Elementary Introduction to Traditional Chinese Plant Dyeing Art and Its Inheritance in Modern Times

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Abstract. In the modern era of internet knowledge-based economy, cultural exchange is a global scale, and the distinctive culture of different nationalities is more and more valued by people. Traditional Chinese dyeing and fabric dyeing process has not only encountered unprecedented difficulties but ushered in numerous development opportunities. This paper briefly describes the development process and characteristics of traditional Chinese plant dyeing, analyzes the importance of traditional dyeing technology in modern society, and how modern craftsmen and designers can make constant innovation on the traditional dyeing to adapt to modern market demands and endow it with new vitality.

Keywords: Chinese traditional plant dyeing · Indigo dyeing · Inheritance Innovation

1 Introduction

Traditional textile and dyeing is a kind of manual skill for human to wear and use. The primary purpose to spin and weave cloth is to keep human bodies from the cold and dyeing technology has developed step by step from the discovery of poplin, hemp and wool for textile printing. The traditional fabric dyeing technology occupies a very important position in the people's daily lives in the ancient times and such dyeing and weaving process as dyeing, printing, painting multicolored, brocade, embroidery emerged during thousands of years of the development process, creating a brilliant traditional Chinese textile culture.

2 Plant Dyestuff Dyeing

2.1 The Emergence and Development of Plant Dyestuff Dyeing Process

Plant dyestuff dyeing is often called "plant dyeing". There is also a pleasant name called "grass dyeing". The history of plant dyeing can be traced back to thousands of years ago. Textile skills are getting more mature and dyeing skills are beginning to develop in the Neolithic period. The emergence of fabric dyeing technology is closely related to the original colored drawing. People have mastered some methods of mineral

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dyeing and applied them to pottery as well as fabrics. The Neolithic fabric excavated from archaeology is used to dye red in hematite. Primitive people used natural dyes directly on the skin to draw patterns to decorate the body to express their worship of totem, in order to exorcise and avoid disasters and also found ways to dye the fabric to achieve the same goal. Shifting from the fabric dyeing with witchcraft meaning into the pursuit of beauty, people drew dyes from animals and minerals and plants to decorate fabrics. With the increasing utilization of such dyestuffs as mineral dyes, animal dyes, plant dyes, the colors that can be dyed are more and more abundant. However, compared with animal and mineral dyes, plant dyes have a wide variety and can be cultivated in large quantities, making it a major source of natural dyes. In the Zhou Dynasty, plant dyes have reached a certain scale in varieties and quantities, and special personnel was arranged to collect dyed grass for the use of stained clothing. During the Qin and Han Dynasties, the plant dye was basically used in dyeing process. In the North and South Dynasties, the planting area of plant dyes was enlarged, the variety was enriched and the process of plant dyestuff dyeing was getting increasingly proficient, and the dyestuff could be stored and used for years. During the Sui and Tang Dynasties, a special department of printing and dyeing was set up. Printing and Xie dyeing fabrics were prevalent, and technology was constantly innovating. In the Song Dynasty, because of the use of Xie dyeing fabrics for military supplies, the development of folk dyestuff-dyed fabrics has been suppressed, and till the Ming and Qing Dynasties, indigo has been set up by the government at south of the Yangtze River for the supply of dyestuffs, and the blue Xie fabric has vigorously developed in the folk.

The development of plant dyeing technology in China embodies human creativity and the pursuit of beauty. Plant dye is the most natural staining method, and has a good affinity with natural cotton, hemp, silk fiber with the advantages of soft color, durability and fastness. Plant dyeing fabric has a unique charm, with natural color, quiet and soft temperament and luster and color sense will not change over time. With the change of time, the color and color texture will be more beautiful in addition to the shades of color because of time and use. Therefore, plant dyeing is now attracting increasing attention from designers and craftsmen to inherit and carry forward the traditional process with their modern perspective and aesthetic.

2.2 Plant-Dyeing Process

Monochrome Plant Dyeing

It is found that plant dyes have better color fastness and washable durability than those of mineral dyes in the dyeing process. Some plant roots, stems, leaves, skins, seeds and flowers can be used for dyeing and can be obtained in large quantities. Madder is used to dye red, gardenia for yellow, cirrhotic for brown, tea for Starching and blue grass for blue with color dyed becoming more and more changeable. At the beginning, people used plants to dye when they were immersed in warm water. After repeated practice, people found the steaming and dyeing technology to dye deep colors (Fig. 1).

There is a big problem with plant dyes, that is, most of the plant pigments are easily decomposed and the dyed color fades seriously with no resistance to sun washing, and in the continuous practice, people found that the addition of salt, vinegar, alum can

Fig. 1. Plant-dyeing fabric

make the fabric bright and long-lasting and these substances are now known as mordant. The process of dyeing with mordant is called mordant dyeing process. Different mordant has different functions, e.g., vinegar can enhance the effect of red and purple; salt and alum are often used for fixing colors. Some mordant can also let the same plant dye different colors.

Although the plant dyes can dye a rich variety of colors, very few plants can be dyed into green, purple, orange and other colors, especially green. In nature, human eyes are filled with green plants, but green leaves are often dyed by other colors. Plant dyes that can dye red, yellow, and blue are common, so people came up with a set of dyeing methods, that is, red, yellow and blue are chromatically dyed to produce rich colors and this process is called the chromatically dyed process, similar to the colors of the three primary colors in the painting, but the painting is the color adjusted directly to the canvas, and cloth dyeing is first dyed blue, and then yellow, and finally green or first dyed blue, red, and finally purple.

Colorful Polychromatic Plant Dyeing

After being able to use different fabric dyes and mordant to dye a rich single color, people began to pursue the richness of the dyeing of single block fabric, and the dyeing process of re-dyeing and multi-color dyeing began to develop, and the increase of processing means further extended the staining range of plant dyeing. Re-dyeing is to immerse fabric repeatedly into the same dye several times and the color deepens with the increase in the number of immersion and thus the fabric can be dyed at a rich color level by changing the number of times it is dyed. Multi-color dyeing is to immerse the

fabric into two or more different dyes to obtain different intermediate color and re-dyeing and multi-color dyeing process enables a richer color with limited staining materials.

Simple and Plain Indigo Dyeing

In ancient China, although people have been able to dye the fabric with rich colors, the color of clothes that people could wear was determined by their social class. Behind the red, green and yellow robe, is the strict feudal hierarchy of the ancient China. Yellow is dedicated to the emperor, red is the color of the aristocracy, but the status of the people in blue continues to decline, and finally to the color of the civilian clothes. Because blue represents the color of the toiling masses, it has the most users and thus blue-dyed and blue-stained clothing began to be seen everywhere in social life, and blue dying became the most common method.

Indigo dyeing has become the most widely used plant dyes and in addition to the social hierarchy of color, the widespread use of cotton in the central plains is also an important reason. The people of all ethnic groups in China's frontier area have been planting and utilizing cotton far earlier than the central plains, while they are planting cotton mainly by silk, hemp and poplin textile. Due to the traffic inconvenience, the cotton textiles are still relatively rare and precious in the central plains in the Han Dynasty. In the Song Dynasty, a large number of cotton textiles were imported into the central plains and cotton cloth were popular in the mainland. People began to grow cotton and learn cotton textile technology. Before the large-scale cotton production, the central plains mainly used hemp and silk to dye various color patterns with small quantity of dyestuff consumption and the patterns are more of embroidery and weaving. The dyeing of cotton cloth was completed by dip method with larger dyestuff consumption. As indigo is easier to obtain than other dyes, it has become the most common and the richest color of national characteristics.

3 Traditional Dyeing Techniques Known as "Xie"

In the early time of china the figured silk fabrics was named as "Xie". Twist-Xie, Wax-Xie, Pinch-Xie and Starching-Xie, are fabric dyeing methods that have been circulated in China. Although there isn't any agreed conclusion concerning the origin of these methods, they are surely developed based on plant dyeing, painting multi-colored, printing and other dyeing process (Fig. 2).

People made their clothing rich and colorful through the re-dyeing and multi-color dyeing, but if the pattern is required for fabric, drawing or printing can be used, and then a brocade and embroidery pattern was created. Brocade and embroidery pattern is rich and luxurious, but very time-consuming and laborious. In order to show status and identity, palace nobles will spend a lot of manpower and resources to weave their garments, creating China's four famous embroidery and fortunei. But the ordinary people do not have the manpower and the financial resources to make the embroidery clothing and at the same time do not satisfy the plain and simple clothing with a hope to wear something decent, so people began to look for the fabric dyeing patterns to make more changes and thus twist-Xie, Wax-Xie, Pinch-Xie, Starching-Xie slowly appeared.

Fig. 2. Plant-dyeing fabric

Because indigo is grown in different places, it is very easy to be collected and refined with strong dyeing effect, and in the period of inconvenient transportation, people tend to find the plant dyeing materials appropriate to local development condition and it has been used to dye blue in many places and thus blue twist-Xie, Wax-Xie, Pinch-Xie and Starching-Xie gradually became the mainstream of fabric dyeing in the fork (Fig. 3).

3.1 Pinch-Xie

Pinch-Xie is to pinch the dyeing fabric with two pieces of woods of the same pattern to achieve the purpose of dyeing patterns, which are more of realism with a variety of auspicious patterns. In the dyeing process, the pattern can't be folded and the adjustment of the closure of the opening on the side of the engraving can enable that the dyeing of different colors reaches the desired stain position, and finally the Pinch-Xie fabric can be dyed. Pinch-Xie flourished in the Tang Dynasty and the Pinch-Xie now we can see from Tang Dynasty is a colorful chromatic Pinch-Xie with a white gap between the overlapping of the color blocks to prevent staining between the color blocks. The production process is similar to that of the modern process with bright colors and symmetrical graphics, which is based on a symbol of auspicious pattern. In the Song Dynasty, dyeing techniques are getting increasingly mature, but the Emperor advocated a simple life to curb the luxury repeatedly and to prohibit the production and use of color dyes, and people are forbidden to wear gorgeous clothes. In the Qing Dynasty, the technology of Pinch-Xie chromatography has new development and there has been a chromatic overprint process more colorful than that of the Tang Dynasty. At

Fig. 3. Pinch-Xie dyeing fabric process

this time, dye printing technology developed with colorful and diverse graphics, whereas Pinch-Xie technology, due to the limitations of color and graphics, faded out of sight and turned into a monochrome dyeing technology in the fork since then. The color printing technology of Pinch-Xie has been extended to the Ming and Qing Dynasties and why has it become a monochrome cotton fabric in modern times, especially indigo dyeing? This may have a great relationship with the easy availability and stability of indigo dyes, and cotton cloth at this time instead of material silk fabrics, became the main fabric, for cotton is particularly suitable for dyeing blue with a more acceptable price (Fig. 4).

3.2 Starching-Xie

Starching-Xie is a kind of traditional dyestuff-dyeing printing process, which is dyed with alkaline anti-staining agent. By using the tung oil soaked bamboo paper, hollow patterns are carved and the mixture of lime and soybean powder is scraped through the hollow pattern plate to the dyed fabric. After the dye powder is immersed in the indigo dye and dyed from shallow to deep color, the dye powder is removed and blue-white pattern appears. The hollow plate can be used for printing the dyestuff and thus the continuous pattern can be formed. This kind of dyeing process uses the hollow cardboard to replace the wood carving board of the Pinch-Xie to dye the pattern. The cardboard carving is easier to carve with varied printing patterns and the process is simpler than wood carving with lower costs and thus Starching-Xie quickly developed into a blue calico. Blue calico became most ordinary people's daily clothing and

Fig. 4. Pinch-Xie dyeing fabric process

household items in the Ming and Qing Dynasties and almost every region has its own blue calico dyeing workshop, and blue calico has become the mainstream of China's blue dyeing industry (Figs. 5 and 6).

Fig. 5. Starching-Xie dyeing fabric process

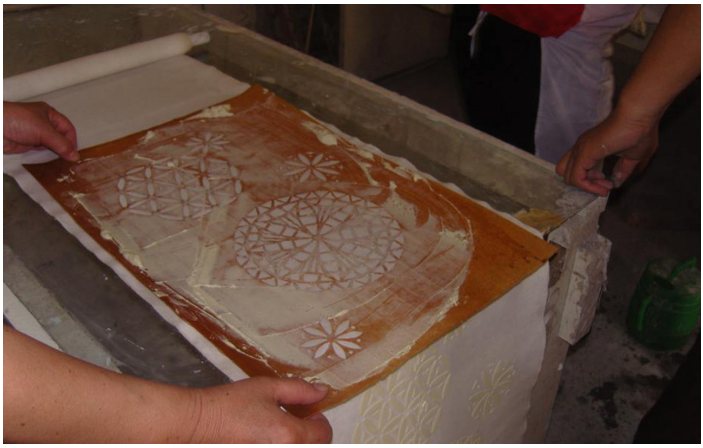

Fig. 6. Starching-Xie dyeing fabric process

3.3 Twist-Xie

Twist-Xie is also a traditional fabric dyeing process that has been circulated in China for thousands of years. As early as the Qin and Han Dynasties, China has been the producer of twist-Xie technology. This method of dyeing is more prevalent in the Sui and Tang Dynasties due to the development of plant dyes and dyeing processes. Twist-Xie is a kind of high artistic and free anti-staining dyeing method. Traditional twist-Xie is using the line or a simple auxiliary tool to knot, clamp and sew to prevent staining and tightly-tied part of the dye cannot penetrate completely, thus forming a white layered color halo pattern. The mutual infiltration of color is the main characteristics of the twist-Xie and this halo dyeing effect can't be achieved by other printing and dyeing methods. Due to the limitations of the process itself, the color of the twist-Xie is generally relatively simple and a wonderful rhythm and change can be formed by combining the points, lines, and surfaces (Figs. 7, 8 and 9).

3.4 Batik Dyeing

Batik Dyeing, an ancient hand-spinning process, refers to drawing pattern on fabric in advantage of waterproof function of wax to form special patterns after the procedure of dyeing and dewaxing. Batik Dyeing is a flexible and variable dyeing process generated on the basis of multiple dyeing processes such as printing and hui without special requirements on dyeing materials. Cotton, linen and silk can all be used in batik dyeing with plant dyes dominated by indigo, as dark blue highlights the white pattern more. However, batik dyeing faded out people's attention gradually in central China in the Song Dynasty, with beewax replaced by slurry made of bean flour and lime, wax painting replaced by scraping pattern with hollow cardboard and batik dyeing replaced by xi technology that can be copied more easily. Batik Dyeing spread to marginal areas and prospered in ethnic minority areas later. Both the wax and blue dyes are highly accessible in ethnic minority areas with more distinctive national features rendered with

traditional techniques of wax painting and waxing. Batik Dyeing techniques such as "Dian La Man" of Miao people and "Yao Ban Bu" of Yao people have become handicrafts handed down from generation to generation in minority areas through long-term preservation and inheritance as symbols of their nations.

Fig. 7. Twist-Xie dyeing fabric with ties on it

Fig. 8. Twist-Xie dyeing fabric, ties be opened

Fig. 9. Twist-Xie dyeing fabric

4 Plant Dyeing Process and Fabric Dyeing Process in Modern Times

Up to modern times, hand-dyed blue and white cloths, costumes, aprons, headdresses, tablecloths, curtains, etc. have been seen commonly in daily life. Color of each part of dyed clothes people wear varies according to different technical styles of printing, and can be even influenced by the weather. Everyone wears unique clothes with outstanding national characteristics. However, in modern times, the hand-woven and dyed clothes as usual as eating and walking for ancient Chinese are far away from our lives.

The whole process of dyeing and fabric dyeing is dependent on hand-spinning, hand-weaving and hand-dyeing. Dyeing a cloth requires more than 10 processes and such a set of pattern design, printing, dyeing and other integrated art forms, because of the complexity and time-consuming of the process and the singleness of the products, can never adapt to the current market demand. In an efficient modern age, fewer people are engaged in these laborious activity, and only a few of the remaining cloth-dyeing mills continue to work.

4.1 Inheritance of Traditional Fabric Dyeing Technology in the New Era

In modern society, factories use the fastest way to produce products, and people also consume products in the quickest way. With dramatic changes in modern printing and dyeing technology in the passing days, the dyed fabric can't be matched by the previous dyeing method in terms of material and color. But modern dyeing technology also has many disadvantages. In order to pursue color effect, various chemicals used cause water pollution and badly influence human skin. These are the negative effects

that are caused by the convenience brought by modernization. Of course, the mention of the drawbacks of modernization is not to emphasize the past is perfect nor to say to go back to the past, but to say in the new era, more efforts should be made to better inherit and carry forward the traditional dyeing process.

Under the influence of modern dyeing technology, many traditional manual dyeing processes have lost, changes occurred in the national characteristics of some ethnic groups and the color of the natural dye was fading away in the earlier days. Because of the convenience and low price of chemical dyestuffs, the minority nationalities in the border area have gradually abandoned the dyeing and processing technology from natural materials, and the disappearance of these technologies often symbolizes the disappearance of some cultures.

However, with the abundance of material life in modern cities, more and more people have begun to realize the problems in life, that is, we lack a sense of intimacy with fabrics that are indispensable in our daily life. The excessively consumed natural resources, the badly damaged ecological balance and increasingly deteriorated living environment have aggregated the problems and some people began to miss the farming era of pastoral life. Traditional handmade products are all derived from the natural environment and coexistence with nature has been emphasized in the production process, endowing the resulting products with a strong human atmosphere, which is exactly in line with people's desire to return to nature.

Some actions to protect the traditional craftsmanship of fabric dyeing have begun and "Pinch-Xie" issued by an editor from Taiwan ECHO of Things Chinese Magazine has set off the trace back of the long-lost dyeing technology and two fabric dyeing private museums have been established in Beijing. Professional handmade artists have set up plant dyeing studios and blue dyeing studios and restored traditional dyeing, hand-woven and hand-dyed technologies to create fabrics of national characteristics and publicize the traditional dyeing process. A number of primary and secondary schools have opened traditional dyeing and fabric dyeing courses to facilitate children's understanding of traditional Chinese craftsmanship and to lay humanistic basis for better inheritance of these skills (Fig. 10).

National government departments have also begun to notice the importance of protecting these traditional techniques, which have been included in the Intangible Cultural Heritage Protection Project. Some traditional handicraft workshops have been revived, and the skills of the old artists with hand-dyed printing have been taken seriously. Wuzhen Hongyuan Thai Dyeing Workshop, Nantong Blue Calico Museum, Wenzhou Blue Xie Museum and other dyeing and printing technology non-heritage projects have been established as a tourist attraction to show people the whole process of traditional dyeing process and market some dyed cloth products to people.

However, the protection and inheritance of traditional technology is a very complex problem, and in modern society, if a traditional technology is only protected and supported by government policy, it is certainly not enough, for pure protection can only make it a non-material cultural heritage to be admired by people. It is necessary to use these traditional techniques to produce products suitable for contemporary generations, pay attention to the development of the art value of the dyeing and fabric dyeing technology and product innovation to endow these technologies with significant market value and to be passed down over thousands of years.

Fig. 10. Modern Xie dyeing fabric

4.2 Innovation of Traditional Dyeing and Fabric Dyeing Process

The emphasis on the inheritance of tradition is to carry forward the unique characteristics rather than the simple and mechanical application. Some contents and forms of traditional plant dyeing and dyeing process have not adapted to the aesthetic demand of people today and more efforts should be made to make the products manufactured by twist- Xie, wax- Xie, Pinch-Xie and Starching-Xie satisfy people's living needs rather than just as tourist souvenirs. We should combine the traditional dyeing handicraft method with the modern design and technology to fully display the taste and individuality of modern people's aesthetic from the color fabric texture, etc. and learn from the useful things of modern technology to enrich and improve the traditional design.

To innovate, we need to know which features of the traditional dyeing and fabric dyeing process need to be retained and which are to be innovated.

Following is the Features that need to be Retained

First, plant dyeing is characterized by the dye oxidation and a rich layer of colors can be formed with local fading fabric. Each piece of work will show different patterns over the years because of different experience. This kind of uniqueness is most suitable for the distinctive characteristics of modern fashion (Fig. 11).

Second, different dyeing and fabric dyeing technologies can form a unique pattern, color halo dyeing and mutual infiltration, superposition with different processes which can never be met by the modern dyeing and fabric dyeing process and which is exactly the human values attached to the products;

Third, all materials of traditional dyeing process are obtained from the nature and the production process will not cause environmental pollution. Thereafter, all the materials

can be returned to nature. The advantages and characteristics of these traditional dyeing and fabric dyeing processes must be retained in the process of innovation.

Fig. 11. Modern Xie dyeing bag

Following is the Features that need to be Innovated

First, process techniques should be more diversified to break the limitations of the original process. We can combine the traditional dyeing and fabric dyeing process with other traditional dyeing process, for example, innovation can be made after dyeing by rubbing, painting multicolored, embroidery, quilting and other methods, to create a printing and dyeing aesthetic effect that is different from the traditional and modern process; we can also combine traditional techniques with modern dyeing and fabric dyeing processes to re-process fabrics after traditional processing with modern dyeing and fabric dyeing techniques, which can process unique texture fabrics (Fig. 12).

Second, the pattern color innovation. The new design of patterns, the change of dyeing methods and the use of modern dyeing tools can free the dyeing and fabric dyeing craftsmanship from traditional material constraints to create a rich modern pattern with a variety of styles. The prediction and collocation of fashion color has injected new vitality to the innovation of traditional dyeing process and the traditional hand-dyed products should have new ideas to get in line with the world trends and to cater to young people's pursuit of personalized clothing.

Third, the dyeing technique innovation. Designers continue to incorporate new technology and new techniques into traditional dyeing and fabric dyeing process to imbue the fabric with different texture patterns and colors and be applied to fashion design through the international brand designers.

When mankind entered the Internet knowledge-based economy era and began the cultural exchange of global scale, the traditional dyeing and fabric dyeing process, although faced with the difficulties, witnessed new development opportunities.

Fig. 12. Modern Xied yeing fabric with embroidery

Traditional craftsmanship can serve as a liaison to connect the people of different times, different cultures and different traditions. In today's historical conditions, when people examine and evaluate these cultural traditions from the perspective of modern civilization, traditional craftsmanship as an element delves deep into modern art life to realize the leap forward towards new cultural atmosphere and aesthetic realm, showing a new cultural significance.

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