

# Rely on One Another as Cheek and Jowl

## The Relationship between the Evolution of Watercolor Materials and the Watercolor Creation

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**Abstract**—To a great degree, watercolor researchers always has studied on material, ingredient, techniques and steps etc. But the evolution history of various materials and the relationship between the evolution of watercolor materials and the watercolor creation rarely has been studied. Based on the previous research, the evolution of watercolor materials were roundly analyzed and researched, in order to clarify the close relationship between the evolution of watercolor materials and the watercolor creation, present the feasibility strategy of using innovative materials to enrich and develop the contemporary watercolor creation, and point out the diversification of watercolor.

**Keywords**—watercolor; material; evolution; diversification

### I. INTRODUCTION

Watercolor refers to painting on the paper with watercolor pigment and water as the dilution medium. Just like other kinds of western painting, watercolor material consists of support, medium and pigment and so on.

Due to the unique transparent nature of watercolor's color, there is certain requirement for hue of appropriate support. Generally speaking, the following two points must be achieved: First, try to choose pure white support as base; second, the base should remain as stable as possible instead of changing color or becoming mildew-growing. During the evolution of watercolor, evolution process of support is: rock—wall—rough straw paper—parchment—watercolor paper. Paper is the most important base of watercolor, and it is the part which influences picture effect most. It can be said that, during the development of watercolor, improvement of the technology and quality of paper as the support becomes the huge impetus pushing forward development of painting. Medium refers to medium bond which blends pigment, influencing painting techniques and picture effect the most among painting material. According to physical nature, there are three types of medium: aqueous, oily and emulsion type. Watercolor belongs to aqueous type, which is used by human being at the earliest, such as water, balsam and animal glue. Among them, water is the main medium to dilute and blend watercolor pigment. If there are special requirements, other materials can also be added into water. For example, alcohol can be added to promote evaporation if you are in need of quick drying. Otherwise, glycerol can be added. Besides, various kinds of additives and relevant products of pigment can also have some influence on picture effect, such as Arabic gum, hide glue, watercolor polish medium, watercolor thickening medium and

so on. Watercolor pigment can only be grinded by a very small amount of bonding agent, and it must stay in water-soluble condition. The earliest pigment is natural mineral substance material in the Old Stone Age, such as *Wounded Buffalo*, a cave painting in north Spain (taking Altamira caves as representative); *Mustang*, a cave painting in south France (taking Lascaux caves as representative).

Nowadays, ingredient of watercolor pigment consists of pure colorant and a small amount of Arabic gum. The requirements for colorant are good transparency, fine and smooth granule, high color purity, brightness and saturation, and the least dry and wet climatic changes. Evolution history is: mineral pigment—dry watercolor pigment—pan watercolor paints—tube watercolor paints. The current watercolor paints used by us are mainly blocky dry paint and tubular wet paint, two types in total. The former is convenient for small sketch in the outside and it can be used by adding water to dissolve it. Tubular watercolor paint is easy to operate and is suitable for substantial creation. Nowadays, domestic watercolor paint with professional quality is packaged in aluminum tube and there are forty to fifty kinds of color.

### II. WATERCOLOR TECHNIQUES AND MATERIALS APPEARED IN DIFFERENT HISTORICAL PERIODS

#### A. The Beginning Period

In the ancient times, more than 10 thousand years from now, there are cave paintings drawn with blending of water and mineral substance paint. It can be said that, earlier painting works of human being are occupation, processing and using of original materials. Ancient countries which enter civilization at the earliest also have the history of "watercolor". Ghost Way Guidance on rough straw paper by ancient Egyptians creates the technique for "watercolor". Miniature painting in ancient Persia also receives great attention. However, painters from Byzantium use water sediment and gum to create watercolor. All these developments owe to development of material. Development of support derives from discovery of papyrus. A kind of fiber substance named papyrus is found along the Nile bank in ancient Egypt. Its bark can be made into scroll, which can be used for writing and painting. As to the pigment, it is no longer about the three colors of yellow, red and black in primitive society made from black charcoal and simple mineral substance. At this time, there is earthy yellow and reddish brown gotten from clay, red from cinnabar mineral substance,

blue from azurite, green from mineral green, yellow from earthy yellow, orange from shell-lac and black from willow charcoal. All these colors are mixed with Arabic gum and egg white, and diluted with water to do painting. The color is thin and transparent, and it is very close to the subsequent watercolor pigment. In the whole Middle Ages, watercolor pigment is used in decoration of parchment manuscript. Most of the illustrations in manuscript of the Middle Ages in Europe are made in watercolor. This kind of watercolor illustration is the basis for generation of watercolor. Since Islam does not allow manifestation of human and animal, so people develop unusual but wonderful thinking. The pattern is decorative and parchment becomes the most suitable support at that time. This kind of paper is usually smooth and light, and made from sheep or goat skin, boasting excellent expressive force and endurance.

The beginning period is about initial shaping of watercolor material. Due to impetus of practical factors, painting material gets renewed and renewal of material leads to evolution of watercolor. With the purpose of recording events, people in primitive society use water to blend natural mineral substance and colored clay to draw on the rock. Expressive materials are water and mineral substance color, and the support is cave rock. Appearance of rough straw paper and parchment bring great changes to the existing form of watercolor. Watercolor support changes from rock to paper and miniature watercolor appears. Watercolor on rough straw paper is generally uniline flat coating with strong color and small picture size, rigid and standard. However, illustrations of Islam legendary literature works on parchment are mainly decorative with abundant colors. The impetus effect of painting paper on watercolor is evident.

#### *B. The Classic Period (from the End of 15th Century to the Middle of 18th Century)*

At the end of the 15th century, watercolor comes into being in Europe. Although in the book of *Research on Watercolor Art*, Zhang Youmin says: "Through check and verification, we know that Durer's watercolor works *Wild Grass and Hare* are about 50 years later than Bellini's *Flower-de-luce*." But Germany painter Durer (Albrecht Dürer, 1471-1528) is recognized as the painter with relative intact and skilled application of watercolor techniques at that time. His works, such as *Wild Grass and Hare*, are exquisite, neat and orderly, boasting as the examples in development history of watercolor. Holding the mind of appreciating the nature, Durer creates many sketch works of animal and plant and exquisite scenery paintings which are poetic and perspective. At the time of creating *Wild Grass*, color variety is very limited and artists use transparency of color itself to express realistic light sensation and texture.

Although watercolor is not derived from England, the atmosphere created by interaction between sunshine and rainy and foggy weather is particularly suitable for watercolor. England in the 17th and 18th century is the hotbed for cultivating watercolor system, especially scenery painting. Primarily, watercolor is mainly applied in drawing religious literature illustrations, especially topographic map in military, geography and constructional engineering. It uses lines to

sketch the outline and thin and light transparent watercolor to achieve more perceptual intuition and become more practical. Sandby (Paul Sandby, 1725~1809), the representative painter of this period, makes great efforts in research on watercolor's expressive techniques and pigment creation, relying on his outstanding talent and diligent perseverance. Based on his deep observation in nature, he pushes forward the original popular watercolor topographic map, thus obtaining the honor of "Father of watercolor art".

In Renaissance period, development of nature science and human science brings historical changes to material and technique of watercolor. According to historical textual research, since material and tools become more convenient in this period, many Italian painters create monochrome painting in the form of watercolor, namely: As to material and technique, water blending monochrome (black and brown) is mainly used in sketch, or using watercolor rendering on the basis of charcoal pencil, pencil or pen sketch.

In classic period, basic form of modern watercolor has initially come into being. It has developed into relatively intact painting type from monochrome topographical map and book illustration. "According to record of painting history, it is exactly in 17th century that the first watercolor is sold. From then on, watercolor obtains relatively equal and independent status with other painting types." However, watercolor in classic period has great limitation. Monotonous color gamut is not so extensive and saturability of color is also limited. Before 18th century, there are only several kinds of watercolor colors, such as reddish brown, brown, cape blue and so on (1 to 3 light colors of blue, purple and taupe gray). Therefore, watercolor mainly appears in monochrome at that time. Paul Standby (Paul Standby, 1725-1809) always complains about "leanness of color on color palette". It takes him a lot of time to do experiments--He mentions that burnt bread can produce a kind of "perfect and warm black" in one letter, and another report says that "After having pea pudding dinner, I try to split peas and bake them into shovel shape". Standby and other artists of his period try to blend various ingredients into pigment, including honey and vegetable juice, which enrich their texture language and dying effect. After entering into 18th century, a kind of blocky watercolor pigment appears and it is put into commercial manufacturing. But it is limited in saturation and it is difficult to dissolve. Thus, it is only suitable for partial painting instead of large area rendering. Apart from disadvantage in color, this kind of dry pigment is air drying oriented, thus limiting painting size at that time. Support mainly consists of parchment and monochrome paper which are limited in water-absorbing ability and tinting strength, so it is not easy to display abundant color.

#### *C. Mature and Flourishing Period (from the Beginning and Middle of 18th Century to 19th Century)*

Entering into the middle of 18th century, British watercolor has become international painting art. As an independent painting type, watercolor is becoming more and more mature at this time. The sign is gradual perfection of color, which breaks through the range of painting practical topographical map and expands into various fields, fully demonstrating the unique blending and mediation effect of water in watercolor.

Through mutual interpenetration, moistening and overlaying of water and color, watercolor becomes a kind of painting with unique personality, which has the same expressive force with oil painting. The most important two figures whom have to be firstly mentioned are Girtin and Turner. From the time of Girtin and Turner, British watercolor steps into completely mature phase.

Thomas Girtin (Thomas Girtin, 1775-1802) not only creates “using individual color to draw partial scenery on paper and depicting shadow according to various different colors in the shadow.” to change monotonous light color painting into colorful watercolor, but also begins to use milky white paper, which is rough and thick with excellent water-absorbing ability and is more suitable for relatively abundant color processing. Turner (J.M.W. Turner, 1775-1851) emphasizes on imitation art in earlier stage and the color is not bright. After traveling in Italy in 1820, he gradually establishes grand, magnificent and colorful expressive style. He especially knows usage of water, transparent color and the original color of paper and uses infiltration of watercolor pigment on wet paper to obtain the color effect unavailable on color palette, thus incisively and vividly displaying sunshine and atmosphere. Afterwards, there are watercolor painters like Cotman, Bonington, Constable and so on. Due to their efforts, watercolor is unprecedentedly flourishing.

In the later half of 19th century, Impressionism appears in France and gradually develops into an international trend. Although art center is in France, painters who do watercolor are not that many. American watercolor emerges in the middle of 19th century, embracing prosperous wave of Impressionism. During this period, there are several great masters of watercolor, such as Homer (W. Homer, 1836-1910), Sargent (J. S. Sargent, 1856-1925), Prendergast (Maurice Prendergast, 1859-1924) and so on. No matter it is Homer's impressionism like painting style, Sargent's display of nature's rhythm style through bright colors and bold and unrestrained brushwork, or Prendergast's small brushwork, they all display succinct and exquisite style and conform to art concept of impressionism and display of natural color. Therefore, in the history of watercolor in the later half of 19th century, American watercolor is quite vigorous. Watercolor leaps forward during this period, which is not only due to great artists, but also benefits from research and development of watercolor material. In 1780s, professional colorists begin to create a kind of pie-shaped watercolor pigment and color variety also achieves unprecedented abundance. “These colors appear successively, such as King's Yellow, Scheele's Green, Turner's Yellow, Sepia, Cobalt Blue, Chinese White, Viridian, Brilliant Scarlet, Mageata, Mauve Lake, Potter's Pink and so on, and various serial colors.” Not only that, in about 1835, a kind of wet and soft watercolor pigment appears and it contains glycerin. Glycerin can prevent pigment from becoming dry and agglomeration in the palette and postpone drying time of color after coloring to make it easy to do coloring. This improvement brings benefit to Turner as the pioneer of impressionism and the later painters of impressionism. From 1900, soupy watercolor pigment begins to sell in tube, and painters can sway colors to their heart's content, thus totally changing the visage of watercolor.

#### *D. Modern Diversification Period (from 20th Century to Now)*

At the beginning of 20th century, with accomplishment of the second industrial revolution, achievement derived from technology springs up like mushrooms, thus bringing revolutionary new material to painting. Acrylic paint has many features which are superior to other paints. It is soluble both in water and oil. It can change its own structure flexibly and it is suitable for painting on various surfaces of substance. Acrylic paint can almost achieve transparency of watercolor paint, decorous feeling of oil painting paint, covering power of gouache and other emulsion paints' simplicity and elegance. The birth of acrylic paint in 50s is like treasure to American artists constantly pursuing innovative and peculiar art form, which is immediately displayed in creation. Paul Picasso and Jackson Pollock have experimentally used acrylic paint. In British and American watercolor association, there are also painters using acrylic paint or other newly developing paints to do painting. Painters adopt mixed use of various water-based paints and watercolor paints more and more frequently. In the book *American Watercolor Techniques*, acrylic painting, gum and casein painting are all listed as watercolor. Huang Tieshan, director of Chinese Watercolor Art Association, when being interviewed, also thinks that the use of newly developing material expands techniques and visage of modern watercolor, saying that “Modern British watercolor painters introduce egg white, gum and acrylic paint as medium and use opaque painting more frequently. All these should be reasonable existence with its own unique aesthetic pursuit. Therefore, it is unnecessary for us to affirm just one form.”

Watercolor rises sharply and becomes the mainstream kind of painting in America during this period. Since establishment of watercolor society, watercolor exhibition is held once a year. Painters have extremely evident personal style and works are in various kinds of forms. With gradual increase of the quantity of creative painters of watercolor and application of newly developing material and techniques, painting material manufacturing industry pays more attention to the art field of watercolor. “In the late 70s, various painting varieties in American art field are in a balanced status. Entering 80s, renaissance of watercolor creation brings a series of impact, including improvement of watercolor paper's manufacturing technology, regarding watercolor as a new concept with specific medium as main means, and gradual mature and perfect new American art market.” Representative figures are: DAVID Lyle Millard, Andrew Wyeth, 1917-1996, Frank Webb A.W.S and so on.

Nowadays, manufacturing of watercolor material wins great attention from many countries all around the world. Exquisite watercolor paints with high quality and of various kinds provide painters with a wide range of choice. Watercolor paint is packaged in tin tube or capsule with exquisite texture and accurate pigment. Even if the surface is dry, it can dissolve quickly upon encountering water, making it handy with facility. There are various varieties of British produced watercolor paper, whose quality and variety give painters great satisfaction. Specification of paper is generally 80 cm long and 60 cm wide. But there is a kind of coiling block watercolor paper, whose width is one meter and length can be selected

arbitrarily. For example, traditional watercolor paper can be divided as 19×24 inch, 22×30 inch, 29.5×40 inch, and 40×60 inch. Size range of creation is limited and it is very inconvenient to use paints. Therefore, painters mainly use blocky dry paint and color mixing quantity is very small each time, unavailable to large area rendering. The painting is generally smaller than 20 cm. Since tin tube paint comes into being, the situation has been improved a lot. However, it is unable to go beyond a standard-sized sheet. Until the appearance of coiling block paper in the last 20 years, the situation has been changed and the image of watercolor has also been changed to some degree.

### III. THE INFLUENCE OF WATERCOLOR MATERIAL INVOLVEMENT ON WATERCOLOR TECHNIQUES

Since its birth to right now, watercolor has experienced several centuries. Seeing from development of world art, we can know that material revolution plays a vital role in development of watercolor. The main factor which pushes forward each revolution is that current material can't meet the need of watercolor creation any more and limit of material itself becomes evident. Through improving performance of every aspect of painting material, artists and paint manufacturers improve limitation of watercolor material, thus promoting development of watercolor. Watercolor material has an evident evolution process. Primitive water soluble color painting is created on cave stone wall through mixing of watercolor, natural mineral substance paint and animal blood; From the Middle Ages to Renaissance, the painting on wet wall through mixing of water, mineral substance paint or botany paint is called fresco, painting on plank is called icon painting, and painting on manuscript is called miniature; In 16th century, hand-made parchment and rough straw paper appear, thus geological landscape painting with water mixing transparent natural mineral paint or botany paint also appears; In the middle of 18th century, with accomplishment of industrial revolution, watercolor paint from chemical industry is researched on and developed in large quantity, improving watercolor manufacturing technology a lot. The unique art language of watercolor is formed. With development of technology, new material emerges in endlessly and painting means becomes more and more abundant, thus constantly improving watercolor creation upon breaking through and improving the whole image greatly. In a word, development of painting material decides the change of painting form. In each period, evolution of watercolor material is reflected in artist's creations directly. In 20th century, abundant and multiple medium facilitates the outlook of watercolor art diversification. Vigorous development of watercolor also promotes research on and development of new medium. We believe that the cycle will create benign development forever.

Every reform of watercolor material leads to change of material's original form, thus definitely changing the outlook of watercolor creation and challenging people's traditional appreciation mode. It is exactly in this repeated communication that people's aesthetic appreciation is developed. The painting defined as "alien" originally also changes into watercolor in traditional sense. It proves that exploration in material directly influences boost of watercolor

language and development of watercolor's art characteristic. The displayed aesthetic appreciation quality and potential are exactly what reforming and creating human being's aesthetics' living environment need. In the current diversified era, material becomes a direct way to participate in multi-dialogue and brings new language into watercolor creation. Just like that, in American watercolor history, it depends on bold experiment on new tools and new material more instead of tradition, to optimize the best performance of color and texture's special effect. Formation of this complexion makes America the center of modern watercolor, leading the trend of current watercolor.

### IV. CONCLUSION

Current Chinese watercolor creation takes on the complexion of diversified prosperous development. Application of new material and techniques changes the traditional outlook of watercolor, causing query about watercolor's ontology language from some people inevitably, and thinking that it deviates from "tradition". However, from evolution history of watercolor material, we can see that the so-called "traditional watercolor" is not changeless. Before 18th century, people think it extremely advanced and unbelievable to do painting on watercolor paper, is not it the "tradition" we worship right now? Taking impressionism as an example, isn't the "tradition" we worship now exactly the painting style and techniques unaccepted by people several centuries ago? Therefore, we should continue exploring the diversification road and the corresponding new material is worth developing and researching forever. A vigorous painting type definitely can't adopt self-seclusion and changing is the necessity of progress of times.

How will Chinese watercolor art develop from now on is tightly linked with expansion of watercolor material. We believe that, nowadays, with improvement of science and technology day by day, many technological problems will be readily solved and Chinese watercolor will certainly obtain greater development in the future.

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