

## A Study on the Historical Evolution, Value, and Inheritance Innovation of Farming and Weaving Pictures

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**Abstract:** Farming and Weaving Pictures show farming and weaving scenes in ancient China, providing picture materials for studying agriculture, folk customs, and art in various dynasties. This paper employed the literature review and iconography to study the themes and images of several editions of the *Farming and Weaving Pictures* by Lou Shu of the Song Dynasty, Cheng Qi of the Yuan Dynasty, Kuang Fan of the Ming Dynasty, and Jiao Bingzhen of the Qing Dynasty, thus describing and analyzing the historical evolution, characteristic styles, and values of these pictures. In addition, it elaborated the approaches for the protection and inheritance innovation of these pictures based on digital technologies, in hope of providing a reference for the protection and inheritance innovation of tangible cultural heritage. Psychological research shows that more than 80% of learning occurs via our visual memory system. Compared with characters, images are more readable and visually attractive, so they are easier to be accepted by the public. Ancient people knew this fact early. Therefore, all sorts of images were used to record and introduce agriculture in brilliant Chinese history and culture. *Farming and Weaving Pictures* are one of the most representative works on agricultural practices among image materials. This paper studied *Farming and Weaving Pictures* drawn by Lou Shu and other related pictures.

**Keywords:** Farming and Weaving Pictures; Image; Value; Inheritance

### I. History of *Farming and Weaving Pictures*

Since the original pictures painted by Lou Shu in the Southern Song Dynasty have been lost, the content can only be deduced based on relevant historical documents. These documents include: The *Postscript to My Uncle's 'Farming and Weaving Pictures'* in *Gong Kui Ji* by Lou Yao, the inscriptions of Lou Hong for *Farming and Weaving Pictures Poems*, the *Postscript to Weaving Pictures* by Song Lian, and the *Biography of Lou Shu* by Lu Xinyuan. According to these materials, *Farming and Weaving Pictures* by Lou Shu combine pictures and poems, similar to a picture book for science popularization. It can also be inferred that set in a rural area, each picture depicts an agricultural practice, all pictures constituting a continuous scroll. <sup>(1)</sup>For the full set of pictures, there are 21 farming pictures, there are 21 farming pictures and 24 weaving pictures. Each picture has a poem introducing the picture's content.

*Farming and Weaving Pictures* (Figure 1) by Cheng Qi in the Yuan Dynasty are now collected in the Freer Gallery of Art in the United States. They are color-painted on silk, consisting of 21 farming pictures and 24 weaving pictures. On the right of each picture is a five-character poem written by Lou Shu in seal script and next to each character are the

explanation in small regular characters. In addition, the blank shows a poem by Emperor Qianlong of the Qing Dynasty in running script.



Figure 1 Seed Soaking of Farming and Weaving Pictures by Cheng Qi (collected in the Freer Gallery of Art)



Figure 2 Seed Soaking of Illustrated Compendium for the Convenience of the People (Bianmin Tuzuan) by

Kuang Fan said, "Farming and Weaving Pictures created by Lou Shu in the Song Dynasty are similar to the folk customs of Wu. His poems are easy to understand. To make it easier to record agricultural practices, Wu folk songs are introduced for an easy understanding of the practices and contents. Through these pictures, local officials can educate people, encourage them to follow what they (themselves) love, and listen to extensive opinions to develop agriculture." (2) It can be seen that the Farming and Needlework Pictures (Figure 2) in the Illustrated Compendium for the Convenience of the People were painted based on Lou Shu's Farming and Weaving Pictures, but Kuang Fan changed the poems into easy-to-understand folk songs of Wu with strong local characteristics, thus they were more likely to spread widely.



Figure 3 Seed Soaking and Tilling of Farming and Weaving Pictures by Jiao Bingzhen, Qing Dynasty

In the Qing Dynasty, Jiao Bingzhen painted *Farming and Weaving Pictures* under the order of Emperor Kangxi (See Figure 3). According to records, Emperor Kangxi received a *Farming and Weaving Picture* of the Song Dynasty presented by collector Zeng Jing during his south tour. It can help the emperor and officials understand farming, weaving, and national agricultural conditions, and also allow ordinary people to learn specific procedures and techniques, which coincided with the emperor's thought of encouraging agriculture. Therefore, Emperor Kangxi ordered Jiao Bingzhen, who was an official of the Directorate of Astronomy to re-paint the pictures.

At present, Chinese and foreign scholars hold diverse opinions on the source based on which Jiao Bingzhen re-painted *Farming and Weaving Pictures*. Dr. Chao Yashu from National Taiwan University thought Jiao Bingzhen referred to Lou's version; Motonosuke Amano, a Japanese scholar, believed that Cheng's version was based<sup>(3)</sup>; in the view of Xiao Kezhi, director at the Exhibition Department of China Agricultural Museum, the collector's presentation revealed that Lou's version remained intact back then. The contents are also sourced from Lou Shu's version. Therefore, it can be inferred that Jiao Bingzhen painted his pictures based on Lou's version. After analyzing Cheng's version collected in the Freer Gallery of Art, Takeshi Watabe from Tokai University said, "It is hard to get an exact answer, but Jiao Bingzhen should be complimented for his painting skills." I think Jiao Bingzhen absorbed the essence of previous versions and made bold innovations to create exquisite pictures which are of practical and artistic value for science popularization.

**II Changes in Images**

(I) Changes in Images

I. Adjustment, split, and deletion of pictures

The above data shows that the content elements of later versions are basically derived from Lou's. However, the contents vary with the difference of dynasties.

First, adjustments in the number of pictures (see Table I).

Table I Comparison of the number of pictures

| Lou's Version           |                  | Cheng's Version         |                  | Kuang's Version         |                  | Jiao's Version          |                  |
|-------------------------|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|------------------|
| Farming pictures        | Weaving pictures | Farming pictures        | Weaving pictures | Farming pictures        | Weaving pictures | Farming pictures        | Weaving pictures |
| 21 pieces               | 24 pieces        | 21 pieces               | 24 pieces        | 15 pieces               | 16 pieces        | 23 pieces               | 23 pieces        |
| <b>Total: 45 pieces</b> |                  | <b>Total: 45 pieces</b> |                  | <b>Total: 31 pieces</b> |                  | <b>Total: 46 pieces</b> |                  |

Second, adjustment, split, and deletion of pictures.

Differences in farming pictures: Compared to Lou's version, Kuang Fan deleted the Raking and Threshing pictures, replaced the Seed Breeding, Pre-transplantation Fertilizing, Seedlings Pulling, and Transplanting pictures with the Sowing,

Fertilizing, and Transplanting ones, and substituted the First Weeding, Second Weeding, and Third Weeding with Harrowing and Ploughing. In addition, he changed Irrigating into Irrigation Bucket, replaced the nine pictures of Harvesting, Gathering on the Threshing Ground, Holding Ears of Paddy, Winnowing, Hulling, Pounding, Sieving, and Warehousing with five ones of Harvesting, Rice Threshing, Hulling, Pounding, and Warehousing, and added a picture of Happy Farming. Based on Lou's version, Jiao Bingzhen added two farming pictures, namely Early Seedling and God Worshipping<sup>(4)</sup>. (See Table 2)

Table 2 Comparison of contents of farming pictures

| Lou's Version                      | Cheng's Version                    | Kuang's Version      | Jiao's Version                     |
|------------------------------------|------------------------------------|----------------------|------------------------------------|
| Farming pictures                   |                                    |                      |                                    |
| 1. Seed Soaking                    | 1. Seed Soaking                    | 1. Seed Soaking      | 1. Seed Soaking                    |
| 2. Tilling                         | 2. Tilling                         | 2. Tilling           | 2. Tilling                         |
| 3. Raking                          | 3. Raking                          | 3. Harrowing         | 3. Raking                          |
| 4. Harrowing                       | 4. Harrowing                       | 4. Sowing            | 4. Harrowing                       |
| 5. Threshing                       | 5. Threshing                       | 5. Fertilizing       | 5. Threshing                       |
| 6. Seed Breeding                   | 6. Seed Breeding                   | 6. Transplanting     | 6. Seed Breeding                   |
| 7. Pre-transplantation Fertilizing | 7. Pre-transplantation Fertilizing | 7. Harrowing         | 7. Early Seedlings                 |
| 8. Seedlings Pulling               | 8. Seedlings Pulling               | 8. Ploughing         | 8. Pre-transplantation Fertilizing |
| 9. Transplanting                   | 9. Transplanting                   | 9. Irrigation Bucket | 9. Seedlings Pulling               |

|                                       |                                       |                    |                                       |
|---------------------------------------|---------------------------------------|--------------------|---------------------------------------|
| 10. First Weeding                     | 10. First Weeding                     | 10. Harvesting     | 10. Transplanting                     |
| 11. Second Weeding                    | 11. Second Weeding                    | 11. Rice Threshing | 11. First Weeding                     |
| 12. Third Weeding                     | 12. Third Weeding                     | 12. Hulling        | 12. Second Weeding                    |
| 13. Irrigating                        | 13. Irrigating                        | 13. Pounding       | 13. Third Weeding                     |
| 14. Harvesting                        | 14. Harvesting                        | 14. Warehousing    | 14. Irrigating                        |
| 15. Gathering on the Threshing Ground | 15. Gathering on the Threshing Ground | 15. Happy Farming  | 15. Harvesting                        |
| 16. Holding Ears of Paddy             | 16. Holding Ears of Paddy             |                    | 16. Gathering on the Threshing Ground |
| 17. Winnowing                         | 17. Winnowing                         |                    | 17. Holding Ears of Paddy             |
| 18. Hulling                           | 18. Hulling                           |                    | 18. Pounding                          |
| 19. Pounding                          | 19. Pounding                          |                    | 19. Sieving                           |
| 20. Sieving                           | 20. Sieving                           |                    | 20. Winnowing                         |
| 21. Warehousing                       | 21. Warehousing                       |                    | 21. Hulling                           |
|                                       |                                       |                    | 22. Warehousing                       |
|                                       |                                       |                    | 23. God Worshipping                   |

Differences in weaving pictures: Compared to Lou's version, Kuang Fan reduced the number of weaving pictures from 24 to 16. He deleted the five pictures of Silkworm Bathing, Silkworm Separating, Silk Thread Twisting, Silkworm Dismounting, and Silkworm Grading, replaced the pictures of First Sleep, Second Sleep, and Third Sleep with the Silkworm Sleep picture, and combined Warp and Weft pictures together. Jiao Bingzhen deleted Silkworm Dismounting, Silkworm Feeding, and First Sleep and added Dyeing and Tailoring (See Table 3).

Table 3 Comparison of contents of weaving pictures

| Lou's Version               | Cheng's Version             | Kuang's Version                  | Jiao's Version              |
|-----------------------------|-----------------------------|----------------------------------|-----------------------------|
| Weaving pictures            |                             |                                  |                             |
| 1. Silkworm Bathing         | 1. Silkworm Bathing         | 1. Silkworm Dismounting          | 1. Silkworm Bathing         |
| 2. Silkworm Dismounting     | 2. Silkworm Dismounting     | 2. Silkworm Feeding              | 2. Second Sleep             |
| 3. Silkworm Feeding         | 3. Silkworm Feeding         | 3. Silkworm Sleep                | 3. Third Sleep              |
| 4. First Sleep              | 4. First Sleep              | 4. Mulberry Leaf Harvesting      | 4. Matured Silkworm         |
| 5. Second Sleep             | 5. Second Sleep             | 5. Matured Silkworm              | 5. Silk Thread Twisting     |
| 6. Third Sleep              | 6. Third Sleep              | 6. Silkworm Mounting             | 6. Silkworm Separating      |
| 7. Silkworm Separating      | 7. Silkworm Separating      | 7. Silkworm-raising Tray Heating | 7. Mulberry Leaf Harvesting |
| 8. Mulberry Leaf Harvesting | 8. Mulberry Leaf Harvesting | 8. Cocoon Storing                | 8. Silkworm Mounting        |
| 9. Matured Silkworm         | 9. Matured Silkworm         | 9. Silk Reeling                  | 9. Silkworm-raising Tray    |

|                                   |                                   |                   |                          |
|-----------------------------------|-----------------------------------|-------------------|--------------------------|
|                                   |                                   |                   | Heating                  |
| 10. Silk Thread Twisting          | 10. Silk Thread Twisting          | 10. Silkworm Moth | 10. Silkworm Dismounting |
| 11. Silkworm Mounting             | 11. Silkworm Mounting             | 11. Praying       | 11. Silkworm Grading     |
| 12. Silkworm-raising Tray Heating | 12. Silkworm-raising Tray Heating | 12. Silk Reeling  | 12. Cocoon Storing       |
| 13. Silkworm Dismounting          | 13. Silkworm Dismounting          | 13. Wrap and Weft | 13. Silk Bleaching       |
| 14. Silkworm Grading              | 14. Silkworm Grading              | 14. Weaving       | 14. Silkworm Moth        |
| 15. Cocoon Storing                | 15. Cocoon Storing                | 15. Embroidering  | 15. Sacrifice and Prayer |
| 16. Silk Reeling                  | 16. Silk Reeling                  | 16. Silk Cutting  | 16. Weft                 |
| 17. Silkworm Moth                 | 17. Silkworm Moth                 |                   | 17. Weaving              |
| 18. Praying                       | 18. Praying                       |                   | 18. Silk Reeling         |
| 19. Silk Reeling                  | 19. Silk Reeling                  |                   | 19. Wrap                 |
| 20. Wrap                          | 20. Wrap                          |                   | 20. Dyeing               |
| 21. Weft                          | 21. Weft                          |                   | 21. Embroidering         |
| 22. Weaving                       | 22. Weaving                       |                   | 22. Silk Cutting         |
| 23. Embroidering                  | 23. Embroidering                  |                   | 23. Tailoring            |

|                  |                  |  |  |
|------------------|------------------|--|--|
| 24. Silk Cutting | 24. Silk Cutting |  |  |
|------------------|------------------|--|--|

2. Changes in poems

For Lou's version, each picture has a five-character poem with eight lines, matching what the picture depicts. For Cheng's version, each picture has a five-character poem (with annotations in small regular characters) in seal script written by Lou Shu, as well as inscriptions and seals of Cheng Qi and Zhao Zijun. Kuang Fan turned the five-character poem into a Bamboo Song with strong regional characteristics for easier understanding and wider spread.

In Jiao's version, there are 42 five-character poems and other poems inscribed by Emperor Kangxi on each picture.

3. Changes in image elements

Changes in the number of people (Lou's version will not be compared in the following part for two reasons: (1) there is no version for reference; (2) the above part reveals that Lou's version is exactly the same as Cheng's version in the number of pictures and contents):

Table 4 Comparison of the number of people in farming pictures

|               | Cheng's Version |        |          | Kuang's Version |        |          | Jiao's Version |        |          |
|---------------|-----------------|--------|----------|-----------------|--------|----------|----------------|--------|----------|
|               | Male            | Female | Children | Male            | Female | Children | Male           | Female | Children |
| Seed Soaking  | 3               |        |          | 3               |        |          | 3              | I      | 2        |
| Tilling       | 2               |        |          | I               |        |          | 3              | I      | I        |
| Harrowing     | 2               |        |          | I               |        |          | I              |        | I        |
| Transplanting | 7               |        |          | 5               |        |          | II             |        |          |
| Irrigating    | 5               |        |          | 3               |        |          | 4              |        |          |



|              |            |           |          |            |          |  |            |           |            |
|--------------|------------|-----------|----------|------------|----------|--|------------|-----------|------------|
| Harvesting   | 3          | 3         | 1        | 7          |          |  | 6          | 2         | 4          |
| Hulling      | 9          |           |          | 8          | 1        |  | 8          |           | 2          |
| Pounding     | 8          |           |          | 6          |          |  | 7          |           | 1          |
| Warehousing  | 4          |           |          | 5          |          |  | 5          |           | 1          |
| Proportion   | 43 persons | 3 persons | 1 person | 35 persons | 1 person |  | 48 persons | 4 persons | 12 persons |
|              | 91.5%      | 6.5%      | 2%       | 97%        | 3%       |  | 75%        | 6.2%      | 18.8%      |
| <b>Total</b> | 47 persons |           |          | 36 persons |          |  | 64 persons |           |            |

Based on the above table, we may draw several conclusions. First, from the sociological perspective, the phenomenon that man was in charge of outside affairs and woman in charge of inside ones in ancient times is vividly demonstrated in Farming and Weaving Pictures. Can we deduce that an increasing number of people participated in agricultural activities because of the surge in population due to the cancellation of the poll tax in the Qing Dynasty? Second, from the perspective of painting, the increase in the number of children makes the composition more balanced and full. To some degree, the pictures are more lively and interesting.

#### 4. Changes in the shape of agricultural tools

Comparing the above versions, we can see the change in the shapes of plows from straight moldboards to curved moldboards. The weaving pictures in Cheng's version show plows with straight moldboards, but they have curved moldboards in Kuang's version. Although the *Classic of the Plough (Lei Si Jing)* written by Lu Guimeng of the Tang Dynasty introduces the plough in detail, experts agreed that the plough was changed from straight to curved moldboards during the Tang Dynasty. Why are the plows with straight moldboards seen in Cheng's version of the Yuan Dynasty? I think it may be attributed to the geographical factor, resulting in the use of plows with straight moldboards in some regions.

#### 5. Changes in painting style

The comparison of the versions of Cheng Qi, Kuang Fan, and Jiao Bingzhen reveals their different painting styles. Cheng's version features a simple style, focusing more on shading than wrinkles. It is of literariness and artistry, showing the painting style of literati in the Yuan Dynasty. Set in a simple environment, this version basically focuses on describing farming, including bamboo baskets for seed soaking, people, and houses and trees behind people. People are well arranged

and painted in curved and smooth lines, but the images are stylized. Kuang's version features powerful lines and farming scenes. The farming pictures also describe ridges next to paddy fields and part of trees, while the weaving pictures only show walls or a few trees outdoors. Paddy fields, trees, houses, and images are simple, looking like sketch paintings. As the ink color dominates, Kuang's version is simple and more lifelike than Cheng's.

To sum up, Cheng's version is resplendent, while Kuang's is simple. But they have something in common, namely "cavalier perspective", a way of displaying several points of sight in a painting. Compared with the objective way of focus perspective, the cavalier perspective is more subjective. To be specific, in the Seed Soaking picture drawn by Cheng Qi, the stool in the house does not share the same point of sight as the house. The house is displayed from a top view, people from a horizontal view, and paddy fields from a top view as well. Kuang's version adopts the similar techniques. In Cheng's "Holding Ears of Paddy" picture, people threshing rice in front are displayed from a top view, haystacks in the middle from a horizontal view, and field ridges from an upward view. Kuang's version adopts the similar techniques.

In contrast, Jiao's version features the focus perspective. It is a way of representing a perspective and a vanishing point. With the focus perspective, pictures are more three-dimensional and objective.

Compared with other versions, Jiao's is more three-dimensional and closer to real life by virtue of rich layers. The Seed Soaking picture is taken as an example. Cheng's and Kuang's versions only focus on the workplace environment with paddy fields, houses, and trees. Jiao's version depicts both close and distant views, subtly mixing the seed-soaking scene with the distant background: the ridge winds from near to far, from large to small, from wide to narrow, and from solid to dotted. The greater the distance, the lighter the color and the smaller the size of the trees, greatly enriching the sense of aerial perspective and the virtual-real sense.<sup>(5)</sup>

### III. Analysis of the Artistic Value of *Farming and Weaving Pictures*

Based on the above analysis, it can be seen that all four versions share the same cultural root, so their function value is basically the same. The specific analysis is as follows:

The Farming and Weaving Pictures are of great artistic value because they reflect the painting levels of the corresponding periods and the changes in painting techniques, and they can be also used as decorative patterns.

Application on porcelain as decorative patterns. Under the reign of Emperor Kangxi, craftsmen started to pattern Farming and Weaving Pictures on porcelain. Tao Ya (elegant pottery) records, "During the period of Emperor Kangxi, colored porcelain was exquisite, especially the official-kiln-producing porcelain items with Farming and Weaving Pictures as decorative patterns."<sup>(6)</sup>The Famille Rose Porcelain Zun (vessel) with Designs of Farming and Weaving Pictures collected by the National Museum of China is one of the representative artifacts. It is small at the top and big below, with a round mouth, a big belly, and two ears. The patterns on it are arranged in four parts. The first and third parts are poems, and the second and fourth parts are derived from farming and weaving pictures. The second part presents three pictures of Mulberry Leaf Harvesting, Silkworm-raising Tray Heating, and Silk Bleaching. The fourth part presents four pictures of Tilling, Pounding, Winnowing, and Hulling. Most pieces of porcelain zun are patterned by one hundred deer, and this artifact with designs of Farming and Weaving Pictures is rarely found. The exquisite patterns, bright and multiple colors, vivid figures, compact composition, and sophisticated workmanship make it a famille rose masterpiece.

Application in woodcarving of doors and windows as decorative patterns. The iconic case is a remaining building of the Qing Dynasty in Yaliu Village, Chengxi Sub-district, Yiwu, Zhejiang Province. The ornamental panels of the screen doors

of the building are patterned by imitations of the *Farming and Weaving Pictures Inscribed by Emperor Kangxi*<sup>(7)</sup>. Carved wooden Farming and Weaving Pictures mark the first discovery of ancient systematic farming and weaving pictures in Chinese architectural decorative wood carving. With a history of hundreds of years, they not only enrich the circulation forms of different versions of Farming and Weaving Pictures, but also give new inspirations to modern architecture. In addition, Farming and Weaving Pictures are also applied to folding screens and fans. It is worth mentioning that *China for the West* by David Sanctuary Howard and John Ayers of the United Kingdom introduced a beverage cup made in Europe at the end of the 18<sup>th</sup> century, and the patterns on the cup are derived from Farming and Weaving Pictures<sup>(8)</sup>. Farming and Weaving Pictures as the source of decorative patterns used in life and decoration provide valuable image materials for the study of ancient China's decorative art.

#### IV Digital Protection, Inheritance and Innovation of Farming and Weaving Pictures

As important image materials of traditional Chinese culture, Farming and Weaving Pictures demonstrate painting's political role in ancient China and contain the aesthetic thoughts endowed by the times. They are a source of wisdom for the practice of traditional aesthetic education in China and have substantial value and significance for the development of contemporary Chinese aesthetic education. In addition, they preserve and reflect the scientific and technological development level in different historical periods to a certain extent, and thus have a value of scientific understanding. For example, the change in shapes of plows from straight moldboards to curved moldboards represents the development of agricultural tools to a certain extent and provides a historical testimony to the development of modern agricultural machinery. Therefore, this paper focuses on the digital development of *Farming and Weaving Pictures*, aiming to contribute to the protection and inheritance of the traditional Chinese tangible cultural heritage.

Many countries attach great importance to the digital protection and communication of tangible cultural heritage, and the transformation of tangible cultural heritage into digital cultural forms on a large scale has gradually become a worldwide trend of cultural protection. In 1992, the United Nations Educational, Scientific and Cultural Organization (UNESCO), with digital technologies, made a large number of downloadable technical publications and manuals available on its website. In the early 1990s, the Library of Congress of the United States digitized the historical memory and cultural archives of the nation, including music, art, folklore, and literature, for the purpose of conservation. In 2000, the Institute of Ethnic Literature of the Chinese Academy of Social Sciences built a database including literature and image data by using traditional and modern digital technologies. Despite the fact of starting late, China has worked on digital development and protection of national tangible cultural heritage for more than 20 years and increased efforts in this regard. Some successful cases have been made, such as the dynamic *Along the River During the Qingming Festival* in Expo 2010 Shanghai China, the animated version of *Emperor Qianlong's Southern Inspection Tour* series of paintings shown in the National Museum of China in 2014, and the VR display of 159 grottoes in Dunhuang at the 5<sup>th</sup> International Symposium on Cultural Heritage Conservation and Digitization in 2018.

This section provides digital design ideas from the aspects of cultural connotation exploration and visual communication forms of Farming and Weaving Pictures, introduces relevant strategies and methods of digitization, and promotes protection, inheritance, display, and communication by digital means.

- (I) An Exploration of the Cultural Connotation of *Farming and Weaving Pictures*

Exploration is made for better development, utilization, and communication. Lyu Chen tried to find the correspondence between the connotation of traditional culture and advertising creativity through in-depth analyses of cultural connotations<sup>(9)</sup>. Yi Zhong considered the combination of the artistic connotation of Chinese traditional culture with commodities can improve the quality of tourism commodities, thus guiding consumers' demand to a higher level<sup>(10)</sup>.

This paper discusses diverse cultural connotations of Farming and Weaving Pictures as decorative patterns in artistic value, and their application as decorative patterns embodies the labor wisdom and emotion of the hard-working Chinese people.

In addition, Farming and Weaving Pictures provide precious historical data for the research of agricultural tools. For example, the painting of *Sieving* by Jiao Bingzhen depicts the sieve, an important farm tool used to screen grains in ancient times, which is still used in some rural areas today.

The *God Worshipping* among farming pictures by Jiao Bingzhen describes the scene of worship after a bumper harvest: beside the altar are five people, with four worshipping on bent knees and one bowing low with hands folded in front; on the altar are two candlesticks, a censer, and grains of rice, millet, wheat, and beans symbolizing good harvests; a wall outside the house is hanging with a picture of a man in a long robe sitting upright with one hand on his knee and the other holding up a plant. Who is this man? The author speculates the man is Hou Ji who was regarded as the god of cereals by folks in ancient China. In *The Classic of Mountains and Seas*, he was introduced as the son of the lord of heaven, and he brought the seeds of all grains to the mundane world. Therefore, people worshiped him during spring for later rich harvests and autumn for requiting his blessings. Both Jiao and Kuang's versions of *Sacrifice and Prayer*, which depict people bowing down or kneeling with their hands folded in front to pray for blessings, reflect people's good wishes. The pictures *God Worshipping* and *Sacrifice and Prayer* reflect the folk customs and beliefs of ancient Chinese people from a lateral perspective, providing image evidence for the study of folklore, especially in agriculture.

## (II) Preservation and Visual Communication Form of *Farming and Weaving Pictures*

As a product of political function, *Farming and Weaving Pictures* offer better intuition than texts. Image is more conducive to the communication of information and the understanding of the receiver. With the development of digital media technology in the information era, diversified information transmission methods provide more choices for the protection, inheritance, development, exploitation, and utilization of tangible cultural heritage. Technologies that are already used or can be possibly used for the digital presentation of traditional culture include digital image, digital simulation, 3D technology, virtual reality (VR), augmented reality (AR), mixed reality (MR), and digital animation technology.

Digital simulation technology can be used to save *Farming and Weaving Pictures*. This technology uses a high-precision scanner to scan the painting with high resolution. This method can not only save the ancient painting in the database, but also use digital micro-jet technology to spray high-simulation replicas on Xuan paper (rice paper) to accurately reproduce the images and colors of the original painting. This technology can preserve the original effect of *Farming and Weaving Pictures* for a longer period of time. In 2003, the Cultural Relics Press initiated the "Rescuing National Treasure-Class Painting and Calligraphy Replication Project" to replicate hundreds of ancient paintings and calligraphy and literature

works for museums with digital simulation technology, providing a way for the wider public to share the fruits of civilization in a free and equal manner.

In terms of the visual communication form of *Farming and Weaving Pictures*, we can use digital animation technology. Animation is a short film that takes text, graphics, and images as the basic visual elements, uses motion and time as the basic means, does not take plot narrative as the main purpose, takes animation or video as the main technology, and focuses on conveying certain concepts and facts. *Farming and Weaving Pictures* are static images spreading agricultural farming techniques in ancient times. Converting them into dynamic images can enable their real-time communication, make them materials for labor education, enrich the elements of agricultural museums, restore ancient farming situations, and provide vivid materials for agricultural historians to study the situation of ancient agriculture.

Besides, MR can be used to spread the pictures in an interactive way.

Based on the above discussion, the following are the exploration of using 3D digital animation technology for *Farming and Weaving Pictures*, and design ideas for practice.

### (III) Practice Research on Digital Construction of *Farming and Weaving Pictures*

The classic case of using 3D digital animation technology to make ancient Chinese paintings animated is the animated version of *Reading in the Autumn Forest* posted by the British Museum on Facebook (now Mate) in 2018. The animation takes the audience into the fascinating classical landscapes of China via 3D, moving shots, and changing points of sight. This section takes *Raking of Farming and Weaving Pictures* by Jiao Bingzhen (Figure 4) as the object for animation production and explores the production method and process with 3D animation production technology as the carrier.

Generally, 3D animation production includes three steps: pre-production, mid-production, and post-production.

I. Pre-production

Pre-production refers to the overall planning and design of animations before formal production with a computer, including script creation, animation storyboards, modeling, and scene design. Given the already available images of scene space and character modeling in *Farming and Weaving Pictures*, we only need to complete the design of the animation storyboards of the character and buffalo (the character swinging a bamboo pole, the character going forward, and the buffalo going forward).

The tools used in this production stage include storyboard paper, pencil, eraser, graphics tablet, and Photoshop.

2. Mid-production

This stage is completed by using relevant computer software and includes several steps of modeling, material, lighting, animation, camera control, and rendering<sup>(11)</sup>.

The software used in this stage is as follows:

The software used in this stage is as follows:



| Software Name | Version Number |
|---------------|----------------|
| Photoshop     | CC2019         |
| 3DMAX         | 2019           |

Model creation content:

| Model                | Name                                     | Software   |
|----------------------|--|------------|
| Scene model creation | Houses, rocks, trees and trestle         | 3DMAX 2019 |
| Prop model creation  | Rake, fence, bamboo pole, rope, shackle, |            |

|                          |                                 |  |
|--------------------------|---------------------------------|--|
|                          | hat, flag on fence              |  |
| Character model creation | Old farmer standing on the rake |  |

Material mapping content:

| Mapping Item      | Name  | Software         |
|-------------------|---|------------------|
| Scene mapping     | Houses, rocks, trees and trestle                            | Photoshop CC2019 |
| Prop mapping      | Rake, fence, bamboo pole, rope, shackle, hat, flag on fence |                  |
| Character mapping | Old farmer standing on the rake                             |                  |

Animation creation content:

| Animation Item                                   | Software   |
|--|------------|
| Rake moving forward                              | 3DMAX 2019 |
| Buffalo going forward                            |            |
| Old farmer standing on the rake, floating leaves |            |
| Wavy water                                       |            |
| Bamboo pole being waved in hand                  |            |

|                   |  |
|-------------------|--|
| Flag on the fence |  |
|-------------------|--|

After completing the above work, we entered the rendering stage. Rendering refers to drawing a complete picture or animation by a program according to the settings of the scene, object materials, maps, lights, and others. Rendering usually supports the output of video files in AVI format.

## 2. Post-production

The post-production of 3D animation mainly includes generating animated film and television files by editing the animation clips, sounds, and other materials previously made through After Effects according to the design of the storyboard script.

## Conclusion

The discussion on the evolution and value of *Farming and Weaving Pictures* fully reflects their cultural connotation and demonstrates their research value. The digital experience design of *Farming and Weaving Pictures* aims to (1) protect and inherit traditional culture, (2) illustrate the value of traditional culture and its practical significance to life in the contemporary cultural system, and (3) make cultivation methods of traditional Chinese farming understandable to provide a reference path for contemporary aesthetic education and an idea for the digital design of traditional paintings. It improves the communication efficiency of the relevant culture, expands the path of cultural content reproduction for pictures, and has certain reference values for the promotion and dissemination, and inheritance of traditional culture.

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