

Research on the Activation Application of Traditional Blue Drying Process

Zheng Wu¹ Rui Zhang² Lili Wang³

^{1,2,3} Hubei Institute of Fine Arts (HIFA), Wuhan, Hubei, China

ABSTRACT

This research focuses on the cultural heritage research and creative design practice of the blue drying process in cotton textile materials, and explores the feasibility of applying the traditional blue drying process to the creation design through multi-dimensional activation application. The research takes traditional craft as the starting point, cultural and creative products as the carrier, and design as the means, which has practical guiding significance for the research and realization of innovative development and creative transformation of traditional craft.

Keywords: *Traditional blue drying process, Design, Culture, Activation, Cultural and creative products.*

1. INTRODUCTION

The blue drying process has a long history. Because of the randomness and controllability of sunlight molding, it can faithfully record the changes in every moment under the sun, forming a sense of dynamic. It has the advantages of short molding time, convenient operation, etc. The blue drying process is simple and rich in color, natural and flexible in shape, and can reflect the characteristics of emotional temperature. Its first practical application was in the 1876 Philadelphia Centennial Exposition, where people applied the blue drying process to industry, architecture and other fields. They use the blue drying process to make drawings, forming blueprints, which can be preserved for a long time without fading [1]. This article takes the exploration of the aesthetic value of blue drying as the starting point, and strives to make the application of blue drying more extensive and multi-dimensional, break through the limitations of its visual plane, and apply its activation to cultural and creative design to adapt to more life scenes.

2. SCIENTIFIC PRINCIPLE AND PROCESS FLOW OF TRADITIONAL BLUE DRYING PROCESS

In the history of more than 170 years, the traditional blue drying process has undergone several changes and continuously adapted to the requirements of the new era [2]. Today, with the rapid development of photography technology, the blue drying process is developing continuously with a new process flow and new identity. In current days, the blue drying process has seven steps, including material preparation, solution preparation, photo paper production, film loading, exposure, water washing and drying.

The photosensitive chemicals in the blue drying process are the mixture of ammonium ferric citrate and potassium ferricyanide. The two solutions were prepared under normal lighting conditions according to a ratio of 1:1 (this ratio of the solution is the purest in blue) and mixed after 24 hours. Its scientific principle is to expose the mixed solution of the two substances to sunlight and ultraviolet rays, through the transparent negative part to produce a photochemical reaction of ultraviolet radiation, the richness of the negative image can control the details of the photo paper, and finally

wash with water, the blue precipitate produced, and then form a rich color picture effect [3].

3. TRANSBOUNDARY DEMAND OF TRADITIONAL BLUE DRYING PROCESS

It has become a trend that traditional craft needs to break through, which is determined by the current social situation. On the one hand, with the rapid development of social science and technology and the stagnation of traditional technology, it has lagged behind the contemporary productivity. It is imperative to meet the needs of the times and actively explore and make breakthroughs. On the one hand, due to the threat of interruption of its own inheritance, the key lies in its own limitations, making its successors weak. However, due to its cultural characteristics, it has to innovate to attract more researchers to learn and inherit.

As a developing technology earlier than black and white photography, the traditional blue drying process was popular in Europe at the beginning of photography. At the moment of rapid development of science and technology, the handedness and uniqueness of the blue drying process are very precious. As a traditional manual development technology, compared with modern photography technology, the blue drying process shows not only a picture, but also the emotional temperature behind the developer.

In today's society, people's requirements for quality of life are gradually improving, and they have higher requirements for product use functions, cultural values and aesthetics. The traditional craft and the cultural connotation and spiritual significance behind it are what modern people expect to understand, and are also important factors in cultural innovation product design. The integration of cultural elements in traditional crafts into modern products can not only meet the aesthetic needs of modern people, but also play a positive role in promoting traditional culture [4]. In 2013, the "Xinhua" series posters designed by Nishimura Design Master in Japan adopted the traditional blue drying process. The poster form is exquisite, which not only conforms to the advertising positioning of the product, but also meets the aesthetic needs of young people [5].

4. VALUE ANALYSIS OF TRADITIONAL BLUE DRYING PROCESS

4.1 Aesthetic Value of Blue Drying Process

The blue drying process is a true naturalistic photography method, which can faithfully record the changes of every moment under the sun. Through contact and washing, people can feel the strange beauty of blue drying process through thick blue and flexible natural edges. From a modern perspective, although the blue drying process has a long history, its initial temperature still remained.

4.1.1 Color — Being Thick and Simple

The classic blue drying process has a thick blue tone. The dark part of the object image turns blue, and the bright part of the object image is finally cleaned, leaving the primary color of the material itself. Blue makes people feel simple and calm, while white makes people feel ethereal and elegant. If parts of a work are given different colors, it will be very amazing. This classic blue and rich and changeable color blending is enough to keep the blue drying process at a strong life temperature.

4.1.2 Form — Showing the Beauty of the Moment

In blue drying process, before drying, a layer of photosensitive solution must be evenly coated on the material. For example, the photo paper material itself is handmade, which will produce natural and smooth white. The designer can design these brush effects to better meet the needs of creation. It is these careless blank spaces that make the image more natural and flexible, break the hard edges of ordinary photos, and have the characteristics of hand painting. This "state" reflects the artistic effect of the blue drying process, and is also a place where the blue drying process can leave a deep impression on the audience. Various films or real objects recorded by the blue drying process have real, natural and living effects. During the exposure process, the sun can faithfully record the changes of every moment on the photo paper, show the beauty of the moment with static images, and restore the state and texture of the object itself to the greatest extent.

4.1.3 Emotion — Containing Temperature

The "feeling" of the blue drying process is visual, tactile and emotional. As a practitioner of the blue drying process, the producer can directly see the changes of the image and appreciate its strange and wonderful change process. In addition, as a picture taken in a short time, it is full of new temperature. Unlike printed images, the blue drying process has a special tactile effect, as if it has a layer of thickness and a layer of space people can touch. People can enjoy the fun of handwork in the production process, observe the new temperature, touch its thickness, and then rise to emotional support, which has strong humanistic feelings and emotional temperature.

4.2 Application Value of Blue Drying Process

4.2.1 Cultural Heritage Value

As an indispensable part of the history of traditional craft and photography, the traditional blue drying process plays an extraordinary role in the inheritance and development of human civilization. The combination of traditional blue drying process and modern design is not only an exploration of the technological value and aesthetic value of blue drying process, but also an inheritance of traditional skills and culture. The emergence and development of blue drying process reflects the cultural and economic level of this era. The inherent natural ecological landscape and cultural environment of an era and a region cannot be easily moved. Cultural and creative products are an effective way for the outside world to understand and feel the local natural and cultural environment from the side [6].

4.2.2 Process Development Value

For the traditional craft that is difficult to adapt to the modernization process, its development is encountering bottlenecks. Traditional crafts need to be innovated or inherited in a new identity to meet the aesthetic requirements of contemporary society and user needs, and become an integral part of modern society. This process is the inheritance and development of traditional crafts. The traditional blue drying process is difficult due to its cumbersome process, production environment and material limitations. However, with the continuous development of modern science and technology, the sensitivity and stability of photosensitive reagents are constantly improved and easily available. Compared with traditional films, the size is limited by the size of traditional films, which makes it difficult to make large blue drying, and traditional films are difficult to adjust the grayscale. With the development of digital technology, digital printing has successfully solved the size limitation of the film. Digital processing technology can accurately adjust the color scale curve of the film, so that the color details of the final blue drying works are richer.

4.2.3 Application Feasibility of Blue Drying Process

Based on traditional handicrafts, the blue drying process has unlimited possibilities to be used in the development and application of contemporary cultural and creative products. Based on the analysis of relevant literature in China and foreign countries, researchers of relevant issues generally agree that solarization is a traditional photography technology, and it is an important idea to apply it to design art. In theory, as long as the carrier can be dyed with a photosensitive solution, the blue drying art can be created. Under the experimental conditions in "Table 1", the subjects were divided into five groups for experiments (as shown in "Table 2", "Figure 1").

Table 1. Experimental parameters (Source: self-made)

Exposure light source	Exposure time/min	Temperature/ ℃	Humidity/% RH	Proportion of sensitizer mixture
Sunlight	40	12	65	1:1

Table 2. Experimental comparison group (Source: self-made)

Experimental control group	A	B	C	D	E
Material type	Paper	Silk	Cotton	Flax fabric	Flocked leather cowhide
Cotton content/%	-	55	100	20	0
Weight/cm	300	150	250	280	450
Size/cm	15*15	15*15	15*15	15*15	15*15

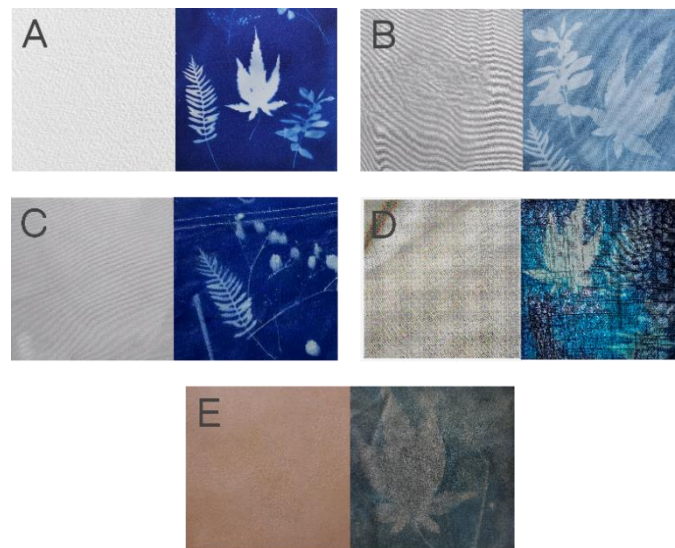


Figure 1 Comparison of five groups of experiments. (Source: self-made)

It can be seen from the experiment that, according to the difference of carriers, the experimental effects are different. For example, the combination of blue drying and silk fabrics has poor presentation effect, mainly reflected in the low color fastness. The flocked leather cowhide fabric is harder and more plastic, but it has strong water absorption, the pigment is difficult to wash, and the color of the cowhide is damaged by exposure to the sun. It has a background color, and the hair color is very unstable, with poor effect. Through the contrast test of cotton fabric and hemp fabric, it is

found that the printing effect of cotton fabric is much better than that of hemp fabric, and the color is saturated and stable. The blue ferricyanide precipitates in the fabric fiber, which is stable and colorfast. In addition, the printing effect varies with the drying time of the reagent solution. In the second experiment, cotton fabric was selected as the experimental sample to explore the best drying time of sensitizer solution. Three representative time nodes are selected for experimental comparison. (see "Table 3", "Figure 2")

Table 3. Experimental comparison group (Source: self-made)

Experimental control group	A	B	C
Materials	Cotton	Cotton	Cotton
Drying time/min	15	60	180
Size/cm	15*15	15*15	15*15

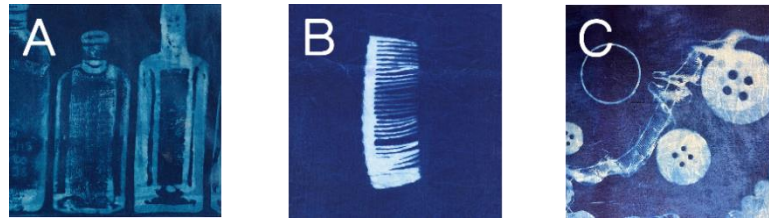


Figure 2 Comparison of three groups of experiments. (Source: self-made)

According to the experiment, the three groups have different presentation effects. The overall presentation effect of Group A and Group C is poor, mainly reflected in the overall green color and low contrast of Group A. The overall tone of group C is dark and the lightness is low. Group B had the best visual effect, color saturation and high contrast. Through previous literature and a large number of experiments, it can be concluded that the traditional blue drying process has a huge application space.

5. ACTIVATION APPLICATION OF TRADITIONAL BLUE DRYING PROCESS

5.1 *Exploring the Cultural Heritage Condensed in Traditional Crafts*

Behind the traditional blue drying process is the development of photography technology at that time, including the wisdom of previous labor practices. The combination of blue drying process and cultural and creative products is not only an affirmation of ancient wisdom by modern people, but also reflects strong cultural value and practical significance [7]. The photography technology in the form of blue drying process can be used to record the beauty in life, which has the artistic value of showing the beauty of the moment. The blue drying

process can be used to express the natural, flexible and changeable living objects or landscape graphics, to freeze them, record the dynamic beauty with static patterns, and give full play to the characteristics of the blue drying process to record the beauty of the moment.

5.2 *Expanding the Combination of Traditional Crafts and Modern Life*

The development and inheritance of traditional processes need to be injected with new ideas and new application methods. Today, with the rapid development of photography technology, the blue drying technology can no longer continue to develop in the image field with its development characteristics as a technical means, and needs to expand new development ways. In the activation application, the blue drying process creation can be combined with the products or other materials in life, and applied to daily life. If plane works are endowed with object surfaces, they will have artistic aesthetic visual effects. Taking the daily life articles storage appliances, lamps, clocks and watches as an example, the artistic expression effect presented by the process can be applied through cotton fabrics as the process carrier. (See "Figure 3")



Figure 3 Yongwu — daily necessities series design. (Source: self-made)

5.3 *Continuing the Artistic Attributes of Traditional Crafts*

The design of "culture based" is not a stack and listing of reluctance and goodwill, just as the core of "Chinese style" cultural and creative design is "wind", and "wind" is the style and character of China, rather than the external image of China. The

activation and redesign of traditional blue drying process must be based on its aesthetic value.

The blue drying works have two colors, blue and white, showing a simple and thick blue tone as a whole, and the local white is ethereal and elegant. The use of light makes the work show different visual characteristics in light and dark. It shows a

rich and simple visual feeling in natural lighting. After the light source is supplemented, it presents a clear visual feature to show its unique color charm. In Alva Alto's humanized design, wood materials

are used frequently [8]. By combining the strong humanistic feelings of the blue drying process with the natural texture of the wood, it is in line with the human characteristics. (As shown in "Figure 4")



Figure 4 Light and shadow — lamp series design. (Source: self-made)

6. CONCLUSION

In the context of modern civilization, it is a leap from photography to design, and the activation and application of the blue drying process not only need to break through the limitations of the plane, but also need to innovate. This research makes a new attempt and exploration to the traditional blue drying process, which has always been mainly represented by photography and plane. In particular, it will be an important way to realize the innovation of traditional blue drying process to use cultural creative design as an activation means to apply it to daily necessities, starting from its aesthetic value, and using the characteristics of its development technology to capture the beauty of the moment.

REFERENCES

- [1] Zhao Min, Ancient Method and Modern Meaning — Classical Blue Printing Technology and Visual Design [J]. *Art Work*, 2017(04): 101-102. (in Chinese)
- [2] Kong Nai, Spectral Bluedream: Evolution and Development of Blue Sun Printing Process [N]. *China Photography News*, 2021-2-19 (009). (in Chinese)
- [3] Wang Changhui, Classical Photography Technology -- Blue Drying Method Experiment [J]. *Popular Literature*, 2010(01): 101. (in Chinese)
- [4] Zhang Rui, Fan Mingshan, Cultural and Creative Product Development Based on Intangible Cultural Heritage -- Taking the Derivative Design of Wang Zhaojun's Legend as an Example [J]. *Art Education Research*, 2017(10): 44-46. (in Chinese)
- [5] Yuan Miaomiao, Ye Linghong, Application of Blue Drying Process in Modern Design — Take "Wangxingji" Fan as an Example [J]. *Industrial Design*, 2021(07): 93-94. (in Chinese)
- [6] Zhang Rui, Research on the Development and Design of Ecological Culture Derivatives in Wufeng Town, With Case Example of a Lamp Design from Firefly Elements [J]. *Art and Design*, 2021, 2(05): 111-113. DOI:10.16824/j.cnki.issn10082832.2021.05.030. (in Chinese)
- [7] Zhang Rui, Lv Jiayong, Yan Kunying, Research on Seasonal Pastry Brand Design Based on "24 Solar Terms" [J]. *Beauty & Times*, 2019(07): 87-90. DOI:10.16129/j.cnki.mysds.2019.07.028. (in Chinese)
- [8] Du Jun, Zhang Fuye, Xu Bochu, Zhi Jinyi, Xu Xiaofei, Design Philosophy and Methods of Alvar Aalto from the Cultural Ecology Perspective [J]. *Packaging Engineering*, 2019, 40(08): 217-222. DOI:10.19554/j.cnki.1001-3563.2019.08.036. (in Chinese)