

The Research on the Origin and Communication of Blue and Green Colors in Chinese Blue and Green Landscape Painting

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Abstract. Blue and Green landscape painting is an important component of Chinese landscape painting. The purpose of this paper is to explore the origins of blue and green colors in blue and green landscape painting and search for the reasons for the establishment of the blue and green landscape painting's style. Today's many researchers identify the murals of the Dunhuang Mogao Caves as the original form of Chinese Blue and Green Landscape Painting, and the Mogao Caves' painting style was significantly influenced by Indian Buddhist art. This paper employs a research approach that compares the stylistic convergence of early Chinese and Western Buddhist artworks. By combining the study of the trade history of the Silk Road, which helped spread Buddhism, and analyzing the origins of blue and green pigments, this paper finds that the use of blue and green colors showed signs that they spread with Buddhist art. The conclusion is that the earliest blue and green color in Chinese Blue and Green Landscape Painting originated from the Buddhist art in the western part of China and spread with Buddhism to the east China.

Keywords: Blue and green landscape painting; Cave mural; Buddhism; Silk road.

1. Introduction

Ancient Chinese painting was called "Dan Qing (two ancient Chinese colors)", which shows that the early Chinese painting form was dominated by color. Blue and green landscape painting is a unique style of traditional Chinese painting, and it is considered the first form of Chinese landscape painting [1]. Blue and green landscape painting uses Azurite, Malachite Green and other colors with blue-green tone as the main colors to depict the natural scenery of the landscape. As a notable branch in the development of Chinese painting, blue and green landscape painting began in the Wei and Jin dynasties, and it became the most popular painting style in the Tang and Song dynasties. Although it has been in decline since the Song Dynasty due to the rise of Chinese Ink Painting, it still owns a prominent status in the history of Chinese painting. Since ancient Chinese painting was dominated by black and red colors during and before the Han Dynasty [2], the reasons and process of the emergence of blue and green colors in Chinese painting are worth exploring. Studying the first use of blue and green colors in Chinese painting requires analyzing the preserved artifacts and the distribution of pigment raw materials. Therefore, the study leads to the deduction of the track and form of its spread across the Asian mainland. Exploring the origin and changes of blue and green colors is to study the cultural background of Chinese painting's color style. The emergence and development of blue and green landscape painting can reflect the process of absorption and integration of Chinese and foreign cultures. The thesis hopes to make a reasonable assumption about the origin of the use of blue and green color in landscape painting by logically analyzing cultural and historical background, geographical factors, and relics information.

There are three chapters in this paper. The first chapter introduces the importance of the study of blue and green landscape painting's origin. The second part traces the process of blue and green colors' development through a specific analysis of Buddhist wall painting in western Asia. Three subtitles in the second chapter discusses Dunhuang murals, Qizil Ming Öy murals and Ajanta murals. The inference follows the reverse order from west to east and from late to early. The third chapter focus on the study of Silk Road trade activities and the producing areas of blue and green pigments to achieve the results that blue and green colors in Chinese landscape painting was arose in Buddhist art and spread eastward with Buddhism.

2. Analysis of the Use of Blue and Green Colors in Western Asian Buddhist Murals

Since the blue and green color can be found mostly in the Western Asian Buddhist murals, it is generally believed that the origin of this color style was influenced by Buddhist art and Northwest ethnic art. This style blended the aesthetics and techniques of traditional Chinese painting and formed a new painting style. By working backwards along the route of the spread of Buddhism eastward on the Asian continent, plenty of murals using blue and green colors can be found. The creative time, drawing techniques, and origins of pigments can serve as clues to trace the source of the blue and green colors.

2.1 The Idea that the Color of Blue and Green Landscape Painting Originated in the Murals in Mogao Caves at Dunhuang

Buddhism and Buddhist art became popular in China during the Six Dynasties (222-589 A.D.) [1]. The overland Silk Road, which began to emerge during the Emperor Wu of Han Dynasty, was a carrier for commercial trade and religious transmission between Asia and Europe. Dunhuang, as a major transportation hub on the Silk Road, has preserved a representative collection of Buddhist art. In terms of the holistic subjects, the earliest established forms of Chinese painting, such as landscapes, figures, birds and flowers, and architecture, which can all be find in Dunhuang murals [3]. The influence of Buddhist art can also be found in the colors used in landscape painting.

According to Kaizhi Gu's "Painting of Mount Yuntai", Chinese landscape painting sprang up in the Jin and Song dynasties (265-479 A.D.). The landscape paintings appeared in Dunhuang murals at this time. The use of brilliant "green and blue" colors is a distinctive feature of Dunhuang landscape paintings, such as the Northern Wei Dynasty's mural "The Deer King's Life (Story Painting of Buddha's Past Life as the Golden Deer)" and "The Monks Suicide" in Cave No. 257 (465-495 A.D.) at Dunhuang. These two paintings use Western Buddhist art form, which set multi-scene in one picture. The backgrounds connecting the different plots is filled with colors after the outlines is finished. On the reddle background, the continuous hills depicted in mineral blue, mineral green, yellow, white and black (the black color may be the result of oxidation and fading of the original color). The color blocks are flat and homogeneous, and they are highly decorative. The mural "Five Hundred Bandits Become Buddhas" [4] on the south wall of Dunhuang Cave No. 285, painted in the Datong period of the Western Wei Dynasty (538-539 A.D.). The artist uses bright mineral green to draw the mountains and forest where the bandits were exiled. The upper half of the peaks are painted in mineral blue, while the lower half is saturated in mineral green. This painting is full of the romantic atmosphere of Buddhist legends transcending the real-world scene. This is the initial realization of blue and green landscape painting in the Dunhuang murals. The early stage of the formation of blue and green landscape painting in the central China was the Sui Dynasty (581-619 A.D.), in which Ziqian Zhan's "Spring Tour" is a representative blue and green landscape work. Its style is similar with the green landscapes painting in the Dunhuang murals of the same period [5]. It is widely believed that blue and green landscape painting became popular during the Tang Dynasty, but the number of preserved works is and most of them are later ages copies. According to the existing relics, the earliest large-scale blue and green landscape paintings in China were found in the Mogao caves at Dunhuang, where the largest number of works were created in the Tang dynasty [6]. It provides important facts and archaeological basis for the origin of green landscape painting's study. The coloring skills of landscape painting in Dunhuang murals were further enriched during the Tang Dynasty. The "Appearance of the Pagoda"[4] on the south wall of Cave No. 23, which was painted during the Flourishing Tang Dynasty (704-780 A.D.), describes the miraculous legend of a seven-precious pagoda that rise from the ground when Shakyamuni spoke the Lotus Sutra. Except for the pagoda, the Buddha and attendants, the blue and green landscape covers more than a half of the picture. The tops of the mountains decorated with shapely trees. The foot of each mountain is haloed with a gradual change from dark to light to achieve the deep of space. The waves of water in the lake

are outlined in smooth lines, which full of undulation and rhythm. In the same cave, the similar patterns of blue and green mountains background can be seen in the mural "The Stories of Herbs", "Avalokiteśvara Save People" and "The Story of Illusory City". The water in "Avalokiteśvara Save People" is colored in light green, and it has variations in intensity and shade to show the undulations of the water surface [4]. The mural "Illusory City in Lotus Sutra" on the south wall in Cave No. 217 (705-709 A.D.) and the mural "Uṣṇīṣa Vijaya Dhāraṇī Sutra" on the eastern wall in Cave No.103, their creators all use blue and green colors to draw different layers of trees on Mount Wutai, and the figures appear between landscapes [4]. There is far-middle-near space design in the "Illusory City in Lotus Sūtra". The two groups of mountains on the upper left are colored in mineral green and light ochre. The painter outlined the hills in different shades of green to highlight the spatial effect of the peaks. The vines draped between hills and waterfalls flowing from them. The mountains on the upper right are slightly closer. There are waterfalls and streams between them. The central group of peaks is gently sloping. The mountains and lakes interlace together, and the trees on the peaks are clearly identifiable. The mountains and rivers in this mural are beautiful and verdant. The waterfalls and lakes reflecting each other, and with pedestrians walking among them. It has the form of a complete landscape painting.

Combining the above analysis of murals with blue and green landscape content, the application of blue and green color in landscape painting from its early stages of formation to maturity is well shown in Dunhuang Buddhist murals. The development of blue and green landscape in Dunhuang murals reaching unprecedented climax during the Flourishing Tang period [1]. The basic forms are outlining, flat coloring and using color to shape the subjects. The early Dunhuang murals have obvious Western Buddhist style. The early artists used brilliant blue and green to paint decorative landscape patterns, and the trend led to more realistic landscape plants in later years. Dunhuang murals can reflect the spread of Western Buddhist art styles to China and the interchange of local painting styles. By analyzing the surviving Dunhuang murals, it can be assumed that the most direct source of the blue and green color in Chinese earliest landscape paintings is the Dunhuang murals.

2.2 The Use of Blue and Green Color in Kizil Murals Compared to Dunhuang Murals

Kucha is an ancient city, which located on the northern route of the Silk Road, and it was the center of Buddhist culture [7] and the first station of the Buddhist culture introduced into China [8]. Ancient Kucha located in a multi-region, and it was a place of exchange and convergence of cultures and arts of different countries and ethnic groups. The Qizil Ming Öy, which has over 300 caves and the largest fresco and statue art heritage, are the most representative achievements of Kucha Buddhist art. It was built in the third century A.D. [9]. The painters used a combination of Chinese and foreign techniques, including the "Concave and Convex Colors" from Ajanta Caves, the "Qu Tie Pan Si" line method of Yiseng Yuchi, and Zhongda Cao's "Cao Yi Chu Shui" [10]. This reflects the bidirectional influence of the exchange of local art after the absorption of foreign art styles during the first transmission of Buddhism to China. Landscapes and trees are one of the main themes of the Qizil Ming Öy murals, where early Chinese landscape patterns using blue and green colors appear. A study of the use of blue and green colors in Qizil Ming Öy and Dunhuang murals can help to trace the spread of Buddhism from the West to the East Asian continent. The Nidana mural in rhombic grids is a typical classic painting method of the Kucha Caves. It is inspired by the local art style of Kucha [11]. It uses blue and green to paint the mountains as a background and then draws the characters' stories on top of it. For example, in Caves No. 8, 14, 17, 38, and 171, the main ceiling story is painted in blue, green, white, vermilion (some parts have oxidized to black), and red as the main colors. The famous Buddhist Mount Lingwu and Mount Sumeru is painted in a dense rhombic pattern. The alternating colors appear according to a certain order, and green is used most often [8]. These painting have high degree of generalization and patterning of the mountains, so they have strong decorative effects. A comparison of early Dunhuang landscape paintings from the Northern Wei to the Northern Zhou periods shows similar decorative color-filled patterned blue and green landscapes. This style was matured in the Tang Dynasty. The trees in the Kucha murals also show various painting skills, and it

is common to paint the same tree in a variety of skills. For instance, there are many different shapes in trees painting, such as large crown heads, spear heads, and small ball heads [12]. These multiple skills playing an important role for decoration in blue and green landscape painting.

The earliest Chinese landscape painting techniques appear in the blue and green landscape paintings in the Qizil Ming Öy Caves. In Cave No. 14, the background of "Dashi Pour Out the Sea Water to Retrieve the Pearls" is white Mount Sumeru with the seven peaks, which are decorated with evenly distributed lapis lazuli and green plants. The sea is painted in mineral green, and the painter uses ochre outlining the spiral water pattern to show the turbulent waves in the sea. The figures are also usually dressed in bright lapis lazuli. Outlining the water wave by lines is very common in later Tang dynasty Dunhuang murals, such as the lotus pond on the east wall of Cave No. 148, "Medicine Buddha Sutra" [4]. The painter used a flat mineral green color and smooth wavy lines to show the calm flow of the pond. Another example is the sea painted at the top of the corridor in Cave No. 148, which is also painted in flat mineral green, and it has Clouds Lines to show the raging waves in the sea. The Qizil Ming Öy murals also express the early Chinese traditional landscape painting brush skill which named Cun. For example, the mural "Macaque King Sacrificed Himself to Save the Monkeys" in Cave No. 17. The artist used green pigment with Cun brush technique to depict the leaves on the crown canopies. It is the initial expression of the Cun method to depict the folds and textures of trees and rocks. The same technique can be seen in the Dunhuang murals. For instance, the trees on the hills on the north wall murals of Dunhuang Cave No. 68 are painted with green pigment dots to show the branches and leaves. The later Rain Dot Cun may be inspired by this. By the Tang dynasty, Dunhuang murals had become more sophisticated in depicting the texture of various plant branches, leaves and tree trunks with Cun skills [13]. The Cun method was evolved and perfected to be used in a large number of landscape paintings in the central China, such as the Small Hook Brush (later evolved into the Small Axe Cun) and the Horse Tooth Hook used in Sixun Li's blue and green landscape techniques.

From the study of painting pigments, the Qizil Ming Öy murals use a large amount of gold powder and gold leaf, especially in the middle period [8]. The practice of decorating religious statues and portraits with precious metal colors can be traced in both the caves of Kucha and Dunhuang. In the Southern Song Dynasty, Xihu Zhao recorded: "General Li of the Tang Dynasty began to make gold and green landscape painting followed by Jinqing Wang, Danian Zhao, and recently Qianli Zhao. [14]" Li's landscape painting were outlined in gold and colored by blue and green. He was the first person to create gold and green landscape painting. This may be an innovation that emerged from the Central China landscape painting inspired by the Western Buddhist art during the flourishing period of the developing and spreading of Buddhism.

The interchange of painting styles from Qizil Ming Öy to Dunhuang to the Central China shows how the aesthetic concepts, techniques and pigments of landscape painting from foreign painting influenced the local style. Then they gradually evolved oriental characteristics.

2.3 The Use of Blue and Green Colors in Landscape Subjects in the Achanta Caves and Its Influences on Later Buddhist Murals

The Achanta Caves is a classic model of Indian Buddhism. Its architecture, sculpture and murals have deep influences on Asian Buddhist art. Its early Gandhara and Gupta styles provided models for Buddhist iconography in various Asian countries.

The earliest frescoes of Ajanta were painted between the 2nd century B.C. and the 1st century A.D. [15]. The murals reflect the rich subject matters of Indian people's daily lives and religious stories. The figures, costumes, backgrounds and decorations are mostly in blue and green colors. It has had a part of influence on Chinese Buddhist art. For example, in Cave No. 10, the "Six-Toothed Elephant's Story" depicts a scene of elephants in the mountains, so a large area of the background was painted to blue and green to representing the mountains and forests. The murals in caves No. 16 and 17 of the Ajanta are "The Stories of an Elephant", which shows a compassionate elephant jumps off a cliff to offer his flesh for consumption in order to rescue thirsty travelers. There is also a drinkable water

source next to its body. The murals are highly weathered and the blue and green color of the background is faintly visible. The ripples of the river are already expressed in wavy lines in the Ajanta murals at this time. In No. 17 caves, the "Mortal Become Immortal" has blue and green hills and the sacred tree of Buddhism with classic shapes. Green ferns grow on the mountain [15]. On the above of the entrance in same cave, there is eight small Buddha figures. Their background is symmetrical canopies of trees in dark green. Four of them have been destroyed, but the remaining parts of the tree are clearly defined, beautifully shaped, and decorated with a dark green vine pattern as frames. This technique of using lime green vine patterns as a frame was also used in the Qizil Ming Öy and Mogao caves. The "Six-Toothed Elephant's Story" in cave No. 17 has a tree with visible leaves, smooth lines, and evenly colored underpainting. Its flat, thick and thin lines are similar to the style of Chinese Buddhist murals. The "Concave and Convex Method" of the Ajanta was also widely used in the Kucha murals and gradually developed into the technique of gradation. By the time of Dunhuang, it was no longer limited to representing the human figure, but was used to express layers and distances in the depiction of mountains and rivers. It can be seen in the Cave No. 172 at Dunhuang, the landscape painting of the Flourishing Tang period. The murals in Cave No. 1 show a large and rolling green mountain range behind a loving couple. The variety of Buddhist art narratives in the murals of the Achanta Caves dictates that a single mural may depict the development of a story or multiple stories. The narrative Buddhist story paintings determined that the characters are the subject of the mural, and the landscape and trees often appearing as background elements that reveal the information of plot. It is in the same way as the early landscape paintings of Qizil Ming Öy and Dunhuang.

The style of the Indian Ajanta art is closely related to the early Chinese Buddhist art, especially the use of color, style and techniques in the Kucha region are the most similar to the Ajanta. The similarities in the choice of religious stories and Buddhist themes are common in them. However, there is no clear historical record of the relationship between them. At this stage, according to the use of blue and green colors in surviving Buddhist artworks, to make the background of the turtle frescoes to lime green and white based on the cool color tone is the presumption of the influence of Indian Buddhist art. The blue and green cool color style of the background in the Kucha murals may be influenced by Indian Buddhist art.

3. The Deduction of The Application of Blue and Green Colors Spread in the Asian Continent

3.1 The Main Route of Blue and Green Painting's Transmission from the Silk Road and the Eastern Expansion of Buddhism

The Silk Road was a path of trade, religious and art exchanges between the East and the West. The rich artworks remain in the ancient caves and temples along the Silk Road can show the eastern expansion of Buddhism. It also reflects the development of artistic diffusion and the early style of blue and green painting. For instance, the round-bottomed pillar elements and the double-linked animal-shaped capitals of the Ajanda cave architecture reflect influences of the Persian style [16]. The cultural exchange here has been related to the overland Silk Road. In the process of the eastern transmission of Buddhist art, monks traveled incessantly between China and India. Kucha was at the first stop of the cultural exchange between East and West. During the Han Dynasty, the government established the military authority at the Wulei city in Kucha [17]. During the Tang Dynasty, the government established the Anxi military authority at Kucha. Kucha became a center of political, military, economic and cultural activities in the western China. Buddhist art gained significant development in this area. Kucha played a leading role in receiving Indian Buddhist art first and allowing it to spread to the mainland.

Buddhism was introduced through Central Asia and the Western regions to the main town on Silk Road, Dunhuang. The early artworks in Dunhuang show clear traces of Western influence, as well as responding to Buddhist art from Central, West, and South Asia [18]. As the Silk Road flourished during the Tang Dynasty, the capital city, Chang'an was easily connected to the Western regions. The

cultural exchanges became more frequent, and the spread of artistic styles in the East and West directions was rapid and well-documented. In landscape painting, the style used in Dunhuang murals can correspond to the popular style in Chang'an. The researcher argued that Dunhuang landscape painting and Li's blue and green landscapes influenced each other during the Tang Dynasty [13]. The proximity to the mainland and the close relationship between them made Dunhuang's blue and green landscape painting further localized than Kucha.

3.2 Clues of Blue and Green Paintings' Creation Time and Location of Raw Material's Origin

The production of mural is divided into two methods: wet and dry painting. In the dry painting method, the wall is chiseled with dense chisel marks and then smoothed with clay mixed with wheat grass. Then coated the wall with fine clay and plaster to make a white base. In both cases, the sketches are first put on the wall with lines and then covered with color. Since there is no detailed historical record of when Buddhism was introduced to Kucha and the carbon-14 examination results from the same caves are highly discrepant, the earliest date of the Kucha caves has not been asserted in current studies. After comparing the existing historical sources with specific caves, most researchers believe that it was built in the third century and declined in the eighth century [10]. The pigments used in Kucha were all mineral pigments. It can be confirmed by the slate used to grind mineral pigments found in the cave No. 19. Mixing of mineral colors would reduce the brightness, so the painters mostly used simple pigments, mixed with water and gum to use them. The colors remained extremely vivid except for white and silver which weathered and darkened over time [19]. According to X diffraction test and polarized light microscopy analysis of pigments, it can be found that the composition of blue pigments in the Kucha caves is lapis lazuli, and the main source of green pigments is atacamite and paratacamite [20]. The origin of Lapis lazuli is limited. The known origins are northeastern Afghanistan, Russia, and Pakistan. The lapis lazuli used in ancient China should be produced from Pakistan and Afghanistan and transferred through the Silk Road [21]. Afghanistan is located on the main Silk Road, and the trade of lapis lazuli has been accompanied by the spread of religion for a long time. The raw materials of pigments such as lapis lazuli used in the mineral green color in Kucha murals originated from Afghanistan [22]. The raw material atacamite for lapis lazuli green is not a rare pigment, it was relatively common in ancient China. Most of the colors used in the Dunhuang murals came from natural mineral pigments [3]. The raw materials of mineral green are lapis lazuli, chalcopyrite and turquoise. Both Iran and Hubei, China are the origin of turquoise. The turquoise can be spread to the West also need the accessible East-West Silk Road.

4. Conclusion

The first use of blue green for landscape subjects in China is found in Buddhist art, so the tracing of the use of blue and green colors in Chinese blue and green landscape painting is inextricably linked to the study of the entry and spread of Buddhism in ancient China and the earliest development of Buddhist art. Based on analyses of the political and economic activities, cultural and artistic exchanges of the time, it is clear that the Silk Road played a pivotal role in the spread of the blue and green color style. The above analogy studied three important mural arts. The Dunhuang Caves, where green and green landscape paintings appear with high frequency, and the Qizil Ming Öy Caves, which were the artistic repository of Buddhist art, and Ajanta Caves, which reflect the early Indian Buddhist art style. According to a comparison of the use of blue and green colors in the surviving paintings in typical Buddhist caves, it is possible that the use of blue and green colors in China can dates back to the early A.D. in Indian Buddhist art. The spread of their painting styles and the trade in pigments followed the similar route as the eastern spread of Buddhism to China on the Asian continent. This study traces the origin and causation of the emergence of blue and green in ancient Chinese landscape painting. It provides a possible logical line of reasoning for later art-historical researchers. However, because of the long age of the surviving murals, the most painters and craftsmen's names are no longer available. It is therefore difficult to explore direct evidence of individual influence on the transmission

of artistic styles from their biographies and travel routes. The results show reasonable deduction based on available historical artifacts. New archaeological discoveries in the future may provide more definitive evidence and clues.

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