

Comparative Study of Rembrandt and Caravaggio's Light-using Methods

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Abstract—The paper has compared the light-using methods of two Baroque art masters, Rembrandt and Caravaggio, and studied the transformative influence of light to painting in this period, explored the development evolution process of artificial light, mixed light, and the brightness of the light source in the painting, and revealed the mysteries of light in painting suitable for retinal viewing characteristic. It has an important role in promoting the transformation of painting itself.

Keywords—light-using method; comparative study; Caravaggio; Rembrandt

I. INTRODUCTION

As one of main visual elements in painting, light has a major role in the picture. The retinal phototaxis principle enables light to produce a magical effect in the picture, and guides the visual center of picture and viewing sequence. In several periods of art history, researchers considered the element of light in visual sense as main research object in the picture. The Caravaggio period is one of them. Caravaggio is a prominent artist who has specially researched the light in the painting after Leonardo Da Vinci. He overturned the light-using method of Renaissance period, and opened the use of artificial light in the painting. He opened the door to the expression of light and shade in the painting, reformed the composition form of light and shade in the space, laid a foundation for the use of light in the Western painting, and opened a new chapter for light-using aesthetic change. The use of light in Caravaggio's painting has a close relationship with the development of technology in this period. It was a result striding from the geometrical perspective era towards the optical instrument era, and a replacement of naked eye to lenticular eye. So, it is an epochal visual change.

II. THE LIGHT-USING METHODS IN THE PAINTINGS OF CARAVAGGIO

Caravaggio's followers are numerous. And Rembrandt is the most prominent master who could use light in the painting successfully. On the basis of inheritance, Rembrandt further improved the use of light, perfecting Caravaggio's light-using method. There are many similarities. Rembrandt inherited Caravaggio's following creative light-using parts.

A. The Use of Artificial Light

The use of artificial light in the picture can be traced back

This paper is supported by the JPJS2016019 project of Institute of Disaster Prevention.

to the early Renaissance period. And there were also some theoretical researches on artificial light. For example, Leonardo da Vinci has ever researched the artificial light. But the use of artificial light in the painting was not developed in that period, and the dominant was still the use of natural light. The research and application of natural light has been formed in that period. Later, Caravaggio extracted the element of artificial light. He used it independently and made it an important expressive language in painting. First, Caravaggio broke through the dependence on the natural light source, and added the artificial light. The initiative use of light has been strengthened, and it greatly increased the freedom degree of painting. Secondly, Caravaggio then abandoned the use of natural light in the painting, and completely used the artificial light in the painting. It is another breakthrough in the formal language of painting itself, which has promoted the transformation of visual language of oil painting. Rembrandt inherited the light-using method of Caravaggio, and became another remarkable master in the use of artificial light in the fine arts history.

B. The Use of Projection Light

With respect to the diffused light of the Renaissance period, the projection light created by Caravaggio in the painting has produced a tremendous visual impact. Firstly, Caravaggio seriously studied the aesthetic principle of Leonardo da Vinci in the use of light in the Renaissance period. The aesthetic concept of the Renaissance period is soft light transition, with no strong light and shade contrast in the painting, especially in the face of figure. The picture center is generated according to the geometric structure of the picture. Secondly, Caravaggio subverted the aesthetic principle of the use of light in this period, and directly used the projection light in the painting, creating a large area of strong light and shade contrast in the painting. The projection light makes the illuminated face of the figure and the shady face of the figure form striking contrast, and produces an obvious division between light and shade. The change of light nature produces the change of picture, and nobody had ever used it before Caravaggio. The projection point of the light source becomes the center point of the vision, and the projection path becomes the direction of the line to guide the viewing sequence. After Caravaggio there emerged a large number of followers, and to the extent that masters in the Rembrandt period followed the use of it. On the basis of inheriting the projection light of Caravaggio, Rembrandt subdivided the types and functions of the projection light. He

became a representative figure in the use of projection light. He strengthened the dramatic expression of the light in the painting.

C. To Strengthen the Light Contrast

Produce a sharp contrast to the surrounding dark background. The brightness of projection light in the painting cannot compare with the brightness of projection in the stage, but they can produce a similar background effect. First, Caravaggio's dark-background painting has a strong light and shade contrast, dark background and limited depth of field. This effect is closely related to the use of lens. It is difficult to observe it with naked eyes. With the aid of tool, Caravaggio took the lead in the use of dark-background painting method, replacing the aesthetic orientation of the dominated optical theory of Leonardo da Vinci in that period: all images are shrouded in a hazy soft light, with no large area of dark background due to light. The foreground and background are real nearby and virtual in the distance in the perspective of air. Secondly, the strong light and shade in Caravaggio's painting involved in the composition of the picture, which had broken traditional single picture composition that is determined by the position and distribution of each parts in the picture. Caravaggio used the artificial light and projection light, so there were a lot of light and shade contrasts in his painting. It produced a relatively complicated skeleton structure in the picture. On the basis, Caravaggio further arted up the background positively. Figure and background were divided into two opposite parts. Mostly figures were placed in the light part, and background was processed in the dark part. Figures are placed in the projection point of light, and become visual center under the concentrated dark background. It accords with the visual characteristic of retinal phototaxis. Caravaggio didn't simply separate the figures and background completely. At this point, he learned from the air perspective principle of Da Vinci, and subtly integrated the dark part of figures with that of background. It has no un-integrated visual phenomenon between hard-edge images in the painting from the early Renaissance to the Middle Ages. Rembrandt inherited Caravaggio's dark-background painting method. It integrated the dark part of figure with background, greatly enhanced the sharpness of the shade, and well combined the artistic calligraphy and texture sense of light and brushwork. He further developed this method.

D. The Sensible Processing of the Primary and Secondary Lights

Before Caravaggio's painting, the visual center was determined by the perspective center of the picture. In the period of Caravaggio, the visual center of the picture is determined by the primary and secondary lights. First, the light and shade of the light in Caravaggio's works is determined by the needs of the picture, rather than the brightness of actual light. The projection center of light is the position of central figure in the picture. At this position, the light is the brightest, and produces the primary and secondary relationship of light in the picture by analogy. Painters can arrange light according to their needs, which further enables painters to grasp the initiative of picture expression. The contrasts in the picture are achieved through the primary and secondary processing of

light. Second, the primary and secondary processing of light sources create a richer visual viewing layer. Compared with the object processing of the picture under unified brightness of light, the processing method with primary and secondary light expression could produce a stronger object contrast and richer visual layers. Caravaggio started to use this technique, and used a lot of controllable primary and secondary lights to guide the primary and secondary relationship of the picture in many works. He applied it subtly, which made the processing of picture natural. In *Night Watch*, Rembrandt has applied the primary and secondary light technique of Caravaggio to the extreme. The blinking light in the picture is variegated and beautiful, with a vague expression in the picture. Usually viewers first see the two officials with weapons in the picture, and following the projection point of the brightest light, in the real visual center is the little girl with wings like an angel.

E. The Use of Multiple Light Sources

The hybrid light sources make the composition of the picture complicated. Compared with the single light source of the Renaissance period, Caravaggio not only used artificial light but also processed the brightness of light in his paintings. He further increased the number and type of light sources. First, by increasing the number of light sources, Caravaggio enhanced the wandering sense of viewing point and the air mobility in the space of static picture. The sources of light are not simply the single fixed light, and in the picture we can see different light sources, including artificial light and natural light. There are changes in the number and type of light. For example, in *Rest on the Way to Egypt*, there is natural light in the distance and artificial light on the left of object nearby. The processing of multiple light sources is harmony and natural. It is hardly to be aware of it without careful observation. Second, if we say the picture of the Renaissance period is stable and solid, Caravaggio has made changes in the arrangement of figure and action scenes. He further enhanced the dynamic state of picture with use of multiple light sources, which has influenced Baroque art. The use of multiple light sources makes the spatial structure of the picture complicated. The space of objects is waved with the space of lights. The interweaving of light and shade produces a magic light and shade effect. Rembrandt's paintings inherited the use of multiple light sources of Caravaggio. He has grasped the true meaning of light shade in the beginning. He naturally used the hybrid light sources in his works. It is often the combination of outdoor light and artificial light, which can make up the insufficient light of near object in the picture. Rembrandt has accurately and flexibly grasped the projection of multiple light sources in his paintings.

Caravaggio classified light source into three types. (1) The introduction of outdoor light into interior; a remarkable characteristic of Caravaggio's works is the introduction of the outdoor light into interior. For example, in *Fortune Teller* and *Call Apostle Matthew*, there are clear paths of outdoor light projecting into interior. (2) The indoor light source; the indoor light sources mainly include artificial light and outdoor light. (3) The hybrid light source; it includes artificial light and natural light.

III. COMPARISON OF REMBRANDT AND CARAVAGGIO'S LIGHT-USING METHODS IN THE PAINTING

On the basis of Caravaggio's use of light, Rembrandt further developed it and improved all aspects of light use. It became an upgraded version of Caravaggio's light. The paper has made a comparison on their characteristics of light of use. The differences are showed in the following.

A. Caravaggio's Use of Light Characteristics

1) *The light path is relative long:* We can clearly see the track of light. Caravaggio used the outdoor light. He is the first one to change the use of natural light source in the Renaissance period. First, Caravaggio introduced the outdoor light indoor. The outdoor light went into room through door or window on the thick wall. The journey of light is long, and the intensity of single outdoor light is not high. But the path of light is quite clear, and we can see it through Caravaggio's Call Apostle Matthew. The picture is still relatively dim, which is related to the indoor painting location and building form at this period. The buildings at this period had thick wall and long and narrow windows, so the light path is prominent. Second, to observe with lens increased the focus and dark painted effect, and highlighted the placement point of projection light – the visual center of the picture. The picture background showed a dark state, forming an obvious contrast with the object. The source and path of light are clear.

2) *The brightness of light source is not high, and the distance of light source is relative far to the object:* First, the picture of Caravaggio's works is shrouded in a dim light, and it is the so-called sauce hue. The brightness of light source in Caravaggio's painting is not enough, and it is related to the introduction of outdoor light and dark indoor space. Second, the effect is also related to the light technology at that time. For example, the dim hue in Calling of Saint Matthew was because of the use of artificial light. The brightness of artificial light is far from reaching the desired effect. The development of lighting technology profoundly influences people's life in all aspects. Painting is the most intuitive recorder, which records the technology and people's life condition in that period. Third, the prospective method broke through the observation with naked eyes. The brightness of light is reduced through the reflection of the lens. It has a great effect on the brightness of the picture in this period. It created a new visual effect in a fixed hue, which was very charming.

3) *The sharpness of the shape of light part is not enough, with a small contrast between the sharpness light part and the sharpness of dark part:* First, in Caravaggio works, the contrast between the light part and dark part is sharp, but the shape of light part is not clearer than that of dark part. The visual point is far from the picture, which is closely related to the observed optical instrument of Caravaggio. The distance of picture and visual point is the reflection distance of optical lens, so that the observation point is far from the picture, and the distance is more far than that of naked eyes. Caravaggio's

works never solve the problem of object shape and picture dimensionality. Under the dominance of light, the picture has a dramatic effect, and strong light and dark contrast. But the shape of light part of the object is not clearer than that of dark part. It seems that they are in the same plane, and the space of the picture is often processed into a wall face, cutting off the reverie of three-dimensional space. For example, in Dinner in Emmaus, behind Jesus Christ ends the dimensionality with a wall.

B. Rembrandt's Use of Light Characteristics

1) *The path of light source is short, and the light is bright:* Compared with Caravaggio's works, the path of light source in Rembrandt's works is greatly shortened. The lighting technology has also been improved, so light is brighter, and no longer a yellow hue. If we compare Caravaggio's works with Rembrandt's works, we can clearly see that the sauce hue has been changed due to the change of the path of light. The first group is Caravaggio's works, and the second group is Rembrandt's works. It can be clearly seen from the self portrait in 1669, as well as the work Smiling Saskia.

2) *The shape of light part of the object is clear, forming a relatively large contrast with the sharpness of dark part:* Due to the change of light source, the sharpness of the polishing part of the object in Rembrandt's works is much higher than that of the object in Caravaggio's works. The visual thickness was produced through similar retina. Under the expression of light texture and brushwork, the dimensionality of three-dimensional space suddenly become large and the space of the picture is not subjected to the rule of light. It surpassed the indoor scene with single light or combination light, and expanded a more vast space. It seems to be the perfect combination of the light use of Caravaggio and Leonardo da Vinci's space. Positively and flexibly apply indoor light to outdoor, even in the picture of indoor environment. The space is largely expanded, and the light sources become more complicated, such as the contrast in Poland Noble.

3) *The larger the intensity of the light source is, the closer the light source is to the object:* The light source in the works of Rembrandt seems to be around the corner. It was so near and so bright. To change the distance between the light source and the object is to change the effect of light in the picture. Express the texture sense and brushwork of the picture with the aid of light source, and it makes the object vivid, and full of emotion.

IV. CONCLUSION

Rembrandt inherited and developed Caravaggio's use of light in the painting, and further promoted the use of light. By comparison, we can deeply understand the marvellous Baroque art. It further revealed the secret of light element in Western ancient painting. It can reflect the origin of western modernism. The light element is an important factor in the development of Western ancient painting. The two artists have created a new visual revolution of Western ancient painting, and laid a foundation for the use of light in painting.

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