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Supplementary issue paper

Reconstructing lacquer technology through Chinese classical texts

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Lacquer has a long and ongoing tradition of use in Asia. Known as *qi* 漆 in China, its use can be traced back to the Neolithic period and it remains in use today. The earliest known Chinese archaeological lacquered object dates to approximately 6000 BCE. Many Chinese classical texts and historical documents over the last 8000 years mention lacquer and related information. An extensive investigation of Chinese literature from different time periods was carried out to search for useful information scattered throughout Chinese texts. This article outlines some of the highlights and research challenges.

Keywords: Lacquer, Chinese literature, Historical documents, *Qi*, *Urushi*

Introduction

In recent years, due to the improvement of technology and development of analytical techniques, scientific studies of Asian lacquer have entered a new phase. It is now possible to identify many of the materials included in historical lacquer samples using scientific analysis (Schilling *et al.*, 2014, p. 132). Science, however, can offer only one perspective on lacquer formulation and is not able to offer cultural context. It is important, therefore, to cross-reference test results with other sources of information in order to contextualize analytical findings. A literature review coupled to analytical results can make a particularly vital contribution to knowledge of historical materials and techniques.

China has some of the earliest archaeological evidence and historical records regarding lacquer, a long tradition of lacquer manufacture, and a well-documented history. This paper focuses on a preliminary survey of Chinese literature and historical documents to find information on lacquer. A systematic review of Chinese texts was carried out, ranging from fifth-century BCE ritual records to nineteenth-century CE imperial workshop documents. Selecting and interpreting this massive and scattered body of information are significant tasks. In the course of this process, the following questions were addressed:

- What should one be aware of before reading historical Chinese texts?

- What are some of the types of information recorded in these documents?
- What can one learn from them?

Some of the names and terms used in this article do not have an official or direct translation. To avoid misunderstanding and provide clarification, the transliteration of the terms includes the original Chinese characters/terminology and an English translation.

Background

The oldest known archaeological lacquer discovered in China is a wooden bow dating to approximately 5000–6000 BCE unearthed from a Neolithic site known as *Kuahuqiao* 跨湖橋, located in the Zhejiang Province (Gao & Bei, 2014). Many Chinese classical texts and historical documents over several thousand years (see Appendix 1 for a timeline) mention lacquer and related information. However, the majority of the records focus on the usage and symbolism of lacquered objects and very few contain in-depth manufacturing details. One of the earliest Chinese references to lacquerware is documented in the famous Legalist classic *Han feizi* 韓非子, written at the end of the Warring States period, in the third century BCE. It is stated in the chapter of *Shiguò* 十過 (*Ten Faults*) that:

... the legendary King Shun created his tableware from wood cut from the hills. After smoothing the traces of tool marks, they were then painted with black lacquer and brought to the palace ... This action was so extravagant that thirteen states refused to pay him allegiance. King Shun

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passed his Empire to King Yu, who decorated his ceremonial dishes with black varnish on the outside and red paint in the inside ... after becoming increasingly extravagant, thirty-three States refused to serve him. (Han & Chen, 2000, p. 221)

The original purpose of this text was to remind later rulers of the importance of living a humble life, because attention to refinement and luxury leads to corruption and disobedience. By referring to the legendary kings, however, the text also reveals valuable information regarding how lacquer entered the evolution of Chinese vessels and the changes in decorative techniques. Information such as this is scattered throughout Chinese historic literature, although many of these writings cannot be taken at face value.

Major challenges

Before delving into data collection, one needs to be aware of some major pitfalls encountered when reading and interpreting historical Chinese literature. These include literature identification, language complications, changes of definition, alterations of measurement, and reliability of the information.

Literature identification

Many of the useful and interesting pieces of information regarding lacquer are hidden in literature that appears at first glance to be unassociated. The obscure nature of some documents makes it difficult to identify which texts may contain useful information. For example, the eighteenth-century text *A Record of Yangzhou Gaily-painted Pleasure Boats*, *Yángzhōu huàfāng lù* 揚州畫舫錄 (Li, 1984) has manufacturing details on the creation of lacquered statues. The first-century BCE text *A Treatise on Salt and Iron*, *Yán tiě lùn* 鹽鐵論 (Huan & Zhang, 1970) mentions places of lacquer production and the value of lacquer. The seventeenth-century text *Notes after dinner at Jin Ao*, *Jīn áo tuì shí bǐjì* 金鰲退食筆記 (Gao, 1971) contains information about the Ming Dynasty imperial workshop and its lacquer production. This information is easily overlooked if one is searching only for lacquer-associated book titles.

Language complications

The majority of the texts are written in classical Chinese, which has no punctuation and uses terminologies that can be different from modern usage. If the reader punctuates the text incorrectly, it can lose meaning and interpretation becomes problematic. In addition, there may be multiple names for the same material and technology, due to regional differences and changes over time. For example, the metal inlay technique that involved cutting thin metal sheets into shape and adhering them to the lacquer surface, then

applying layers of lacquer and polishing the surface to reveal the metal designs was commonly refer to as *ping-tuo* 平脫 during the Tang Dynasty (CE 618–907) (Wang & Huang, 1983, p. 107). However, the sixteenth-century Ming Dynasty (CE 1368–1644) text *Xiushi lu* 髹飾錄 (*A Treatise of Lacquer Art*) refers to the same technique as *qian-jin-yin* 嵌金銀 (Wang & Huang, 1983, p. 106). In addition, in twentieth-century Fuzhou, the traditional *ping-tuo* technique evolved into a regional specialty known as *tai-hua* 台花 (Zhang, 1997, p. 122).

Terminology sometimes leads to difficulties in fully understanding the recipes, as in the case of one of the most commonly-used drying oils in China, *tong-yóu* 桐油 (tung oil). A number of different names are used to refer to tung oil depending on where it was collected, how it was processed and where it was used. For example, *xiù-you* 秀油 is a type of high-quality tung oil produced in *Xiushan* 秀山, a county located in southeastern Chongqing, whereas regular-quality tung oil produced outside of *Xiushan* can be referred to as *bai-you* 白油 (white oil) due to its lighter color (Xu, 1994). Furthermore, *pei-you* 胚油 or *míng-yóu* 明油 are names given to the type of tung oil created by heating the oil without any additives and cooling it at a rapid rate (Zhang, 2010, p. 316). Other names for tung oil include *guǎng-yóu* 廣油, *guāng-yóu* 光油, *shú-yóu* 熟油, and *dà míng-yóu* 大明油.

As a result of China's long history and extensive geography, even something as simple as powdered soot is referred to by multiple names, such as *méi-yān* 煤烟, *guō-méi-mò* 鍋煤墨, *guō-yān-zi* 鍋烟子, *hēi-yān-zi* 黑烟子, *wū-yān* 烏烟, *nán-yān-zi* 南烟子, *yān-zi* 烟子, and *zào-é-mò* 灶額墨. This use of multiple terms to refer to the same material applies to many other ingredients used in lacquer, which adds to the challenges of interpretation and translation.

Changes of definition

Not only do many materials and technologies have multiple names, but these names can refer to different things depending on the time and location. This is exemplified by the material *hufen* 胡粉 in Chinese or *gofun* 胡粉 in Japanese. It is a white pigment used in lacquer manufacturing. Its name literally means 'foreign powder', probably because it was first introduced to China through the Silk Road from places such as Sogdiana (Bi, 2013, pp. 308–9) (Cheng 1998). In the seventeenth-century Chinese technological text *Tiangong Kaiwu* 天工開物 (*The exploitation of the works of nature*) a detailed stepwise process for making *hufen* was recorded (Song et al., 1966). Based on the description, *hufen* is unmistakably a lead white powder. In most lacquer dictionaries and glossaries today the same term is commonly defined as 'shell powder'. For example, Herberts (1962,

p. 282) defines *hufen/gofun* as ‘a white powder of calcium-carbonate obtained by heating marine shells’. This is most likely due to the widespread Japanese influence on Western understanding in the lacquer field.

In the Nara period in Japan (CE 710–794), as in China, the term *hufen/gofun* commonly referred to lead white. Lead white was costly and easily discolored in Japan’s humid environment. Alternatives were sought and a white pigment produced by burning or grinding weathered shell was discovered. Instead of using a new name, shell powder replaced white lead powder as the main ingredient for *hufen/gofun* (Harada, 2013). In the Edo period (CE 1603–1868) shell powder-based *hufen/gofun* was mass-produced due to an increase in demand. Exchanges between the two cultures allowed lacquer artists to exchange skills and knowledge. The definition of the two characters ‘胡粉’ is confusing if there is not a clear understanding of the artist’s training, background, and time period. *Hufen* is just one of the many terms that have more than one definition.

Changes of measurements

In addition to confusing terminologies, deciphering the measuring scales in different historic recipes is also essential for their interpretation. It is often said that numbers are a ‘universal language’; however, this is only true if the measurement is understood correctly. Chinese culture has its own measuring units. Many of the units have an extensive history that can be traced back to the prehistoric period. According to legend, *Huang-ti* 黃帝 (the Yellow Emperor) set up the measuring units based on *huangzhong* 黃鐘 (a yellow bell). The dimensions of the bell became the length unit, its volume became the capacity measurement, its weight became the mass unit, and its sounds became the standards for music (Wu & Cheng, 1957, pp. 8, 22–23). It is a poetic story, but unlikely to be true. Chinese length units often relate to the dimensions of the human body. According to the first-century BCE Confucian classic *Dadai-liji* 大戴禮記 (*Rites of the Elder Dai*), the measurement of *cun* 寸 (Chinese inch) is from the finger, and the measurement of *chi* 尺 (Chinese foot) is from the hand (Dai & Lu, 1922).

Although many of the measuring units were set up at a very early period, the standards of the units were not necessarily carried over from one dynasty to another. The First Emperor, *Qin Shi Huang* 秦始皇, (260–210 BCE) and Emperor *Wang Mang* 王莽 (45 BCE–CE 23) attempted to set up a unified standard for measurements, but the systems did not last. This is clearly reflected in the evolution of the length unit *chi*. The seventh-century CE historical text *Sui Shū* 隋書 (*Book of Sui*) compared 15 different types of *chi*

used from the Zhou Dynasty (1046–256 BCE) to the Sui Dynasty (CE 582–618) and found all of them to be different from each other (Wu & Cheng, 1957, p. 8). From the Zhou Dynasty (534–550 BCE) to the Qin Dynasty (221–206 BCE) the length unit *chi* increased from 19.91 to 27.65 cm (Table 1). Perhaps the most extreme changes in the definition of measuring units occurred between the Eastern Jin (CE 317–430) and the Northern Wei (CE 386–534). Over 300 years, one *chi* increased by close to 30% in length, although it was not the only measuring unit to have experienced dramatic changes in Chinese history (Wang & Lin, 2008, p. 88).

Most scholars believe the changes were largely caused by desire of the aristocratic class to increase tax collection. In other words, the changes of measuring scales between different dynasties were probably due to political decisions rather than an inability to maintain measurement standards. In the present research, it was important to identify changes to the measuring units at different time periods, so that historical recipes could be deciphered and understood correctly. Future attempts to recreate ancient recipes based upon an accurate understanding of the correct measuring units would only then become possible (Tables 1–3).

Reliability of the information

Chinese literature and historical documents cover a massive range of information that varies in detail and quality. By cross-referencing the records with other disciplines and sources of information, one can sometimes identify unreliable materials in a text. This does not necessarily mean other information in the same document is unreliable, but it is important to evaluate historical records critically. Two examples serve to illustrate this point.

Example 1

The Northern Song Dynasty scholar *Fāng Shào* 方勺 (lived around the eleventh to the twelfth century CE) stated in his informative notes *Pō Zhái Biān* 泊宅編 that *luótian* 螺填 (mother of pearl inlay) is a decorative technique that originally derived from Japan (Fang & Yan, 1968). Archaeological records show that mother of pearl inlay existed in China during the Shang Dynasty (1600–1027 BCE) (Fan, 2014). The technique was further developed and became more elaborate in the Zhou Dynasty (1046–256 BCE) and Tang Dynasty (CE 618–907). This decorative technique was later introduced in Japan during the Nara period (CE 710–794) (Shikkoshi, 2012, p. 422). By the time of the Song Dynasty (CE 960–1279), the Japanese were already extremely skilful with mother of pearl inlay. With limited information at hand, *Fāng Shào* misunderstood the development of the technology,

Table 1 Changes in Chinese length units over time (Wu & Cheng, 1957, pp. 30, 54, 90)

	1 <i>chi</i> 尺 (Chinese foot) in metric value	1 <i>cun</i> 寸 (Chinese inch) in metric value	1 <i>fen</i> 分 in metric value
Shang Dynasty (1600–1027 BCE)	≈31.1 cm	≈3.1 cm	≈3.1 mm
Zhou Dynasty (1046–256 BCE)	≈19.91 cm	≈2.0 cm	≈2.0 mm
Qin Dynasty (221–206 BCE)	≈27.7 cm	≈2.8 cm	≈2.8 mm
Han Dynasty (206 BCE–CE 220)	≈27.7 cm	≈2.8 cm	≈2.8 mm
Eastern Jin (CE 317–430)	≈24.5 cm	≈2.5 cm	≈2.5 mm
Northern Wei (CE 386–534)	≈27.8 cm ≈27.9 cm ≈29.5 cm	≈2.8 cm ≈2.8 cm ≈3.0 cm	≈2.8 mm ≈2.79 mm ≈3.0 mm
Tang Dynasty (CE 618–907)	≈31.1 cm	≈3.1 cm	≈3.1 mm
Song Dynasty (CE 960–1279)	≈30.7 cm	≈3.1 cm	≈3.1 mm
Yuan Dynasty (CE 1271–1368)	≈30.7 cm	≈3.1 cm	≈3.1 mm
Ming Dynasty (CE 1368–1644)	≈31.1 cm	≈3.1 cm	≈3.1 mm
Qing Dynasty (CE 1644–1912)	≈32.0 cm	≈3.2 cm	≈3.2 mm

Notes: 1 *chi* = 10 *cun*, 1 *cun* = 10 *fen*.

bequeathing misleading information in his notes. Although his statements on *luótian*'s origin were incorrect, nonetheless they give an indication of the favorable perception of Japanese mother of pearl inlay in China during the Song Dynasty.

Example 2

Perilla oil is collected by pressing the seeds from *Perilla frutescens* var. *frutescens*. It is normally referred to as *rěn-yóu* 荳蔻油 or *sūzǐ-yóu* 蘇子油 in Chinese texts. Based on historical records, it is commonly believed to be the main drying oil used in Chinese lacquer before it was replaced by tung oil (Wang & Huang, 1983). Its first documented association with lacquer can be traced back to a late Han Dynasty (206 BCE–CE 220) medical text *Ming Yi Bie Lu* 名醫別錄 (Tao & Shang, 1986). However, a written account by a Southern Song Dynasty scholar *Chéng Dà-chāng* 程大昌 demonstrates that just because an oil is referred to as *rěn-yóu* does not necessarily mean it is perilla oil. He wrote:

When I was in Eastern Zhejiang, the local lacquer craftsman told me he used *rěn-yóu* in his production. I asked him how was *rěn-yóu* produced? The craftsman does not know the answer, so he brought the oil over for me to examine. It is actually tung oil. (Cheng & Zhang, 1991)

Although the dictionary definition for *rěn-yóu* is perilla oil, according to *Chéng Dà-chāng*, *rěn-yóu* can be another name for tung oil. It is not clear when and where this mixing of terminology began, but it demonstrates that just because a person is involved in the manufacturing process this does not mean that he knew what he was using, and his accounts might not always be reliable. This can apply to both historic literature and modern interviews and is why cross-referencing with other disciplines, sources of information, and scientific analysis is extremely important.

Table 2 Changes in Chinese mass units over time (Wu & Cheng, 1957, p. 60)

	1 <i>jin</i> 斤 (catty) in metric value	1 <i>liang</i> 兩 (tael) in metric value	1 <i>qian</i> 錢 (mace) in metric value	1 <i>fen</i> 分 (candareen) in metric value
Zhou Dynasty (1046–256 BCE)	≈228.86 g	≈14.93 g	≈1.49 g	≈0.15 g
Qin Dynasty (221–206 BCE)	≈258.24 g	≈16.14 g	≈1.61 g	≈0.16 g
Western Han (206 BCE–CE 9)	≈258.24 g	≈16.14 g	≈1.61 g	≈0.16 g
Eastern Han (CE 25–220)	≈222.73 g	≈13.92 g	≈1.39 g	≈0.14 g
Tang Dynasty (CE 618–907)	≈596.82 g	≈37.30 g	≈3.73 g	≈0.37 g
Song Dynasty (CE 960–1279)	≈596.82 g	≈37.30 g	≈3.73 g	≈0.37 g
Yuan Dynasty (CE 1271–1368)	≈596.82 g	≈37.30 g	≈3.73 g	≈0.37 g
Ming Dynasty (CE 1368–1644)	≈596.82 g	≈37.30 g	≈3.73 g	≈0.37 g
Qing Dynasty (CE 1644–1912)	≈596.82 g	≈37.30 g	≈3.73 g	≈0.37 g

Notes: 1 *catty* = 16 *taels*, 1 *tael* = 10 *maces*, 1 *mace* = 10 *candareen*.

Table 3 Changes in Chinese volume units over time (Wu & Cheng 1957, p. 58)

	1 <i>dou</i> 斗 in metric value	1 <i>sheng</i> 升 in metric value	1 <i>he</i> 合 in metric value
Zhou Dynasty (1046–256 BCE)	≈1.937 l	≈193.7 ml	≈19.37 ml
Qin Dynasty (221–206 BCE)	≈3.425 l	≈342.5 ml	≈34.25 ml
Western Han (206 BCE–CE 9)	≈3.425 l	≈342.5 ml	≈34.25 ml
Eastern Han (CE 25–220)	≈1.981 l	≈198.1 ml	≈19.81 ml
Tang Dynasty (CE 618–907)	≈5.944 l	≈594.4 ml	≈59.44 ml
Song Dynasty (CE 960–1279)	≈6.641 l	≈664.1 ml	≈66.41 ml
Yuan Dynasty (CE 1271–1368)	≈9.488 l	≈948.8 ml	≈94.88 ml
Ming Dynasty (CE 1368–1644)	≈10.737 l	≈1073.7 ml	≈107.37 ml
Qing Dynasty (CE 1644–1912)	≈10.355 l	≈1035.5 ml	≈103.55 ml

Notes: 1 *dou* = 10 *sheng*, 1 *sheng* = 10 *he*, 1 *he* = 2 *yue*.

Manufacturing processes

In addition to literature and historical documents, useful information can also be obtained from inscriptions on archaeological materials. The Han Dynasty (206 BCE–CE 220) ear cup unearthed in 1957 in Guizhou province has a line of inscription describing its manufacturing details:

In the third year of Yuanshi's reign 元始 [Emperor Ping of Han, CE 3], the Operating Officer of the Guanghan County 廣漢郡 manufactured a painted wooden ear cup for the imperial usage. The cup has the volume of one *sheng* 升 sixteen *yue* 龠 [c.616.5 ml, Table 3]. It is created by substrate maker Sù 素, lacquerer Lì 立, decorator Jiē 階, metal worker Cháng 常, painter Fāng 方, inscription carver Píng 平, polisher Kuāng 匡, workshop manager Zhōng 忠 ... (Zi, 2010)

The names of the individuals associated with the making of the ear cup were followed by a list of administrative staff. This inscription shows that the manufacturing of a single high-quality lacquer piece was divided into many different processes and different individuals were responsible for each step. Similar inscriptions were discovered on many archaeological objects from around the same time period. This information helps enrich our understanding of the Han Dynasty lacquer industry.

Imperial records

One of the best sets of surviving documents associated with Chinese lacquer is the Qing Dynasty (CE

1644–1911) court records, including the *Comprehensive Archival Records from the Qing Imperial Household Department's Workshops* 清宮內務府造辦處檔案總匯 (First Historical Archives of China, 2005) and the *Yuanming Gardens' Construction Method* 圓明園工程則例 (China National Microfilming Center for Library Resources, 2004). These contain information that includes the materials required for different lacquer decoration techniques, the price of individual materials used in lacquer workshops, the Emperor's comments on specific pieces of work, the time required for the execution, the amount of labor needed for particular techniques, and other associated information. Due to the scale of this massive database, tracking down useful information and interpreting it is a very time-consuming process. The following sections illustrate the range and depth of information that is contained in this important collection.

Recipe and manufacturing standards

Multiple recipes for manufacturing lacquer were recorded in the Imperial court records. The main purpose of these documents was to record and estimate the amount of materials and labor required for a specific technique. Although this information was not recorded in a handbook format with in-depth manufacturing details, useful information regarding material usage and the application process can be obtained from the text. For example, a recipe used to manufacture red lacquer for the Qing court states:

First, evenly apply a layer of raw lacquer on a smooth surface. This action is followed by four applications of foundation layers and one application of cloth layer. Afterward, a layer of *caoqi* 糙漆 [lower lacquer coating], a layer of *dianguang-qi* 墊光漆 [intermediate coating], and finally a layer of red-pigmented lacquer surface coating 光硃紅漆. (Wang, 2008)

This application process is followed by a detailed list of material and labor estimates for the same technique:

Every *chi* 尺 (c.32 cm, Table 1) uses:

- 5 *taels* 兩 (c.186.5 g) and 6 *maces* 錢 (c.22.2 g) of good quality raw lacquer 嚴生漆
- 4 *taels* 兩 (c.149.2 g) of pyrolusite (manganese dioxide) powder 土子麵
- 5 *cuns* 寸 (16 cm) of official silk fabric 二官絹
- 4 *maces* 錢 (c.14.8 g) of *tui-guang-qi* 退光漆 (a type of processed lacquer used to create the final surface)
- 4 *maces* 錢 (c.14.8 g) of *long-zhao-qi* 籠罩漆 (a type of coating lacquer with a high percentage of tung oil)
- 8 *maces* 錢 (c.29.6 g) of vermilion 銀硃

Every 1 *chi* (c.32 cm) and 5 *cun* (c.16 cm) of lacquer surface requires the effort of one lacquer workman (Wang, 2008).

Imperial designs and Japanese cultural exchange

The Qing Dynasty Emperor's personal taste had a great impact on the styles and designs of Imperial lacquerware. For example, the Yongzheng Emperor's (CE 1722–1735) love for *yang-qī* 洋漆 (foreign or Japanese lacquer) is clearly reflected in multiple court accounts. *Yang-qī* is a type of gold or silver decorative *maki-e* technique exported from Japan to China. The Yongzheng Emperor had his imperial lacquer workshop create imitations from the true Japanese *Yang-qī* pieces in his collection. An example of this action is documented on 28 October during the tenth year of the Yongzheng reign (1732), when the Emperor ordered the 'Oil and Lacquer Workshop' to create imitations of a *yang-qī* box. He gave specific instructions and comments on the work:

... the decorative patterns on this box are great. The Imperial Workshop can decorate its box according to this pattern in the future, however the style of the box does not have to be exactly the same. In addition, the quality of lacquer on the boxes you presented to me previously was good, however their decorative patterns did not capture the essence. Ask the craftsmen to be careful during their imitation ... (First Historical Archives of China, 2005, p. 405)

Furthermore, the Imperial Household Department's *Jishilù* 記事錄 (record of events) recorded conversations between the Yongzheng Emperor and one of his administrative officers, *Hǎi-wàng* 海望. The Emperor expressed his wish to increase the production of *yang-qī* in his Imperial workshop. He ordered a new cellar to be built near the workshop and even gave specific instructions on the new cellar's window size (First Historical Archives of China, 2005, pp. 202–3).

These records show the Emperor's involvement in the creation of Imperial wares. They also serve as supporting evidence about the use of Japanese artistic styles in the Chinese imperial court. Certain pieces mentioned in the records survive today. Scholars have matched some records to the Imperial collection and re-established the link between records and objects (Zhang, 2009). Due to the preservation of both historical records and physical materials, the Qing Dynasty court record is an exceptionally valuable source of information on historical lacquerware.

Conclusion

Scientific analysis alone cannot answer questions such as how many people worked on a single piece of

lacquer, what the standard procedures were in the lacquer industry at a particular time period, or the work flow in a lacquer workshop. This is where historical texts offer a different perspective, enrich the cultural context of an artifact and help to fill in missing pieces of the puzzle. Chinese classical texts and historic documents contain a wide variety of materials; from stories of legendary kings to workshop inscriptions and from Emperors' decrees to notes by a dejected scholar. Because of language complications, this information has not been widely available outside the Chinese speaking world. This research aims to bring more attention to the existence of those texts and make them available to a wider audience. Due to space limitations this article provides only an overview with some of the highlights and major research challenges.

In common with other written materials, information recorded in historic texts is subject to all the perceptual and cognitive mistakes associated with human error. They must be carefully examined and cross-referenced with other sources and disciplines and verified by scientific analysis. Through this multi-disciplinary diagnostic process, the links between the textual world and the reality of historic lacquered objects are slowly being rediscovered.

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References

- Bi, B. 畢波. 2013. The Sogdians and the Overland Silk Road Xiangyao Trade in Medieval China: From Jin to Tang Dynasty. 粟特人與晉唐時期陸上絲綢之路香藥貿易. *Taiwan Journal of East Asian Studies*, 10(2): 299–323 [in Chinese].
- Cheng, P. 鄭炳林. 1998. A Study of the *K'ang Hsiuhua Hsieh-ching Shih-ju Shu* and *Hsüan ho-shang huo-mai hu-fen li* 「康秀華寫經施入疏」與「炫和尚貨賣胡粉曆」研究. *Tun-huang T'u-lu-fan Yen-chiu* 敦煌吐蕃會番研究 3:196 [in Chinese].
- Cheng, D. 程大昌 & Zhang, H. 張海鵬. 1991. *Yan Fan Lu*. 演繁露續集. Beijing: Zhonghua Book Company [in Chinese].
- China National Microfilming Center for Library Resources. 全國圖書館文獻縮微複製中. 2004. *Yuanming Gardens' Construction Method*. 圓明園工程則例. Beijing: China National Microfilming Center for Library Resources.
- Dai, D. 戴德 & Lu, B. 盧辯. 1922. *Records of Ritual Matters by Dai Senior*: 13 volumes. 大戴禮記：十三卷. Shanghai: The Commercial Press [in Chinese].
- Fan, S. 范淑英. 2014. The Terminology of Luodian Mirror in the Tang dynasty and Its Technological Characteristics. 唐代螺鈿鏡的定名及其工藝內涵. *Archaeology and Cultural Relics*, 1: 89–94 [in Chinese].
- Fang, S. 方勺 & Yan, Y. 嚴一萍. 1968. *Records Collected While Residing in Bozhai*: 13 Volumes. 泊宅編十三卷. Taipei: Yee Wen Publishing Company.
- First Historical Archives of China and the Art Museum of the Chinese University of Hong Kong. 香港中文大學文物館合編

- 中國第一歷史檔案館. 2005. *Comprehensive Archival Records from the Qing Imperial Household Department's Workshops*. 清宮內務府造辦處檔案總匯. Beijing: People's Publishing House.
- Gao, S. 高士奇. 1971. *Notes After Dinner at Jin Ao*. 金鰲退食筆記. Taipei: Kwang Wen Publication.
- Gao, Z. 高志強 & Bei, Y. 貝玉芳. 2014. Discussion on the Lacquer Art Features of Jiangnan Region in New Stone Age. 論江南地區新石器時代漆器藝術的特徵. *Colleges*, 256(08): 129–30 [in Chinese].
- Han, F. 韓非 & Chen, Q. 陳奇猷. 2000. *Newly Annotated Han Feizi*. 韓非子新校注. Shanghai: Shanghai Rarebooks Publishing House.
- Harada, S. 1993. *Gofun* [accessed 6 July 2016]. Available at: <www.minase.co.jp/syouhin/kami/ryousi/gofun/gofun.htm>
- Herberts, K. 1962. *Oriental Lacquer: Art and Technique*. London: Thames and Hudson.
- Huan, K. 桓寬 & Zhang, D. 張敦仁. 1970. *A Treatise on Salt and Iron*. 鹽鐵論. Taipei: The Commercial Press.
- Li, D. 李斗. 1984. *A Record of Yangzhou Gaily-Painted Pleasure Boats*. 揚州畫舫錄. Yangzhou: Yangzhou Ancient Bookstore.
- Schilling, M., Khanjian, H., Chang, J., Heginbotham, A. & Schellmann, N. 2014. Chinese Lacquer: Much More than Chinese lacquer. In: A. Nevin, J.H. Townsend, S. Rivers, B. Knight, S. Chan, E. Yeung, C. Tang, & C. Liu, eds. *An Unbroken History: Conserving East Asian Works of Art and Heritage*. *Studies in Conservation* 59(S1) S131–3.
- Shikkoshi, G. 漆工史学会編. 2012. *A Dictionary of Lacquer Crafts*. 漆工辭典. Tokyo: Kadokawagakugei.
- Song, Y., Sun, E. & Sun, S. 1966. *Tian'gong Kaiwu; Chinese Technology in the Seventeenth Century*. University Park: Pennsylvania State.
- Tao, H. 陶弘景 & Shang, Z. 尚志鈞. 1986. *Supplementary Records of Famous Physicians*. 名醫別錄. Beijing: People's Medical Publishing House.
- Wang, S. 王世襄. 2008. *A Compilation of Handicraft Regulations and Precedents in the Qing Dynasty: Renovation Workshop, Lacquer Workshop, Nijin Workshop, and Oil Workshop*. 清代匠作則例彙編: 裝修作, 漆作, 泥金作, 油作. Beijing: Cathay Bookshop.
- Wang, S. 王世襄 & Huang, C. 黃成. 1983. *Annotated Treatise of Lacquer Art Xiushilu: Research on Chinese Traditional Lacquer Craft*. 髹飾錄解說: 中國傳統漆工藝研究. Beijing: Wenwu Publication.
- Wang, G. 王國維 & Lin, W. 林文光. 2008. *Wang Guowei Anthology*. 王國維文選. Chengdou: Sichuan Literature and Art Publishing House.
- Wu, C. 吳承洛 & Cheng, L. 程理濬. 1957. *The History of Chinese Measurements*. 中國度量衡史. Shanghai: The Commercial Press.
- Xu, J. 徐建青. 1994. The Oil Industry in the Early Qing Dynasty. 清代前期的榨油業. *Agricultural History of China*, 13(2): 59–68 [in Chinese].
- Zhang, Y. 張燕. 1997. Twentieth-Century Chinese Lacquer Art. 二十世紀中國漆器藝術. *Literature & Art Studies*, 3: 120–32 [in Chinese].
- Zhang, R. 張榮. 2009. A Comparative Study of Text and Existing Lacquer Objects from the Qing Yong Zheng Imperial Workshop. 見諸檔案與實物的清雍正朝造辦處漆器. *Forbidden City*, 11(178): 66–77 [in Chinese].
- Zhang, F. 張飛龍. 2010. *Chinese Lacquer: Technology and Conservation*. 中國髹漆工藝與漆器保護. Beijing: Science Press.
- Zi, F. 子房. 2010. Lacquer Industry During the Sanxingdui Period. 三星堆時期的髹漆業. *Wenshi zazhi*, 1(145): 32–34 [in Chinese].

Appendix 1: Chinese timeline

Date	Period
5000–6000 BCE	Neolithic Period (Kuahucqiao culture)
5000–3300 BCE	Neolithic Period (Hemudu)
3400–2250 BCE	Neolithic Period (Liangzhu culture)
3000–2000 BCE	Neolithic Period (Longshan culture)
2070–1600 BCE	Xia Dynasty
1600–1027 BCE	Shang Dynasty
1046–771 BCE	Western Zhou Dynasty
770–256 BCE	Eastern Zhou Dynasty
475–221 BCE	Warring States Period
221–206 BCE	Qin Dynasty
206 BCE–9 CE	Western Han Dynasty
25–220 CE	Eastern Han Dynasty
618–907 CE	Tang Dynasty
960–1127 CE	Northern Song Dynasty
1127–1279 CE	Southern Song Dynasty
1271–1368 CE	Yuan Dynasty
1368–1644 CE	Ming Dynasty
1644–1912 CE	Qing Dynasty