

*Atmospheric Composition and Tonal Values in Piranesi:  
A Study of Depth in the Carceri Series Drawings*

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**Abstract**

In the Carceri's series, Piranesi draws imaginary labyrinths of wonder and mystery. We are captivated by the dark environment, full of architectural elements, low-key lighting, strong contrasts defining staircases, bridges, tunnels and ornaments. The linear perspective, drawing these crossed paths and structures of this fictional maze, is generally defined here by two vanishing points, creating some distortion and oppressing the viewer. Using masterfully the geometrical system, Piranesi creates an overlapped complexity of distances, directions and scales. But there is another parallel system being used: the atmospheric perspective. This study dives first into an analysis of the light sources and shadows, to better understand their expressive role on the definition of the three-dimensional immersive space. A tonal analysis was then made, by the separation of dark, mid and bright tones, to present the compositional structure and pinpoint the densities and contrasts, where the tonal depths are defined and used. From the layered analysis of these receding interplaying depths, we arrive to the display of the gradual setup that defines a neoclassical atmospheric perspective, from a peripheric darkness into a dreamy hazy deep background. The atmospheric compositions drawn by Piranesi can play, therefore, a sensorial role where our senses are tested and manipulated through an illusionary immersive depicted space; but also, a narrative role, where it defines an emotional ethos of a trapped romantic spirit.

Keywords: Shadow, Drawing, Atmospheric Perspective, Architectural Representation, Piranesi

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## **Introduction**

The Carceri Series stand out from any other work done by Piranesi. Allegedly dreamed during a strike of fever (Wilton-Ely, 1988) it draws a set of dense complex scenes like never imagined before.

Having studied with Giuseppe Vasi, and later with Tiepolo, the first edition of the Carceri Series is believed to have been published in 1745-1750, with some works being signed by Piranesi as “Plates produced in 1742”, when he was only twenty-two years old. Ten years later that work was revised, adding also two more plates for the second edition. The second edition, considered to be more final, has a total of 16 plates, numbered and named.

Being a more experienced artist in representing views of Rome, between the archaeological ruins of a dreamed glorious empire ceased by time and nature, and the modern sight of the cosmopolitan baroque Italian capital, the artist adds more expression, more dense hatches, more deep shadows and ornamental details. Piranesi sets the tone for a more intense, dramatic and existential representation of a dream (Yourcenar, 1985).

Considering both versions of the work, we focus more on the final versions, as they are the more reinforced and worked by the artist. In this study, with open-access permission as a courtesy of the Princeton University Art Museum (2015), we use the source images to explore freely these series of etchings, through image analysis crossed with literature reviews, trying to understand and discover the characteristic tone and depth of the fictional places that influenced so many styles and architects across time (Stone & Vaughan, 2015).

## **Linear Perspective and Manipulated Labyrinths**

Linear perspective was properly defined in the Renaissance period, using principles of optics and geometry, spread across treatises and publications. Reestablished by Brunelleschi's experiments, that grounded that knowledge into operative method of representing space into a flat surface, artists started to depict three-dimensional spaces in a pulsing new way. Either with the Vedutas, that showed the views of the present cities, ideal souvenirs for the Grand Tour; or with the Capriccio, the thematical style that represented fantasy landscapes and ruined empires; architectural representations were high on demand and consideration.

Coined by Alessandro Salucci, Viviano Codazzi and later Giovanni Paolo Panini, and harnessing the desire for fantasy and fictions, but also a sense of nostalgia and wonder for the ancient empires, the capriccio style showed a deconstructed mix of speculative architecture embraced with the erosion made by time and nature (Steil, 2014/2016).

The technique of linear perspective allowed an experimental approach to project such spaces. Not only it surfaced as the representation of reality but also dived into a depiction of fantastic worlds. Either in the Vedutas or the Capriccio's, the perspective with one vanishing point was the primary choice, by structuring a strong, stable compositional axis that laid the fixed path to interpret the space.

The thriving scenography of Venetian theatres also used this to enhance the experience, expanding the limits of scenic space onto the illusive infinite, with a trompe l'oeil effect (Chiarenza, 2016). The control of the linear perspective, along with the knowledge of architectural details, made many architects be also scenographers. From those architects,

stands out the Galli Bibiena family. The technical expertise manifested by Ferdinando Galli Bibiena in “L’Architettura Civile” (Bibiena, 1711) defined a different approach on scene composition – the “scena per angolo”, an inventive take on scenography, with two vanishing points, presenting the scene at the corner of a space, projecting the eyes in different directions and showing the dynamic baroque play of mass and voids, creating an overlapped perception of spaces that project towards a boundless space (Durand, 1988).

Bibiena’s approach turned to be very influential to Piranesi’s Carceri. In the linear perspective of the Carceri series, we can see two vanishing points, wide apart, with an open field of view, forcing that disproportionate scale of the architectural structures onto the viewer, tightening the fictional space. Studying the directionality of the lines and perspective structure (Figure 1), we understand that some directions are towards the two main vanishing points, and others appear as variations that give accent to the magnanimous scale of fictional space, but do not share the same origin. This tends to happen more on the upper part of the image, as our eyes move away from the horizon. The manipulation of the linear perspective done by Piranesi have been documented in many studies (Rapp, 2008; Purini & Neri, 2008; Vogt-Göknil, 1958), and they show it’s not a gratuitous gesture.

Analysing the directions that they project, either in the structural passages or in the stereotomy of the stone, they lay a crossed path that makes the eye wonder before the interconnected depth, giving complexity to the understanding of space. We can never understand a way of passing through it. Additionally, Piranesi positions disrupting elements through the addition of staircases, arches, passages, decorative objects, that counter the main directions, giving even more difficulty to the perception of space. It is, therefore, laid out a rich and complex maze of architectural overlapping, making the viewer diverge in many directions but with no idea of getting out.

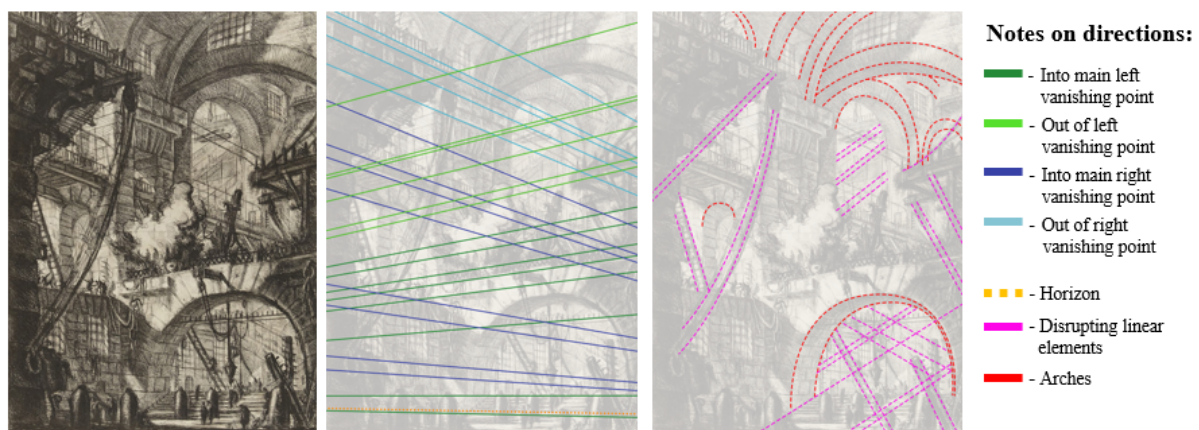


Figure 1: Linear Perspective Analysis of “*The Smoking Fire*” by Piranesi (from authors, 2024)

### Shadows and Light Sources – Understanding the Representation of Space

Our study now sets out to understand that dramatic dark tone added in the Carceri Series. Using the Digital Image Histogram, that graphically represents the number of pixels (vertical axis) dedicated to a tonality, from 0 – dark (left) to 255 – bright (right); we can analyse the overall tonality proportion of each image. In the Figure 2, in the first image (left), we see a Veduta of Rome by Piranesi, with tones distributed with strong contrast, balancing the dark and bright tones in high amount, which is natural, considering that it is a natural outdoor open

landscape scene; In the second image (center), in this interior scene from Ferdinando Bibiena’s scenography drawings, we understand the heavy distribution of dark tones but also the compensation of brightness that enters the pictorial space to balance the space. In the last image (right) we have the Carceri’s etching, with a strong focus on the dark tones, setting the overall low light of the prison. As Foucault said about prisons: “It is a place of darkness in which the citizen's eye cannot count the victims, in which consequently their number is lost as an example” (Foucault, 1975/1995, p. 115).



Figure 2: Overall Tonality and Luminosity Comparison With Digital Histogram (from authors, 2024)

It is speculated that Piranesi’s heavy tonality has to do with the heavy use and worn of the plates, getting more than three thousand copies from each, contrary to the engravers at that time, who made approximately a hundred out of each (Yourcenar, 1985). His technique and methods were virtuous, with better control of crosshatching and line thickness, but despite this, it is the density of details, textured rendering and the choice of strong contrast of intense dark tones, proportionality against the other tones, that create the characteristic overall dark atmosphere.

Also important, is to analyse the light source and shadow orientation on the scenes, as they define the distribution and position of the highlights and dark tones. By tracing the areas with clear direct light and their consequent shadows on the architectural features, we can identify their orientation and vector. In Figure 3, we can hint the origin of the light source, coming from top left to down right, with big wide areas, highlighted by a striking bold light, making strong shadow edges. This hidden wide-open light source makes us question where the prisons are located.

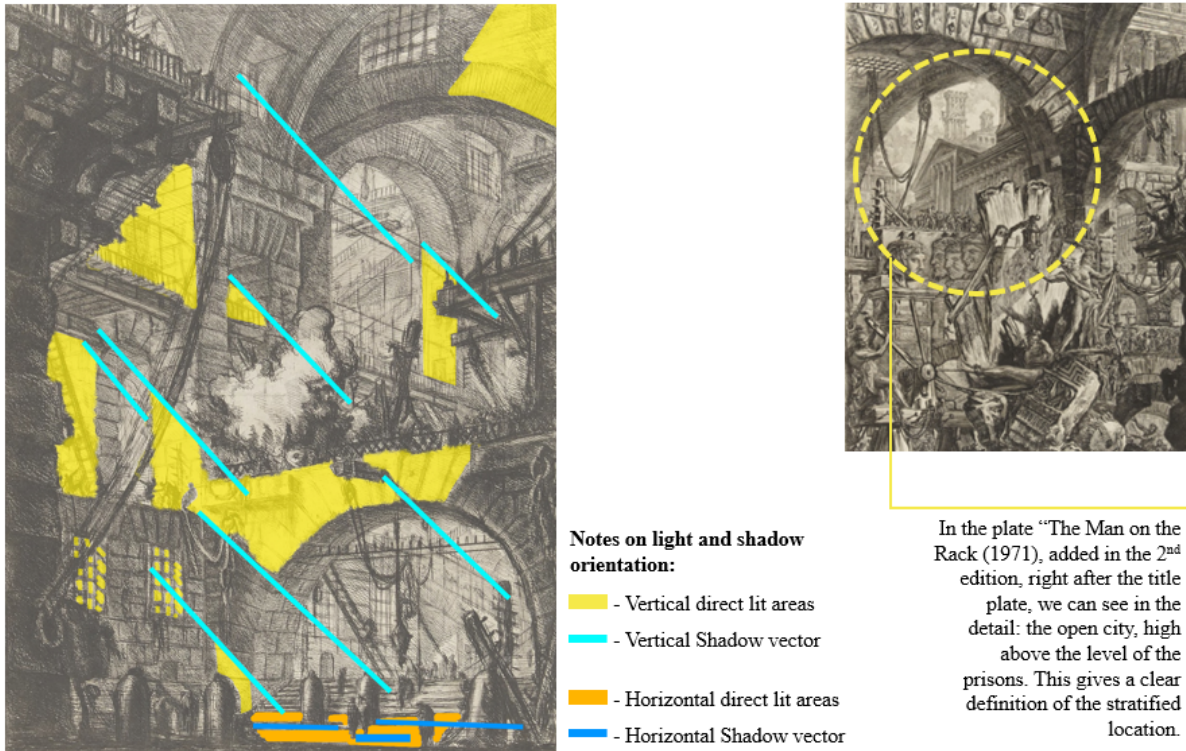


Figure 3: Light Source and Shadow Orientation Analysis of "The Smoking Fire" by Piranesi (from authors, 2024)

Considering the first introductory plates "Title Plate", "The Man on the Rack" (added in 2nd edition) and "The Grand Piazza", we get in these etches some sort of hint on the location of the imaginary prisons, clearly under the level of the normal city. So, if the prisons are deep underground, relative to the normal city, how can we have such big openings of direct light? The concept of being an underworld is therefore contrasted by some light sources, that suggest a big wide source flooding the space with a strong strange light. In some plates, the light and shadow directionality are so sided that it confirms the paradox of a "black sun" (Yourcenar, 1985), implying it's added strangeness to the scene and suggesting, at some points, that it is not a natural but an eery artificial man-made light source, a cauldron or furnace.

Shadows play an essential part in the scene composition of the Carceri. They play two different roles in these dramatic settings.

First, the volumetric shadows enhance the shapes of the architectural features. Piranesi moves away from the overloaded decoration of Bibiena's theatrical scenes, onto a greater structural clarity and massiveness of shapes (Rapp, 2008). Without the density of decorative small features, in a more modern (or neoclassical) approach, the shadows take center stage, with the use of precise crosshatching, complex densities and well-defined rendering, therefore accentuating the volumetry of the objects and their textures, providing focus to the massive structural shapes of the prisons, giving them solidity and weight.

Secondly, there's also the importance of use of the cast shadows. Playing with the light source origin (in this case, hidden), they are applied to heighten and accentuate the relations between the three-dimensional objects of the fictional space, causing also dramatic projections (Gombrich, 1995). Piranesi also used this element of the projected direction of

cast shadows to add another layer of complexity to the labyrinth, sometimes contraposing with the architectural features within the linear perspective directions, as seen specially in the plate “The Gothic Arch”, playing with our level of perception.

In conclusion, shadows either accentuate the volume and texture of the objects in the pictorial scene, or enhance the relation between them, the hidden light and the viewer, causing a trompe l'oeil effect, an optical illusion that makes us feel more there.

### **Tonal Segmentation Method – Analysing the Density in Shade and Shadow**

As we better understand the general orientations and strategies for the use of light and shadow, we study now how they are placed on the composition. To do so, we create a method of tone analysis. Using non-manipulative methods, we set out to understand how the tone distribution can give information on how the composition is structured.

Using Adobe Photoshop 2022 (Version: 23.5.1 x64), we first remove the border of the frames of the pictures, analysing just the etching itself. Then, working just with the greyscale digital spectrum of tone values, from 0 (dark) to 255 (bright), we separate the range of tones into:

- Dark tones, going from 0 to 70;
- Midtones, going from 100 to 150;
- Bright tones, going from 180 to 255.

An interval was set between the tones to avoid fuzzy outcomes between the ranges. Then, we separated the ranges in layers, with colours, with the dark, mid and bright tones being assigned with red, purple and green, respectively. We understood that because of the technique applied, the tones are controlled by the density of the crosshatching and lines. So, to visually understand the density, we applied a mosaic filter to each tonal range layer, to create a grid with the average density of each mosaic with a size of 35 pixels. This allows not only to see the intended tonality but also the density and strength in which it was applied. Last, we insert a faded original layer with the image of the plate, to serve as reference, in order to analyse where and what happens.

This method, therefore, tries to demonstrate the relation between tonality and density applied, trying to map the distribution on the plates. It allows to show contrast intensities and balances, smooth definition or strong separation.

From all the etchings, there are some particularities to be considered. The ones added in the second edition, “The Man on the Rack” and “The Lion Bas-Reliefs”, don’t follow so much the general structure of the rest: the linear perspective is set with asymmetrical positioning of the two vanishing points, the overall tonality is slightly brighter, the compositions are more confusing, with higher density of ornaments, decoration, human figures – trying to give a better social context to the Prisons. These two plates, being imagined approximately 10 years later from the original ones, have noticeably different structure, maybe experimenting with different variations of the theme. Also, the plate “The Giant Wheel” looks unchanged, deprived from all the tonality enhancement, crosshatching definition and added details characteristic of the second version.

## Tonal Compositional Analysis

Proceeding to the analysis, we can understand some repeating phenomena happening across the plates.

First, the dark tones are distributed strongly on the periphery of the foreground, creating strong borders. It helps to frame the scene. The elements closer to us have deep densities of cross-hatching, up to a point of not even understanding the contours. By doing so, they activate the field of the peripheric vision (Livingstone, 2002/2014). This defines a surrounding aspect, but then, because of their low definition and contrast, they dismiss the focus of attention towards the centre of the composition.

Secondly, the eye is conduced to the midground. The midtones occupy it, being used for detailed textures, sensitive shadow definitions and some details. It sets the base foundation for the development of the scene. In some plates, it is suppressed to the minimum, to stimulate the contrast of distances.

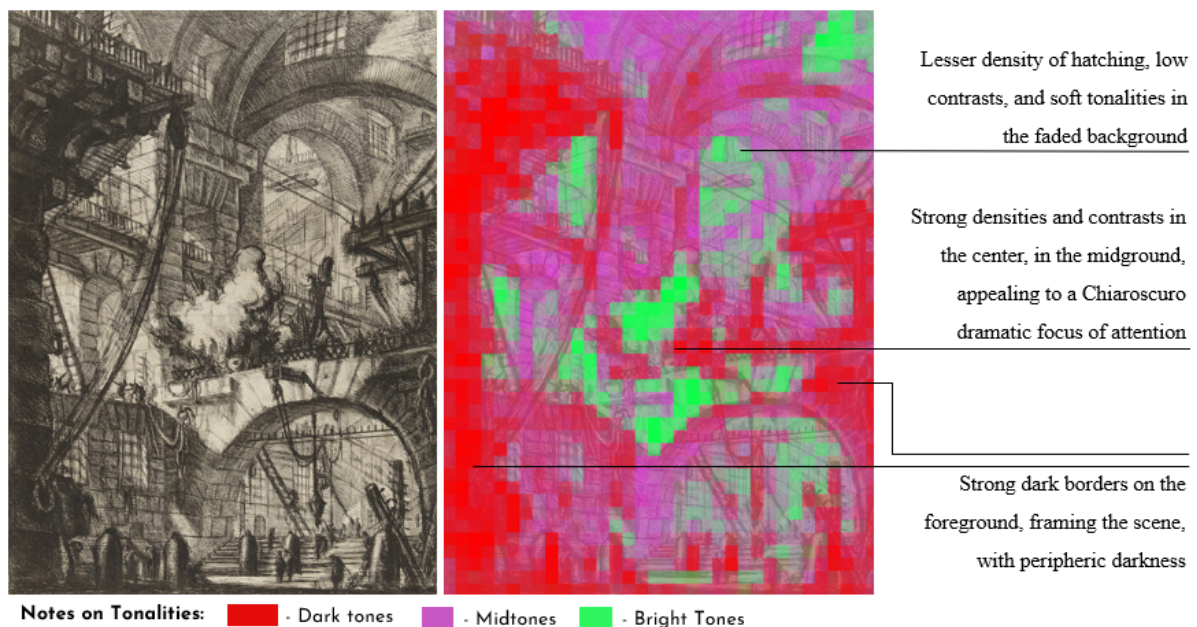


Figure 4: Tonal Analysis of “*The Smoking Fire*” by Piranesi (from authors, 2024)

But interestingly, in the centre of the composition, the general distribution of midtones is suddenly interrupted by an architectural feature that captures all the attention. At this event, the dark and bright tones appear, with strong densities and sharp borders. The hidden light strikes the middle of the etching and gives spotlight to some specific contour or shape. The shaded rendition causes dramatic effect, with strong contrasts, high definition of contours and volume.

Lastly, apart from this centred stage event, the bright tones are distributed at the distance, mixed with low density midtones. There is a clear soft fade between the midtones and the bright, dissipating on to the infinite. Populated with low contrasts, low detailing and light contours, the background fades into a hazy soft bright mist (Panofsky, 2012).

Manfredo Tafuri, referring to Piranesi as a “Wicked Architect”, and talking about Ulya Vogt-Goknil analysis of the Carceri says: “His perspective reconstructions of the plan, in

particular, tells us a great deal about Piranesi's method of composition: Piranesi's complex organisms are seen to have their origins in planimetries whose dominating element is the randomness of the episodes, the lawless intertwining of superstructures, the undermining of the laws of perspective, so as to make non-existent sequences of structures seem real” Tafuri adds that Piranesi’s work is “of this disintegration that induces the spectator to recompose laboriously the spatial distortions, to reconnect the fragments of a puzzle that proves to be, in the end, unsolvable” (Tafuri, 1990, p. 26).

Piranesi’s creative free spirit seeks for constant variation and experimentation, even more, when free from archaeological precision or landscape reproductions. The Carceri series are an open lab to these experiments. As seen with the linear perspective, not everything is a rule.

The structure of tonal composition is set with these elements: the dark tones in the foreground, with strong density and low contrast, framing the peripheral view, setting a dark interior scene; the midtones laying the midground base to space definition; the bright tones, softened and faded by the mix with midtones, with low detail and contrast set the background; and finally, there’s a contradiction, an interruption in the structure, a spotlighted element in the centre of the composition that pulls the focus of the viewer. But as we look along the plates, this dramatic and expressive interruption is a fluctuation event, either happening in the midground or on the foreground, depending on the manipulation of attention that the artist wants, on where the spotlight is set on. In plates 07, 09, 10, 11 and 15 the event happens in the foreground. It is used to balance the composition, or to enhance the three-dimensional feature, often using cast shadows to confront that element against the viewer, forcing even more the spatial illusion.

### **Segmentation of Spatial Depth – From Here to the Deep Background**

When understood the tonal distribution, and as a way to filter all the layers of overlapped complexity between the succession of intricate spaces and the manipulation of shadows, it became relevant to clearly define the levels of depth in the scene. In the figure 5, we try to show the differences between them.

There are always dark architectural elements defining the foreground. They appear at close distance, almost in backlight, becoming mainly a strong dark contoured frame.

Then, in the middle of the zigzag diagonal flow of the linear perspective, with passages or arches along the space, there is a transition from the foreground into the midground. Generally, an architectural element starts diagonally from the side of the periphery, into the centre, pulling the view into the midground. On the other side of the periphery, some elements remain to balance the frame and to give a distance anchor, formalizing the first level of depth. This “pull” induces the eyes of the viewer to enter the space. The transition, in a way, starts the path along the maze of over-positioned passages and arches, and goes from the peripheric vision that establishes “where” I am, into the foveal vision of “what” is in front. (Zeki, 1993). It qualifies as a *trompe l’oeil* effect, defining a strong three-dimensional effect, that forces an illusion of entering the space.

The midground gets a good definition of its elements, with precise crosshatching and line thicknesses. It is the receiver of the dramatic hidden light source, and it presents as the base of the etching.



The background generally appears through openings of frames of arches and passages, as they are a direct consequence of this system of two vanishing point perspective, causing an overlapping of depths.

In all plates, except the Plates 01, 09 and 12 (that show a more focused detailed scene of the Carceri), in the composition of the scene, there is another level, a deep background, succeeding from the background, even more far, where the details are sparse and thin, and the density of lines are low, proving the importance of the separation of frontal planes in the perspective structure (Dunning, 1991).

As shown in figure 5, if we flatten the layers of distance, it's clear to see that that central spotlight event mentioned before resides in the midground. But here resides a contradictory perception: this element looks to stand out, move forward towards us, into the foreground, even though it stays in the midground. The strong contrasts, the hard light and the volumetric accentuation bend the perception, interrupting the structure, and giving even more complexity to the composition.

The scenography studies were important to Piranesi, because they helped structure his compositions, as the scenario curtains or backdrops overlap one another. To deal with all the complexity of linear overlapping, the layering of depth allows to control hierarchies of perception. As a set of a theatrical scene, that extends the limit of the room, it gradually projects the viewer into the distance.

This gradual structure demanded that we asked: if we are in the deep underground levels, locked in the prison, towards an unknown labyrinth, where darkness looms and light appear only in rare events, shouldn't the background or deep background be total dark? Instead, as we investigate and proceed into the background, it gets brighter.



Figure 5: Levels of Depth Analysis of “*The Smoking Fire*” by Piranesi (from authors, 2024)

The background and deep background play an important role in these compositions. Piranesi uses light and shadows to define a volumetric effect that bends perception and enhances the

immersion but strays away from the dark background of baroque period. The protagonist, in this case, the architectural space, is not brought forward coming from darkness. We, as viewers, stand before the labyrinth, coming from a dark peripheric view, wander our eyes through the successive layers of depth, and onto a neoclassical hazy bright deep background, fading into distance.

The restless and inquiring spirit of Piranesi sets between two systems. He uses a recessional type of composition, structurally used in the baroque period (Wolfflin, 1932/1950), but uses a more classical transition of tonal graduation, like a natural landscape, but into a tormented interior vast dreamy space.

These principles applied are the ones of atmospheric (or aerial) perspective composition, generally used in landscape painting, to represent the density of the air, water, smoke or other element that thickens this interior pictorial space.

### **The Perception and Use of Atmospheric Perspective**

The definition of atmospheric perspective is formally introduced by Leonardo Da Vinci, with the sentence: “If in your picture you want to have one appear more distant than another, you must first suppose the air somewhat thick, because, as we have said before, in such a kind of air the objects seen at a great distance, as mountains are, appear blueish like the air, by means of the great quantity of air that interposes between the eye and such mountains”. It is part of the chapter dedicated to Aerial Perspective, in the “A Treatise on Painting” by (Da Vinci, 1835, p. 180). In his drawing “First Landscape Drawing for Santa Maria Della Neve” in 1473, he first represented this concept.

Although Leonardo Da Vinci did in fact define this feature to the world of artistic representation, it has been characterized in science many centuries before. It is alleged that the artist got the optical knowledge from the sculptor Lorenzo Ghiberti’s grandson, named Bonaccorso, a contemporary acquaintance and friend, who had the Italian translation of The Book of Optics, written by Alhacen (1021/1989) and the adaptation made by Ghiberti’s into his book “Commentarii”, c.1447. Leonardo Da Vinci, wrote, later in life, that “the boundary of a thing is a surface, which is not part of the body clothed in that surface, nor is it part of the air surrounding these bodies, but is the division interposed between the air and the body” (Fiorani, 2020, p. 76).

The main principles of the atmospheric perspective were succinctly these:

- The object’s colour saturation decreases with distance.
- Contrast decreases with distance.
- Brightness (value) increases with distance.
- The atmospheric perspective may be weakened by far elements that are hit by strong lighting.

This last point reveals itself particularly interesting, as it is the sum of two conditions. First, strong lighting is associated with radiance and temperature, which disperses or lightens the air in those areas, making it more visible. Secondly, the strong lighting accentuates the difference between light and shadow, enhancing the contrasts.

These principles of atmospheric perspective, as well as the scientific knowledge behind them, are not exclusive of the Renaissance. They were effective but not obvious. Nevertheless, they

span across time, when the need to create a pictorial space illusion appeared, finally taking an important role in the sixteenth-century and the other Renaissance-based illusions that followed (Dunning, 1991).

Since the Roman Frescos from Pompeii, from the 1<sup>st</sup> century (see Figure 6) that already showed the concept of distance through the thickness of atmosphere, along with initial principles of linear perspective, we can see a discreet path along the history of pictorial space. The Oriental landscape painting also had experience with this technique, since Yan Wengui (c. 960 – 1279) or Dai Jin (c. 1425). The characterization of the principles of representing the thickness of air, is well defined in some paintings, showing not only the mass of air particles between the viewer and the far away mountains, but also the rising mist, ascending from the river, full of water particles, defining a specific atmosphere. Leonardo Da Vinci, as mentioned before, aggregated the loose notes into a treatise of painting, and used extensively it's principles, sometimes even jumping between levels of depth, from the foreground into the deep background (Livingstone, 2002).

Piranesi used the concept of atmospheric depth, mainly used before in landscape painting, to define the illusion of an interior atmosphere. It accentuates not only depth, bringing a vastness of that underground world, but also, like Dai Jin, represents the thickness of the air, in this case, full of heat and smoke. Through his manipulations, Piranesi not only shortens the immense scale of the linear perspective towards the viewer, but also compacts what is usually a vast territory depiction into a dense thick hazy atmospheric composition.



Figure 6: The Use of Atmospheric Perspective

From left to right: detail of “Paris on Mount Ida” (1st century), Pompeiian Fresco (Unknown Author); detail of “Landscape in the Style of Yan Wengui” (c. 1425) by Dai Jin; detail of First Landscape Drawing for Santa Maria Della Neve (1473) by Leonardo da Vinci; and detail of The Drawbridge (1761) by Giovanni Battista Piranesi

## **The Roles of Atmospheric Perspective in the Carceri Series**

Dunning considers that the atmospheric perspective technique can withstand exaggeration and distortion without the viewer's notice. It becomes, then, a powerful tool for illusion, based on the relationship between contrast and value: "If an object is sharply focused and contrasts with the value of a blurred ground, it appears to advance. If the figure is blurred and remains similar in value to the ground, it tends to recede" (Dunning, 1991, p. 46).

In the Carceri series, Piranesi used this technique, as with the linear perspective, to manipulate and control perceptions into the compositions. The central spotlight event mentioned before is part of that intention in the organization of the scene. As it shows standing out, coming forth, it plays with the layers of depth. Like the cast shadows or the pulling transitional elements from the foreground into the midground, this event helps to accentuate the three-dimensionality of the representation and turns it into an immersive experience.

The visual experience is not bound to the rigor of the linear perspective (Damisch, 2002). The atmospheric composition can use a set of tools to, from a two-dimensional representation, project an idea of space that is organic, inducing and immersive. In the Carceri Series, it can play different roles.

The atmosphere of the place can play a narrative role. It can change the interpretation of a pictorial space, shifting visual hierarchies and controlling focus. Not only the human figures and decoration can hold stories. The space can tell it too. The implied emotional narrative is already pre-romantic: to feel lost in the middle of the darkness, setting our peripheral view in it, and looking desperately at an impossible labyrinth, with paths that we can't comprehend, gazing a hidden phantasmagorical light that floods the space, projecting strong dramatic cast shadows and giving volume and textural quality to massive architectural structures. Through it, we see levels and levels of over positioned complexities, fading into an uncertain, dreamy and hazy interior horizon.

Another role can be one of sensorial play. The setting of a relative multi-point perspective, that lifts from the horizon to give an accentuation of disproportionate scale already gives a subtle delusion. But there are also constant diagonal transitions between levels of depth that pull us in and strong contrasted elements that advance from their position and capture our focus. Not only this, but it is also represented the thickness of the air that we seem to breathe. The interior human-made world spans across successive galleries, gradually showing the density of smoke in the air, hinting a topological map that one cannot understand. It projects into the unseen infinite, into a cloud. These clouds are not only metaphorical. They are represented, in the plates 04, 06, 07, 09 and 10, as protagonists, burning from a fire we cannot grasp, like human figures, presenting themselves.

Clouds have been used in the Renaissance and Baroque periods to represent a different pictorial space, one of heaven and dreams. Either in the Capriccio landscapes that fade into the mist, or in the frescoed domes that lead into heavens, the clouds break the rigid space, towards an immersive sensorial experience (Damisch, 2002).

## **Conclusion**

The importance of the atmospheric perspective and tonal compositions have been slightly relegated, as properties of a defined pictorial space. Opposite to a rigorous and precise linear perspective system based on geometrical and mathematical principles, it fell in a box, somewhere between the unapologetic intuitive approach and the overburdened complexity of optical systems.

Leonardo Da Vinci, with his treatise of painting and notebooks, recentred the discourse around this theme. The development of spatial experiments since the Renaissance and the historical periods that soon followed, fascinated the artists and architects with the possibility of testing the limits of representation up to a point of illusion and manipulation of perception.

Through the analysis of the Piranesi's Carceri Series, a fictional space that wants to feel real, we tried to underline the importance of these concepts and techniques, as they project not only spatial configurations but also immersive perceptions and sensorial speculations, positioning us inside a dream.

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