Changes in the Characteristics of White Porcelain Decorated with Underglaze Iron-brown Produced in Joseon Official Kilns

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Introduction

White porcelain decorated with underglaze iron-brown (鐵畵白磁, *cheolhwa baekja*) is painted using an iron pigment the main component of which is ferric oxide (Fe2O3). This pigment, which was called *seokganju* (石間朱, red ocher) during the Joseon period (朝鮮, 1392–1910), is created by refining the pigment after combining it with certain components of clay and glaze, including feldspar, quartz, and limestone. Iron has long been used as a pigment in a variety of ways, as it is one of the decorative colorants most available in nature and readily usable. The official kilns in Gwangju, Gyeonggi-do Province that produced Joseon court wares continuously used iron oxide to decorate white porcelain.

White porcelain decorated with underglaze iron-brown from the official court kilns have been much studied. Most investigations of this type of white porcelain have focused on the stylistic changes apparent among extant examples, particularly those from the seventeenth century. However, since white porcelain decorated with underglaze iron-brown was made throughout the entire period when the official kilns were in operation, limiting studies to seventeenth-century porcelain wares restricts a more comprehensive understanding of the characteristics of this type of ware. Moreover, recent discoveries of numerous porcelain wares, including white porcelain decorated with underglaze iron-brown, from excavations and archeological field surveys of Joseon white porcelain kilns have created a need for research into these newly discovered ceramics.

This paper covers the period from 1466, when the Joseon royal court established a cluster of official court kilns in Gwangju, Gyeonggi-do Province as a branch office, known as the Bunwon (分院) of the Saongwon (司饔院, Office of Royal Cuisine), through 1883 when the official kilns were privatized. This timeframe is divided here into three periods based on changes in the characteristics of white porcelain decorated with underglaze iron-brown as identified through a study of historical sources as well as comparative analysis of porcelain excavated from kilns and surviving heirlooms (傳世品, *jeonsepum*). Phase I spans from the latter half of the fifteenth century to the sixteenth century; phase II runs from the seventeenth century to the first half of the eighteenth century; and phase III begins in the latter half of the eighteenth century and lasts into the nineteenth century. Referencing this timeframe, this study explains how the characteristics of white porcelain decorated with underglaze iron-brown from official kilns changed over time.

This study also reexamines discussions on when white porcelain decorated with underglaze iron-brown began to be produced by analyzing historical records that describe

factors which stimulated its production, such as the supply and demand of iron oxide pigment and the visual impact of foreign polychrome wares. Furthermore, it draws upon the outcomes of recent excavations and archeological field surveys to scrutinize Joseon people's perception of white porcelain decorated with underglaze iron-brown by analyzing the types of wares unearthed and the distribution of their manufacturing locations. In so doing, this research will show how the nature of white porcelain decorated with underglaze iron-brown from official kilns developed and changed over time.

The Manufacture of White Porcelain Decorated with Underglaze Iron-brown at Official Kilns and the Initiation of Its Production

Background of the Manufacture of White Porcelain Decorated with Underglaze Iron-brown

1. Relationship between Iron and Cobalt Pigments

The use of iron pigment for decorating white porcelain at the official kilns is closely connected to the procurement of cobalt pigment. From the early stages of their operation, the official court kilns produced white porcelain with underglaze cobalt-blue decoration (鐵畵白磁, *cheonghwa baekja*) as the finest ceramics available to the Joseon court. Records from the reigns of King Seongjong (成宗, r. 1469–1494) and King Jungjong (中宗, r. 1506–1544) in the *Joseon wangjo sillok* (朝鮮王朝實錄, Annals of the Joseon dynasty) repeatedly mention that the Joseon court imported cobalt from China to produce blue-and-white porcelain (Entries for the 11th day of the eighth month of the ninth year, *Seongjong sillok*, vol. 95; 23th day of the first month of the 19th year, *Seongjong sillok*, vol. 211; 28th day of the 12th month of the 36th year, *Jungjong sillok*, vol. 97). Yet, according to the *Yongjae chonghwa* (鐵畵白磁, Assorted writings of Yongjae), vol. 10, written by Seong Hyeon (成俔, 1439–1504) in the late fifteenth and early sixteenth centuries, "as cobalt (回青, *hoecheong*) is rare and precious, it has become difficult to obtain the pigment even in China. . . . For this reason, Joseon has very few porcelain wares with paintings." These records indicate that the procurement of Chinese cobalt became a challenge.

During the first half of the seventeenth century, Joseon suffered financial difficulties stemming from constant warfare and recurring natural disasters, which led to the temporary closure of the official kilns. In China, during the same period, a Jurchen invasion and a peasant rebellion led by Li Zicheng (李自成, 1606–1645) disrupted porcelain production at the Jingdezhen (景德鎭) kilns in Jiangxi Province. The wars in both Joseon and China, not to mention Joseon's foreign policy toward Ming and Qing China had an adverse impact on official trade. Accordingly, the procurement of Chinese ceramics and cobalt pigment became even more difficult in the seventeenth century, as shown in a record from the reign of King Gwanghaegun (光海君, r. 1608–1623):

> "The Saongwon reported that since none of the painted wine jars (畵樽, *hwajun*) used for court banquets for foreign envoys survived the wars, they attempted to make some by purchasing cobalt-blue pigment. However, there was no way to obtain the pigment. Thus, whenever court banquets were held, the office had no choice but to use faked versions. It seemed rather pitiful." (Entry for the third day of the fourth month of the tenth year, *Gwanghaegun ilgi*, vol. 27)

As indicated in this record, Joseon became unable to produce painted jars for holding wine or flowers at court banquets due to the difficulty of procuring cobalt, and had no choice but to use white porcelain adorned with fake blue-and-white decoration, known as *gahwa* (假畵, literally "fake painting"). Moreover, another record from 1634, the 12th year of the reign of King Injo (仁祖, r. 1623–1649) from the *Seungjeongwon ilgi* (承政院日記, Daily records of the royal secretariat) noted the following:

> "In the past, dragon jars used at the banquets for foreign envoys bore imitations of underglaze blue-and-white decoration [*gahwa*], and so when they were transported, the paints often flaked off. Thus, we [Saongwon] frequently entrusted money to official interpreters who went to Beijing and ordered them to purchase cobalt pigment; however, the interpreters failed to bring it back. As a last resort, we painted dragon jars with *seokganju* and fired them, which were then used when welcoming Chinese envoys. We would like to reuse them at future receptions for the Chinese envoys." (Entry for the 18th day of the fifth month of the 12th year of King Injo's reign, *Seungjeongwon ilgi*, fasc. 43)

As shown in the above entry, when it became impossible to procure cobalt pigment to decorate dragon jars for use at the welcoming receptions for envoys, dragon jars began to be manufactured using *seokganju*, iron oxide pigment. This information, which is the earliest documentation of the use of *seokganju* in decorating white porcelain, indicates that the difficulties in producing blue-and-white porcelain resulted in a switch to white porcelain decorated with underglaze iron-brown. The scarcity of cobalt pigment continued to be mentioned until the early eighteenth century.

2. Supply and Demand of Iron Oxide Pigment and the

Visual Effects of Decoration

1) Efficient Procurement of Iron Oxide Pigment

Next, let us examine the ease of procuring iron oxide pigment as another context for the production of white porcelain decorated with underglaze iron-brown. Shards of white porcelain ware decorated with underglaze iron-brown from the Goryeo dynasty have been excavated at kiln sites in Gyeonggi-do Province, such as the klin sites in Bangsan-dong, Siheung, and the white porcelain kiln sites in Seo-ri, Yongin, which operated during the early Goryeo period. Moreover, celadon decorated with underglaze iron-brown were produced at the kilns in Jinsan-ri, Haenam, Jeollanam-do Province, which demonstrates the widespread use of underglaze iron-brown designs on both white porcelain and celadon wares. It is well known that iron oxide pigment was used to decorate *buncheong* ware (粉青沙器, *buncheong sagi*) at the early Joseon kilns in Hakbong-ri on Mt. Gyeryongsan in the Gongju area. The continuous use of iron oxide to decorate ceramics from the Goryeo era onward may in part have been due to the pigment being easily obtainable.

The *Sejong sillok jiriji* (世宗實錄 地理志, Geographical appendix to the annals of King Sejong, 1432), the definitive record reflecting Joseon in the first half of the fifteenth century, mentions the regions that produced iron oxide pigment, also known as *juto* (朱土, literally "red clay"). As *juto* was extracted in Gyeonggi-do, Chungcheong-do, Gyeongsang-do, Hwanghae-do, and Gangwon-do Provinces, the pigment was essentially available nationwide. The ease of obtaining iron oxide pigment naturally led to the use of iron to decorate white porcelain, and iron oxide replaced cobalt when the latter became unavailable.

2) Inspiration from Foreign Polychrome Wares

The production of white porcelain decorated with underglaze iron-brown in the early and mid-Joseon period was closely related to the insufficient supply of cobalt pigment and the widespread availability of iron oxide pigment. In the late Joseon period, however, iron oxide pigment was deliberately used to maximize the visual effect of porcelain wares. Lavishly decorated polychrome wares were imported from China and Japan during the late Joseon period and transformed the tastes of the consumers.

Writings by late Joseon scholars from the Bukhak school (北學派, School of Northern Learning) testify to the changes in the perception of porcelain among prospective consumers. In his book titled *Seolsuoesa* (雪岫外史, Seolsu's miscellaneous notes), Yi Huigyeong (李喜經, 1764–1845) praised Chinese ceramics while criticizing the deficiencies in the manufacturing techniques used for producing their Joseon counterparts. He further criticized the policy of King Jeongjo (正祖, r. 1776–1800) that emphasized diligence and frugality, and asserted a need for systemic reform to promote consumption and develop commerce and industry. In a similar vein, the *Imwon simnyukji* (林園經濟志, Sixteen treaties on rural life and economy) by Seo Yugu (徐有榘, 1764–1845) describes the outstanding qualities of Chinese ceramics, as well as of three-tiered Japanese containers with a crackled glaze in the style of the Ge ware (哥窯, Ch. *geyao*), with gold cloisonné, or painted in gold and blue. Yi Gyugyeong (李圭景, 1788–1860) also wrote that Joseon porcelain was inferior to its Chinese and Japanese counterparts in his book *Oju yeonmun jangjeon sango* (五洲衍文長箋散稿, Random expatiations of Oju) and its appendix *Oju seojong* (五洲書種, Books on military technology).

Several extant documents, including the aforementioned examples, reveal that some high-quality Chinese and Japanese porcelain wares were used in Joseon, and that these imported polychrome wares inspired a need for refining the production system of Joseon ceramics. Such changes in the aesthetic tastes of the consumers affected porcelain production at official court kilns, and porcelain began to be decorated using a variety of new styles and techniques. In the late Joseon period, iron oxide pigment was used to enhance the visual effects of porcelain in accordance with the trends that prevailed at that time.

Beginning Phase of the Production of White Porcelain Decorated with Underglaze Iron-brown

White porcelain decorated with underglaze iron-brown was created throughout the Joseon period; however, precisely when its production at official court kilns began has not yet been determined. Since no remaining early Joseon documents feature records on the production of white porcelain decorated with underglaze iron-brown and only a few examples with reliable dates have survived, it is not easy to ascertain the actual initiation of its production. The earliest dated example is *White Porcelain Epitaph Plaque with Inscription of "Jeong Seon, Grand Supervisor at the Directorate for Palace Delicacies" in Underglaze Iron-brown*, which was produced around 1468 and currently housed in the Haegang Ceramics Museum.[1] Jeong Seon (鄭善, died 1468) was a Korean official who held the title of grand supervisor (太監, Ch. *taijian*) at the Directorate for Palace Delicacies (尙膳監, Ch. *shangshanjian*) in the Ming Chinese court. Although this is an example with a clear date, it cannot be concluded that white porcelain decorated with underglaze iron-brown was common at this time because this is an epitaph plaque. Nevertheless, some surviving documents indicate that the Joseon court made an effort to seek out a local cobalt pigment called *tocheong* (土靑, literally "local blue") around the time when this epitaph plaque was made. For example, the *Joseon wangjo sillok* noted such efforts during the reigns of King Sejo (世祖, r. 1455–1468) and King Yejong (睿宗, r. 1468–1469) (Entries for the 24th day of the fifth month of the ninth year, *Sejo sillok*, vol. 30; third day of the seventh month of the ninth year,

1 For the image, see Haegang Ceramics Museum 2006, Fig. 67.

Fig. 1. *White Porcelain Jar Shards with Black and White Slip-painted Decoration*. Late Yuan and early Ming, China. Excavated at the Doma-ri kiln site No. 1 in Gwangju, Gyeonggi-do Province. National Museum of Korea

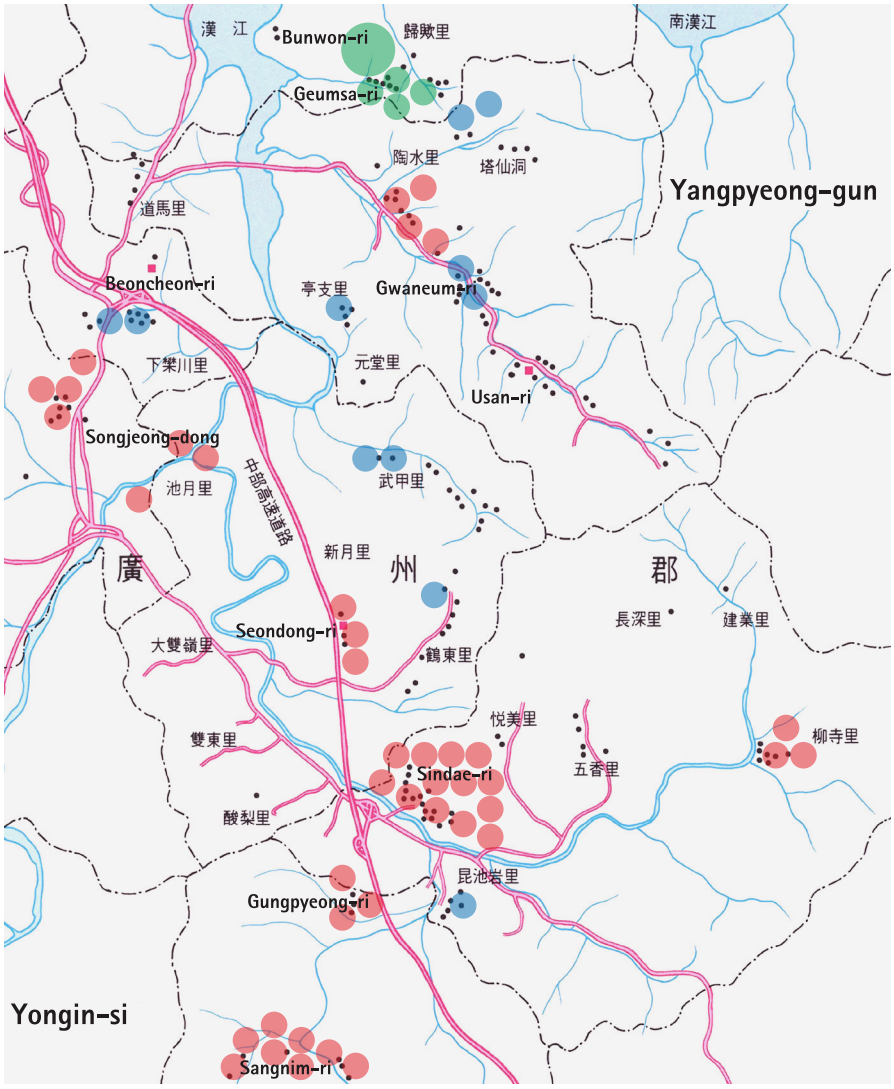
Fig. 2. *White Porcelain Jar Shards with Black and White Slip-painted Dragon Design*. Late Yuan and early Ming, China. Length: 19.6 cm (max). Excavated in Cheongjin-dong, Jongno-gu, Seoul. Hanul Research Institute of Cultural Heritage

Fig. 3. *White Porcelain Jar with Plum Blossom Design in Underglaze Iron-brown*. Joseon, 16th century. Height: 7.1 cm, Diameter: 3.9 cm (mouth); 5.6 cm (foot). National Museum of Korea

Fig. 4. *White Porcelain Jar with Plum and Bamboo Design in Underglaze Cobalt-blue*. Joseon, 16th century. Height: 12.4 cm, Diameter: 7.3 cm (mouth). National Museum of Korea

Sejo sillok, vol. 34; 13th day of the ninth month of the tenth year, *Sejo sillok*, vol. 34; fifth day of the tenth month of the first year, *Yejong sillok*, vol. 8). However, the production of blue-and-white porcelain using local blue pigment failed. Due to the failure to procure suitable local blue pigment, iron oxide pigment appears to have been used as a substitute for cobalt from the time when the official court kilns came into operation.

The production of white porcelain decorated with underglaze iron-brown at official kilns is thought to be attributable to the influence of inlaid white porcelain, *buncheong* ware with underglaze iron-brown decoration, and Chinese porcelain. However, inlaid white porcelain and *buncheong* ware with painted iron decoration both present striking contrasts to white porcelain decorated with underglaze iron-brown in terms of manufacturing technique as well as the compositions and subject matters of the decoration. Moreover, white porcelain shards with underglaze black decoration in the style of Cizhou ware (磁州窯, Ch. *cizhouyao*) have been excavated at the Doma-ri kiln site No. 1 in Gwangju, Gyeonggi-do Province, which began operations around 1505 (Fig. 1). Recently similar types of shards have also been found in Cheongjin-dong, Jongno-gu, Seoul (Fig. 2). It may be argued that white porcelain with underglaze black decoration in the style of Cizhou ware influenced the emergence of underglaze iron-brown decoration in Joseon, but since the decorations on Joseon wares greatly differ from those on Chinese wares in terms of subject matter and composition, it seems that



Map 1. Distribution of the official kiln sites that yielded white porcelain decorated with underglaze iron-brown in Gwangju, Gyeonggi-do Province (Image edited by the author; Ewha Womans University 1993, P. 5)

- 16th century
- 17th century
- 18th century

the Cizhou-type wares bore no direct influence on Joseon white porcelain decorated with underglaze iron-brown.

Rather, it is more likely that it was the blue-and-white porcelain produced at the official court kilns that prompted the widespread production and use of iron-painted designs on early Joseon porcelain wares. Both *White Porcelain Jar with Plum Blossom Design in Underglaze Iron-brown* and *White Porcelain Jar with Plum and Bamboo Design in Underglaze Cobalt-blue* from the early Joseon period in the collection of the National Museum of Korea show a thick, everted rim and a wide shoulder tapering to a narrow foot (Figs. 3 and 4). In addition they both bear similar designs of plum blossoms rendered in the "boneless" (沒骨, K. *molgol;* Ch. *mogu*) technique of ink and wash painting. Thus, white porcelain decorated with underglaze iron-brown seems to manifest a closer relation to contemporaneous official blue-and-white porcelain than to inlaid white porcelain, *buncheong* ware with underglaze iron-brown decoration, and Chinese Cizhou-type wares.

As discussed above, the production of white porcelain decorated with underglaze iron-brown at the official kilns was closely related to that of official blue-and-white porcelain. Since cobalt pigment was not produced domestically in the early and mid-Joseon periods, Joseon had no choice but to rely upon imports from China. Consequently, when Joseon's diplomatic relations with China were strained and the country's internal affairs disrupted trade, blue-and-white porcelain production suffered and cobalt had to be replaced with iron oxide, which was easily obtainable within Joseon. In the late Joseon period, imported polychrome wares sparked in consumers a penchant for more decorative wares. In response to this trend, official court kilns began to use iron oxide pigment as decoration to enhance the visual impact of their products and the kilns continued to do so until the end of the Joseon period.

Excavation of White Porcelain Decorated with Underglaze Iron-brown from Official Kilns

Official Kilns for White Porcelain Decorated with Underglaze Iron-brown and Relevant Findings

Thus far, there is no known example of white porcelain decorated with underglaze iron-brown excavated from the sites of official court kilns that operated from the second half of the fifteenth to the first half of the sixteenth century. The earliest example unearthed was from the Beoncheon-ri kiln site No. 9, which is known to have been in operation around 1552, and a few examples have been found at early Joseon kiln sites from the second half of the sixteenth century, including Beoncheon-ri kiln sites Nos. 5 and 8, Hakdong-ri kiln site No. 2, and Mugap-ri kiln site No. 10 (Woo Minah 2011, 250). In terms of type, epitaph plaques have been the most commonly found, followed by foliated cups, jars, and animal-shaped ritual vessels, implying that white porcelain decorated with underglaze iron-brown was produced for special uses and occasions rather than for daily use. In general, underglaze iron decoration was applied to fine-quality white wares, and decorative motifs were limited to plum blossoms and Chinese characters.

Approximately 180 official kiln sites from the fifteenth and sixteenth centuries have been investigated, and twelve of them (6.7 percent) have yielded white porcelain decorated with underglaze iron-brown (Map 1). Considering the small amount of this type of excavated porcelain, there must have been relatively few kilns producing white porcelain decorated with underglaze iron-brown during this time.

As for seventeenth-century kilns, a considerable number have yielded ceramics with underglaze iron-brown decoration, including those in Wangsan-ri in Yongin (1626–1627). Such kiln sites in Gwangju, Gyeonggi-do Province include Sangnim-ri (1618–1636), Seondong-ri (1640–1648), Songjeong-dong (1649–1654), Yusa-ri (1655–1664), Sindae-ri (1665–1676), Jiwol-ri (1677–1680), and Yujeong-ri (late seventeenth to early eighteenth century) (Woo Minah 2011, 251). Although the ancient sites of the Tanbeol-ri (1606–1612) and Hakdong-ri (1613–1617) kilns which operated prior to the Sangnim-ri kilns have yielded no white porcelain decorated with underglaze iron-brown, it can be assumed that white porcelain decorated with underglaze iron-brown was manufactured consistently from the latter half of the sixteenth century, and that its production increased around the time when the Sangnim-ri kilns were in operation. Seventeenth-century white porcelain decorated with underglaze iron-brown not only took the form of specialized vessels, such as jars, bottles, water droppers, lidded bowls, epitaph plaques, and ritual vessels, but also wares for daily use, including bowls, dishes, and cups. Moreover, compared to examples from the early Joseon period, those of the seventeenth century were embellished with more diverse designs, including dragon and cloud, plum blossom, bamboo, grape, chrysanthemum, orchid, and poetry motifs. In the latter half of the seventeenth century, wares for daily use were increasingly decorated in underglaze iron-brown, and simple designs such as flowers and plants became more frequently used.

Among the 90 official court kilns from the seventeenth century that have so far been investigated, 46 have yielded white porcelain decorated with underglaze iron-brown, manufactured in both saggar- and stack-fired kilns. These comprise 51 percent of all seventeenth-century kilns that have been investigated to date. This reflects the increase in the production of white porcelain decorated with underglaze iron-brown during the seventeenth century.

A small quantity of shards with iron-brown decoration were discovered at the eighteenth- and nineteenth-century kiln sites in Geumsa-ri (1721–1752) and Bunwon-ri (1752–1883). They have been identified as fragments of jars and bottles decorated with dragon and cloud, bamboo, or grass and flower designs. A shard of white porcelain with dragon and cloud design was unearthed at the Geumsa-ri kiln site, which suggests that products of the first half of the eighteenth century still exhibited characteristics of seventeenth-century royal porcelain. Excavations have thus far revealed a total of 20 kilns that operated in and after the eighteenth century, and white porcelain shards with underglaze iron-brown decoration have been found at five of them. This suggests that the production of white porcelain decorated with underglaze iron-brown declined compared to the seventeenth century.

Even though a large number of kilns were in operation during the early Joseon period, only a few of them have been revealed to have manufactured white porcelain decorated with underglaze iron-brown. On the other hand, the discovery of white porcelain decorated with underglaze iron-brown at seventeenth-century official kiln sites indicates that its production expanded considerably at this time, although the quality of white porcelain decreased because of management problems at the official court kilns due to internal and external factors. This clearly confirms that iron oxide was the most widely used pigment for ornamenting official ceramics during this period. However, the production of white porcelain decorated with underglaze iron-brown declined once again in the eighteenth century as an amicable trade relationship with Qing China facilitated the procurement of cobalt pigment, and the production of blue-and-white porcelain accordingly increased.

Characteristics of White Porcelain Decorated with Underglaze Iron-brown Excavated from Official and Regional Kiln Sites

Ceramics unearthed from the Songjeong-dong kiln site No. 5

Fig. 5. *White Porcelain Shards Decorated with Underglaze Iron-brown.* Joseon, second half of the 17th century. Height: 26.7 cm (bottle). Excavated at the Sindae-ri kiln site No. 18 in Gwangju, Gyeonggi-do Province. Gyeonggi Ceramic Museum (Gyeonggi Ceramic Museum 2008c, p. 10)

Fig. 6. *White Porcelain Bowl Shard and Cup with Grass Design in Underglaze Iron-brown.* Joseon, second half of the 17th century. Bowl-Height: 11.2 cm, Diameter: 18.0 cm (mouth); 6.8 cm (foot). Cup-Height: 3.6 cm, Diameter: 14.4 cm (mouth); 6.5 cm (foot). Excavated at the Hapan-ri kiln site in Gapyeong, Gyeonggi-do Province. Gyeonggi Ceramic Museum (Gyeonggi Ceramic Museum 2008a, p. 30)

Fig. 7. *White Porcelain Jar Shards with Dragon and Cloud Design in Underglaze Iron-brown.* Joseon, second half of the 17th century. Left–Height: 33.7 cm (max), Diameter: 13.7 cm (foot). Right–Height: 21.2 cm (max), Diameter: 15.8 cm (mouth). Excavated at the Hapan-ri kiln site in Gapyeong, Gyeonggi-do Province. Gyeonggi Ceramic Museum (Gyeonggi Ceramic Museum 2008a, p. 32)

(1649–1659) mainly consist of bowls (20.54 percent), dishes (55.6 percent), and cups (6.02 percent). In other words, porcelain wares for daily use comprise 82.16 percent of the excavated items, while wares for special occasions, such as jars, bottles, and lidded bowls comprise only 17.84 percent of the total (Gyeonggi Ceramic Museum 2008, 75). Most of the Joseon kiln sites investigated present a similar configuration of ceramic types. Due to the difficulty of their manufacture, large-scale vessels seem to have been produced only in small quantities as an offering to the king. A total of 33 shards with underglaze iron-brown decoration were discovered at the Songjeong-dong kiln site. Most of these were remnants of jars and bottles, which were produced in small quantities, rather than bowls and dishes. Sindae-ri kiln site No. 18 yielded a greater number of daily wares decorated with iron oxide pigment, but as in the case of the Songjeong-dong kiln site No. 5 underglaze iron-brown decorations were found more frequently on jars and bottles than on wares for daily use (Fig. 5). These findings indicate that at the official court kilns, underglaze iron-brown decoration was predominantly used on special types of ware.

Regional kilns, on the other hand, show different results compared to the official court kilns. The production of white porcelain decorated with underglaze iron-brown increased at regional kilns in the mid-seventeenth century. Excavations of regional kilns have revealed that white wares decorated with underglaze iron-brown were created in a number of regions. In contrast to the official court kilns, the regional kilns employed underglaze iron-brown decoration more frequently on wares for daily use, including bowls, dishes, and cups, rather than on special wares, such as jars and bottles (Central Institute of Cultural Heritage 2003 and 2004; Chungbuk National University Museum 1995; Chungcheong Research Institute of Archaeological Heritage 2002; Ewha Womans University Museum 2000; Gyeonggi Ceramic Museum 2009; Honam Cultural Property Research Center 2006; Korea Cultural Heritage Institute 2010).

Moreover, decorations on official white porcelain wares differ from those on local kiln products. While the former was ornamented primarily with motifs reserved for the royal court, such as dragon and cloud, in addition to bamboo, plum blossom, and chrysanthemum, the latter were decorated chiefly with grass and flowers or simple dot designs (Fig. 6). Recently, shards of a jar with a dragon and cloud design were unearthed for the first time at a local kiln site in Hapan-ri, Gapyeong, Gyeonggi-do Province (Fig. 7). These jar shards exhibit crude strokes and a simple, carelessly depicted design compared to jars with dragon and cloud designs from the official court kilns. The ease of procurement of iron oxide pigment prompted the production of local iron-painted white porcelain ware, but the underglaze iron-brown decoration was applied in a different manner and style on

royal and on local wares.

This section scrutinized aspects of the production of iron-painted white porcelain by briefly investigating the results of excavations of white porcelain ware decorated with underglaze iron-brown at both official court and regional kilns. While only a handful of kilns produced white porcelain decorated with underglaze iron-brown in the early Joseon period, the manufacture of iron-painted wares increased notably during the seventeenth century. In the eighteenth century, the resumption of ready imports of cobalt pigment led to a decline in the production of white porcelain decorated with underglaze iron-brown. In comparison with regional kilns, official court kilns issued relatively greater quantities of white porcelain decorated with underglaze iron-brown intended for special use, such as jars and bottles, and employed more varied motifs for decoration, including dragon and cloud, bamboo, plum blossom, grape, and chrysanthemum designs. Accordingly, official kilns produced fine quality wares with underglaze iron-brown decoration for court use on special occasions, such as banquets and ritual ceremonies.

Types and Ornamentation of Official White Porcelain Decorated with Underglaze Iron-brown

From the Late Fifteenth Century to the Sixteenth Century

Only a small quantity of white porcelain decorated with underglaze iron-brown was manufactured during this period. In form, it was limited to jars, bottles, water droppers, funerary objects, epitaph plaques, ritual vessels, and dishes, and in decoration to plum blossom, bamboo, and simple linear designs. A case in point is *White Porcelain Jar with Mountains and Fret Design in Underglaze Iron-brown and Cobalt-blue* housed in Leeum, Samsung Museum of Art (Fig. 8). It takes its form after ancient ritual bronzeware. Excluding the rings on the shoulder, its form resembles that of *White Porcelain Jar with Plum and Bamboo Design in Underglaze Cobalt-blue*, also in the Leeum collection, which dates it to the second half of the fifteenth century (Fig. 9). Since no contemporaneous examples of iron-painted white porcelain in a similar style have been found, it is likely that iron oxide pigment was only temporarily used for making white porcelain ritual vessels. *White Porcelain Bottle with Rope Design in Underglaze Iron-brown* in the collection of the National Museum of Korea resembles *White Porcelain Bottle with Plum, Bird, and Bamboo Design in Underglaze Cobalt-blue* in a private collection, which is presumed to have been produced between the early to mid-sixteenth century (Fig. 10).[2] Both bottles have an everted rim, narrow neck, and voluminous lower body that widens from the neck. A comparison between these two bottles proves that white porcelain decorated with underglaze iron-brown from the early Joseon period was created in similar shapes as blue-and-white porcelain from the same period.

In addition to their forms, the decorations on blue-and-white porcelain impacted contemporaneous white porcelain decorated with underglaze iron-brown. As mentioned previously, *White Porcelain Jar with Plum Blossom Design in Underglaze Iron-brown* and *White Porcelain Jar with Plum and Bamboo Design in Underglaze Cobalt-blue*, both in the collection of the National Museum of Korea, share similarities in the placement of their plum designs that spread across the entire surface of the body, the use of "boneless" brushstrokes, and the painting style which depicts only the plum blossoms and branches without trunks (Figs. 3 and 4). Both jars have thick, everted mouths and wide shoulders that gradually taper to the foot. Such similarities indicate that during the early Joseon period, white porcelain decorated with underglaze iron-brown and white porcelain decorated with underglaze cobalt-blue were produced simultaneously in official court kilns and were used concurrently. Furthermore, extant examples of early Joseon white porcelain decorated with underglaze iron-brown are of a similar premium quality as the blue-and-white porcelain of the era, as evidenced by the quality of the clay, glaze, carved foot, and decoration.

Seventeenth Century

During the seventeenth century, white porcelain decorated with underglaze iron-brown was produced in the official court kilns in nearly all the then-current forms, including jars, bottles, lidded boxes, bowls, dishes, cups, water droppers, burial objects, ritual vessels, epitaph plaques, and barrel-shaped jars (*janggun*). They were also decorated in a range of motifs, such as dragon and cloud, bamboo, plum blossom, grape, chrysanthemum, flower, and Chinese characters.

The traditions of the early Joseon period continued well into the first half of the seventeenth century, yet changes took place as well. For example, *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown* in the collection of the National Museum of Korea follows the form of the early Joseon *White Porcelain Jar with Plum and Bamboo Design in Underglaze Cobalt-blue* discussed earlier (Figs. 9 and 11). Both jars have inverted mouths and broad shoulders that taper sharply toward a flaring foot. The traditions of the preceding period can also be seen in the decorations as well as in the forms. Plum and bamboo designs, common in the early Joseon period, continued to appear on white porcelain decorated with underglaze iron-brown from the first half of the seventeenth century. The only difference in the designs is found in their compositions. For instance, on *White Porcelain Jar with Plum*

2 For the image in a private collection, see Yekyong 2000, Fig. 48.

Fig. 8. *White Porcelain Jar with Mountains and Fret Design in Underglaze Iron-brown and Cobalt-blue.* Joseon, second half of the 15th century. Height: 27.8 cm. Diameter: 9.5cm (mouth); 11.8 cm (foot). Leeum, Samsung Museum of Art

Fig. 9. *White Porcelain Jar with Plum and Bamboo Design in Underglaze Cobalt-blue.* Joseon, second half of the 15th century. Height: 41 cm, Diameter: 15.7 (mouth); 18.2 cm (foot). Leeum, Samsung Museum of Art

Fig. 10. *White Porcelain Bottle with Rope Design in Underglaze Iron-brown.* Joseon, 16th century. Height: 31.4 cm, Diameter: 7.0 cm (mouth); 10.6 cm (foot). National Museum of Korea

Fig. 11. *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown.* Joseon, first half of the 17th century. Height: 36.2 cm, Diameter: 14.0 cm (mouth); 14.1 cm (foot). National Museum of Korea

Fig. 12. *White Porcelain Jar with Plum and Bamboo Design in Underglaze Iron-brown.* Joseon, first half of the 17th century. Height: 36.9 cm, Diameter: 14.0 cm (mouth); 14.1 cm (foot). Leeum, Samsung Museum of Art

and Bamboo Design in Underglaze Cobalt-blue from the late fifteenth century plum and bamboo are painted together, whereas plum and bamboo are painted separately on different sides of the seventeenth-century *White Porcelain Jar with Plum and Bamboo Design in Underglaze Iron-brown* (Figs. 9 and 12).

In the latter half of the seventeenth century, the forms of white porcelain jars decorated with underglaze iron-brown changed once again. *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown* in the National Museum of Korea represents a new shape with an upright mouth slightly inverted at the rim and voluminous shoulders that gradually taper to a somewhat flaring foot (Fig. 13). There are several surviving examples of this type of jar, suggesting that official white porcelain wares were made in a schematized style during the latter half of the seventeenth century.

The second half of the seventeenth century witnessed an increase in the production of iron-painted white porcelain wares for daily use, such as bowls and dishes. Furthermore, their motifs expanded from plum and bamboo, dragon and cloud, to chrysanthemum, grape, and grass and flower designs. Despite this expansion of vessel types and designs, later productions repeat the same shapes and have simplified and schematized designs, which may be a result of the increased production of white porcelain decorated with underglaze iron-brown at the official kilns in the latter half of the seventeenth century. Such stylization of motifs can be observed in dragon and cloud

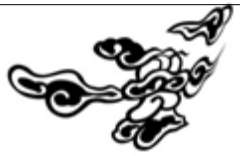
	First Half of the 17th Century *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown* (National Museum of Korea)	Second Half of the 17th Century *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown* (National Museum of Korea) (Fig. 13)
Scroll Design		
Dragon Design		
Cloud Design		
Wave Design		

Table 1. Comparison of jars with dragon and cloud designs in underglaze iron-brown from the early and late seventeenth century

Fig. 13. *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown*. Joseon, first half of the 17th century. Height: 35.7 cm. National Museum of Korea

designs (Table 1). The scales of the dragon on a jar from the first half of the seventeenth century are fan-shaped and carefully painted. On the other hand, those on a jar from the latter half of the seventeenth century are roughly depicted and the fan-shaped scales are finished with simple dots. Moreover, the clouds on the former jar are outlined and colored in, whereas only the contours of the clouds on the latter jar are drawn up. Considering that the design resembles that on a shard uncovered from the Sindae-ri kiln site No. 18, the latter jar seems to have been made around the time when the Sindae-ri kilns were in operation (Fig. 14). In the case of the plum and bamboo design, in the first half of the seventeenth century it was elaborately rendered in a realistic manner, whereas examples from the latter half of the seventeenth century show a simple composition of bamboo leaves and less complicated brushstrokes (Fig. 12). Such a simplified composition is well represented in a white porcelain bottle shard with iron-painted bamboo leaves excavated from the Sindae-ri kiln site No. 18 (Fig. 15). This site also yielded other iron-painted white porcelain shards decorated with simple grass and flower designs using only dots and lines. These wares seem to have been fired without saggars at the official kilns and were used at the royal court and government offices

From the Eighteenth through the Nineteenth Century

There is very little white porcelain with iron decoration from the eighteenth century that has survived till today. What remains

Fig. 14. *White Porcelain Jar Shard with Dragon and Cloud Design in Underglaze Iron-brown*. Excavated at the Sindae-ri kiln site No. 18 in Gwangju, Gyeonggi-do Province. Joseon, second half of the 17th century. Height: 7.6 cm (max). Gyeonggi Ceramic Museum (Gyeonggi Ceramic Museum 2008c, p. 117)

Fig. 15. *White Porcelain Bottle Shards with Bamboo Design in Underglaze Iron-brown*. Joseon, second half of the 17th century. Height: 26.7 cm (max). Excavated at the Sindae-ri kiln site No. 18 in Gwangju, Gyeonggi-do Province. Gyeonggi Ceramic Museum (Gyeonggi Ceramic Museum 2008c, p. 121)

is mainly jars, bottles, water droppers, paper-roll holders, and brush holders.

A representative example from the first half of the eighteenth century is *White Porcelain Bottle with Inscription of "Tea Bottle for the King" in Underglaze Iron-brown*, probably made between 1710

Fig. 16. *White Porcelain Jar with Grape Design in Underglaze Iron-brown*. Joseon, first half of the 18th century. Height: 53.3 cm, Diameter: 19.0 cm (mouth); 18.6 cm (foot). Ewha Womans University Museum

Fig. 17. *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown*. Joseon, 18th century. Height: 57.5 cm, Diameter: 21.3 cm (mouth). National Museum of Korea

Fig. 18. *White Porcelain Mold-impressed Bottle with Orchid, Chrysanthemum, Grass, and Insect Design in Underglaze Cobalt-blue, Iron-brown, and Copper-red*. Joseon, late 18th century. Height: 42.3 cm, Diameter: 4.1 cm (mouth); 13.3 cm (foot). Gansong Art Museum

and 1720.[3] According to the *Seungjeongwon ilgi*, while King Yeongjo (英祖, r. 1724–1776) held the title of chief superintendent (都提調, *dojejo*) of the Bunwon official court kilns, during his term as crown prince, he commanded that an inscription of "tea bottle for the king" (進上茶甁) be written in *seokganju* on royal wares in order to prevent Bunwon officials from misappropriating official wares (Entry for the 21th day of the tenth month of the third year of King Yeongjo's reign, *Seungjeongwon ilgi*, fasc. 648). Therefore, this bottle was possibly created either in the 1710s when King Yeongjo held the position of *dojejo*, or in the 1720s during the early years of his reign. It attests to the ongoing use of iron oxide pigment on royal white porcelain during the eighteenth century.

There are a few examples of white porcelain jars with grape designs in underglaze iron-brown which may date to the first half of the eighteenth century. Formerly, grape designs had mainly been used to decorate dishes and flat bottles (扁甁, *pyeonbyeong*), but only rarely jars. It is noteworthy that in this period, the grape design began to be used as a chief motif for decorating ceramics and that iron oxide pigment was used to execute the design. *White Porcelain Jar with Grape Design in Underglaze Iron-brown* in the collection of the Ewha Womans University Museum is decorated with grapes on the upper half of the front and rear sides of the body, while the lower half is left blank (Fig. 16). The diagonally arranged composition of grapes is elegant, and the grape leaves, stems, and vines are painted in a delicate and elaborate manner. White porcelain jars with dragon and cloud designs were still being decorated using underglaze iron-brown during the eighteenth century, as evidenced by a small number of jar shards bearing dragon and cloud designs excavated from the Geumsa-ri kiln site. *White Porcelain Jar with Dragon and Cloud Design in Underglaze Iron-brown*, a tall jar in the National Museum of Korea, was probably made in the late eighteenth or early nineteenth century, considering that its shape and overall design reflect those of blue-and-white porcelain jars with dragon and cloud designs from the same period (Fig. 17).

In the latter half of the eighteenth to the nineteenth century, white porcelain decorated with underglaze iron-brown was produced in various novel types and shapes, including cylindrical bottles, paper-roll holders, coins, and saucers. Most examples from this period were not decorated with iron oxide pigment alone, but in combination with cobalt and copper pigments. Furthermore, decorative techniques diversified and came to incorporate relief and openwork. New motifs such as potted plants or grass and insects began to be employed, and the technique of covering the entire body with iron oxide pigment, known as the *cheolchae* (鐵彩) technique, was more frequently used. This phenomenon could be linked to the aforementioned polychrome wares of China and Japan. *White Porcelain Mold-impressed Bottle with Orchid, Chrysanthemum, Grass, and Insect Design in Underglaze Cobalt-blue, Iron-brown, and Copper-red* (Fig. 18) in the Gansong Art Museum exhibits the contemporaneous trend of including several different decorative methods within a single piece, such as a relief technique with various colorants, including cobalt, copper, and iron. Another example from this period is *White Porcelain Bottle Decorated with Underglaze Iron-brown* (Fig. 19). Its unprecedented cylindrical body is entirely covered with iron oxide pigment. Thus, white porcelain decorated with underglaze iron-brown changed following the trend of the time of enhancing visual effects by incorporating multiple pigments and techniques within a single piece or by painting the entire body of the vessel with iron pigment.

3 For the image, see Haegang Ceramic Museum 2006, Fig. 4.

Fig. 19. *White Porcelain Bottle Decorated with Underglaze Iron-brown*. Joseon, 19th century. Height: 27.0 cm, Diameter: 3.3 cm (mouth); 13.9 cm (foot). National Museum of Korea

Periodic Division Based on the Variations of White Porcelain Decorated with Underglaze Iron-brown and Changes in Its Characteristics

Phase I: From the Latter Half of the Fifteenth through the Sixteenth Century

During this phase, official court kilns were established in Gwangju, Gyeonggi-do Province and iron oxide pigment was used only sparingly as a recourse to the instability of the supply of cobalt pigment. Since iron oxide pigment was easily obtainable in Joseon, it began to be employed temporarily as a substitute for cobalt pigment. Examinations of extant dated examples verify that iron oxide pigment was being used to decorate white porcelain around the time when official court kilns were established in Gwangju. As this period coincides with the attempts to locate a domestic source of cobalt pigment, known as *tocheong*, we can confirm that iron oxide pigment was used when the supply of cobalt pigment was problematic. The proportion of white porcelain wares with underglaze iron-brown designs uncovered at the kilns that yielded such wares suggests only a limited production of white porcelain decorated with underglaze iron-brown. The types of wares unearthed were also restricted to those made for special purposes, such as jars, bottles, epitaph plaques, ritual vessels, and funerary objects, and the motifs of their designs were limited to plum blossoms and Chinese characters. Produced in relatively small quantities, early Joseon white porcelain decorated with underglaze iron-brown shares similarities with contemporaneous blue-and-white porcelain in terms of form and design (i.e., motifs, composition, and techniques), which indicates that both types were produced at the official kilns. From these results, it can be concluded that in the early Joseon period, white porcelain decorated with underglaze iron-brown was produced on a limited scale as a substitute for blue-and-white ware for the royal court at times when the supply of cobalt pigment was unstable.

Phase II: From the Seventeenth to the First Half of the Eighteenth Century

Phase II ranges from the seventeenth century after the invasions by China and Japan to the first half of the eighteenth century when the Geumsa-ri kilns (1721–1752) were in operation. During this period, iron oxide functioned as the main decorative pigment at the official kilns. Although iron oxide was a replacement for cobalt, which could not be imported due to internal and external difficulties, it was principally used to decorate vessels for the royal court. In the seventeenth century, white porcelain decorated with underglaze iron-brown was used at major functions at the court and was therefore decorated with dragon and cloud designs symbolizing the royal household. The percentage of kiln sites where white porcelain decorated with underglaze iron-brown have been excavated and the types and designs of the ceramics unearthed reveal that the official kilns of the seventeenth century produced white porcelain decorated with underglaze iron-brown as their chief form of decorated ceramics.

While white porcelain wares decorated with underglaze iron-brown from the first half of the seventeenth century still showed features of their early Joseon precedents, those from the latter half of the seventeenth century introduced innovations. Furthermore, in the latter half of the seventeenth century, painting in underglaze iron-brown gradually became the dominant decorative technique for vessels made for daily use such as bowls, dishes, and cups, and they incorporated a wide range of motifs such as grapes, chrysanthemums, and grass and flowers. Despite such diversification, however, underglaze iron-brown designs became simplified, cruder, and more stylized: grass and flower designs were rendered with merely one or two dots and lines, and supplementary patterns were omitted to highlight only the main motifs. This trend might have arisen out of changes in quality that came in conjunction with the more extensive production of ceramics using both saggar- and stack-firing and the expanded demand for porcelain decorated with underglaze iron-brown.

When official kilns actively resumed the production of blue-and-white porcelain in the first half of the eighteenth century, the production of white porcelain decorated with underglaze iron-brown plunged. Nevertheless, since royal ceramics were still decorated with underglaze iron-brown, examples from the first half of the eighteenth century continued to retain features of their seventeenth-century precedents.

Phase III: From the Latter Half of the Eighteenth through the Nineteenth Century

During phase III, the kilns in Bunwon-ri were still in operation. A tendency toward extravagance and a preference for colorful porcelains from China and Japan inspired the production of a new type of decorative white porcelain. Starting in the late eighteenth century, landscapes, human figures, and supplementary motifs elaborately embellished the entire bodies with no background left undecorated. Moreover, several techniques were employed to adorn a single piece. For example, cobalt, copper, and iron pigments were used simultaneously, or the entire surface of a vessel was covered with one of these pigments. Diverse decorative techniques, such as relief and openwork, were also used. When iron and cobalt pigments were used together, the former generally supplemented the latter. Furthermore, the *cheolchae* technique emerged wherein iron oxide pigment covered the entire surface of ceramics. In the late Joseon dynasty, iron oxide pigment was used as a supplement to

cobalt for enhancing visual effects, which in turn prompted the employment of new decorative techniques.

Conclusion

The production of white porcelain decorated with iron oxide continued uninterrupted from the time when the official kilns were established in Gwangju, Gyeonggi-do Province until the privatization of the official kilns toward the end of the nineteenth century. The characteristics and status of white porcelain decorated with underglaze iron-brown changed over the course of its history.

Above all, the ease of procuring iron oxide pigment encouraged official kilns to produce white porcelain decorated with underglaze iron-brown, and along with blue-and-white porcelain it was crafted as the finest ware destined for use in the royal court since the early stages of the operation of the official kilns. A comparison between porcelain excavated from official kiln sites and examples unearthed at regional kiln sites reveals that official white porcelain decorated with underglaze iron-brown functioned not as daily tableware, but as specialized pieces used for ceremonies at the royal court and government offices.

From the latter half of the fifteenth to the sixteenth century, due to the unreliable supply of cobalt pigment white porcelain decorated with underglaze iron-brown was produced on a limited scale as a substitute for blue-and-white porcelain used at the royal court. During the seventeenth and the first half of the eighteenth centuries, white porcelain decorated with underglaze iron-brown became the dominant form of premium-quality royal porcelain. However, due to changes in consumer preferences in the latter half of the eighteenth century, iron oxide was used alongside cobalt as a means to achieve a heightened visual effect, or it was used to coat the entire surface of a vessel.

The use of iron oxide pigment continued from the early through the late Joseon period, presenting different characteristics and meanings in each phase. Since iron oxide pigment was readily available on the Korean Peninsula, white porcelain decorated with underglaze iron-brown was produced not only for the royal court, but also in different styles meeting the tastes of ordinary customers. Therefore, vessels for the royal court exhibit a refined appearance, while those destined for commoners reflect a more exuberant beauty. Such characteristics make Joseon white porcelain decorated with underglaze iron-brown unique and distinguishable from other Korean ceramics.

Translated by Park Shinhee

This article is an abridged and revised English version of "Changes in the Characteristics of White Porcelain Decorated with Underglaze Iron-brown Produced in Joseon Official Kilns" (조선시대 관요 철화백자의 성격 변화), previously published in 2011 in *Misulsayeongu* (미술사연구) 25.

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