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Study on the Technological Process and Artistic Characteristics of Ancient Chinese Zhuanghua Silk Fabric

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Abstract

In order to explore the traditional and superb craftsmanship as well as unique characteristics of artistic expression in ancient China, in this paper Zhuanghua silk fabric was selected as the research object, and the research methods of expert interview, cultural relic investigation, field investigation and others were adopted. The craft, pattern, colour and other artistic characteristics of Zhuanghua silk fabric were analysed and studied. First of all, the historical background and classification of Zhuanghua silk fabric are introduced, focusing on a comparison with other processes such as Chinese Silk Tapestry. Secondly, taking Zhuanghua Satin as an example, the technological process of Zhuanghua Satin is analysed in detail. Based on this, the artistic characteristics of Zhuanghua silk fabric are analysed from a micro perspective. The problem of vagueness with regard to the skills and artistic features of traditional Zhuanghua silk fabric was solved in the study, and an important reference for modern innovative practice is put forward so as to inherit and carry forward the technique of Zhuanghua silk fabric.

Key words: Zhuanghua, artistic characteristics, technological process, traditional Chinese textile and weaving process.

ical origin of Zhuanghua and research only on the variety of Zhuanghua satin; a representative essay is Bao Mingxin's *Preliminary Exploration of Zhuanghua Stain*, in which, by using the methods of literature research and field investigation, a distinction between Zhuanghua and Zhuanghua satin is made, and the origin and development of Zhuanghua satin is analysed, pointing out that Zhuanghua satin is a great achievement amongst all kinds of brocade technology. The swivel technique was derived from Zhicheng silk fabric and Chinese silk tapestry techniques. The colour velvet as weft technique originated from the velvet brocade of the Song and Yuan dynasties, and multi-purpose gold inherited the tradition of Nasich in the Yuan Dynasty. The basic organisation is the result of the development and change in brocade organisation since the Han and Tang dynasties. Second, based on the study of Zhuanghua in Nanjing Brocade, according to Lu Ye's study: *A Brief Discussion on Nanjing Brocade Zhuanghua Technique*, the brocade consists of three categories including jacquard satin, multicolor brocade and Zhuanghua. Zhuanghua is the most gorgeous and representative variety of brocade, and is the highest artistic achievement of Chinese brocade, deserving of "World Heritage" status. Third, based on research on the Zhuanghua technique for imperial robes in the Ming and Qing dynasties, Wang Yehong, introduced the Zhuanghua technique in the third part of the weaving and embroidery

method of his *Study on Imperial Robe in the Early Qing Dynasty*, pointing out that there were different types of Zhuanghua imperial robes in the Qing Dynasty, such as Zhuanghua satin, Zhuanghua yarn, Zhuanghua silk, Zhuanghua net and other types. The study focused on the spindle-through Zhuanghua female imperial robe in the Qing Dynasty, a kind of colorful Zhuanghua multicolour satin. In addition, Jia Yangcuo analysed the structure and damage degree of Zhuanghua satin in *Structure Analysis and Protection and Restoration of Sihe Ruyi Yuncun Python-pattern Golden Zhuanghua Satin in the Early Qing Dynasty*. Conservation and restoration schemes were developed, and the restored fabric could be used as the physical basis for the study of Chinese silk fabrics. *Tianshui Bingshan Records*, written in the Ming Dynasty, registers a variety of rare fabrics woven using Zhuanghua technology. In *Protection and Restoration of Mang Yi of Zhuanghua Gauze Over Blue Ground* by Guan Jie, taking a Mang Yi of Zhuanghua gauze over blue ground as an example, the author introduces the characteristics of Zhuanghua technology as well as the process of the protection and restoration for the robe. *Study on Zhuanghua Gauze Over Solid Ground of Nanjing Yunjin* by Hu Deyin reproduces ancient silk relics of Zhuanghua. However, few people have carried out special research on the Zhuanghua technique or made a detailed study of the traditional Zhuanghua process and artistic features.

Introduction

Zhuanghua silk fabric is the highest representative in the achievement of silk weaving technology in ancient China. Most of the imperial robes in the Qing Dynasty were woven using the Zhuanghua silk fabric technique. Zhuanghua technology is a new species of silk weaving, whose formation resulted from the absorption of the warp-through and weft-broken technique for tapestry silk based on traditional brocade and using the weaving method of swivel. It changed the weaving method of tating and colour transformation by means of the section used in the past for colourful brocade, diversifying and enriching fabric patterns [1]. "Zhuanghua" was founded after the Yuan Dynasty and developed rapidly in the Ming and Qing dynasties. It is a general term for the weaving technique of "warp-through and weft-back", performed on a drawloom. At present, academic research on Zhuanghua is mainly focused on the following aspects; first of all, the histor-



Figure 1. Bright Zhuanghua Satin Cloud-Dragon-Pattern Imperial Robe from the Early Qing Dynasty (Li Yulai's collection, taken by the author on January 9, 2018).



Figure 2. Author participating in Li Yulai's palace garment exhibition and introduction of cultural relics (taken on January 8, 2018).



Figure 3. Mr. Li Yulai explaining the techniques of Zhuanghua (taken by the author on January 8, 2018).



Figure 4. On-site display of the weaving process (Nanjing Brocade Museum) (taken by the author on March 12, 2018).

From December 3, 2017, to January 8, 2018, a team including the author held the *Exhibition of Chinese Gorgeous Dress: Mr. Li Yulai's Collection of Palace Garments of the Qing Dynasty* at the Folk Garment Museum of Jiangnan University, which displayed nearly 100 objects collected by Mr. Li Yulai from the court of the Qing Dynasty, including a large number of Qing Dynasty Zhuanghua costumes, showing the exquisite Zhuanghua technique; and the patterns of the clothing also showed a serious hierarchical system. As shown in **Figure 1**, the bright red Zhuanghua satin cloud-dragon-pattern imperial robe from the early Qing Dynasty is 143 cm in body length, 200 cm in Tong sleeve length (including the total length of both sleeves and the width of the back) and 121 cm in lower hem width. The patterns are mainly finished with Zhuanghua techniques, and the fabrics are made of Zhuanghua satin. The Zhuanghua and

colour weaving method of weft-through and warp-back as well as swivel patterns were applied. The shading is bright red, and the color changes of patterns are rich, gorgeous and harmonious. In order to further study the technique of Zhuanghua in the imperial robe exhibition, the author participated in the arrangement of Mr. Li Yulai's collection of Qing dynasty palace garments and in the writing of cultural relic explanation boards, shown in **Figure 2**. At the exhibition site, Mr. Li Yulai led guests around the Qing Dynasty Palace Garment Exhibition and described in detail the history, weaving techniques and artistic features of the participating cultural relics, shown in **Figure 3**. In order to further study the Zhuanghua technique and technological process, the author chose the Nanjing Brocade Research Institute, a unique place for the conservation of such skills at present, to conduct on-the-spot research. In the Nanjing Brocade Museum,

the author learned the process of Zhuanghua weaving displayed by the on-spot craftsman (shown in **Figure 4**), conducted interviews and compiled records of the complicated parts of Zhuanghua technology. It is generally completed by two skilled craftsmen; the complexity of weaving technology is beyond the imagination of ordinary people, which reflects the spirit of Chinese craftsmen with exquisite workmanship.

Based on this, for the purpose of inheriting and carrying forward the national art, in this paper, the research methods of field research and exquisite objects are adopted, the weaving technique of ancient Chinese Zhuanghua interpreted in detail, and the technological process and artistic characteristics of Zhuanghua are focused on, so as to provide a reference for the inheritance, innovation and transformation of national traditional art.

Summary of Chinese Zhuanghua technology

As one of the founding weaving techniques, the term “Zhuanghua” first appeared in the *Tianshui Bingshan Records* in the Ming dynasty, which records more than 14,000 bolts of fabrics confiscated from Yan Song, a powerful official, during the Jiaping Period of the Ming Dynasty, among which 168 items, amounting to 4368 bolts, are related to Zhuanghua [2]. From the records, the Zhuanghua technique was used in satin, yarn, silk, brocade, veil and other silk fabrics, as well as in cotton fabrics. Whether there is a decorative tapestry with gold thread or brocade in gold color, it is the most complicated weaving technique for brocade [3].

The structure of Zhuanghua fabric is complex but can be divided into single warp, repeating warp, knitting and horizontal jacquard, which can be classified from the point of view of weaving technology and traditional classification. According to the traditional classification, Zhuanghua fabric can be divided into shuttle Zhuanghua brocade, Zhuanghua multicolour satin and Zhuanghua colour multicolor satin; according to the weft thread and patterns, it can be divided into varieties of double-weft through weaving, such as varieties of shuttle Zhuanghua satin, hibiscus Zhuanghua and double-weft Zhuanghua, as well as into varieties of Zhuanghua silk, Zhuanghua sateen, Zhuanghua brocade, Zhuanghua satin, Zhuanghua yarn and Zhuanghua velvet in warp-thread Zhuanghua and weft-face Zhuanghua Jinbaodi; according to the classification of structure, plain weave fabrics include Zhuanghua silk, Zhuanghua flat yarn, Zhuanghua gold silk, twill weave fabrics – Zhuanghua gold brocade and Zhuanghua brocade, satin weaving fabrics – Zhuanghua satin, Zhuanghua sateen, shuttle Zhuanghua stain, shuttle Jinbaodi, hibiscus Zhuanghua and weft face brocade, braided fabrics – Jinbaodi, reeled yarn fabrics – Zhuanghua reeled yarn and Zhuanghua silk, and raising fabrics include Zhuanghua velvet.

Distinction between the Chinese Zhuanghua technique and other crafts

Distinguishing Zhuanghua and tapestry silk techniques

From the point of view of weaving technology, Zhuanghua is “warp-through and



Figure 5. Organisational structure of tapestry silk (Li Yulai's collection, taken by the author on January 8, 2018).

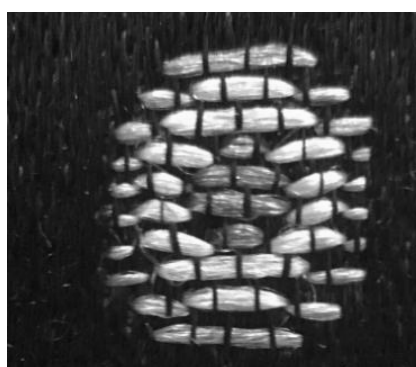


Figure 7. Organisational structure of Zhuanghua (Li Yulai's collection, taken by the author on January 8, 2018).

weft-back”, while tapestry silk is “warp-through and weft-broken”, with two versions of the same meaning; but the difference is that the “weft-back” of the silk will be connected at the other end, and its whole fabric is composed of “weft-back” silk [4]. However, Zhuanghua can intervene at will according to the design of the patterns; if there is no Zhuanghua skill, knitting is also set up; but if the “back weft” is removed, only the warp threads are left, unable to form a sound fabric. As shown in **Figure 5**, in the organisational structure of tapestry silk, if there are no weft-back threads, only the warp threads are left in the whole material. As shown in the schematic diagram of the silk structure in **Figure 6**, the red is the warp thread, and the blue and yellow are the tapestry silk patterns. **Figure 7** shows the structure of Zhuanghua, where the light green and light-yellow threads are Zhuanghua; **Figure 8** is a schematic diagram of Zhuanghua, where the dark threads show Zhuanghua; without Zhuanghua, it is a piece of fabric. From the front and back side of the fabric, there will be floating threads on the back side

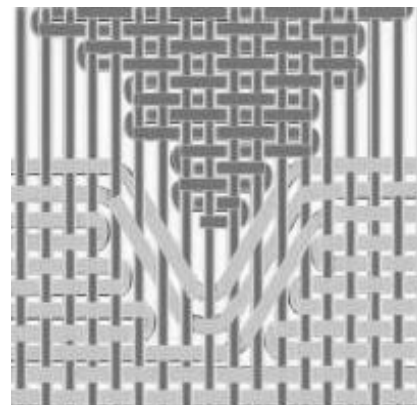


Figure 6. Schematic diagram of silk structure (hand-drawn by the author).

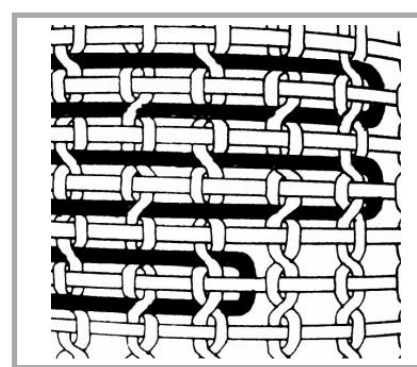


Figure 8. Schematic diagram of Zhuanghua structure (hand-drawn by the author).

of Zhuanghua fabric; hence, most Zhuanghua fabrics need to be threaded (as shown in **Figure 10**), otherwise they will fall apart at random. Moreover, when carefully observing the trend of back weave weft emergence, there will be almost no horizontal single long floating weft on the back side (as shown in **Figure 9**). From the point of view of technology, Zhuanghua is a kind of weaving technology which has nothing to do with the pattern, origin or knitting, while the patterns woven on the fabric by the swivel and shuttle process are Zhuanghua.

Distinction between Zhuanghua and Zhijin techniques

The most essential difference between Zhuanghua and Zhijin is that there are more Zhuanghua patterns and rich colours, while Zhijin is sewn with gold threads or gold foils; hence, its colour is more monotonous, and there is only one colour of gold. The former gives humans a kind of visual enjoyment, while the latter is mainly used to show a kind of wealth. Zhuanghua is a representative jacquard silk variety with Nanjing local

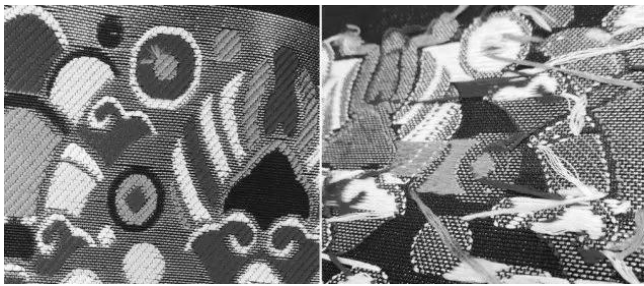


Figure 9. Front and back of Zhuanghua fabric (taken by the author in Nanjing Brocade Museum on March 12, 2018).

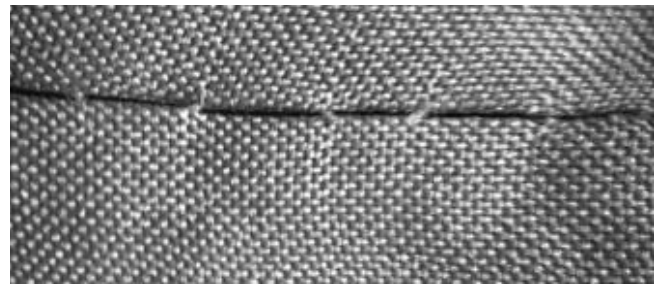


Figure 10. Lining of Zhuanghua fabric (Li Yulai's collection, taken by the author on January 8, 2018).

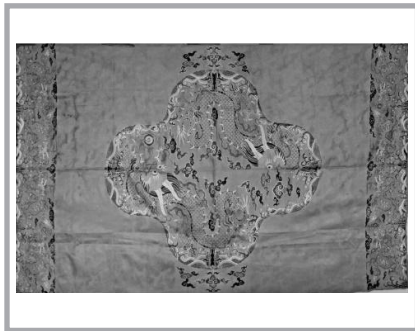


Figure 11. Apricot yellow over-shoulder dragon Zhuanghua Satin Robe from the Early Qing Dynasty (Li Yulai's collection, taken by the author on January 8, 2018).



Figure 12. Golden yellow Zhuanghua stain calyx-pattern dragon-pattern robe (Li Yulai's collection, taken by the author on January 8, 2018).

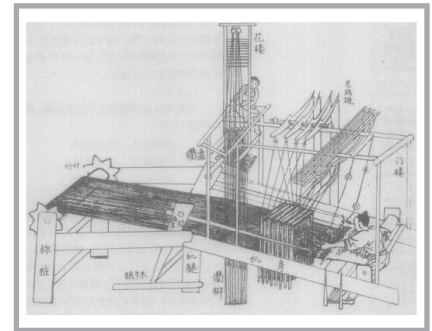


Figure 13. Zhuanghua machine in *Exploitation of the Works of Nature*.

characteristics, which is a kind of cloud brocade in the brocade which is characterised by extremely rich colours [5]. Zhijin was the most popular technique in the Yuan Dynasty, and the rulers at that time liked to use Zhijin to show a rich and noble temperament. Zhijin silk could be roughly divided into two categories: one made of gold threads twisted with gold foils and ordinary silk threads, and the other of sheet gold, that is, long strips of gold foil were sandwiched in the silk threads, as a result of which, most of the patterns had only one colour of gold, but the material was rich in colour.

Technological process of Zhuanghua decoration – taking dragon robes of Zhuanghua satin in the Qing Dynasty as an example

Few varieties of Zhuanghua fabrics have been handed down and most of the weaving methods have been lost, with only “Zhuanghua satin” having been passed on, the process of which cannot be replaced by machines. Satin is mainly composed of satin texture, with a smooth and shiny appearance. These can be plain or colourful fabrics and are characterized by a soft touch. According to the

structure, the stain can be divided into five-heddle satin and seven-heddle satin, and according to jacquard – into plain satin and colour stain [6]. Therefore, the author mainly took the Zhuanghua stain as an example and studied the operation process of the Zhuanghua stain through a field investigation at the Nanjing Brocade Museum, which mainly includes the design of patterns, the production of the design, cross-stitching and knitting, preparation of the warp and weft threads, machine loading and weaving, and other complicated procedures [7].

Pattern design

For the traditional Zhuanghua decoration process, the first process is to perform a pattern design, which should focus on the constitution, requiring rigorous patterns, prudent determination of the design theme of fabric and subsequent preliminary theme-based composition, concise composition with smooth lines to make the design picture full of rhythm, vivid rather than rigid to achieve alignment with theme, coordination between the theme and its matched patterns with distinct layers to foil and highlight the theme, concise and clear design and colours and right mix of texture and pattern to achieve the beauty and harmony [8].

The pattern design of Zhuanghua should be comprehensively considered according to practical requirements, materials, production conditions, the weaving effect and other factors. Before the design, it should first be clear about its use, whether there are special requirements, and then determine the specifications, dimensions, and design patterns that meet the practical requirements. There are two forms of Zhuanghua fabrics: one is the matching material for the whole pattern, and the other is weaving into various practical forms, such as robe materials, bedding materials, etc., and the design methods of patterns are also different. The main forms of matching materials are floral patterns and twines. The design of clothing materials should follow the classical system. As shown in **Figure 11**, the apricot yellow over-shoulder dragon Zhuanghua satin robe in the early Qing Dynasty had strict regulations governing it. The robe was sewn from cloth materials of the Ming Dynasty, basically continuing the style and pattern of that era. The upper dress adopts a composition of over-shoulder dragon patterns, and there is a frame with dragon-walking patterns under the dress. Because this is the robe material of the whole dress, the author photographed the local display. The main pattern composition is centered on the

neck thread, which is composed of four dragons facing each other from the top to bottom and from the left to right. There is a dragon on the front and back of the upper dress, and then the dragon is surrounded by landscape patterns. The rest of the space is filled with cloud and eight-treasure patterns. Generally, the Ruyi Pavilion of the Imperial Household Department would draw a small sample according to the code, and then it could be woven after the Imperial decree.

Drawing of artistic conception

After designing the patterns, according to the characteristics of the fabric structure, the patterns are enlarged proportionally and painted on a kind of checkered paper called artistic conception paper. The vertical lattice on the artistic conception drawing is the warp thread of the fabric, and the parallel lattice represents the weft thread. The applique craftsman should first depict the picture as an actual-sized artwork, and then accurately calculate and draw lattice threads on the artwork according to organisation, latitude and longitude, and colour matching. Wei Jie has a more detailed record of the production of ordinary colour patterns in *Extract and Compilation of Sericulture*. Wei Jie said that the craftsman used five pieces of paper to obtain patterns in order to get samples of patterns. The first way is to think of the new, and draw for the style; the second is draw according to the style; the third is to choose a good style and four inlay placement exquisite, and set a picture; the fourth is to put the patterns with bottom sticky paper of appropriate size, and the fifth is, with thin and bright paper, to draw and clean the pattern, then do horizontal craftsmanship, and with lead powder clean the cold water so that

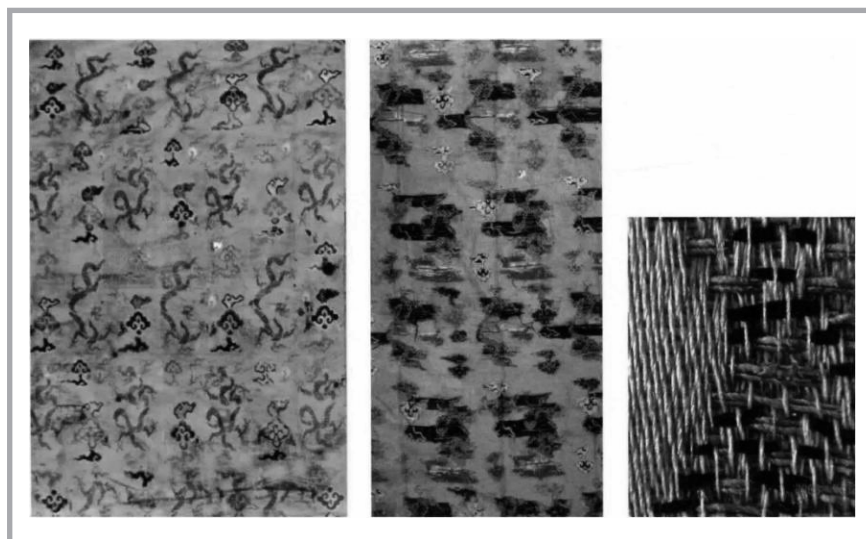


Figure 14. Yellow satin cloud dragon Zhuanghua fabric with gold Zhuanghua (Li Yulai's collection, taken by the author on January 5, 2018).

the pen is all smeared, in order to avoid paper light damage to the eye waiting for the powder to dry, in which red and green ointment colour is used, remembering the number for ease of choice. Its horizontal lattice is one piece, that is, it is a blank, and the size of the space varies from one to another. If the number is formed into a horizontal grid, the number of shuttles is also. All the flowers are distinguished on the horizontal lattice of the shuttle number. The more difficult of the five above are the third and fifth. The third way is to make the pattern into a continuous pattern in all directions, which must be connected from left to right and up to down, and properly dense. The fifth way is equivalent to the artistic craft of today, but in the Qing Dynasty it was painted first and then typed, with the plaid being well typed, but still being an artistic conception drawing. The most important thing in this way is to clear the ratio of

warp and weft so that the figure will not be out of shape. Such as in knitting robes, the artistic conception drawing can only draw the organisation of the unit. However, if it is clothing, the whole patterns must be made into an artistic conception drawing.

Warp-through and weft-broken

Traditional Zhuanghua is woven by a manual wood-weaving machine, while the artistic conception drawing is designed to transfer the patterns on it to the fabric, and it is also a process of turning into a pattern model, which is the most important link in the process of Zhuanghua weaving. According to the floating points on the warp-through and weft-broken threads of the artistic conception drawing, the pattern knot is made of warp threads of the pattern model, that is, foot threads made of silk

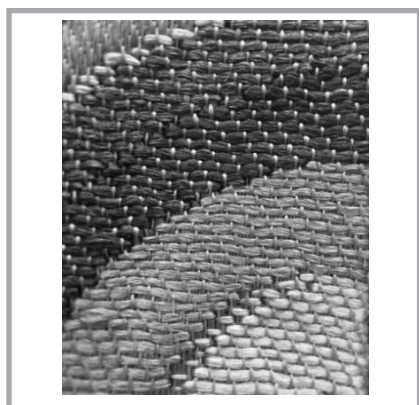


Figure 15. Organisational structure of Zhuanghua (Li Yulai collection, taken by the author on January 5, 2018).



Figure 16. Details of Zhuanghua patterns (Li Yulai's collection, taken by the author on January 5, 2018).



Figure 17. Details of Zhuanghua patterns (Li Yulai's collection, taken by the author on January 5, 2018).

threads, and weft threads, that is, ear threads made of cotton or hemp threads as raw materials. The number of the pattern model's warp threads is determined according to the artistic conception drawing, and then special bamboo sticks are used to pick and weave them according to the artistic conception drawing one by one and colour by colour. It is necessary to pick and weave several colours on each thread in the artistic conception drawing. After picking and weaving a number of bamboo sticks, an inverted hook should be used on the bamboo stick to thread in, and the drawn bamboo sticks can be recycled until the artistic conception drawing has all been formed into a completely new pattern model, also known as the "ancestral model." The warp-through and weft-broken technique also includes the process of inverted patterns, mosaic and others. Generally speaking, each warp-through and weft-broken area holds three to five hundred foot threads, thus each model is divided into an array to pick it out separately, and then a mosaic is made. Inverted patterns involve a process of copying the ancestral model with inverted patterns, and then using the mosaic technique to assemble the pattern into a model.

When weaving the imperial robe, as shown in *Figure 12*, the Golden Yellow Zhuanghua Stain Calyx-Pattern Dragon-Pattern Robe, the calyx-patterns on the front of the chest are combined patterns with two middle threads of sleeves as symmetrical axes, and the walking dragons under the dress are symmetrical on the left and right sides. Generally, when picking a group dragon pattern, for selecting eyes first, due to the limitation of the size of pattern area, the calyx-pattern dragon-pattern is divided into several small pictures that are selected separately, one by one, flipping horizontally and vertically from the ancestral model, merging inverted patterns, and assembling them into a calyx-pattern dragon-pattern model. This imperial robe weighs only a gram, but due to the large and complicated ornament, the pattern model could have been tens of metres long and weighed tens of kilograms. Song Yingxing's *Exploitation of the Works of Nature* recorded that "where the craftsman does the warp-through and weft-broken technique, the heart is the most delicate. The painter first draws what kind of design and colour is on the paper, then measures with

the silk thread, calculates the minutes and seconds, and turns it into a hanging pattern frame. That is to say, the weaver does not know the design and color; with warp through, according to its size and degree, lifting the foot threads, after passing by, the pattern appears unexpectedly [9]. "It can be seen that the antecedents had enough understanding of the complexity and delicacy of the warp-through and weft-broken technique. The quality of the pattern model is the key to production by the warp-through and weft-broken process, which directly relates to the quality of the imperial robe.

Preparation and loading of warp-through and weft-back threads

The warp-through and weft-back threads for weaving Zhuanghua include longitude, latitude, colored weft and gold threads. The imperial robe also uses special weft threads, that is, round gold threads, flat gold threads and peacock feather threads. Taking the gold threads in Zhuanghua as an example, according to the historical records of the Ming Dynasty, it includes two major steps and more than a dozen processes to be completed. The first step is to make gold into gold foil through eight processes: smelting, leaf-tapping, blanking, foil-making, foil-making and blanking again, and package-making. The second step is to make gold foil into gold threads. The first is to paste gold sheets, that is, bamboo paper is soaked in water, brushed with fish glue and mounted in a double layer, and the gold foil is then pasted piece by piece and polished with agate. Finally, the gold foil is rolled and cut into 0 with a foil cutter. The last is to use a foil knife to roll the gold foil cut into about 0.5 mm wide gold wire.

The black gold paper for making gold foil is very important in the production of gold foil. According to records, this kind of black gold paper is made of tender bamboo, which is cut down in summer, soaked in water, and soybean juice added to make the paper billet. Black gold paper should also be slapped with some talcum powder when in use to reduce the resistance when the gold foil is extended. Good black gold paper not only produces good quality gold foil, but it has a long life. Of course, hammering technology is also critical, and the black gold paper produced by skilled craftsmen has been used for decades without breaking.

Machine-loading is the last complicated and meticulous work before weaving, which should be carried out according to the drawing. Zhuanghua is a kind of complex jacquard fabric, and its weaving diagram is composed of a fabric organisation diagram, reed drawing, drafting plan, bamboo sequence diagram, bamboo ensemble connection diagram, and others.

Weaving

Weaving is the last process of the whole process of Zhuanghua, which is completed by two skilled mechanics (*Figure 4*), one of whom sits on the pattern platform and pulls the threads according to the pattern model, who is called the "drawer". The other is the "weaver", who sits at one end of the shed of the loom to do weft insertion, reed and other work, as shown in *Figure 13*. When weaving, the two machinists should cooperate with each other very tacitly. The drawer sits on the pattern platform and operates according to the order of the ear thread of the flower book, lifting an ear thread to separate the corresponding foot thread, and at the same time, the corresponding warp thread connected to it is lifted to form a shed. The drawer completes a shovel of ear thread, and the weaver puts in the colour weft in order to complete the weaving of a shuttle weft.

After that, the weaver sets a foot on the weaving mouth (raven wings) to form the weaving mouth of the ground pattern, then weaves it into a shuttle weft, and by so doing repeatedly, gradually weaves the patterns of the dress. For the weaver, the technical requirement is higher, hence the weaver should not only control the opening of the ensemble to throw the shuttle into the weaving ground, but pass through the weft tube and gold thread after the pattern ensemble is lifted, and do reed, coiling and other work from time to time. Some of the technical requirements are very strong, such as the reed force's relation to the weft density of the fabric. Therefore, the reed force of the whole fabric should be consistent, otherwise not only the thickness of the fabric is uneven, but the pattern will be deformed. A pair of mechanics use the pattern platform to weave Zhuanghua, which generally comprises only about one or two inches a day; thus, a finished piece of Zhuanghua can only be completed after several months or even years.

Artistic characteristics of Zhuanghua from a micro perspective

Exquisite and complicated weaving process

Zhuanghua is the most complex and representative variety of weaving technology for brocade, which still cannot be replaced by machines and takes the longest time. Every step of the organisational structure design requires human participation. Some complex Zhuanghua imperial robes (Figure 12) from pattern design to warp-through and weft-broken, model finish and machine weaving should be completed by many people, with years to complete and a technical need for a certain degree of proficiency. Therefore, the “inch” is as the unit of valuation. Whether the Zhuanghua is woven from gold thread or not, brocade with a gold Zhuanghua colour is a variety of silk weaving technology. Shonn in Figure 14, gold Zhuanghua yellow satin dragon Zhuanghua fabric is fine work of Zhuanghua, as evidenced by the auspicious cloud pattern, with real gold thread, black velvet reel woven dragon-cloud pattern, bright yellow satin against the cloud dragon pattern, and by the color changes with the movement of the angle of view, showing the exquisite weaving craftsmanship. The emergence of Zhuanghua weaving techniques has transformed the shortcomings of the colour matching of silk fabrics existing in the past. It is the further development of silk weaving jacquard technology in ancient China, widely used in Ming and Qing silk fabrics, which has been unearthed and handed down.

Rich and delicate colour scheme

The pattern colour on the traditional fabric is generally a horizontal juxtaposition of several patterns of the same colour, or like embroidery, which expresses the diversity of colours on fabric through decorative technology.

While “Zhuanghua” fabric is characterised by its expression of pattern through fabric weave construction and rich colour matching, enabling a horizontal juxtaposition of a variety of pattern colours (Figure 15). With regards to the weaving method, the weft shuttle tied with a variety of colour velvet performs warp-through and weft-broken and swivel weaving part by part on the pattern on the fabric. Colour matching can be conducted freely, subject to no limits. As shown in Figure 16, in the early Qing Dynasty, the main pattern of the bright red Zhuanghua

satin three-grade peacock pattern is usually expressed in three or four levels of colour, with a “halo colour” matching performance, making the colour transition more natural and forming a unique painting style. Peony patterns use digging and weaving to show the decorative effect of different colours. Peony patterns vary in colour from different perspectives, and pedicels and leaves are generally expressed in monochrome. This bright red Zhuanghua satin glow pattern can be matched in as many as ten or even twenty or thirty colours; although there are many colors, they can all be handled with complex, uncluttered, hierarchical, unified and harmonious patterns, and the flowers are rich, different in colour, vivid and beautiful. It fully shows the characteristics of the Zhuanghua fabric process.

Vivid and realistic patterns

The weaving technology of Zhuanghua fabric reached its peak in the Qing Dynasty, with a variety of fabric patterns, extensive subject matters with auspicious implications, husky and plump shapes, strong and gorgeous colours, and substantial use of gold and silver threads to match with various colour threads and peacock feather threads, impressing as resplendent and magnificent. Most of the decorative patterns were auspicious with a narrative meaning, the colors mainly red, yellow, black, purple and other bright ones, and coloured Zhuanghua were wrapped with gold, with gold and silver patterns wrapped with colored velvet [10]. The weaving is fine enough to weave various patterns into satin brocade by digging patterns and weaving them. (Figure 17) As seen in the bright red make-up satin cloud dragon robe from the early Qing Dynasty, the shading is mainly red, and the layout of the imperial robe pattern has a three-dimensional design effect. The golden imperial pattern is lifelike through the color matching method of color-by-color halo dyeing and the technology of white thread hook edge, and the surrounding colour cloud patterns are shown in four or five different colors. The cool colour of the green-blue series is combined with the warm colour of the red series; the luster is bright and light, and the matching colour intense, forming a glossy effect of different colour systems. The twisted edge is decorated with a piece of gold and silver thread, which is used in the colorful moire, making the whole fabric glow with gold and colour. Above all, it is bold and grand, with a very noble artistic appeal, as well as gorgeous and luxurious.

Conclusions

Zhuanghua represents the highest achievement of ancient Chinese silk weaving technology, and has the reputation of “an inch of gold for an inch of Zhuanghua”. Up to now, it has not been possible to replace the skill of Zhuanghua decoration technology by modern looms. In the Ming and Qing dynasties, Zhuanghua was produced by the government-run weaving bureau, a special craft for the feudal rulers, with special and strict requirements for imperial tribute. Zhuanghua fabric can also be used in the decoration of screens, curtains and Buddhist sutras. With the emergence and change of new science, technology, concepts and designs, designers should find the meeting point between traditional art, modern lifestyle and aesthetic taste, and improve the competitiveness of the clothing market, so as to open the application idea of traditional Zhuanghua technology. It is of great significance to study, explore, protect, inherit and carry forward the precious traditional silk weaving technology.

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