

The Exploration of Leonardo da Vinci's Artistic Works' Style

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Abstract. Leonardo da Vinci is the most perfect representative figure of the Renaissance, known as one of the three masters of the Renaissance, and is recognized as a remarkable talent of many ages. Compared with the other artists of the same period, he had not finished many paintings, but each one is immortal. Up to now, people have never stopped researching the Mona Lisa, the Last Supper, and so on. Based on the background of Leonardo da Vinci's time and life, this paper explores the close relevance between the unique painting style and science in his works through the analysis of his several important works, to try to explain the mysterious smile of Mona Lisa and how to portray the causes of everyone's precise different facial expressions in the last dinner. By comparative analysis, this paper compares and analyzes the artistic styles of Leonardo da Vinci's works in different periods to illustrate the continuous improvement of Leonardo da Vinci's painting technology after studying and adopting scientific methods. The conclusion is that returning to the ideology of humanism during the Renaissance made Leonardo da Vinci advocate naturalism, deeply study natural sciences, especially optics, mathematics, anatomy, biology, and other disciplines related to painting, and master a wide range of knowledge fields, all of these created his unrepeatable artistic style. Throughout Leonardo da Vinci's entire life, the most worth learning for us to learn is his persistent spirit of pursuing truth.

Keywords: Leonardo da Vinci, painting and science, unique artistic style.

1. Introduction

Leonardo da Vinci is called a wizard because he did in-depth research in various fields such as painting, music, architecture, mathematics, hydraulic engineering, geology, geography, the creation of military weapons and even clothing. This is fully demonstrated in his letter to Duke Roduvico Yier Moro, he said that he could design light and portable bridges, tunnels, and stairs, which could attack and destroy forts and fortifications, and he also could design all kinds of offensive and defensive weapons, warships, manufacture armored chariots, cannons, light weapons, crossbows, city machines, buildings, canals, sculptures, and cast bronze statues, etc. [1].

Leonardo da Vinci can almost be called a superman. His strong interest in natural science is not only the social trend of the Renaissance but also the need for his living environment. His learning path began with painting, and painting skills are closely related to the development of visual science, mechanics, geometry, human anatomy, and other fields, so he needs to learn, master, practice, re-study, and create new methods in order to constantly improve painting techniques [2]. Leonardo da Vinci's spirit of perpetual exploration made him become an omniscient genius in people's eyes. This article will start with the Renaissance and Leonardo da Vinci, and discuss the formation of his view of nature and the ignition of his scientific enthusiasm, and then this paper will explore his theory of light and shadow and perspective [3]. This article will not analyze these theories in depth but just summarize the research results of scholars for analyzing Leonardo da Vinci's paintings. At last, this article will analyze the "mysterious" effect of Leonardo da Vinci's paintings by using the knowledge of perspective and anatomy.

2. Background

Medieval Europe was a "dark age". As the spiritual pillar of the society at that time, religion established a strict hierarchy and regarded God as absolute authority. Therefore, his artistic works do

not pay attention to the realism of the picture, nor to the rationality of the objects in the painting. These works are more used for the dissemination and belief of religion.

In ancient Greece and Rome, it was a civilization that advocated “truth”, and people could express various academic ideas freely. Therefore, literature and art achieved great success. This is in sharp contrast to the Middle Ages.

A cultural movement of ideological emancipation arose in Europe from the 14th to the 16th century, the core of which was the revival of “humanism”, which emphasized people-centered rather than God-centered. People began to pursue “truth” and “authenticity”. Paintings also began to express realism, pursue life and express natural people and objects. At the same time, advocating science, and painters have more space to create freely, study various painting techniques, improve the quality of their works and painting techniques, and thus improve their social status and gain more respect.

Leonardo da Vinci was born in 1452 in Finch, a small town next to Florence. He had not studied language and mathematics systematically as he was an illegitimate child. It can be imagined that Leonardo da Vinci deeply loved nature’s mountains, waters, plants and animals as he grew up in the countryside. This was the internal driving force of his lifelong exploration of everything about nature, natural laws and natural phenomena. At the age of 15, his father sent him to the most important painting workshop in Florence, to study painting with Andrea Del Verrochio (1435-1488). Leonardo da Vinci learned advanced painting skills and various painting theories at here. He showed his painting ability during his apprenticeship. The characters in the painting “Annunciation” are very vivid, the wrinkles of clothes and the shading of light and shadow show that he has learned the techniques of his teachers well and used them skillfully. In about 1477, Leonardo da Vinci ended his ten-year apprenticeship and started his own painting workshop. He once wrote a letter of self-recommendation to the Grand Duke of Milan, which was mentioned above that he said he could make all kinds of weapons, and he was good at building civil facilities, and he also said that he could draw and sculpt if necessary. So the Grand Duke invited him to Milan. Leonardo da Vinci left Florence to Milan to serve the Grand Duke of Milan around 1482. This period in Milan was the richest period of painting in his life, and also the deepest period of scientific research. He studied optics, mathematics, and anatomy, which was fully reflected in the *Mona Lisa* and the *Last Supper* [4].

3. Leonardo Da Vinci’s Theory of Light and Shadow

Leonardo da Vinci believed that the two most important aspects that painters need to deal with in painting practice are perspective and light and shade. They could make objects show “relief effects”, which was considered a miracle of a painting by the audience at the time. In order to show three-dimensional modeling in flat paintings, Leonardo da Vinci believed that painters should learn perspective, light and shade, proportion, anatomy, animals and plants, and so on [5]. Leonardo da Vinci divided the light shining on opaque objects into four types: universal light, special light, reflected light, and transmitted light; The second classification is universal light, special light, and soft light; and the second classification is general light, special light, and soft light. Leonardo da Vinci liked the soft light most which refers to the light when the sun is completely below the horizon in the evening or early morning. Leonardo da Vinci used soft light perfectly in *Mona Lisa* [6].

For the study of visual mechanism, Leonardo da Vinci studied the cornea by dissecting the eyes, tried to make something similar to the cornea with glass, and observed the function of glasses in connection with the principle of pinhole imaging [7]. He put forward many new concepts, such as he put forward his air perspective and oblivion perspective based on linear perspective, and integrated them into his works, showing more vivid and three-dimensional effects. Linear perspective is the cause of the size changes due to the distance between objects and glasses. He also expressed the quantitative relationship between the projection size of linear perspective and the distance via mathematical methods. Air perspective refers to the universal reflection phenomenon of any object, so any opaque object is always stained with the color of the opposite object. When people look at objects with their eyes, people also look through the air with the color of the air. Leonardo da Vinci

also proved that the air is blue through experiments [8]. Invisible perspective means that with the increase of the distance between the human eye and the object, the object will become more and more blurred. Leonardo da Vinci's discovery of the perspective of invisibility made his painting technique "gradual invisibility".

This paper simply summarizes Leonardo da Vinci's theory of light and shadow here, in fact, referring to many scholars' papers and research results, Leonardo da Vinci's research on light and shadow and perspective is very in-depth and extensive. Just to study the principle of visual imaging of eyes, Leonardo da Vinci adopted methods such as observation, experimentation, mathematical and geometric quantitative analysis, dissection of the human head, and so on, which shows his persistent spirit. This article just takes the study of light and shadow theory as the representative to explore Leonardo da Vinci's scientific spirit here.

4. Comparative Analysis of Leonardo da Vinci's Works in Different Periods

The use of light shadow and perspective by Leonardo Da Vinci in his works is different in different periods. Leonardo da Vinci created his own whole set of light and shadow and perspective theory and painting methods from learning the painting skills of his predecessors to his own continuous research.

4.1. Ginevra de' Benci

The following Figure 1 is *Ginevra de' Benci's* portraiture which was created around 1474. The woman's face, body, and clothes, as well as the clear boundary lines with the background, and the treatment of shadows under the neck; but there is no painting effect of the interaction of various colors of air perspective on the face and body. The background behind is represented using a linear perspective of near big and far small, but there is no use of hidden perspective to express the hazy visual sense of further depth of field. This painting still reflects more traditional painting techniques, character modeling, the background of the object moral, light and shadow relationship, etc. The distant background in the painting is represented by Leonardo da Vinci's air color-blue. This shows that Leonardo da Vinci began to use the theoretical knowledge obtained from his observations and experiments in his paintings.



Figure 1. Leonardo da Vinci, Ginevra de' Benci, c.1474-98

4.2. Mona Lisa

The following Figure 2 is Leonardo da Vinci's most famous painting, the *Mona Lisa*. Many people always explore the story behind the "mysterious smile". In fact, this is the effect that Leonardo da

Vinci fully and precisely applied a variety of light and shadow, perspective techniques, and even the visual knowledge gained in the painting. Compared with Figure 1, which is Leonardo da Vinci's early portrait of Ginevra Benci, some difference had been showed between the two paintings. The *Mona Lisa*'s face looks full and soft rather than the stiff and clear outline seen in picture 1. When Leonardo da Vinci studied optics, he came to the conclusion that the objects in nature that people's eyes see have no boundaries, and even when people see the outline, those lines are invisible. In this painting, There is no obvious brushwork as Leonardo da Vinci painted the paint layer by layer with his fingers in order to achieve the hazy feeling, this is Leonardo da Vinci's "Sfumato", this technique can make the transition between light and shade very natural and continuous, and no sense of boundary can be seen in the previous painting at all. The "mysterious smile" is the effect of using Sfumato on the corners of the eyes and mouth, the outlines of these two places are more blurred and giving the viewer's a half smile and hazy feeling because of the layered paints and finger smearing.

In this work, Leonardo da Vinci also used his favorite "soft light". He imitated the warm effect of natural light in the early morning and evening. The illuminating light from the upper left makes the forehead and chest of the characters in the painting first receive light, and then gradually spread around and darken. This kind of light can make the characters in the whole picture look gentler and give people a soft visual effect. Leonardo da Vinci persistently study the principle of eyes and visual imaging had only one purpose, which was to try to restore the natural scenery of the eyes in the picture. Only in this way, there will be an immersive sense of substitution when people see the painting. The blurring of the outline, the change of the scenery, the change of light and shadow, etc., these are all the reasons why people's eyes see the magical "relief feeling", and *Mona Lisa*'s eyes are always watching us and smiling at us forever.

The true restoration of the visual image of the eyes does not represent the stiff imitation. Leonardo da Vinci summarized the presentation effect of different lights; he imitated the soft light in the morning and evening in nature and artificially added warm color to the picture when it was necessary to describe the graceful *Mona Lisa*.

In this painting, the background also makes full use of various perspective effects, for example, there is no obvious boundary between mountains and sky in the distance, trees, rivers and mountains are also integrated. With the distance getting farther and farther, the scenery becomes more and more blurred, and the color of the distant scenery and the sky becomes dark and blue. Compared with Figure 1, the three-dimensional sense and realism of *Mona Lisa* are much stronger. This painting is more like a photo that fixed at the moment when *Mona Lisa* smiles.



Figure 2. Leonardo da Vinci, *Mona Lisa*, c.1503-19

4.3. Last Supper

The following Figure 3 is Leonardo da Vinci's other famous painting, the *Last Supper*. This painting has a strong sense of space. Jesus is right in the middle, and three Windows are arranged at the back of Jesus, placing the perspective focus of the picture on the bright forehead of Jesus. The walls on both sides also extend linearly to the distance, enhancing the sense of spatial perspective. The blue sky and white clouds in the distance in the windows use air perspective to deepen the three-dimensional effect. The twelve disciples were performed by three in the group. In the picture can see the vivid description of each disciple's expression, action, and manner after he said, "Someone betrayed me among you." Leonardo Da Vinci is a "master of narrative". In previous paintings, the composition always put the disciples rigidly on a line, which is to describe an event, but Leonardo da Vinci's paintings are impressive because he describes "a moment". If the *Mona Lisa* is fixed at the moment of smiling, then the *Last Supper* describes the true expressions of the disciples at the moment after hearing the words, some people are nervous, some people are frightened, some people are timid, and so on [9]. Leonardo da Vinci made full use of the effect of light and shadow here, Jesus was in the front, the disciples were mostly sideways, and Judas was blocked by two disciples, looking darker than the others, which made one wonder if this was because of excessive panic and ashes, or was it really because the light was blocked? Leonardo da Vinci's greatness lies in that when he tries to make us see the painting, he thinks it is a representation of what happened. Leonardo da Vinci's paintings are very realistic, unlike the paintings of previous times, in which the gods are always frosty, without a trace of joy and sorrow [10]. Everyone has different expressions and complex psychologies, just like the people around him in this painting, so viewers feel like things are happening around them when viewer see it; this may be the so-called "empathy" [11].

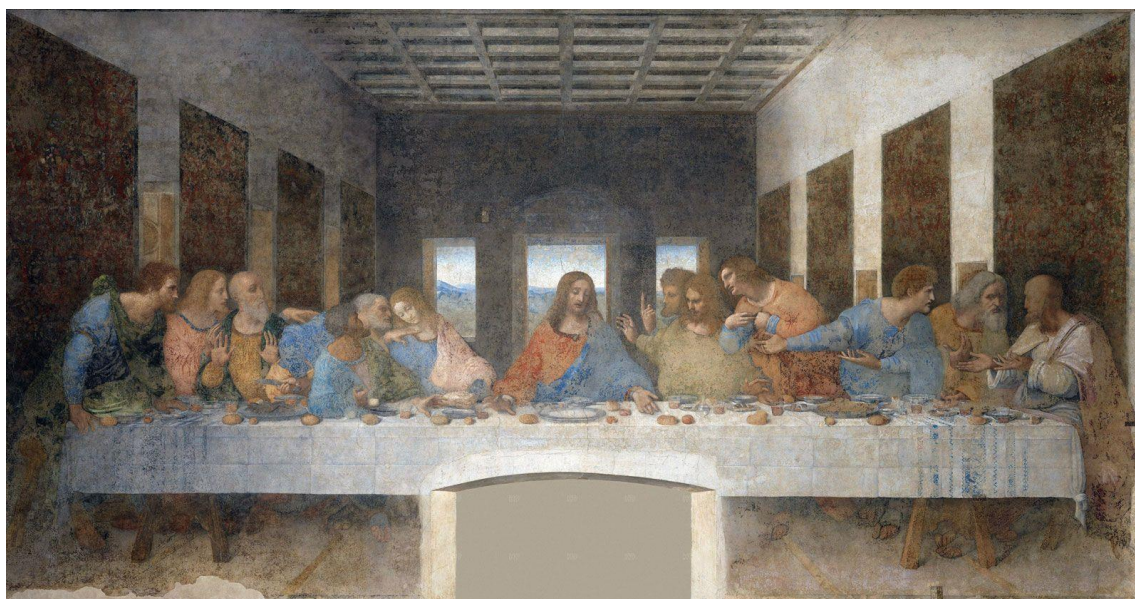


Figure 3. Leonardo da Vinci, Last Supper, c.1495-98

5. Conclusion

There was never a born talent. When everyone marvels at why Leonardo da Vinci has achieved amazing achievements, whether people see the extraordinary efforts behind him. From the more than 13,000 pages of sketches and manuscripts left by Leonardo da Vinci, his extensive exploration, meticulous description and accurate proportion made him a great scientist, philosopher, inventor, architect and mechanic rather than a great artist. When everyone appreciates the smile of *Mona Lisa*, do people think that for this perfect presentation, Leonardo da Vinci once dissected more than 30 bodies in a room without an anatomy room, preservative, to explore every organ, muscles and nerves of the human body to find out how they work. He always takes nature as his teacher, explores the

laws of nature, restores the natural scene, enriches the nature and transforms the nature. He respects the laws of nature and science and is full of curiosity all his life and never stops longing for knowledge. It is still the most artistic style worthy of exploration even today after 500 years.

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