. The restoration

3.1. The decision to intervene

Applying the glue, in particular, was a threat to the paint film because each application produced continuous and extremely minute tears which are a good breeding ground for fungal microflora, harmful to pigments. That is why in June 1980, the Staff

of the Vatican Museums decided to intervene by performing a trial cleaning test on the Eleazar lunette.⁵ Only after restoration of this limited portion of the vault and evaluating the results, as well as receiving encouragement from leading art historians and the world of culture in general to continue the work, was the restoration project for the entire cycle of Michelangelo's frescoes defined. The work, which lasted 14 years, was carried out by a very small team from the Paintings Restoration Laboratory of the Vatican Museums.⁶

The restoration was completed on April 8th, 1994 with a solemn Mass celebrated in the Sistine Chapel by Pope John Paul II [4].

3.2. Vault – method of intervention

White spots of salt efflorescence occurred particularly in the area of the lunettes and on the haunches of the vault where the pendentives are decorated with prophets and sibyls. This continuous and recurrent phenomenon required a great many restoration interventions to try to hide or at least mask the annoying white spots. This operation was carried out by coating the frescoes several times with very diluted animal glue, maintained in a hot or cold liquid form with the addition of a high percentage of vinegar – to which was added a small percentage of oil. Later on, gum arabic dissolved in water was used for coating, also with the aim of brightening the colors. Coatings of ox gall were also used for the same purpose. Due to the fading of the colors, flattening of the shapes and the continuous formation of salt deposits, it had also been necessary for the old restorers to darken the shadows of the drapery, as well as the shadows cast behind the figures even further, using the color black. As a result, any memory of the original colors was gradually lost, as well as giving rise to the formation of those blackish-brown flesh tones on the frescoes, full of stains, which can still be seen in old photographs (Figure 5).

To remove the layers of foreign substances from the surfaces painted using '*buon fresco*' the following protocol was used: solvent mixture consisting of water, carboxymethyl cellulose, ammonium bicarbonate, sodium bicarbonate and desogen. The gelatinous mixture was spread on the part to be cleaned, left to act for 3 minutes (timed using a stopwatch), and then removed with a natural sponge soaked in deionized water. After the fresco had dried it was possible to assess whether or not, and to what extent, to perform a second cleaning using the same method. The cleaned parts were repeatedly treated with large quantities of deionized water to remove any remaining solvent.

Before proceeding to clean the parts painted in '*buon fresco*', the few parts painted in dry fresco, including parts of the retouching performed by previous restorers, were waterproofed with Paraloid, so that the water used for the fresco did not do any damage. These parts were subsequently dealt with in small portions, slowly removing the layer of waterproofing and cleaning the surface of the pigments in dry fresco with small brushes and solvent. In this way, even old retouching could be removed in a very controlled way or preserved if deemed necessary.

The clean parts were not treated. Where necessary (some rare areas attacked by salts), parts were treated locally with Paraloid B 72 using the C80 method which leaves no acrylic resin on the surface. This method uses a solution of Paraloid B 72 at 5%, removed after 24 hours with nitro thinner and distilled water according to a carefully studied plan of alternation.



Figure 5. An old photograph of the Sistine Chapel before restoration. Michelangelo's true colors are completely hidden.

3.3. The Last Judgment – method of intervention

The method for cleaning the Last Judgment was different compared to that of the vault, due to the large area of sky painted with blue lapis lazuli, prepared in 'buon fresco', but then executed dry and therefore very delicate and impossible to treat with water and even less so with the gel of the solvent mixture [5].

Method: light cleaning with deionized water; cleaning with small natural sponge soaked in ammonium carbonate dissolved in water; a compress of 4 sheets of Japanese paper soaked in ammonium carbonate maintained for 12-15 minutes on the interested part; removal of the compress and cleaning with ammonium carbonate. Treatment with deionized water, only once cleaning is definitively completed (Figure 6).

The extremely delicate sky was cleaned separately using a specific method based on the light and sensitive manual skills of the restorer. The color of the sky was fixed with a solution of Paraloid B72 at 2%. No final treatment was carried out on the parts in 'buon fresco'.



Figure 6. "The Last Judgment": the "Cyrenian". One phase of the cleaning with compresses of Japanese paper and ammonium carbonate.

3.4. Censored parts

During restoration of the Last Judgment, the problem arose on what action was to be taken about the censored parts. In line with Cesare Brandi's *Theory of Restoration*, and in particular with concepts of "historical instances" and "aesthetic instances", the censored parts from the sixteenth century were preserved because they were considered to be of significant historical importance as they relate to a particularly important period in time for the church: the Council of Trent and the Counter-Reformation [5]. Instead, as the censored parts from the eighteenth and nineteenth centuries were not considered to be historically important, because they are not associated with any historical moment in time, they were removed, preferring, as a general rule, the aesthetic instance (Figures 7, 8).

In the vault, there were only two censored parts: the sex of one of Noah's sons, and the naked breast of a female figure nursing her baby in the Salmon lunette. In both cases, the censored parts were removed.



Figure 7. "The Last Judgment": the censored figure of "Saint Andrew", with a cloth added in the 18th century.



Figure 8. "The Last Judgment": the uncensored figure of "Saint Andrew", after removing the cloth added in the 18th century.

4. Diagnostics

4.1. Laboratory investigations

In the 1920s the Vatican Museums set up an Office for Scientific Research which today provides support to the various Restoration Laboratories. It is these laboratories that are responsible for all the investigations aimed at the study and restoration of Michelangelo's frescoes (over 400 cross-sections and 3,714 elemental analyses). The analytical techniques used were: atomic-absorption spectrophotometry, observation with optical microscope, infrared spectrophotometry, liquid chromatography and thin-layer chromatography with corresponding sections of color, ultraviolet fluorescence and infrared photography. External collaborators analyzed the composition of the plasters, the chromatic value of the pigments, the pathogenic microorganisms on the frescoes and the air pollutants dispersed in the atmosphere of the Sistine Chapel.⁷

4.2. Michelangelo's colors

Michelangelo, who in his youth had attended the workshop of Ghirlandaio, shows thorough knowledge both in his use of the fresco technique and in his choice of pigments all of excellent quality, selecting those suitable for fresco painting and discarding any unsuitable ones. Consequently, it can be noted there is a lack of copper-based pigments and a minimal use of lead-based pigments. The color range is as follows:

- '*bianco di San Giovanni*' (a white obtained using air-dried hydrated lime which is then ground; the procedure is repeated at least three times);
- vine black;
- ivory black;
- mars brown (iron oxide); umber (iron oxide, manganese dioxide and clay silicates); burnt sienna;
- yellow ochers (iron oxide hydrate); raw sienna;
- red ochers; rarely cinnabar, rarely minium;
- green earth (iron silicate);
- smalt (cobalt glass);
- lapis lazuli (aluminum silicate containing sulfur).

4.3. Substances extraneous to the frescoes

Siliceous microparticles naturally present in dust.

Black smoke with long-chain fatty acids.

Gum resins of gum arabic type.

Repainting pertaining to previous restorations.

Animal proteins (glues) and linseed oil.

4.4. Microbiological examination

Study of the bacterial and fungal loads present on the frescoes made it evident that the high level of bacterial load found in the restoration work performed without disinfection would have been drastically reduced, if concepts of asepsis had been adopted, in other words, if the work had been conducted using disinfected materials, such as sterilized natural sponges.⁸

4.5. Evaluation of cleaning operation

Determining surface colors through the use of numerical parameters obtained with instrumental readings, addresses the need to document this representative characteristic objectively and in a reproducible way, even after a long period of time has elapsed. The colorimetric measurements were used to investigate whether the cleaning, with its solvent, could in some way alter the chromatism of the fresco pigments.

Instrumental readings were taken in ninety points corresponding to the colors, white, yellow, pink, red, green, blue and the flesh tones. Pigment alteration was not found in any of these points; instead there was an increase in brightness and a phenomenon that was the reverse of yellowing. In all cases it was demonstrated how, by removing the glue and carbon black from the paint, the cleaning had restored the brilliance and tone of the colors.

4.6. Microclimatic study

In anticipation of the end of the restoration, the General Staff of the Vatican Museums were careful to ensure the future of the newly restored frescoes. Since no “protective products” were used due to the fact their “life” is much shorter than that of the natural surface of the frescoes, and being subject to alteration they must be removed, consequently, attention focused on the optimal quality of the microclimate in the Sistine Chapel, in addition to that of the cleaning and air supply.

To design a system that met these requirements a study of the micro-climate inside the Chapel had to be carried out. The task was given to Dario Camuffo and Adriana Bernardi¹⁰.

As a result of their study, Delchi Carrier designed and built a system that was able to create a microclimate suited to the preservation of the frescoes, and at the same time was acceptable for human comfort and well-being, so as to allow people to fully enjoy their visit to the Sistine Chapel.¹¹

In 2014, the system was modernized and upgraded by Carrier, and the lighting in the Chapel fully renovated with LEDs by Osram.¹²

4.7. Filming

Unique in the history of restoration, was the cinematographic documentation of all fourteen years of the cleaning operations. With these real-time records on film, it is possible to re-examine the cleaning of any part or figure of Michelangelo’s frescoes. The filming was carried out by the Japanese NTV crew from Tokyo. The seven thousand meters of film are kept in the refrigerators of the photographic archives in the Vatican Museums.¹³

5. Michelangelo’s painting

5.1. Color

Thanks to the excellent technical execution and particularly resistant materials, such as lime plaster and pozzolan, Michelangelo’s frescoes have withstood the test of time and in spite of the previously described damage it was subjected to. The restora-

tion therefore concentrated on the cleaning of the frescoes, allowing them to return to their original state with the colors almost intact.

Recovery of the unexpected colors immediately provoked great interest, making a strong impact on the conscience of scholars and connoisseurs of Michelangelo's painting, at the same time arousing unrestrained enthusiasm, but also some controversy. The rediscovery of the color is certainly the most evident result of the cleaning of the Sistine Chapel frescoes. There are, however, other less showy, less evident aspects of these paintings, which come after a carefully studied examination.

When the vault was dark and almost devoid of any color scheme, the composition was based exclusively on the drawing and on the *chiaroscuro* effect created by the repainting of the false shadows. Today we find that Michelangelo has, however, entrusted these effects mainly to three pictorial procedures, two of which are based on the particular use of the brushstroke and the third on the calibrated juxtaposition of color. Not merely *chiaroscuro* then, but color as volume. This is evident from the constant consideration of interaction between light and color, an ancient medieval technique, which he uses as an element of volumetric construction.

But not all the color combinations depend on the effect produced by the interaction between light and color, very often he combines and alternates different colors, just like musical themes that contribute to the construction of the entire composition: the *morel-lone* (reddish-violet color) of the Creator's mantles, the green, the yellow, the red, the skin tones of the nudes, the ochre of the bronze nudes, the white of the thrones and the monochrome *putti*.

Michelangelo's palette, made of pigments of the highest quality and purity, is apparently very rich, but is in reality based almost exclusively, as we have said, on colors suited to fresco work which, as is known, essentially consist of a range limited to natural or burnt oxides. The choice of color tones and combinations does vary however; in the first half of the vault, Michelangelo's colors are influenced by the culture and taste of the late fifteenth century, as can be seen in the Erithraean Sibyl, the Delphic Sibyl and in the prophet Zechariah; in the second half of the vault he develops his own chromatic sensitivity which will influence a great many artists whose work will later be known as Mannerism. This is very evident in the tone of the mantles of God the Father in the scenes of the creation, in the Persian Sybil, the Libyan Sibyl and the Prophet Jonah.

5.2. *The ductus of the brushstrokes*

In 1506, Pope Julius II commissioned Michelangelo to design and sculpt a large tomb to be placed in the center of St. Peter's Basilica in memory of his pontificate.

At this point in time, the project is a very important one for Michelangelo and he will devote his entire life to it. However, it soon becomes for him, what Condivi calls "the tragedy of the tomb", because a little later, due to economic reasons and political prudence, the Pope curbs his enthusiasm and resolutely slows down the progress of the project, causing great disappointment and a violent reaction in the Tuscan artist. For this reason, when Julius II himself put pressure on Michelangelo to fresco the ceiling of the Sistine Chapel, he received a proud refusal, justified by the fact he was not a painter. Eventually though, Michelangelo gave in and after some initial hesitation about the form of the composition, in 1508 he began the work that ended in 1512.

Michelangelo said he was not a painter, but as a boy he had spent time in Florence learning the art in the famous workshop of Ghirlandaio, the great fresco painter; the

result is that in the Sistine, after a short trial period, he puts into practice a technique of rare perfection.

Leaving aside chisel and mallet, in taking hold of the paintbrush, he expresses himself in painting with the true language of this art composed of shape and color, but also adds to its expressiveness, an almost imperceptible material structure, functional to the image, that he obtains through a variety of brushstrokes and layers of color. His hand moves from broad liquid strokes that are almost gestural to that dense network of fine sharp brushstrokes and clean colors that create, as in Adam's face, a slightly rough surface that recalls the marble of the *Brutus* in the Bargello Museum in Florence sculpted using a tooth chisel. And in the same scene of the creation of Adam, we pass from the lightness of the hair and flowing beard to the strong stony face of God the Father. In contrast, in the face of the Sibyl Eritrea, the brushstrokes are thickly amalgamated and impalpable, just like the smooth gleaming surface of the wax-polished marble face of the Virgin of the *Pietà* in St. Peter's. In many cases, the different ways of representing the hair is conceptually similar both in painting as in sculpture, just like the heavy clouds on which rest the naked bodies of the Last Judgment that are similar to what Michelangelo leaves of the block of marble from which he frees the bodies from their "prisons".

In parallel to the unfinished marble, there are some heads painted in the lunettes and in the Last Judgment. In some there is a clear spatial function; in others, it is as if the painter stopped as soon as the material started taking shape. Not a rough sketch then, but a completed form which needed no additional detail, as in the figure on the right in the Azor lunette.

I would even venture to say that the vexed question of the 'unfinished' may even find in the rereading of the frescoes a new key of interpretation.

The parallel between Michelangelo the sculptor and Michelangelo the painter has always been made, and it would seem superfluous to propose it again today, but there is a difference now because, once upon a time the sculptor was identified in the little attention he paid to color and the heavy use of chiaroscuro; today, on the other hand, the sculptor is seen to compare painted surfaces and marble ones in a similar way. Thus, volume, always taken into great consideration, is obtained through a combination of complementary colors and not the use of black shadows.

Michelangelo's painting derives from an extremely calibrated project, studied in every part, in every detail, even in the choice of the various properties and workmanship of the plaster, according to the rendering of the color and surface appearance: smooth, glazed or slightly rough.

The previously mentioned ductus of the brushstrokes too, presents a wide range of variants designed to achieve the expected spatial and volumetric effects of the composition.

It is, therefore, pure reasoning combined with an extraordinary sense of art that characterizes the work of Michelangelo. Hence, it would be wrong to look for the same instinctive playful trait found for example, in Raphael or Titian, to name but two of his contemporaries who, in their painting transfer the charming and attractive form and chromatic scheme that belong to those who are born painters and are able to paint the moment they hold a paintbrush in their hand.

The Last Judgment, painted approximately twenty-five years after the vault, was pictured as a scene in the empty space left by the breach in the altar wall; this is demonstrated by the small figure to the right margin of the scene depicted with hands resting on the real marble frame of the Chapel wall.

The scene takes place in a space oriented toward the outside where the position of the groups of figures respects the rules of perspective in the vanishing point. For this, Michelangelo takes into account the optical effects related to the location of the single figure in the space in relation to the greater or lesser distance of the image from the eye of the observer and the volume of each figure.

The concept of color in the Final judgment is based entirely on the blue sky. The play of colors focuses on the contrast between the lapis lazuli background and the modulated tones of the flesh color of the nude figures.

The only hint of color is found in some drapery, where a more aggressive color scheme can be observed, compared with that of the vault. The brushstrokes are also more rapid and decisive, and rarely return to the ordered, almost mathematical structure seen in the vault.

5.3. Three-dimensionality and spatiality

As mentioned earlier, in Michelangelo's complex painting there are several particularly interesting practical expedients he has adopted to give the viewer the illusion of seeing strongly evident three-dimensional figures positioned at various distances in space.

Starting from the principle that the closer an object is to the eye, the more the details are perceived, Michelangelo painted the figures of the prophets, the sibyls and the naked youths with sharp precision, using narrow blended brushstrokes and finely detailed particulars so they appear close to the viewer, as these are found inside the great hall. On the contrary: the figures in the central scenes with stories of the creation, which have to appear to be more distant, hovering beyond the physical space of the vault, were painted with a textured weave of broad brushstrokes, so as to blur the details of the faces and draperies.

But the optical experiment that Michelangelo employs in the ceiling of the Sistine goes further, because, especially in the large figures of the lunettes, he adjusts the "focus" of the image as in a photographic lens. Imagine that three focal planes pass through the figure vertically, only one of which is depicted as if it were "in focus". This can be seen in the Jacob-Joseph lunette (Figure 9), where the forehead and the nose on the face of old Jacob's figure are in focus, but the hair, beard and chest are slightly blurred and the details are lost. The knee, sharp and bright, is in focus. In this way, at a distance of twenty meters one has the impression that Jacob's forehead and knee are on the same plane so that the figure does really appear to be curved and bent over (Figure 9). The outline of the shoulder of the female figure in the Achim-Eliud lunette is much sharper than that of the neck and shoulder of the figure of the child behind her in order to push these parts farther into the background.

Michelangelo adopts the same method for the Last Judgment, but with many variations some of them completely new as in the group of Christ the Judge and the Virgin, where the face and the whole body of Christ are painted with a strength and sharpness of detail suited to a figure that is at the center of the composition, while the Virgin, who is near him but in the background, is painted in less detail and the face has a sort of "vagueness" produced by fraying the lines using a jab of color given with the tip of a paintbrush. But here Michelangelo has a stroke of genius, because he does not merely paint using the tip of a paintbrush: he creates the complexion of the Virgin by juxtaposing three separate colors, white, red, pink, anticipating by three centuries, divisionism and pointillism (Figure 10).



Figure 9. The "Jacob and Joseph" lunette: it can be noted that the nose and eyebrows of Jacob's head in the forefront, are in focus, while the beard and hair are blurred, because they are in the background.

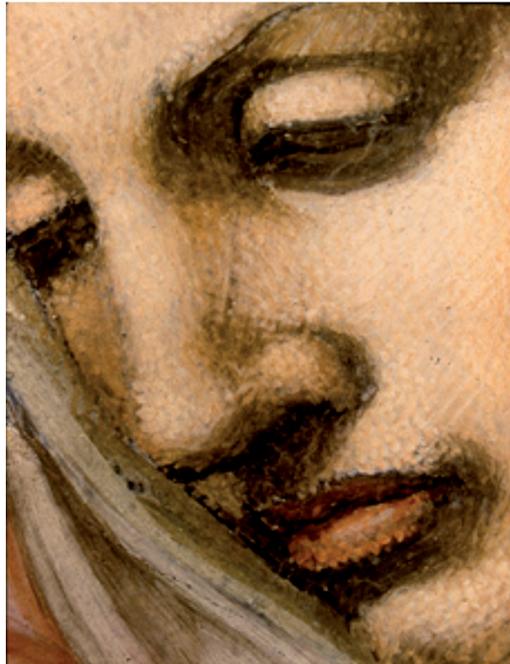


Figure 10. "The Last Judgment": In the "Virgin", the textured weave effect of the brushstrokes produced with jabs of the tip of the paintbrush are evident, as if anticipating pointillism far ahead of its time.

Notes

- ¹ The restoration, which lasted from 10 June 1980 to 8 April 1994, was directed by Prof. Carlo Pietrangeli, General Director of the Vatican Museums, by Dr. Fabrizio Mancinelli, Director of the Byzantine, Medieval and Modern Art department; by Dr. h.c. Gianluigi Colalucci, chief restorer, who also performed the work, and Dr. Nazzareno Gabrielli, Director of the Scientific Research Bureau.
- ² Shearman, J., (1986) La costruzione della Cappella e la prima decorazione al tempo di Sisto IV. In: *La Cappella Sistina i primi restauri: La scoperta del colore*. Novara: Istituto Geografico De Agostini, pp. 22-35.
- ³ Biagetti, B., (1936) La volta della Cappella Sistina: primo saggio di indagini sulla cronologia e la tecnica della pittura di Michelangelo. *Rendiconti della Pontificia Accademia Romana di Archeologia*, Roma, vol. XII, pp. 199-220.
- ⁴ Morresi, F., Gabrielli, N., (1999) Indagine sugli interventi censori. In: *Michelangelo La Cappella Sistina Documentazioni e Interpretazioni. Rapporto sul restauro del Giudizio Universale*. Novara: Musei Vaticani – Istituto Geografico De Agostini, vol. I, pp. 257- 278.
- ⁵ Colalucci, G., (2015) *Io e Michelangelo*. Milano: Edizioni Musei Vaticani and 24 ore Cultura, pp. 31-32.
- ⁶ The Vatican Museums have a laboratory for the restoration of paintings and a group of well-prepared in-house restorers. The restoration itself was carried out by a limited number of restorers for safety reasons. The restorers were: Gianluigi Colalucci (head), maestro Maurizio Rossi, maestro Piergiorgio Bonetti, maestro John Grossi and restorer Bruno Baratti. Philip Petrignani was in charge of computer graphics.
- ⁷ Gabrielli, N., (1994) Introduzione. In: *Michelangelo, La Cappella Sistina, documentazione e interpretazioni- Rapporto sul restauro della volta*. Novara: Istituto Geografico De Agostini, vol. II, pp. 363-424.
- ⁸ Montacutelli, R., Tarsitani, G., Maggi, O., Gabrielli, N., (1994) Indagini microbiologiche sugli affreschi di Michelangelo in Cappella Sistina. In: *Michelangelo, La Cappella Sistina, documentazione e interpretazioni- Rapporto sul restauro della volta*. Novara: Istituto Geografico De Agostini, vol. III, pp. 297-299.
- ⁹ Borrelli, E., Tabasso, M.L., (1994) Valutazione e documentazione dell'intervento di pulitura sugli affreschi di Michelangelo in Cappella Sistina. In: *Michelangelo, La Cappella Sistina, documentazione e interpretazioni- Rapporto sul restauro della volta*. Novara: Istituto Geografico De Agostini, vol. III, pp. 289-295.
- ¹⁰ Camuffo, D., Bernardini, A., (1994) Il microclima della Cappella Sistina. In: *Michelangelo, La Cappella Sistina, documentazione e interpretazioni - Rapporto sul restauro della volta*. Novara: Istituto Geografico De Agostini, vol III, pp. 289-295.
- ¹¹ Grabon, M., (2015) Il nuovo impianto: lo studio e il progetto. In: *La cappella Sistina venti anni dopo, atti del convegno*. Città del Vaticano: Edizioni Musei Vaticani.
- ¹² Bogani, C.M., (2015) *Un sistema d'illuminazione digitale integrato. Lo studio e il progetto*. In: *La cappella Sistina venti anni dopo, atti del convegno*, Città del Vaticano: Edizioni Musei Vaticani.
- ¹³ Maruyama, K., (2015) *Il ruolo della Nippon Television*. In: *La cappella Sistina venti anni dopo, atti del convegno*, Città del Vaticano: Edizioni Musei Vaticani.

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Biographical notes

Gianluigi Colalucci was born in Rome in 1929. In 1953 he obtained his Diploma from the Central Institute of Restoration with Cesare Brandi. In 1960 he joined the Laboratory for the Restoration of Paintings of the Vatican Museums and in 1979 became Chief Restorer. From 1980-1994 he was the technical manager and personally carried out the restoration of Michelangelo's frescoes in the vault and the Last Judgment, in the Sistine Chapel.

Since 2009 he has been engaged in the restoration of the fourteenth century frescoes by Buffalmacco in the Monumental Cemetery of Pisa. He has restored the works of many artists including Michelangelo, Raphael, Titian, Giotto, Caravaggio, Mantegna, Crivelli, Lorenzo Lotto, Sartorio, Ferrazzi, Sciltian and Morandi. In 1990 and 1995, respectively, the University of New York and the Universidad Politecnica de Valencia conferred on him a Degree Honoris Causa. He has lectured throughout Europe, Japan, the United States, Canada, Cuba, Argentina, Brazil, Colombia and Australia. In November 2015 he published "*Io e Michelangelo*", also available in Spanish and English.