Xuande vs. Chenghua Qinghua

Difference in style and blue

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February 2020, London

Abstract

Chinese porcelains from the Xuande and Chenghua reigns enjoy great fame among all due to their improved techniques and outstanding style. Xuande blue and white porcelains were considered the highest value already by connoisseurs from Ming dynasty, whereas Chenghua wears were more appreciated because of their “doucai” [1]. In fact, Chgenghua blue and white are also highly valued because of their delicacy and elegance. Chenghua reign came only thirty years after Xuande, but how come the blue and white porcelains from the two periods have such evident differences in colour and style? This essay reviews the reasons by comparing the typical styles and cobalt ore resulting blue colour throughout the entire Xuande and Chenghua reigns and providing scientific analyses that can support the determination of period of time.

To simplify some of the terms and avoid confusion, the word “qinghua” is used for “blue-and-white porcelain” or “underglaze blue”. Chemical elements are written in this way: Co for cobalt, Fe for iron, Mn for manganese, Ni for nickel.

Table of Contents

Introduction

Even though short in duration, within the history of Ming dynasty Xuande (1425-1435 AD) and Chenghua (1464-1487 AD) reigns led remarkable creation of arts and crafts. Among all forms of arts, qinghua are the most appreciated from those reigns not because of the vast production and exports, but rather the distinguished style, design and brilliant blue colour. Although most connoisseurs praise higher Xuande qinghua, Chenghua qinghua is sometimes considered as an even match with its own improvement. Typical qinghua from these two reigns appear different due to the changes in style and variation in blue colour.

The way to tell the difference between typical Xuande and Chenghua qinghua are by their styles and colours. General speaking, Xuande wears are often large in size, whereas there are hardly comparable sizes existing from Chenghua qianghua. Colourswise, sharp blue with sometimes black sports appear on Xuande qinghua, making the contrast between blue and white sharp; Chenghua qinghua often shows a subtle blue greyish colour with more defined paintings. The former appear powerful, which provides a different feeling from the latter that looks more elegant or even feminine. Archaeological excavation and scientific tests have achieved progress in finding the reasons why the qinghua from those two reigns are different and the chemical compositions that determine the varied blue colour effects. It is due to the Co ore used that could be imported from a few places in the middle east or other parts of Asia.

This essay is divided into four sections:

- The first section “Style of qinghua from Xuande and Chenghua” discusses the cause of their style variation from the emperor’s personal preference, political situation and painting techniques
- The second section “Sources of cobalt” discover the reason why the blue colours vary during Xuande and Chenghua reigns; it also provides scientific proofs that support the opinions on when the imported Co and domestic Co are used.
- The third section “fish and aquatic plants” guides through the journey to explore the qinghua from the two reigns of the same design and enables one to tell the obvious difference between the two reigns

While having carried out thorough study by literature research and visits to museums and collections, I want to show special thanks to Helen Glaister for her guidance and Ana Luiza Lima da Silva for help with searching articles.

Style of qinghua from Xuande and Chenghua reigns

Qinghua from Xuande and Chenghua reigns differentiate in style. There are various reasons behind this, which are affected by emperors themselves as well as economic and politic situations during each reign. In addition, the porcelain painting technique also played an important role.

Taste of the emperors

When talking about the style of porcelain from the two reigns, one cannot ignore that they had great impact from the tastes of emperors themselves, which were the results of how they grew up and the environments of politics and economy at that time. The Xuande emperor is the grandson of the Yongle Emperor (1402-1424) and was said to be his grandfather's favourite. Xuande was well educated, not only showing his skill in politics but also talents in various art forms, such as painting and calligraphy [2]. He is a great patron of arts, comparable with Huizong from the Song dynasty, based on their artistic achievements. This surely contributed to the creation and acceleration of porcelain development. Therefore, Xuande qinghua tend to show classical and simple shape with relatively large size [3], though a broad range of sizes and shapes could be found. Actually, the main reason why Xuande Qinghua are in large size is that a lot were exported to middle East, made during Yongle and early Xuande reigns which had Xuande mark [4]. They were exclusively used in court, while those not being sent to court were destroyed and buried, preventing production elsewhere [4]. They are considered beautifully and lively painted, representing a peaceful era with powerful emperorship. The great connoisseur Qianlong emperor appreciated massively Xuande qinghua, placing it right next to his day bed in his studio, which is demonstrated in the painting shown in Figure 1 [5].

Figure 1 Qianlong emperor shi yi shi er, Palace Museum [6]

In contrast to Xuande emperor, Chenghua emperor had a miserable childhood, as a result of the political instability. He lived under the pressure of being deposed as the heir, threat of Mongol invasions and financial difficulties. He was in no way to comparable with Yongle and Xuande as a strong ruler and his power was controlled by eunuchs at court, as well as to some extent his own concubines [7]. Among all, Lady Wan was the most dominant one, who was recorded in the history as almost Chenghua emperor's only true wife, whom Chenghua was most dependent on [5]. Therefore. It is suggested that his taste towards porcelain was rather more feminine looking so as to please Lady Wan, so delicate paintings and shapes in smaller sizes were favoured. The lack of a powerful appearance of Chenghua qinghua leads them into particularly high aesthetic elegance – harmony and tranquillity [8], which is appreciated by many later collectors and connoisseurs. This is the opposite to the large sized Xuande qinghua with masculine-styled paintings (Figure 2 and 3). Even the Chenghua marks usually are in consistent calligraphy, which is considered the same as written by Chenghua emperor himself when he was young, soon after his accession to the throne at the age of eighteen [9]. Some experts believe that the contrast in sizes between Xuande and Chenghua might be due to the functions: Xuande qinghua were used mainly for decoration purpose, whereas Chenghua wears were more for daily use to be held in hands for a more intimate appreciation [10].

Figure 2 Xuande qinghua dish decorated with a dragon and clouds, diameter 16.2 cm [11]

Figure 3 Xuande qinghua dish decorated with a dragon and strings of flowers, diameter 19.5 cm [12]

It has to be noted that early Chenghua Qinghua followed the Xuande style, which is normal, because at the beginning of each new reign the art works do not have immediate change, and this only happens gradually with time [13]. That's why the shapes of the early Chenghua Qinghua resemble Xuande, particularly the bowls and dishes for imperial daily use [14]. They look to have the same designs in shape and motif but they are made in a more elegant and graceful style. Sometimes the Co blue from early Chenghua qinghua seems thicker but it does not show the so called "heaping and piling" effects (Figure 4 and 5) as explained above.

Figure 4 Early Chenghua qinghua dish decoated with a design of a dragon among ocean and waves, diameter 30.6 cm [10]

Figure 5 Early Chenghua dish decorated with dragon and strings of flowers, diameter 24.9 cm [10]

It is widely accepted that during Interregnum period (1436-1464) of the three short reigns of Zhengtong, Jingtai and Tianshun reigns, no imperial porcelain was produced. Accordingly, when exactly these unmarked bowls were produced has been much debated, some of them now are attributed either to Chenghua or some to Zhengtong/Tianshun [15]. Therefore, some of the early Chenghua qinghua may look in between the styles of Xuande and later Chenghua, which could be fired during the Interregnum [14].

Since the 1987-1988 Zhushan Jingdezhen excavation, the mysterious vale of Chenghua qinghua was being uncovered. The chenghua sherds were discovered, which were from pieces intentionally smashed and buried [16]. Among all, the Chenghua shards clearly can be divide into three main accumulations representing three periods of time during Chenghua reign [10]: early Chenghua up to 4th year of the era; mid Chenghua reign between 4th and 17th of the era; late Chenghua reign between 17th and 23rd of the era. What people think typical about Chenghua qinghua came mainly from the late era, where the domestic cobalt ore was used so they appear more lucid and pleasant. A few examples of both Xuandde and Chenghua from the three eras with similar decorations are shown below. In comparison with those from early and mid eras (Figure 6 and 7), the qinghua from late Chenghua era are the finest among all Chenghua production (Figure 8 and 9).

Figure 6 Mid Chenghua qinghua dish decorated with two lions and embroidered balls, diameter 41.8 cm [10]

Figure 7 Mid Chenghua qinghua deep dish decorated with dragon and phoenix, diameter 23.9 cm [10]

Figure 8 Late Chenghua qinghua large dish decorated with unicorns, diameter 33.2 cm [10]

Figure 9 Late Chenghua qinghua dish decorated with lions and balls, diameter 24.9 cm [10]

Indeed, it is thought that there are three reasons for the destruction of the fired Chenghua porcelains: slight fault; rejection of a certain design; excess of the number ordered [16]. We can only assume that Chenghua emperor had quite different aesthetic taste from his ancestors and even predecessors, he preferred a perfect elegance not allowing any imprecision such as blurring of blue or "heaping and piling" effects. It is said that Chenghua emperor's approach to the porcelain production was as extravagant as his fascination of Tibetan Buddhism. [7] In addition, he did not bear any imperfection in porcelain, smashing the imperfect ones rather than selling them as second quality. He made sure that flawless porcelains were produced under such high standards. As a result, the quantity of qinghua produced in the late Chenghua era was the greatest during the last 6 years of his reign (Figure 10). Several materials were found complaining about the large cost for the production and also the corruption of the eunuchs supervising the porcelain production, which implied that the production in this era was increased [16].

Figure 10 Chenghua qinghua with a dragon among ocean and waves, diameter 30.9 cm, Au Bak Ling Collection, Hong Kong [16]

Way to apply cobalt

The Xuande qinghua let the blue colour overlapping layers exhibit the nature change of shade. The "heaping and piling" effects associated with Xuande qianghua are resulted from the use of imported Fe-rich Co that will be explained in the later chapter [7]. When the Co materials contain more Fe, depending on the concentration, how refined the grands of the Co ore and how heavy the brush work, after being fired at high temperature Co and Fe form different substances exhibiting various shades of blue colours, blue, greenish, brownish, blackish, etc (Figure 11) [2]. This makes the Xuande qinghua look more sparkly and alive.

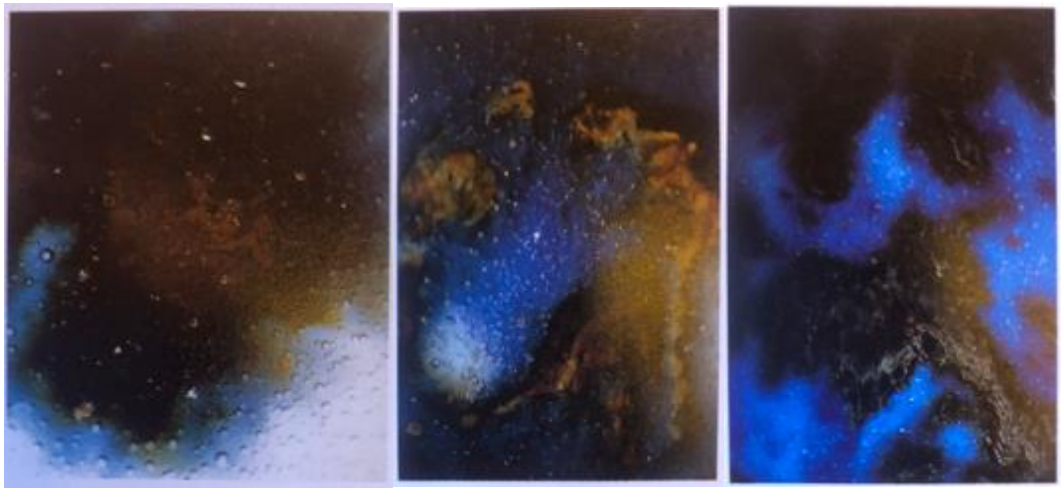

Figure 11 Surface effect of blue colour on Xuande qinghua: (left) browm-green crystaline spot; (middle)brown-yellow crystaline spot; (right) Iron brownish crystaline spot

Sometimes, the blue colour looks like it is sweeping away from the glazed surface, which is due to the heavy brush work leaving high concentrated block of colour pigment. This would

have been considered as a fault by Chenghua qinghua, but conversely becomes the signature of beauty for Xuande qinghua (Figure 12).

Figure 12 (Left) Xuande qinghua dish decorated with lotus, diameter 17.3 cm; (Right) sweeping blue [3]

Two examples of Chenghua qinghua are shown with the same decoration below. The Chenghua qinghua has a more refined look compared to Xuande qinghua, presented by the white body and smooth blue colour. The "blank" space is left on purpose to highlight the whiteness of the body and the blue decorations. The painting is quite soft and has lighter and smoother brush work compared with that of Xuande qinghua [8], where the colour seems to be dipped on the surface with tiny brush repeatedly with force creating a shaper contrast [17]. For Chenghua qinghua, it is often found that the outline is darker than the blue filling and the transition is smooth, showing a mature control of the use of colour application [7]. This grey and subtle appearance is realised by using the "ping deng blue" obtained from inland [7]. Particularly for late Chenghua, the blue colour is evenly dispersed and remains constant, while the lines are delicate without showing the running pigment [10]. Chenghua qinghua seldom come cross the "black spots" and the grey blue colour is evenly and smoothly spread (Figure 13).

Figure 13 (Left) Late Chenghua qinghua small bowl decorated with lotus and aquatic plants, diameter 8.9 cm, excavated at Zhongshan, 1987-1988 [10]; (Right) Chenghua qinghua jar decorated with lotus and aquatic plants, height 10.3 cm, Au Bak Ling Collection, Hong Kong [16]

Source of blue

The main reason why Yongle and Xuande qinghua were highly appreciated is because of their heavy brilliant blue colour. Blue colouring materials come from different places, which were imported and locally sourced.

Imported blue vs. domestic blue

Connoisseurs from late Ming dynasty generally agreed that Yongle and Xuande qinghua all used the imported Co, thus leading to a heavy blue colour [18]. For centuries the origins of imported Co blue remain mystery. In general, it is believed that it was imported to China from the Middle East. However, no clear record showing the exact location could be found. Chemical research proved that Co blue applied on early Ming dynasty qinghua including Yongle and Xuande is high in Fe and low in Mn, which is in agreement with the impurity content of the Persian Co. It is therefore widely recognised that the Co "Sunima qing 苏泥麻青" (qing is blue in Chinese) was from Iran. However, the term Sunima itself has an unclear origin and the different versions of names have been derived since mid-Ming dynasty, including sumali, suboni, sunibo [19]. They all meant the same Co materials, but none of them makes sense to be Chinese phonetics, thus must be from foreign languages. However, this may not be the only type of imported Co ore to have been initially employed in the Yongle reign [20].

In contrast, starting from Chenghua, more locally sourced Co "ping deng qing 平等青" or "bo tang qing 陂塘青" from Jiangxi province was used resulting in a lighter greyish blue. The analysis shows that it contains 0.2-5.8 wt% Co and 20-30 wt% Mn [21].

Since 1980s, excavation of Zhushan discovered some Xuande sherds that bear light greyish blue paintings, comparing with those identified to be earlier qinghua from yuan dynasty and Yongle reign. After those samples being tested by the Shanghai Institute of Ceramics of the Chinese Academy of Sciences (SICCAS), it is concluded that Hongwu and Yongle qianhua contains higher Fe_2O_3 and low MnO, whereas Xuande qinghua contain low Fe_2O_3 and high MnO [22]. It strongly suggests that before Xuande merely imported Co was used for qinghua, but the situation changed starting from Xuande period when local Mn-high Co ore was discovered. However, it is widely agreed that folk kilns already started to use local Co ore to reduce the cost since early Xuande dynasty before Chenghua [23]. This seems to be correlated to the historical events, when the early and middle Chenghua reign still continued the trade ban

launched by the early emperors during the Interregnum period, so the craftsmen were obliged to find local "bo tang qing" Co ore and to develop new technologies in order to continue the qinghua production. This event made the qinghua production independent from the imported Co sources, accelerating the production quantity. Chenghua Co is mainly domestic sourced, well refined and contained little impurity [8].

Moreover, it is fair to say that not all Xuande qinghua used imported cobalt. It is also likely that both types of cobalt materials are blended or combined to create certain effects in the blue paintings (Figure 13) – imported blue for dragon and local Co for waves presenting different shades making the dragon more vivant [23]. Judging only by the blue tones, Chinese connoisseurs often put Xuande blue colours into three groups: imported sunibo qing, domestic qing and mixed qing [24].

Figure 14 Xuande qinghua dish with a dragons a dragon among ocean and waves, diameter 17.8 cm [25]

Recent excavation in 1980's from Zhushan Jingdezhen has shown that early Chenghua qinghua also applied darker blue, continuing the style of Xuande. Some research also showed that it was a mixture of both imported and "bo tang qing" that was used in Chenghua qinghua that made the blue similar to Xuande [10]. In addition, some of the early Chenghua pieces also bore Xuande marks, making Chenghua qinghua the earliest copies of marks from the previous reigns [7] (Figure 15). This in turn shows two things: the imported Co was not distinct entirely throughout the Chenghua reign and Xuande qinghua was so well regarded that even imperial kilns from the later reigns copied them. Therefore, the use of imported Co cannot be excluded from Chenghua qinghua in particular during early Chenghua reign.

Figure 15 Two late Chenghua qinghua mall bowls decorated with baoxiang flowers with one having Xuande mark [10]

Chemical composition of blue colour

Here, I want to shed more light on the blue colour and effects from the perspective of modern chemistry along with the scientific methods used to determine the chemical composition of qinghua from different reigns of Ming dynasty.

Chemically speaking, the blue colour is derived from Co that comes from its substances, such as cobaltite (CoAsS), smaltite (CoAs2) and asbolane (a hydrated manganese mineral). In addition, other elements as impurities are contained in the Co sources, e.g. Mn, Ni, Cu, Fe, Zn, Pb [26]. The different starting materials and recipe making qinghua led to the variations in chemical compositions of qinghua, thus showing different appearance of their blue colours.

Since 1980s scientific methods have been developed to determine the chemical composition of qinghua [27]. Among all, the most popular one is X-ray florescence (XRF), which is non-destructive qualitative method that does not make any damage to the porcelain. The compositions of various sherds of qinghua made during different periods of Ming dynasty were compared [25, 26]. This method provides the intensity ratios of the different elements that are contained in the blue areas, glaze and the body materials. Some results analysing the Chenghua qinghua pieces on the portion painted in blue found that the Mn/Co ratio was between 2 and 4, determined by the intensities of Mn and Co content (Figure below), which is similar to results from earlier research analysing porcelains from Qing and republic periods [28]. Another

research took samples before Xuande reign showed the Mn/Co ratios to be less than 0.5 [29]. However, the complexity of colouring materials used for Ming Qinghua cannot be concluded in such a simple manner, a few experiments from more recent research with various methods are chosen below to provide a detailed view.

Experiment 1

The materials come different sources, such as the imported "Sumani qing" and "Mohammedan Blue" as well as the local "bo tang qing". Their chemical compositions may be different because of their varied locations, thus could be detected by energy dispersive X-ray fluorescence (EDXRF) [26]. A research carried out by Miao *et al* established a database by analysing a wider range of qinghua from Yongle to republic periods [26]. In general, the early Ming dynasty and republic periods exhibited a low Mn/Co ratios, whereas Chenghua and Qing dynasty showed a much higher Mn/Co level (Table 1). This is in consistence with the results from the earlier research, suggesting that Yongle and Xuande mainly used imported Co while Chenghua applied more domestic Co.

Table 1 The X-ray fluorescence intensities of characteristic elements from typical spectra [26]

	MnKα	CoKα	NiKα	FeKα	ZnKα	PbLα	MnKα/CaKα	CaKα/NiKα
Yongle Xuande (Ming)	24.24	139.01	4.54	725.33	5.38	44.17	0.17	30.62
Chenghua (Ming)	49.05	9.42	13.81	276.34	4.26	9.88	5.21	0.68
Jiajing (Ming)	84.61	90.83	20.16	403.97	8.31	15.7	0.93	4.51
Wanli (Ming)	131.17	27.86	12.13	328.99	6.56	11.16	4.71	2.3
Kangxi (Qing)	473.07	120.92	13.76	295.59	4.94	12.98	3.91	8.79
Guangxu (Qing)	207.42	50.15	7.22	381.81	5.44	11.18	4.14	6.95
Republic	136.15	231.79	8.55	444.54	6.01	28.71	0.59	27.11
Modern	26.74	31.65	2.99	323.03	147.33	7.91	0.84	10.58

Meanwhile, the contents of Fe and Pb in Yongle and Xuande are also greater than the rest of the periods (Figure 16). The colour of Fe_2O_3 is black, so this explains the "black spots" spearing on the surface of early Ming qinghua blue that have become the characteristics of that period.

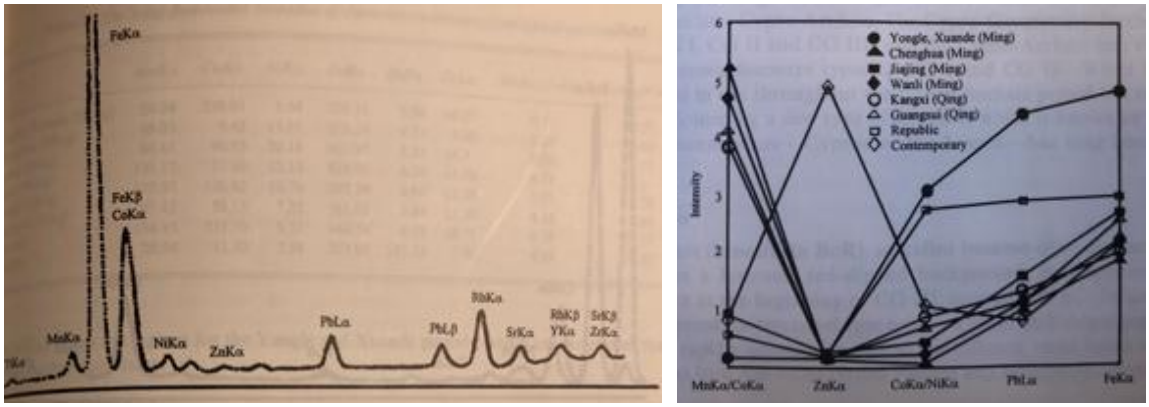

Figure 16 (Left) A typical X-ray fluorescence spectrum of a blue and white porcelain in the period of Yongle and Xuande [26]; (Right) The distribution of intensities of characteristic elements in typical X-ray fluorescence spectra [26].

Experiment 2

Other techniques including transmission electron microscopy (TEM) and scanning electron microscopy (SEM) in combination with energy dispersive spectrometry (EDS) are also used to provide imagines and chemical compositions on the selected blue areas on Ming qinghua specks. The results show that Yuan and Hongwu samples mainly contain Fe and its main phase is magnetite (Fe_3O_4) as well as a little Co, whereas those on Xuande and Chenghua samples consists of small $MnFe_2O_4$ crystallites, which contain mainly Mn and little Fe, Co and even Cu [30] (Figure 17 and

Table 2).

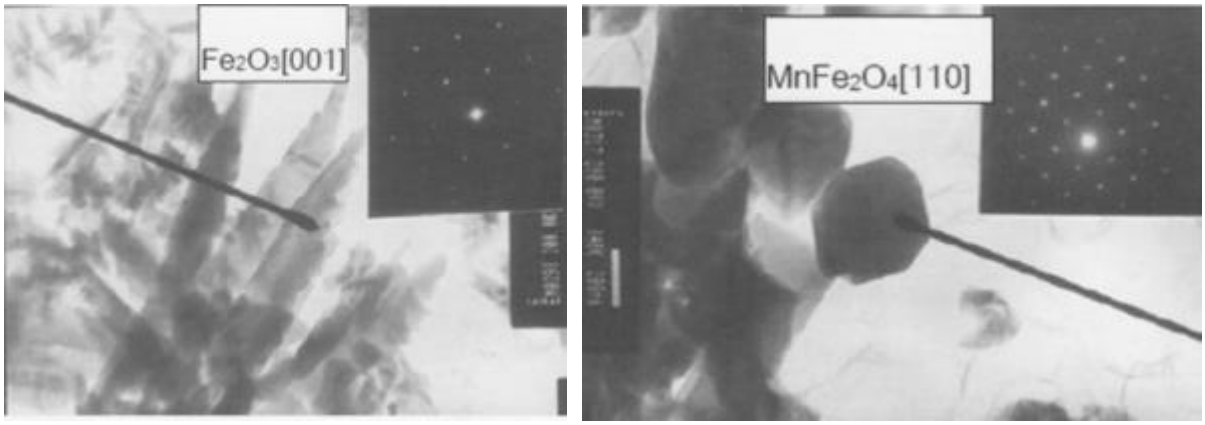

Figure 17 TEM photograph [30] of sample from: (left) Hongwu, magnification x8000; (right) Xuande, magnification x40000

Table 2 Main phases in specks and Mn, Co and Fe content in blue pigment of Jingdezhen imperial specimens (wt%) [30]

No	Name	Period	Main phases in specks	Co	Fe	Mn
1	Y-1	Yuan dynasty	α-Fe	3.05	13.39	0.11
2	Y-2	Yuan dynasty	Fe_3O_4	1.02	6.73	0.06
3	MH-1	Hongwu period of Ming dynasty	Fe_3O_4, Fe_2O_3	1.35	21.97	0.13
4	MH-2	Hongwu period of Ming dynasty	Fe_3O_4, Fe_2O_3	2.37	11.81	0.11
5	MX-1	Xuande period of Ming dynasty	$MnFe_2O_4$, compound of Fe, Co and Mn	1.69	1.33	9.33
6	MX-2	Xuande period of Ming dynasty	$MnFe_2O_4$, compound of Fe, Co and Mn	1.99	3.78	9.61
7	MC-1	Chenghua period of Ming dynasty	$MnFe_2O_4$, compound of Fe, Co and Mn	3.21	1.42	20.56

Clearly, the chemical compositions of specks on qinghua depends on the Co ore used. It is interesting that this research has divided Jingdezhen qinghua into two groups: prior to Xuande period of Ming dynasty that used imported Co that with a higher Fe content and low Mn content; during and after Xuande period that used local Chinese Co with high Mn content and relatively low Fe content [30] (Figure 18). This conclusion is different from the previous results that seem to put the divider – whether imported Co was used of the two group between Xuande and Chenghua.

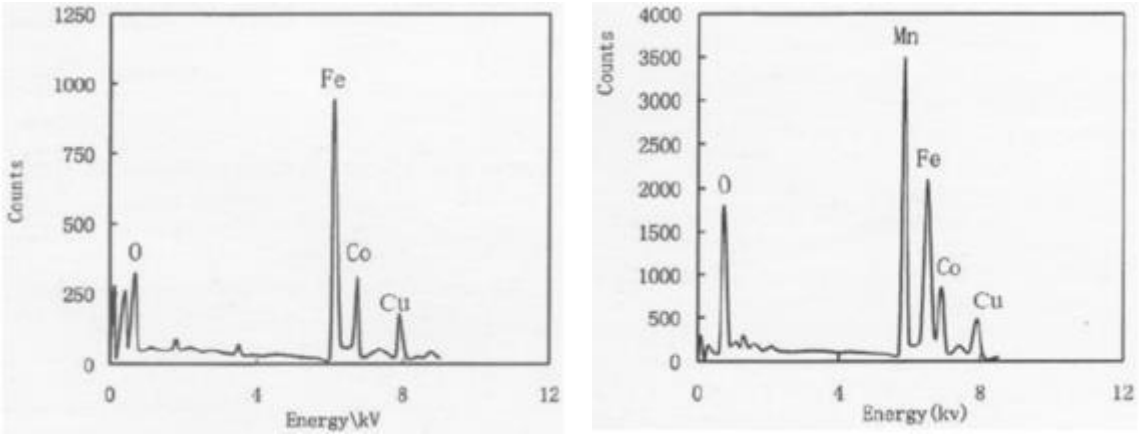

Figure 18 EDS energy spectrum of: (left) sample from Yuan dynasty [30]; (right) sample from Chenghua [30]

Experiment 3

A more recent research using synchrotron radiation X-ray fluorescence (SR-XRF), the same technique but with a stronger energy for detection, was carried out to compare the Fe/Mn

between light blue, dark blue and clear glaze areas [31]. Clearly, the Fe/Mn ratio detected on the light blue areas can be divided into three groups (Figure 19): early Ming up to Yongle (yl), mid Ming from Xuande (xd) to Hongzhi (hz) and late Ming from Zhengde (zd) to the end. There is little debate for early Ming dynasty, the same as in Yuan dynasty, where imported Co was almost exclusive used [32]. This segregation is different, as Xuande is usually put to early Ming dynasty. This research seems to be in good agreement with the Experiment 2 showing that from Xuande reign 1425 AD, Co blue already started to contain more Mn. Although some other research showed higher Fe content for Xuande reign, it is still reasonable to say that the domestic Co ore started to be widely in use during Xuande reign, which is a transition period where both imported and local Co were used. This is already shown from the painting style and effect of a typical Xuande qinghua dish in the chapter above. This research showed a variable Fe/Mn ratio for Chenghua samples, with most being consistent with Xuande and Zhengde (zd). There is no historical record that imported Co was used in Chenghua reign because the trade ceased after Xuande reign due to political instability and the imported Co was gradually used off by then [31]. It has to be mentioned that Fe/Mn ratio increases again from Zhengde (zd) period, but still remains lower than early Ming dynasty. This is due to another imported Co ore called "hui hui qing (回回青)", which is said to come from Western Asia tribes or even Indonesia [31]. It was often used together with domestic Co because of its rarity. The blue colour from this period can be demonstrated by a Wanli qinghua sample in the later chapters (Figure 29). However, some other record said that hui hui qing was imported as early as Xuande period and blended with other imported and local Co [20].

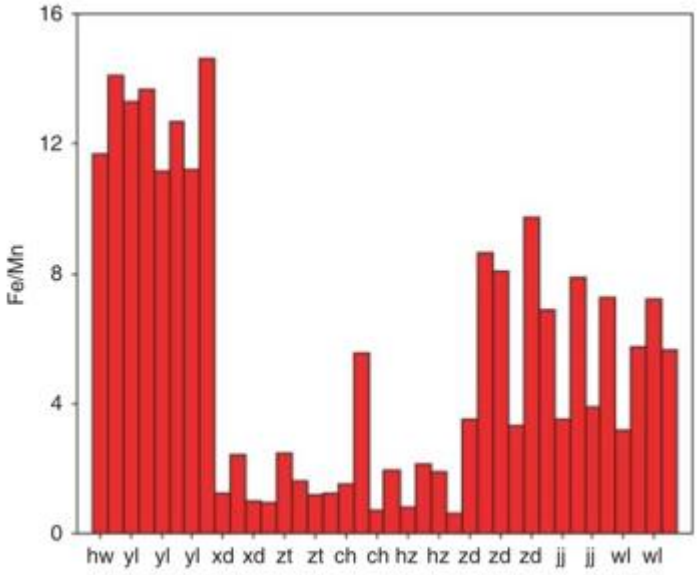

Figure 19 A bar chart of the Fe/Mn ratios in the light blue area over the whole Ming dynasty [31]

Glaze

The surface of Xuande qinghua is said to look well refined, smooth but having so-called orange peal undulations on the glaze. This and the bubbles are the result of kiln firing temperature and composition of the glaze [2]: higher temperature, larger and looser bubbles; lower temperature, smaller and denser bubbles. To certain extent, the bubbles break, resulting in very fine needle like holes, constituting “orange peal”. This means that Xuande porcelain usually overcome high firing temperature. The glaze layer for Xuande is often thick, sometimes concealing the underglaze blue; but when the glaze is evenly spread onto the surface, the blue colour appears sharper.

Chenghua glaze shows a touch of warm white similar to that of teeth, in comparison with Xuande that is slightly blue. The surface of the glaze is smooth having no bubbles or shrinking of glaze exposing clay. The glaze is firmly attached to the clay, with no crack [8]. Based on the shards excavated from Zhushan late Chenghua era, they bear a whiter biscuit and jade-like transparent glaze compared to Xuande qinghua, which exhibits a smoother feeling. In addition, the glaze has a waxy texture and the potting is thin and delicate [9].

Seen from results of the chemical composition tested by SICCAS, less Fe_2O_3 and more Al_2O_3 are contained in the Chenghua body than Xuande (Table 3). Less Fe_2O_3 and calcium oxide (CaO_2) contents in Chenghua body make less Fe dissolve in the glaze under reduction firing, thus the glaze remains clearer than Xuande. This is believed to have something to do with stricter standard applied to control and improve the glaze and clay quality set up by Chenghua emperor [10].

Table 3 Chemical composition of bodies and glazes of Xuande and Chenghua wares [10]

Description		Chemical Composition											
		SiO_2	Al_2O_3	CaO	MgO	K_2O	Na_2O	Fe_2O_3	TiO_2	MnO	CoO	P_2O_5	Total
Shard of Xuande qinghua	Body	70.84	19.03	0.75	0.30	3.11	3.54	0.60	0.28	0.01			100.46
	Glaze	70.74	14.16	6.79	1.36	3.10	2.76	0.97		0.77			99.95
Shard of Chenghua qinghua	Body	73.66	221.24	0.12	0.15	3.12	0.60	0.59	0.09	0.02			99.49
	Glaze	71.14	15.12	4.46	0.28	5.68	1.88	0.82	0.11	0.10	<0.01	0.08	99.67

Fish and aquatic plants

Here I want to put together a whole range of qinghua having the same motif throughout Xuande and Chenghua reigns for comparison. By going through the images, one can fully understand the difference between the two reigns and appreciate their beauties.

One of the most common and beautiful motifs is fish amongst lotus and aquatic plants (鱼塘莲藻纹) [18]. It appears on various forms, such as cup, bowl, dish, etc (Figure 20-22). It started to be become popular throughout Xuande to Chenghua. It is believed that this motif appeared as carving on ding kiln during Song dynasty and using underglaze blue started from Yuan dynasty.

Figure 20 Xuande qinghua brush-washer, xi, painted with fish and lotus, diameter 18cm, excavated at Zhongshan, 1993 [18]

Figure 21 (Left) Xuande qinghua bowl, wan, painted with fish and lotus [18]; (Right) Xuande Holly-hock shaped bowl decorated with fish and aquatic plants in a lotus pond, dimeter 18.4 cm, National Palace Museum no5157 [2]

Figure 22 Xuande qinghua dish decorated with fish and aquatic plants in a lotus pond, dimeter 22.0 cm, National Palace Museum no. 4897 [2]

The shape (Figure 23) is inspired by the Islamic metalwork called metal bell shaped bowl (jinzhongwan).

Figure 23 (Left) Xuande qinghua bell-shaped bowl, jinzhongwan, painted with fish and lotus, diameter 15.8 cm, excavated at Zhushan, 1993 [18]; (Right) Xuande qinghua bell-shaped bowl, jinzhongwan, painted with fish and lotus, excavated at Zhushan, 1993 [18]

The samples below (Figure 24) have deep blue colour and it is painted white but not only leaving white blank space. This kind of porcelain with white decoration on a blue background was made as early as Yuan dynasty. This is an inverse design of qinghua.

Figure 24 Xuande white and blue (up left) stem bowl, bazhan, decorated with fish [18]; (up right) bowl with fish and water-plants, diameter 22 cm, National Palace Museum [3]; (Down) dish white fish and aquatic plants in a lotus pond, dimeter 21.3 cm, National Palace Museum no. 9709 [2]

Some rare examples are found to have blue painting on turquoise glaze (Figure 25).

Figure 25 Xuande blue and turquoise bowl, wan, painted with fish and lotus, diameter 20.3 cm, excavated at Zhushan, 1988 [18]

The motif usually contains four different types of fish species on the exterior, qingyu (a type of mullet) (Figure 26), baiyu, liyu (carp) and guiyu (mandarin fish) swimming amongst lotus and aquatic plants. All each elements involved into this motif make up a Chinese expression called “qing bai lian jie” [18], meaning “blue and white lotus is pure” and qingyu has the same sound as “blue” in Chinese as well. This expression is quite often used for officials to remind them of be incorrupt and remaining honest. Since the motifs containing fish and lotus, it can also be understood as “lian nian you yu” [2], meaning “there are fish among many lotus”, wishing people year and year good wealth and abundance.

Figure 26 Xuande qinghua bowl with fish and aquatic plants in a lotus pond, dimeter 21.8 cm, National Palace Museum no. 13483 [2]

Although the same motif has been found common in Chenghua reign, no bowl or dish has survived (Figure 27). Figure 27 (Right) below has the most similar painting but without fish.

Figure 27 (Left) Chenghua qinghua bowl with fish and aquatic plants reserved on a ground of waves, diameter 18.5 cm, excavation Jingdezhen Zhushan [14]; (Right) Chenghua qinghua cup with lotus and waterweeds in a pond, diameter 8.7 cm, National Palace Museum no. 16245 [13]

There is only one stem bowl with underglaze blue and copper red that bear the same motif in a private hand (Figure 28) [16]. The waxy surface and soft tone of blue make sure that it is a late Chenghua production. The four fish in a thick copper red swim amongst aquatic plants painted with underglaze blue.

Figure 28 Chenghua stem bowl with underglaze cobalt blue and copper red decoration, dimeter 16.1 cm, Au Bak Ling Collection, Hong Kong [16]

The same motif continued to show up after Xuande and Chenghua reigns, but later productions cannot compare with Chenghua qinghua, in terms of imperfection and quality, such as that from Wanli period with Xuande mark below (Figure 29).

Figure 29 Wanli qinghua with Xuande mark with two breeds of fish swimming in opposite directions among lotus and other water, diameter 17cm [33]

Summary

Xuande and Chenghua qinghua have the highest aesthetic value among all from Ming dynasty. There are obvious differences between typical qinghua from the two reigns, partially due to the taste of each emperor and eco-political situations at that time. The comparisons in style, blue colour and glaze are listed in Table 4 below.

Table 4 Difference between qinghua from Xuande and Chenghua reigns

Reign	Xuande	Chenghua
Style	Larger size for decoration purpose; powerful looking; rough brush work	Smaller size to hold in hand; feminine feeling and more elegant; fine brush work
Blue colour	Deep blue with dark spots; containing more layers of blue; sometimes combined with blue-grey colour in the painting; often heaping and piling effect; blurring and sweeping blue	Early and mid ears are deep blue, but most those from late era look blue greyish; outline darker than blue filling
Glaze	Orange-peal undulations and bubbles on the surface; thick and slightly blueish	Smooth and waxy surface texture; teeth white biscuit and jade-like transparent; no bubble or glaze shrinking

Scientific research, using methods such as XRF, TEM, SEM, etc., uncovered the chemical composition of blue colour and glaze from qinghua of these two reigns and explained the reasons why the blue colour effects are different:

1. Imported Co blue called “Sumali qing” from early Ming dynasty contained more Fe as an impurity leading to a deep blue colour and dark specks
2. Starting from Xuande more and more domestic Co called “bo tang qing” was involved; it contains higher Mn and less Fe, giving a softer greyish blue colour
3. One should not put a sharp line between Xuande and Chenghua qinghua in terms of types of Co; there is certainly an overlap from the end of Xuande reign and beginning of Chenghua reign, when both imported and domestic Co materials were applied.
4. Imperial kilns used less imported Co by end Xuande and Chenghua reign used mainly domestic Co, whereas folk kilns might have started to use domestic Co from early Xuande reign.

The scientific research did prove the sources of blue colour and support records regarding the qinghua production technologies and historic events having impact on the its quality. However, more samples sourced from qinghua along the trade routes need to be analysed to further investigate locations where Co materials were imported, which would help picture the evolutions of qinghua as well as the society throughout Xuande and Chenghua reigns.

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