

The background of the cover is a painting of a Venetian canal scene. In the foreground, several gondolas are visible, with people rowing. The water is calm, reflecting the buildings and the sky. In the background, the Basilica di Santa Maria della Salute is prominent, with its large dome and the Campanile tower. The sky is a soft, hazy blue, suggesting a bright but slightly overcast day. The overall style is that of a classical painting, with visible brushstrokes and a focus on light and atmosphere.

LIGHT IN ART

Perception and the Use of Light
in the History of Art



Heinrich Fuseli,
Titania and Bottom, 1790.
Tate Gallery, London.

Heinrich Fuseli,
The Shepherd's Dream, 1793.
Tate Gallery, London.





memory of the splendour of distant worlds with an everyday life marked by the light and silence Dutch traders found when they relaxed in their homes.

It is worth analysing *The Courtyard of a House in Delft* by Pieter de Hooch. While the interiors of de Hooch's paintings recall the style of Jan Vermeer (such as *The Visit*), his rare, wholly external views reveal a truly independent personality. *The Courtyard of a House in Delft*, compared to Taddeo Gaddi's earlier work, is a sharp and strident juxtaposition, given the historical, cultural and geographical distance of these artists, which, however, can show the evolution and the disparity of the symbolic use of the luminous and its theatricalisation. This work is unlikely to be a true-to-life view as de Hooch used many of the same architectural elements in the second version (*Courtyard with an Arbour*) in which the right side of the painting (where a maid and child are standing) has been radically transformed.

The viewer can appreciate how the painter has managed to evoke a world of domestic bliss suggested by the image of a well-ordered environment, designed like a theatre set where the lighting is carefully angled to focus on the scenic details of a drama extolling the small pleasures of everyday Dutch life. Due to the lack of ecclesiastical artistic patronage (typical of the Counter-Reformation), the representation of space in painting here takes a new



Pieter de Hooch,
The Visit, 1657.
The Metropolitan Museum of Art, New York.

darkness, that is to say, with the study and practice of the perceptual effect of light gradients. This expertise is simply the technique of shading, skilfully used to make surfaces recede around the contours and so emphasise the points of greatest clarity.

It is normal for painters to have used this device, sometimes with rigour and sometimes with relative freedom, but always to give the illusion of formal vivacity to objects and human figures, and, amazingly, to render in three dimensions those presences which unknowingly live quite happily on a flat surface.

Master of the Straus Madonna,
Annunciation, c. 1390.
Galleria dell'Accademia, Florence.

In the symmetry of many medieval works, for example, the figures on the left receive light from the left and those on the right light



from the right, regardless of the actual probable light source. In the *Annunciation* by the Master of the Straus Madonna this license is evident if one looks at the complexion of the faces of the angel and of the Madonna.

Of course, it is not that people saw differently in the Middle Ages than they do today, or that painters were like children just starting to play with their colours, insensitive to the phenomenon of light, quite the contrary; the fact is that every representation, every image produced by hand is the result of a real illusion, a projection of a certain mentality, neither better nor worse than any other, but merely adequate and convincing for the public of the time.

Every surface has its own structure, its own texture, since every material has a different nature and responds to light in a particular way.

In artistic practice light is of paramount importance, no one disputes this, and over the years painters have learnt to use it to their advantage to bring out the qualities of surfaces, model forms, and to achieve tonal and atmospheric values.

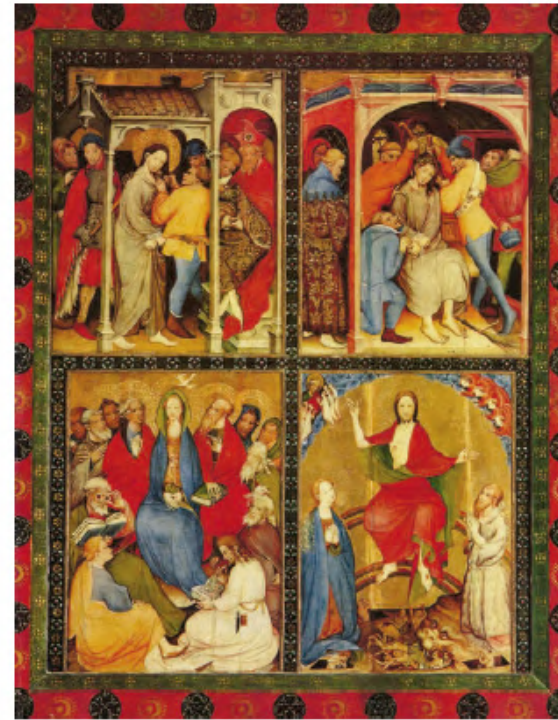
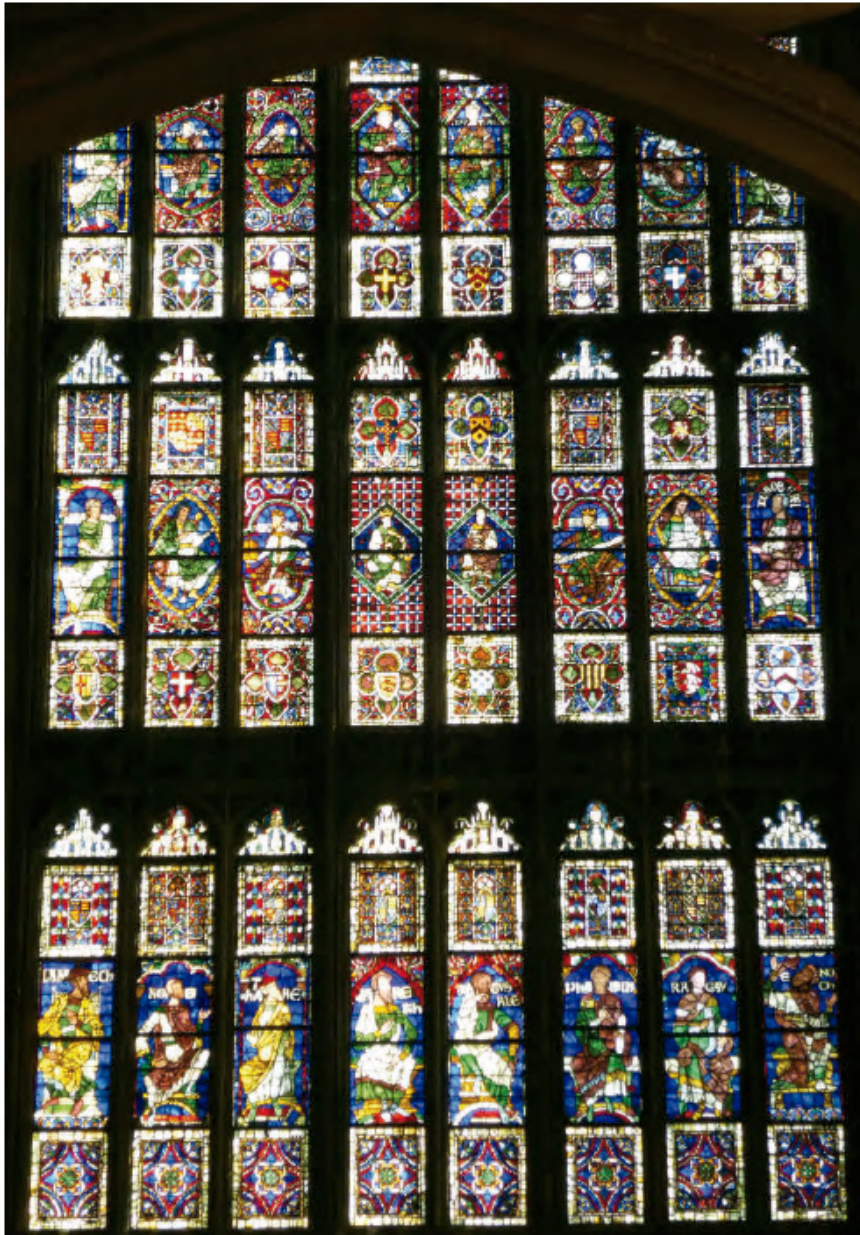
Working with marble, bronze, or wood is very different to painting frescoes on plaster or using oil on canvas, and the results are quite different when the material is used in a manner appropriate to its qualities.

If, for example, we run our hand over a Byzantine mosaic we notice that its surface is uneven, as if the tiles were crooked. This irregularity is deliberate since every tile is exposed to the light at a different angle and reflects the light in a different way, thereby increasing the overall brilliance of the mosaic and making the colours appear to vibrate intensely. And hasn't all painting endeavoured to conceal a mark, a brushstroke, a colour, to delude us that we are in the presence of a space inhabited by an illuminated body?

Robert Fludd (A Renaissance hermit philosopher) published his works between 1617 and 1621, and each volume is enriched with diagrams, tables, and figures.

The image I propose is very simple but raises many questions. In a section about the origin of the universe, Fludd is forced to speculate on what existed before the divine creation.

He chose the representation of a simple black square to suggest a nothingness, a void, an absolute absence of light and consequently of the entire universe.

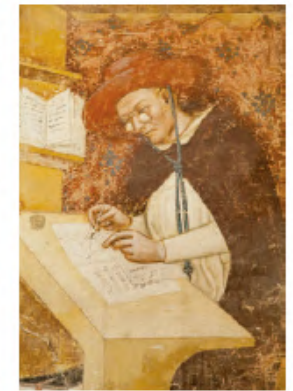


Altarpiece dated 1403 from the church of Bad Wildungen in Germany.

tific progress: I am talking of the discovery of glass convex lenses which was to play a considerable role for centuries to come.

Probably imported from the Islamic world, they spread slowly in the West at the end of the 13th century, a period when the Venetian glass industry was expanding, eyeglasses to correct presbyopia appeared in Italy for the first time in the world.

The scientific use of lenses to correct eyesight was opposed by the late-medieval learned community on the basis of philosophical and theological theories. It was thought, in fact, that they belonged to the world of optical illusions, a domain of phenomena bordering on magic, extremely suspect for a science of vision woven from a misunderstood religious neo-Platonism.



Tommaso da Modena,
Portrait of Hugh de Provence, 1352.
Church of San Nicolò, Treviso.
This fresco is one of the earliest examples of
the use of eyeglasses.

THE CAMERA OBSCURA WAS USED MAINLY BY RENAISSANCE ARTISTS TO PROJECT ONTO WALLS OR CANVASES THE IMAGES THEY NEEDED TO COMPOSE A DRAWING OR PAINTING.

Della Porta affirmed the usefulness of lenses and convex lenses, and described their many applications as tools that could enhance the organ of sight.

I would add, however, that Della Porta's work is not scientific in the strict sense, but rather oriented towards the practice of magic; this explains his tendency to highlight the prodigious and apparently inexplicable aspects of optical phenomena.

FRANCESCO MAUROLICO

Francesco Maurolico (Messina, 1494 - Messina, 1575) was a mathematician, astronomer and historian.

In his works on optics, in particular *Photismi de lumine et umbra* (1521), he studied the illumination of beams under different conditions, the formation of shadows, reflection on flat and spherical mirrors, the rainbow, and refraction on spheres, on prisms and on foils.

Maurolico's theory is based on the propagation of light rays in all directions. With this premise he began to analyse the phenomenon of light passing through apertures, describing, for the first time in the West, an adequate and coherent geometric theory of the camera obscura.

Of particular importance is the demonstration of theorem 68. Having an illuminated or luminous object placed AB in front of a small aperture CD, the rays that propagate from the extremities of the body and touch the apexes of the aperture are AH, AE, BF, and BK. The radiative pyramids from C and D are FCH and KDE which have as their base the same shape as the luminous body AB, but of course inverted.

When dealing with lenses and the anatomy of the eye, the author compares the crystalline lens to converging glass lenses, and ascribes sight defects to it. Maurolico's research in astronomy is of great importance and with his *Cosmographia*, published in Venice in 1543, he created a manual with a rigorous and, at the same time, popular presentation of the subject.

Maurolico's work is atypical in the 16th century panorama: some claim that it even surpasses Della Porta's studies and anticipates Kepler's ideas.

Maurolico assumes that rays are emitted from every point of a light source in all directions and with equal continuity.

Finally, in his study of the eye and lenses, Maurolico establishes an analogy between the crystalline lens and converging glass lenses, and attributes sight defects to the shape of the crystalline lens with great medical prescience.

THE SCIENTIFIC REVOLUTION AND THE DEBATE ON THE NATURE OF LIGHT IN THE 17TH CENTURY

The credit for establishing the scientific nature of the optical instruments known up to that time goes entirely to Galileo Galilei (Pisa, 1564 - Arcetri, 1642) who in 1609 was the first to use the telescope for a series of astronomical observations and discoveries.

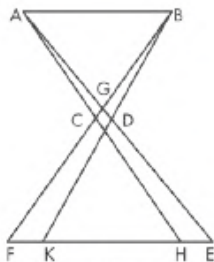
The telescope had already been around for a few years thanks to certain Dutch craftsmen who, perhaps randomly, put them together using eyeglass lenses and so would have had very low magnification, poor light, and considerable distortions.

Thus the telescope, although potentially of use in military and naval applications, initially failed to find serious credence. Only Galileo's skilful presentation to the authorities (shortly after the publication of *Sidereus Nuncius* in 1610) succeeded in introducing the instrument and arousing the interest, albeit varied and mostly negative, of the official scientific community.

It should be noted that Galileo perfected his telescope to such an extent that it he could obtain a magnification tens of times greater than that of the specimens which had been circulating for some years in the workshops of eyeglass-makers in Europe.

Kepler's favourable opinion of Galileo's observations at the end of 1610 marked the victory of the telescope and the end of the ostracism of optical instruments. By accepting the use of the telescope, the Church and official scientific knowledge abandoned the prejudice that it was an instrument which distorted reality and deceived nature.

Theorem 68 of *Photismi de lumine et umbra* by Maurolico, 1521.



Theorem 68 of *Photismi de lumine et umbra* by Maurolico.

CHEVREUL'S CHROMO-LUMINIST THEORY

Michel Eugène Chevreul (Angers, 1786 - Paris, 1889) published his studies on textile dyeing, light and colour in 1839, and developed his famous chromatic circle.

His theory expounds the principle of simultaneous contrast, or the increase in brightness due to the juxtaposition of two complementary colours. The phenomenon of the reciprocal influence of colours had previously been described by Goethe, although not as systematically as the French scholar.

The latter had noticed that on a white sheet of paper every colour possesses an aura of its complementary colour along its edges, so if two complementary colours are placed side by side, the aura of one reinforces that of the other, increasing its luminosity. His laws on the reciprocal influence of colours and his system of classification were studied and applied by painters such as Delacroix, Degas, Seurat and Signac.



Chevreul,
The 72-colour chromatic circle, developed in 1861, was to influence post-impressionist artists, above all Georges Seurat.



Georges Seurat,
Gray Weather, Grande Jatte, c. 1886-1888.
Metropolitan Museum of Art, New York.

Pointillism stems from Impressionism and is part of the continuing study of colours revealed by light.

In accordance with the theory of chromatic complementarity, painters aimed to apply the natural manifestation of colours at retinal level based on the latest scientific discoveries on the manifestation of the solar spectrum. According to this principle, the observer's retina is the point of view delegated to compose the tone (the classic shade) of the painting.

The Pointillist method was systematically used by Seurat and Signac who, taking as their basis the principle of breaking down colour into its main elements, attempted to experiment with Chevreul's optical principles of light and colour.

the light beam clearly appears to be in front of the pole. The grey background, the result of mixing equal parts of black and white, is the basis of comparison for the relationship between the two colours (Figure 1).

If, on the other hand, the area where the white light meets the black field is much darker at the edges of the mast than in the background (again, equal parts of black and white) and brighter in the centre (compared to the same mixture), we are led to imagine the pole as transparent and passing over the ray of light. This happens because in each case the background remains the term of comparison for the relationship of white vs black, light vs darkness (Figure 2).

These examples lead to the conclusion that the assumption of a veiled form as continuous and front-standing, or prominent or frontal, is given by a minimal difference in brightness compared to the background environment, which represents the field of comparison.

When and where light and matter meet, light tells us how matter takes on a significance, even a symbolic one (but the symbolic comes later as a cultural construct), and reveals that light is able to decide which entity has an appearance, a visible prevalence. One can speak of light-matter when the encounter between the intensity of light and material hardware poses problems of occupancy, as light and matter are fighting to occupy a portion of space. This

Drawings by the author.



Figure 1

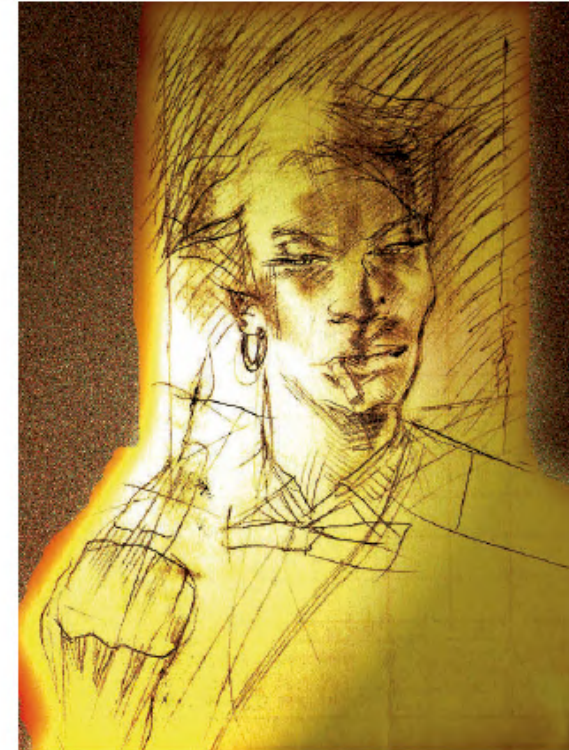


Figure 2

has several effects: the first is the competition between the shine and the relief of a shape which strips colour of its authority and absorbs most of the available light energy. Next, the tendency to convert the comparison between dark and light into a tonal scale, or what in painting is called *chiaroscuro*. At the same time, the overall illumination is kept under control by two opposing modes: the volumetric prominence enhanced by light and the unknown depth of darkness.

The relative phenomena are:

1- the light source can appear or disappear, and the first consequence is the appreciation that a certain amount of time has elapsed. In this case, the clash-conflict of light with the human dimension of time becomes the narrative of a fleeting moment.



Digital elaboration of a drawing by the author, 2006



Angelo Morbelli,
Old socks, 1902 - 1903.
Cornèr Bank Collection, Lugano.



Gustav Klimt,
Lady with Hat and Feather Boa, 1909.
Österreichische Galerie Belvedere, Vienna.



Georges de La Tour,
Le Nouveau-né, c. 1648.
Museum of Fine Arts, Rennes.

THE LUMINIST CONSEQUENCES OF THE BAROQUE

Omar Calabrese (semiotician and visual arts theorist) was also a keen observer of our contemporary world. In *L'età neobarocca [The Neobaroque Age]* (Laterza, 1992) he already defines with the title of his book a certain mode of expression, typical of our time. This attitude, according to the author, is an ideal continuation of the historical Baroque since many formal aspects, such as the blatant manifestation of the limit and ostentation of excess, are similar to those that governed the culture of the 17th and early 18th centuries.

In my view, this can also be applied to the use of lighting in certain films and many successful commercials.

With a certain amount of unscrupulousness one could trace the modern techniques of light back to Filippo Baldinucci when in *Notizie de' professori del disegno da Cimabue in qua [Notes on Teachers of Drawing from Cimabue until Now]* (Florence, 1681) he wrote about Rembrandt:

“This painter, as he was very different in mind from other men in the government of himself, so he was also very extravagant in the way of painting, and he created a manner, which can be said to be entirely his own, without a contour as such or any internal or external lines, all made up of scrambled and repeated strokes, with great strength of dark shades made his way, but without any deeply dark ones. What this artist was really good at was a very bizarre style which he invented of aquaforte etching in copper, again his own and not used by others nor seen any more, using certain friezes big and small, irregular strokes, and without contours, making however a deep chiaroscuro and of great strength”.

Furthermore, in the *Vocabolario toscano dell'arte del disegno [Tuscan Vocabulary of the Art of Design]*, Baldinucci analyses the value of shadow and states: “... in the language of painters, shadow is divided into three degrees, called shadow, half-shadow, and fluttering”. Today the first type of shadow is called self shadow, the half-shadow penumbra, and the last one, which sounds strange now, cast shadow. Baldinucci explains fluttering as follows: “... it is the shadow that is caused on the plane, or elsewhere, by the painted object, and corresponds to that darkness which the bodies cast out of themselves in the part opposite to that which is illuminated”.

Today, the light techniques of chiaroscuro (modelling and shading) have been studied and experimented with in a wide variety of fields (including digital graphics) as they have drawn experience from the main works of Western artists.

Self shadows are a technical baggage, a part of the indispensable skills of a good painter, even if their presence in different times and places have had a different impact on the taste and style of execution. Cast shadows, on the other hand, have a fluctuating destiny and are more linked to the painter's style: their realisation is discontinuous, accidental, they are labile and even want to communicate a shift, as if an ideal observer were walking within the figurative scene and their eye were following the movement of the light.