

Special Feature

Utilization of Earthenware Pottery for Food Storage in the Goryeo Period

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The Review of Korean Studies Volume 24 Number 1 (June 2021): 177-212

doi: 10.25024/review.2021.24.1.177

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Introduction

Across time, people have eaten and drunk a wide variety of foods for both sustenance and pleasure. A series of processes must be completed in order for a dish to be made with the proper ingredients and served on a table for eventual consumption. The entire process matters, but securing quality ingredients must be an initial step. This was especially true when poor transportation meant long periods were required to bring ingredients from their places of origin, and there was no refrigeration as there is now. The diversity and advance of food culture clearly depend on how freshly and safely food ingredients can be preserved and stored.

The issue of food storage is also important when examining the food culture of the Goryeo period. The paucity of written materials available on the subject poses a fundamental limitation, but fortunately many valuable materials related to the food culture of the Goryeo period have been excavated from a wide range of sites. Examples include the earthenware designed for storage excavated from the temple and building sites and the vessels for storing water and food salvaged from ships from the Goryeo period that sank during the process of maritime transportation (National Research Institute of Cultural Heritage 2019, 327-28).¹ The contents of the vessels can be confirmed by the wooden tablets used as freight tags or remnants of the materials stored within. The usage of this earthenware can be presumed based on its location with the site.

In particular, the three sunken vessels from the Goryeo period that were discovered off the shore of Mado Island in Taean, Chungcheongnam-do between 2009 and 2011 (named the “Mado Shipwrecks”) are regarded as illustrative examples of the life of the time (National Research Institute of Maritime Cultural Heritage 2010, 2011, 2012). A number of ceramic pieces in a variety of sizes were salvaged from these three ships along with wooden

tablets used as freight tags that provide important information such as the ships’ departure places, the types and quantities of their cargo, their destinations, and the intended recipients. The results of analysis of the salvaged wooden tablets and earthenware pots show types of grains, *jeotgal* (salted seafood), and fish eaten by people at the time and items used for onboard life.

With the discovery of the Mado Shipwrecks, previously overlooked Goryeo earthenware came into the spotlight. Furthermore, questions about the food culture of the era have emerged, such as about the purpose and function of the pottery, i.e., and how and where it was used. Although earthenware is a crucial subject in examining the food culture of the time, it has not received much attention. However, it seems possible to discover new facts related to food storage based on the excavation results of the Mado Shipwreck, by re-examining the pattern of the use of earthenware pots excavated from the previously investigated sites as well as reviewing related written records. Therefore, this paper will examine how earthenware pottery was used for food storage by analyzing written records and studying remains from the Goryeo period.² Hopefully this work would contribute to restoring aspects of the food culture of the Goryeo period by looking at its earthenware pottery.

Usages of Earthenware Pottery for Food Storage

Drinking Water Storage

Water and grain were essential for long-distance travel by ship. Water was used for drinking, of course, but it was also required for cooking various types of food. In addition to earthenware, a container made of straw or wood could also be used to store grain, but earthenware was the most effective container for storing water since pottery is made of clay that is readily available everywhere compared to some other materials, especially metals such as copper and iron.

1. Earthenware refers to a vessel made of earthenware clay and baked at or below 1,200°C. It is called *jilgeureut* (clay articles) in Korean vernacular as it is made of *jilheuk* (clay). The concept of earthenware includes unglazed earthenware (*wagi* 瓦器), which appear in literary records, and glazed earthenware (*onggi* 甕器) which are primarily large jars finished with dark brown glaze. Considered an opposing concept to porcelain, whose production has involved glazing since the Goryeo period, earthenware is a term that includes even unglazed *wagi*. Earthenware can be classified into glazed and non-glazed earthenware depending on whether glaze is applied.

2. The fact that Goryeo earthenware was excavated over the entire period and that kiln sites has been discovered throughout the country suggests that the mass production of earthenware was common at the time. In addition, numerous excavations have shown that earthenware pottery was widely used in living spaces such as temples and buildings and also as grave goods. Compared to the celadon used as food containers in the same period, more types of earthenware were used for storage and transportation purposes. For the overall aspects and characteristics of the Goryeo earthenware, see Han 2019.

Moreover, clay has advantages in that its form can be adjusted relatively quickly and it is light for its size. For these reasons, earthenware pottery would have been the best choice for drinking-water storage on a ship (Han 2012, 117-25; 2019, 330-32).

One example of earthenware being used to store drinking water can be found in the *Xuanhe fengshi Gaoli tujing* (*Illustrated Account of the Xuanhe Embassy to Goryeo* 宣和奉使高麗圖經) written by Xu Jing 徐兢 (1091-1153), an envoy from the Song China. It describes images of Goryeo from the first half of the 12th century. He introduced earthenware water vessels as follows:

A. The water pot is earthenware; it has a wide belly and compact neck, and its mouth is somewhat large. It is six cheek tall and four cheek and five chon wide, and can contain three seok and two seung. In the quarters reserved for dynastic guests, a copper jar is used [for storing water]. These water jars are only used to transport water between the rocky islands along the sea lanes.³

Record A above indicates that earthenware pots used for water storage had a wide body that tapers toward the neck, which is consistent with the form of the large earthenware pots excavated from Goryeo period sites. In addition, the fact that earthenware pots were essential for drinking water aboard ships can be found in the following record:

B. Seawater, being very salty and bitter, is undrinkable. All ships that are preparing to traverse the ocean must be equipped with water vats so there will be an ample store of fresh water for [the cooking of] food and to drink. Once on the ocean, the worry is not about the wind, but the availability of water, which is a matter of life and death. Understanding that the [boats] coming from the west have been crossing the ocean for many days, the Koryŏ people think that the Chinese must have run out of fresh water and so fill large jars with water and quickly dispatch boats to come out and meet them [the Chinese vessels]. All of [the Koryŏ people who provide food and

water] are recompensed with tea or rice.⁴

C. On that day, we anchored near this island. Koryŏ people paddled boats loaded with water to offer to us, and we thanked them with rice.⁵

Records B and C above show that when a ship traveling to Goryeo from China passed along the coast, the people living in the vicinity expected it to have run out of water and carried water in a large pot to provide it. A large earthenware pot was needed to contain enough water for a long voyage. Meanwhile, if water ran short on the island, it was supplied from land, presumably using a large earthenware pot. Let us look at the following records:

D. Also, as there are no wells or springs on the island, people often had to go to the mainland to fetch water, but sometimes people who went out to fetch water were captured. So, Kim Banggyeong 金方慶 (1212-1300) made a reservoir to collect rainwater, finally eradicating such worries.⁶

E. Im Bak 林樸 (1327-1376) stopped by Naju, where he filled a jar with water [to drink] on his way, but did not even require the service of a cup of tea to drink. Exceptionally pleased, the people said to each other, “A saint has come. If all the court officials were like Pacification Commissioner Im Bak, why would we revolt?”⁷

Record E shows that when Im Bak proceeded to his post as the pacification commissioner of Jeju to appease the prefectural officials and people there, he drew water from Naju and put it in a pot so as not to cause any inconvenience to them (Park 2019, 209). It is certain that earthenware was used for containers

3. “Water Jjars,” Chapter 32, Vessels 3, *Xuānhwafengshi Gaolituji*: “水瓮陶器也 廣腹短頸 其口差敞 高六尺闊四尺五寸 容三石二升 館中用銅瓮 唯山島海道 以舟載水上遣 則用之。” All English translations of *Xuānhwafengshi Gaolituji* in this paper are adapted from Vermeersch Sem 2016.

4. “Provision of Water,” Chapter 33, Vessels, *Xuānhwafengshi Gaolituji*: “海水味劇鹹苦 不可口 凡舟船將過洋 必設水櫃 廣蓄甘泉 以備食飲 蓋洋中不甚憂風 而以水之有無 為生死耳 華人自西絕洋而來 既已累日 麗人料其甘泉必盡 故以大瓮載水 鼓舟來迎 各以茶米 醉之。”

5. “Hedgehog Islet,” Chapter 36, Sea lanes 3, *Xuānhwafengshi Gaolituji*: “是日拋泊此苦 麗人擊舟載水來獻。”

6. Biography 17, “Kim Bangyeong,” Chapter 104, *Goryeosa*: “島又無井泉 常陸汲往往被虜 方慶貯雨 為池 其患遂絕。”

7. Biography 24, “Im Bak,” Chapter 111, *Goryeosa*: “樸行至羅州 取水盛瓮而歸 雖茶湯不入口 民大悅相謂曰 聖人來也 王官皆如林宣撫 我輩何至叛乎?”; Book 8 of “Annals of Silla,” Chapter 8, *Samguk sagi*: “神文王 三年春二月 納一吉浪金欽運少女為夫人 先差伊浪文顯波珍浪 三光定期 以大阿浪智常納采 幣帛十五 釐米酒油蜜醬鼓脯醢 一百三十五 釐 租一百五十車。”

for water at this time.

As discussed earlier, it has been confirmed through written records that earthenware pots were used for storage of drinking water on ships at sea. In addition, earthenware pots have been found at archeological sites from the Goryeo period. A case in point is three sunken ships from the Goryeo period that were found off the coast of Mado in Taean, Chungcheongnam-do, as mentioned in the introduction. The earthenware pots salvaged from Mado Shipwreck Nos. 1 and 2 were undoubtedly used for storing drinking water. Various relics such as grain, *jeotgal*, celadon, pottery, bamboo products, cast utensils, and iron products were salvaged from these two shipwrecks from the early 13th century, including wooden tablets with the sender and recipient of the cargo written on them. Mado Shipwrecks No. 1 and No. 2 departed from Jeollanam-do and Jeollabuk-do respectively and toward Gaegyeong, but sank in the middle of their voyages. Most of the goods loaded upon the two ships were being sent from the place of departure to the destination. They also included items the crew would need while sailing, particularly large earthenware pots for drinking water.

One earthenware pot with a height of about 75 to 80 centimeters and a capacity of 172 liters or more was extracted from Mado Shipwreck No. 1, and other two were found in No. 2 (Figs. 1 to 3). These pots flare toward the shoulders from a flat foot and then taper until reaching an everted rim. Their bodies are consistently thin, with a thickness of approximately 0.5 centimeters (Han 2012, 113). Given that large amounts of water are needed for drinking or cooking food, it would be reasonable to assume that these large pots were used to store drinking water even while sailing along the coast. This assumption is supported by the fact that tools needed for cooking, such as iron pots, earthenware steamers, spoons, and chopsticks made of bronze or bamboo, have been found around the large earthenware pots (Joo 2013, 392; Shin 2020, 231). The large pots used to store drinking water were so voluminous that only the number needed were loaded, such as one or two per ship.



Figure 1. An earthenware pot salvaged from Mado Shipwreck No. 1, height 79.8 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage



Figure 2. Earthenware pot No. 1 salvaged from Mado Shipwreck No. 2, height 75 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage



Figure 3. Earthenware pot No. 2 salvaged from Mado Shipwreck No. 2, height 74 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage

A container for storing water on a ship had to be large in size but light in weight. The large earthenware pots retrieved from the Tae-an Mado shipwrecks meet these conditions precisely. The use of earthenware pots for the storage of drinking water can be found in existing records and excavated artifacts.

Food Storage

The living spaces of people of the Goryeo period contained a variety of types of earthenware pottery that must have been used for food storage. The types of food ingredients that were contained in earthenware pottery at the time can be found by looking at surviving written records. The types of food stored in this pottery can be classified into three categories: grains; fermented foods including *jang*, *jeotgal*, and kimchi; and liquor.

First, let us look at the cases where earthenware pottery was used for storing grain and legumes. During the Goryeo period, people cultivated foodstuffs such as rice, barley, wheat, proso millet, red beans, beans, and foxtail millet (Park 2019, 21). These were used for paying taxes and were also essential

food ingredients. This meant that keeping them safe for a long time was critical. Durable earthenware pottery can be made with locally available materials, while straw bags or wooden storage containers rot easily and can be damaged by animals. Therefore, it is reasonable that earthenware pottery, which has a higher cost performance than the other two containers, was used for food storage. Earthenware's relative ability to block moisture would have also been considered.

Examples of the use of earthenware pottery to store grain can be found in Goryeo period remains. A representative case is the Dongchang-ri Site in Pyeongtaek dating from the end of the ninth century to the middle stage of the Goryeo period (Samgang Cultural Heritage Researcher 2011, 59-61). More than 50 pits for the storage of grain were found here, and it was confirmed that large earthenware pots were buried in pits to store various kinds of grains. Such a case of storing grain in earthenware pottery had already been found at the Seonggeon-dong Site in Gyeongju dating to the ninth century (Seorabeol Institute of Cultural Heritage 2020, 151). At this site, dozens of capacious earthenware pots were buried in a large building for storage, and a considerable amount of organic matter, including rice husks and rice straw, was found in them.

Second, earthenware pottery was used to store various fermented foods, including *jang*, *jeotgal*, and kimchi. *Jang* and *jeotgal* have long been essential food ingredients and were already listed as gifts as early as the Three Kingdoms period.⁸ Records confirm that this practice prevailed in the Goryeo dynasty as well: In the ninth year of the reign of King Hyeonjong (1018), cotton cloth, salt, and *jang* were bestowed to the people in Heunghwajin who had suffered from the turmoil of war.⁹ In the 32nd year of the reign of King Gojong (1245), a fire broke out in Gangdo, the temporary capital of Goryeo, and the Royal Sauce Storage was destroyed.¹⁰ The existence of a Royal Sauce Storage for the ruling family suggests that *jang* and other fermented foods were widely used as major food ingredients. For example, fermented soybean bricks (*meju*) were so crucial

8. Book 8 of "Annals of Silla," Chapter 8, *Samguk sagi*: "神文王 三年春二月 納一吉浪金欽運少女爲夫人 先差伊浪文顯波珍浪三光定期 以大阿浪智常納采 幣帛十五擧 米酒油蜜醬豉脯醢一百三十五擧 租一百五十車."

9. "Relief Aaid," Food and Commerce 3, Treatise 34, Chapter 80, *Goryeosa*: "九年正月 以興化鎮比因兵荒民多寒餓 給緜布鹽醬."

10. "Fire," Five Elements 1, Treatise 7, Chapter 53, *Goryeosa*: "三十二年三月甲子 江都見子山北里民家八百餘戶火 老弱焚死者 八十餘人 連燒延慶宮法王寺御醬庫大常府輪養都監."

that there were certified containers with predetermined dimensions to ensure proper measures for them.¹¹ *Meju* was an essential fermented food for the people of Goryeo to the extent that it was marked on the wooden tablets salvaged from Mado Shipwreck Nos. 1 and 2 (Koh 2014, 503-06).

The people of the Goryeo era frequently used *jeotgal* made from various types of marine products. Marine products were more abundant than any other food ingredients during the Goryeo period and they could be gathered so easily that even ordinary people could enjoy them in various ways.¹² Processing them into *jeotgal* was the most effective means to store them for long periods and provide them to Gaegyeong, the capital city of the Goryeo dynasty. It is confirmed in various written records and the wooden tablets salvaged from the Mado Shipwreck that *jeotgal* made from mackerel, abalone, crab, shrimp, mussels, and fish eggs needed to be placed in a container for shipment (Koh 2014, 500). Especially, crab, one of the most readily available marine products found in both fresh and salt water, was much enjoyed as marinated crab sauce (pickled meat).¹³ Because salted and fermented roe is a delicacy, Kwon Geun 權近 (1352-1409), an intellectual literary figure in the late Goryeo Dynasty, created a poem of gratitude to a person who sent some to him.¹⁴ Yi Saek 李穡 (1328-1396) wrote a poem after receiving a gift from the magistrate of Haeju Strategic County,¹⁵ and when the Royal Inspector of Jungdo sent him two jars of *jeotgal*, he was so delighted that he wrote a poem.¹⁶ At that time, a container for *jeotgal* was called a *hang* (ewer 甁), and is presumed to have been earthenware. Types of *jeotgal* included fish sauce, fermented rabbit sauce, and fermented venison sauce, all of which were essential items (as pickled meats) for

presenting on a table during important national ceremonies.¹⁷

Mentions of *jeotgal* can be found in written records and on the wooden tablets discovered at the sites. Traces of it can also be found in the organic matter remaining in the earthenware pots found there. An earthenware pot containing an organic matter presumed to have been salted and fermented shrimp, and another organic matter presumed to have been salted and fermented crabs was discovered in Mado Shipwreck No. 1 (National Research Institute of Maritime Cultural Heritage 2010, 248-49) (See Fig. 4.). A wooden tablet salvaged from Mado Shipwreck No. 2 mentions that salted and fermented crabs, mackerel, and roe were to be delivered to Gaegyeong (Koh 2014, 503). Mado Shipwreck No. 3 transported salted and fermented mussels and abalone in earthenware pots (National Research Institute of Maritime Cultural Heritage 2012, 154). Mussel filaments were found in an earthenware pot, while salted and fermented mussels and abalone were separately mentioned on wooden tablets.



Figure 4. Paddler crab remnants found in an earthenware pot salvaged from Mado Shipwreck No. 1

11. "Organizational System," Penal Code 1, Treatise 38, Chapter 84, *Goryeosa*: "文宗七年 判 内外官斛長 廣高 方酌定 米斛則長廣高 各一尺二寸 稗租斛 長廣高 各一尺四寸五分 末醬斛 長廣高 各一尺三寸九分 太 小豆斛 長廣高 各一尺九分。"
12. "Fishery," Chapter 23, Various Customs 2, *Xuānhwafengshi Gaolitujiing*: "國俗有羊豕 非王公貴人不 食 細民多食海品 故有鱸鮓蚌珠母蝦王文蛤紫蟹蠔房龜脚 以至海藻昆布 貴賤通嗜 多勝食氣 然而臭腥味鹹 久亦可厭也 海人 每至潮落 疍舟島嶼而捕魚 然不善結網 但以疏布漉之 用力多而見功寡 唯蠔蛤之屬 潮落 不能去 人掇拾盡力取之不竭也。"
13. Yu Bangseon 柳方善 (1388-1443), "An extempore poem," Chapter 17, *Dongmunseon (Anthology of Korean Literature in Chinese 東文選)*: "四山松櫟一茅廬 坐負牆暄睡味餘 衣縫每捫王猛虱 漁竿空釣呂望 魚 軒裳已是無心得 金玉何須滿意儲 芋栗自堪謀送日 盤殮不必蟹爲胥。"
14. Chapter 10, Yangchon seonsaeng munjip 陽村先生文集: "謝慶尙道觀察使鉄城君李公原 卵醢新大口魚 之惠。"
15. Chapter 34 of Mogeun sigo 牧隱詩藁: "謝海州牧使送小螺醢。"
16. Chapter 34 of Mogeun sigo 牧隱詩藁: "謝中道廉使送醢二甁。"

17. Taking *gilnye* (sacrificial rites 吉禮) as an example, *jeotgal* is presented in sacrificial rites personally conducted by a king, the ritual ceremony for the gods of soil and grain, the grand collective ancestral sacrifice conducted by the king, and the sacrifice performed by the office in charge on behalf of the king.

Most of the earthenware pots for *jeotgal* salvaged from the Mado Shipwrecks were used for transporting it from Jeollanam-do to Gaegyeong or Gangdo. However, earthenware pots storing *jeotgal* for the crew's own consumption were found in some cooking areas (Joo 2013, 398). Most of the earthenware pots used to store *jeotgal* were glazed (Fig. 5). This would have been a measure to both prevent the salt in the *jeotgal* from escaping and to block outside air from entering and thus better preserve the fresh and flavorful taste of the *jeotgal* inside (Choi 2018a, 238; 2019, 38).¹⁸ It was also important to provide a tightly fitting lid made from wood or other organic materials. Before *jeotgal* could be used as food, a container capable of storing it was needed. The most suitable candidate was an earthenware pot.

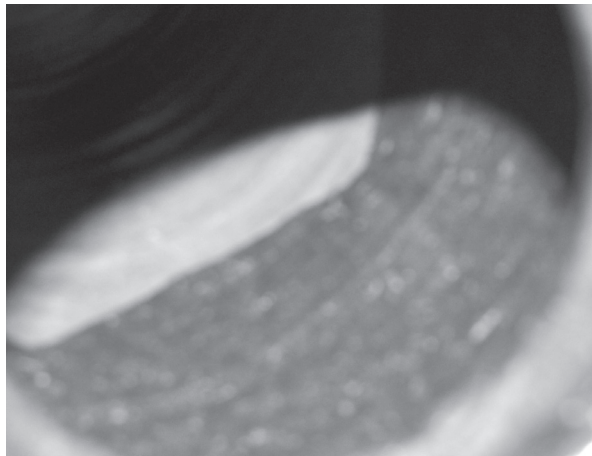


Figure 5. Condition of glaze applied inside an earthenware pot salvaged from Mado Shipwreck No. 2

Various types of kimchi have existed since the early Goryeo dynasty and would also have been stored in pottery. In particular, varieties of kimchi respectively made from water parsley, chives, bamboo shoots, turnips, and curled mallow were presented at important national rites, and it is presumed that a large quantity of pottery was used to store them (Wee 2018, 572). This is confirmed by the fact that various types and sizes of earthenware pots were

excavated during a survey of the Goryeo royal palace in Gaeseong conducted several years ago (National Research Institute of Cultural Heritage 2012).¹⁹

Meanwhile, earthenware pots were used not only for the fermented foods described above, but also for the storage of other foods. Let us look at the following record:

F. Regarding their fruits and nuts, the chestnuts are as large as peaches and sweet tasting and very nice. An old record said that you could also eat them in the summer months. I once inquired about this, and it turns out they are stored in earthenware containers buried in the ground, which allows them to be preserved for several years.²⁰

According to this record, earthenware seems to have been used for long-term storage of seasonal fruit. In those days when there was no refrigeration, large earthenware pots performed a similar function (Han 2019, 330). One of the places where earthenware storing *jang* and other fermented foods have been found most frequently are temple sites. As Zen Buddhist temples that emphasized meditation and practices of Zen monks emerged in the late Unified Silla Kingdom and Goryeo eras, facilities to store and preserve food ingredients in large quantities began to be needed. This is because a temple was a place where practicing monks lived together and many people visited. A separate space had to be prepared for food storage, which came to be called the “Warehouse Hall” 庫院 at Zen Buddhist temples (Kim 2019, 297). It consisted of facilities for cooking, serving, and eating meals by monks, and also other related subsidiary facilities (Han 2014, 146).²¹ Once a separate storage space had been prepared in the practice space, a person was needed to manage it. According to the *Rules of Purity* 清規, a collection of living standards for monks

19. Earthenware pottery was not reported in the “Excavation Research Report on Goryeo Royal Palace of Gaeseong II” published in 2015, which included the results of excavations conducted in 2010–2011 and 2014. However, according to a message from a South Korean investigator who participated in the survey in person, a considerable amount of earthenware was excavated.

20. “Local products,” Chapter 23, Various Customs 2, Xuānhwafengshi Gaolitujiing: “其果實 栗大如桃 甘美可愛 舊記謂 夏月亦有之 嘗問其故 乃盛以陶器埋土中 故經歲不損。”

21. This space was referred to as “Warehouse Hall” at Zen Buddhist temples in the Song and Yuan dynasties, as well as the Middle Ages of Japan. In Korea, its function was limited to kitchens, and called a *jeongju* (purified kitchen 淨廚), *poju* (kitchen 庖廚), *hyangjeokju* (kitchen of fragrance accumulation 香積殿), or *hyangjeokcheon* (hall of fragrance accumulation 香積殿).

18. In China, the *tuzhi* (daubs 塗治) technique was used, in which cattle or sheep oil was applied to earthenware pots prior to use to increase water resistance.

at the Zen Buddhist temples of the Goryeo period, the duty of the cook at a Buddhist monastery (*jeonjwa* 典座), the position responsible for preparing meals at the temple, was to procure and thoroughly manage *jangcho* 醬醋 and other food, using the *eomjang* 淹藏 and *suchae* 收菜 methods (Choi 2011, 166-67). *Jangcho* refers to a range of *jang* and vinegars, while *eomjang* refers to the preservation of vegetables and other food by pickling them, and *suchae* refers to the storage of vegetables by drying. Establishing this separate position of *jeonjwa* and stipulating the related duties suggests that food storage was considered significant.

Written records indicate that there was a space in temples for storing fermented dishes and other foodstuffs in large quantities, and this can be confirmed at actual sites. Silsangsa Temple in Namwon and the Godalsa Temple Site in Yeosu are informative cases. Pit facilities were discovered at Silsangsa Temple, and excavated were 44 large earthenware pots that had been buried in an orderly row inside Building Site No. 7, north of the Medicine Buddha Hall (Research Institute of Buddhist Cultural Heritage 2018, 71-74) (Fig. 6). Only parts of the bases and bodies of the large earthenware pots remained, and no organic matter was found in them. It is clear, however, that they were used for storing food. At the site of the Godalsa Temple, a leading Zen Buddhist temple of the Goryeo period, a number of earthenware pots were found at the Building Site Nos. Ga-3 and Ga-4, which are presumed to have been a Warehouse Hall. At Building Site No. Ga-



Figure 6. A storage facility at Building Site No. 7 at Silsangsa Temple in Namwon, excavated by the Research Institute of Buddhist Cultural Heritage



Figure 7. A storage facility at Building Site No. Ga-3 at the Godalsa Temple Site in Yeosu, excavated by the Gijeon Institute of Cultural Heritage

3, there were pits in two rows running east to west between the cornerstones, and the bottoms of large earthenware pots were found buried in some of them (Gyeonggi Provincial Museum and Gijeon Institute of Cultural Heritage 2002, 53) (Fig. 7). These earthenware pots are presumed to have been used for food storage (Gyeonggi Institute of Cultural Properties 2016, 156-57).

Such large earthenware storage pots have been found at various temples and seem closely related to stored food, but it is also possible that they were used to contain alcohol as well (Lee 2013, 266). As early as in the early Goryeo period, temples were criticized of brewing and distributing alcohol, and several prohibitions on producing alcohol at temples were issued (Jeong 2014, 117-18). Let us look at the following records:

G. On the *gyemi* day, an official request was presented from the Yangju authorities reading, “The monks of Janguisa Temple, Samcheonsa Temple, and Cheongyeonsa Temple made alcohol from a total of 360 *seok* of rice in violation of the law banning the production of alcohol. We request that they be punished according to the law.” The King approved the request.²²

H. On the *byeongsin* day, the King issued a royal mandate reading, “Buddha taught us to put purity first, to avoid filth, and to eliminate greed. Recently, a group of people who are evading their obligatory national service have registered themselves as monks, earning wealth to make a living, finding jobs in agriculture and livestock, or pursuing commerce as a common practice. When they go out, they violate the articles of the precepts; when entering a house, they are not interested in the code of pure mind. The monastic coat that reveals one shoulder has been allowed to be used as a cover for a liquor jar, and the place where the Buddhist scriptures were read aloud and memorized was torn down and turned into fields for garlic and green onions. These monks communicate with merchants for selling and buying and get together with guests for alcohol and entertainment. Furthermore, they mingle in the *gisaeng* house, polluting the Ullambana purification event.”²³

22. *Gyemi* Day (14), Month 6, Year 18, Hereditary Houses 5, “King Hyeonjong,” Chapter 5, *Goryeosa*: “楊州奏 莊義三川青淵等寺僧犯禁釀酒 共米三百六十餘石 請依律斷罪 從之。”

23. *Byeongsin* Day (17), Month 9, Year 10, Hereditary Houses 7, “King Munjong,” Chapter 7, *Goryeosa*: “制曰 釋迦闍教 清淨爲先 遠離垢陋 斷除貪欲 今有避役之徒 托號沙門 殖貨營生 耕畜爲業 估販爲風 進違戒律之文 退無清淨之約 袒肩之袍 任爲酒罌之覆 講唄之場 割爲葱蒜之疇 通商買賣 結客醉娛 喧雜花院 穢臭蘭盆。”

Both Records G and H above are examples of problems attributable to the public brewing of alcohol at a temple. During the Goryeo period, temples required large quantities of alcohol in preparation for visits by the general public and for various ceremonies and events, and earthenware was even used to brew or store alcohol for sale.

As seen above, it can be confirmed in records and excavations at historical sites from the Goryeo period that earthenware pottery was used in various ways to store grain; fermented foods such as *jang*, *jeotgal* and kimchi; and liquor. In particular, temples which were in need of large volumes of food made use of a special storage places for earthenware pots.

Utilization of Earthenware Pottery for Storage

Installation of Earthenware Pottery

In the previous chapter, the types of food being stored in earthenware was examined. Next, let us examine in greater detail how this pottery was arranged and used through examples excavated from historical sites. In conclusion, most of the earthenware pottery for food storage at temples and other buildings from the Goryeo period was buried, either entirely or partially, in the ground for use. This was a means to bulwark the pots, whose size might be large but whose walls were thin, leaving them prone to breakage when disturbed. It also helped to maintain a constant temperature and prevent moisture from reaching stored food.

As described in the previous chapter, the excavation survey of the Godalsa Temple Site in Yeosu revealed two or more earthenware pots with their lower bodies buried for storage purposes and their upper bodies missing in Building Site Ga-3, presumed to have been the Warehouse Hall where food ingredients would have been stored, as well as Building Sites Ga-12, Ga-14, and Ga-16 (Gyeonggi Institute of Cultural Properties 2014, 541) (Figs. 8 to 10). The earthenware pots with their full bodies remaining are about 80 centimeters in height. Judging based on their current state, those for which only the lower parts remain must have been well over 50 centimeters tall. Even at Feature No. 1 of Mabunghisa Temple Site in Yongin, a large earthenware pot as tall as 77 centimeters was found buried roughly 40 centimeters in the ground for

use (Museum of Hanshin University 2003, 216). Earthenware pots with their bodies half-buried in the ground for storage purposes were excavated from the Geodonsa Temple Site in Wonju, Dongbulam Hermitage at Seonunsa Temple in Gochang, and Building Site No. 3 at the Yeongchuksa Temple Site in Ulsan (Hallym University Museum 2000, 170; Buyeo National Research Institute of Cultural Heritage 1995, 150; Ulsan Museum 2018, 92).



Figure 8. Earthenware pot No. 1, excavated from Building Site Ga-14 at the Godalsa Temple Site in Yeosu, remaining height 44 centimeters, excavated by the Gyeonggi Institute of Cultural Properties

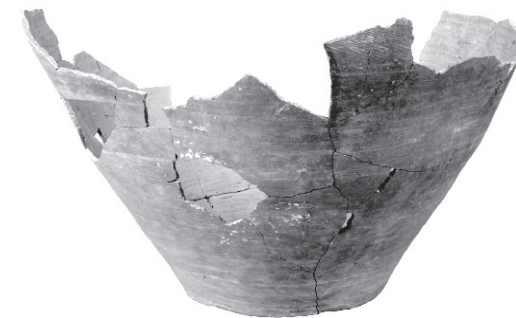


Figure 9. Earthenware pot No. 2, excavated from Building Site Ga-14 at the Godalsa Temple Site in Yeosu, remaining height 33.5 centimeters, excavated by the Gyeonggi Institute of Cultural Properties

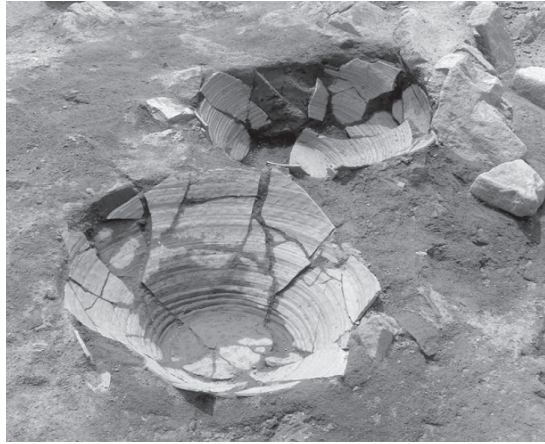


Figure 10. Condition of earthenware pots excavated from Building Site Ga-16 at the Godalsa Temple Site in Yeosu, excavated by the Gyeonggi Institute of Cultural Properties

In addition to temples, pottery used for food storage can be found in residential areas and other building sites from the Goryeo period. In a Goryeo era pit at the Baekbong-ri Site in Pyeongtaek, found was a large earthenware pot with a curved mouth which was completely buried for use (Giho Cultural Heritage Research Center 2010, 81) (Figs. 11-12). At the Jinan-ri Site in Cheongsong, roof-end tiles with a monster-eye design, a celadon spittoon, and a celadon dish, an earthenware pot for storage that had been completely buried inside the pit for use were excavated from Building Site No. 1 dating to the Goryeo period (Daegyeong Institute of Cultural Heritage 2008, 75). And another pot was found on the southern side of the building site. Both pots are large with a height of more than 70 centimeters. In addition, large earthenware pots buried completely in the ground for storage purposes were found at the Sinhyeon-ri Site in Gapyeong and the Docheon-dong Site in Seongnam (Hanbaek Research Institute for Cultural Heritage 2009, 173; Gyeonggi Institute of Cultural Properties 2009, 9).

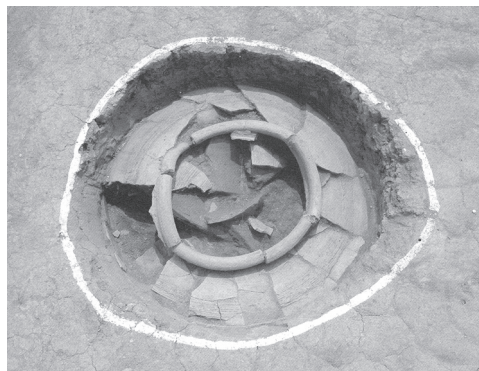


Figure 11. An earthenware pot buried at the Baekbong-ri Site in Pyeongtaek, excavated by the Giho Cultural Heritage Research Center



Figure 12. An earthenware pot excavated from the Baekbong-ri Site in Pyeongtaek, height 66.9 centimeters, excavated by the Giho Cultural Heritage Research Center

There are also cases where large earthenware pots were buried in the ground with a separate facility created to protect them. At the Yeongamsa Temple Site in Hapcheon, after the pottery was buried, the surrounding area was walled off with stone to keep it safe (Seokdang Museum of Dong-a University 2005, 250) (Fig. 13). A similar case was found in the excavation survey of the Building Site for the Museum at Bulguksa Temple in Gyeongju (Gyeongju University Museum 2006, 378) (Fig. 14). At Building Site No.1 from the Goryeo period, it was discovered that several earthenware pots had been buried in a row and a kind of protective facility was then built around them using stone (Han 2020, 81-82). From the examples of these two sites, it can



Figure 13. Burial facility for large earthenware pots at the Yeongamsa Temple Site in Hapcheon



Figure 14. Pottery burial facility at Building Site No. 1 at the Bulguksa Museum Site in Gyeongju

be understood that facilities were made to ensure the safety of the pottery and its contents, taking a step beyond simply burying it in the ground for use.

The large earthenware pots were buried entirely or partly in the ground before being used for storage due to, among other considerations, their characteristic shape. Most large earthenware pots have a narrow bottom and relatively broad shoulders, making them unstable without auxiliary devices or additional facilities. If they tip sideways, they are highly likely to be damaged. Therefore, it is presumed that burying the pots in part or entirely in the ground was intended to compensate for the weakness of their form and increase their efficiency.

Sites demonstrating how such large earthenware pots were placed have recently been investigated. One is the Segyo-dong Site in Pyeongtaek (Hansung Research Institute of Cultural Heritage 2021, 128). Inside Pit Feature No. 5 in Area B of this site, three large earthenware pots were excavated in a row (Fig. 15). These earthenware pots from the early Goryeo period were buried to store food and were excavated in a condition mostly intact (Figs. 16 to 18). Among the three, the neck and mouth of one are missing. Its bottom was crushed during the baking process, leaving it unbalanced. Because it is out of balance, it cannot stand independently without a supporting device or facility capable of correcting the slope of the bottom. Nevertheless, it was excavated at the consumption site as a used relic, and it means that it fully performed its original function of storing food ingredients. In other words, the shape and size of the pot or the presence of defects did not matter since it was buried in the ground during use.



Figure 15. Condition of an earthenware pot excavated from a pit feature at Segyo-dong Site No. 5 in Pyeongtaek, excavated by the Hansung Research Institute of Cultural Heritage



Figure 16. Earthenware pot No. 1, excavated from a pit feature at Segyo-dong Site No. 5 in Pyeongtaek, height 78.8 centimeters, excavated by the Hansung Research Institute of Cultural Heritage



Figure 17. Earthenware pot No. 2, excavated from a pit feature at Segyo-dong Site No. 5 in Pyeongtaek, height 80.2 centimeters, excavated by the Hansung Research Institute of Cultural Heritage



Figure 18. Earthenware pot No. 3, excavated from a pit feature at Segyo-dong Site No. 5 in Pyeongtaek, remaining height 68 centimeters, excavated by the Hansung Research Institute of Cultural Heritage

Earthenware pots used for storage like this is often large. Since they have been mostly buried in the ground, it can be challenging to replace them when they are damaged. To solve this problem, there is a case where a pit was reused by inserting a pot smaller than the one initially installed. Such a case was found during the excavation of the Seonggeon-dong Site in Gyeongju, which is presumed to have been the area of the Warehouse Hall of the Samrangsa Temple Site in Gyeongju, although the site is attributed to the Unified Silla period (Seorabeol Institute of Cultural Heritage 2020, 150). In addition, traces of waterproofing treatment to solve a moisture problem can be found. Before installing pottery into a round pit at Silsangsa Temple in Namwon, yellow clay was laid with a thickness of 0.5 to 1 centimeter. The reporter presumed that this was a waterproofing treatment intended to solve the problems with moisture that can occur when using pottery buried in the ground (Research Institute of Buddhist Cultural Heritage 2018, 304) (Fig. 19). I agree with this presumption. Meanwhile, although this is an early case, it was revealed in the excavation survey of Pungnaptoseong Fortress in Seoul that a series of pre-treatments was applied when large earthenware pots were placed in pits. The soil was deeply dug in a rectangular shape to create a pit, which was then filled with compacted soil to a certain height. The pit was treated once again to accommodate the forms of the bottoms of the earthenware pots. After the pots were set in place, the surrounding area was refilled with soil (So 2012, 24). It is estimated that a similar method was used when installing large earthenware pots during the Goryeo period.



Figure 19. Traces of reinforcement with yellow clay found in the pits for burying earthenware pots at Silsangsa Temple in Namwon, excavated by the Research Institute of Buddhist Cultural Heritage

In some cases, unique processes were added to maximize the effects of fermentation, such as those found at the Geumgwang-ri Site in Yeongju (The Korea Archaeology and Art History Research Institute 2018, 286-93). This is a huge village site which seems to have been active from the Three Kingdoms through the Joseon periods. Large earthenware pots from the Goryeo period were found in the pit of Section D4 when two burial features were excavated. Given that a considerable amount of charcoal was contained inside a large earthenware pot that was covered with baked earth, the investigator assumed that fermented food has been placed in the pot and it was then sealed with clay. In the recipe for *jang* and salted and fermented fish in the *Important Arts for the People's Welfare* (*Qimin yaoshu* 齊民要術), it is said that the pot should be sealed with clay for fermentation after the food is prepared. (Choi 2018b, 42; 52) This can be considered evidence making the above view more plausible. Although this is a case from China, it would not be unreasonable to consider it applicable since fermented foods are often manufactured using a similar process in both countries.

Unlike porcelain, earthenware in the Goryeo period had the advantage that it could be made thin and large. With the advancement of production and baking techniques, it was possible to produce large but light pottery. Another advantage of earthenware is that it was easier to produce than porcelain since the raw materials are readily available in many places. Furthermore, it performs all its functions without being glazed. With all these advantages, earthenware was used for storing various foods during the Goryeo period.

Roles of Measuring Instrument

While fulfilling its intended function of food storage as discussed above, Goryeo earthenware pottery was also manufactured in various sizes to be used as a measuring vessel in the distribution process. Although not officially recognized by the state, pottery was used as a measuring vessel that reflected a unit of quantity agreed upon by a seller, middleman, or other type of manager who was engaged in the sales of the food contained in it, and by the end the consumers (Han 2012, 99-154; 2019, 348-50). This fact can be confirmed by the wooden tablets and earthenware pots salvaged from the Mado Shipwreck.

First, let us look at the wooden tablets. As shown in Table 1 below,

different amounts of jeotgal, in this case 5, 4, 3, and 2 *du*, were placed in each jar. Although the exact shape of the jars is unknown, the capacity of each jar was relatively constant. Five units of capacity were used in the Goryeo period: *jak* 勺, *hap* 合, *seung* 升, *du* 斗, and *seok* 石 (Lee 2016, 127).²⁴ According to the research conducted to date, 1 *seung* from the Goryeo period equaled about 340 millimeters, meaning 1 *du* is 3.4 liters (Lee 1997, 151-52), 5 *du* is 17 liters, 4 *du* is 13.6 liters, 3 *du* is 10.2 liters, and 2 *du* is 6.8 liters.

Table 1. Bamboo slips and wooden tablets with volumes indicated excavated from the Taean Mado Shipwrecks

Volume	Name of artifacts	Original text	Content	Source
5 du	0817-G14-wooden tablet	...檢校大將軍尹起華宅...貳(缸)各入伍斗	(Presented to) Acting Grand General Yun Gihwa...two jars containing 5 <i>du</i> each.	<i>Taeon Mado shipwreck No. 1 underwater excavation</i> , p. 358
4 du	0913-I13-bamboo slip	竹山縣在京校尉尹邦俊宅上蟹醢壹缸入四斗	Presented by Juksan District to Commandant Yun Bangjun in Seoul. One pot of salted and fermented crabs, 4 <i>du</i> inside.	<i>Taeon Mado shipwreck No. 1 underwater excavation</i> , p. 381
3 du	Mado3-119-bamboo slip	Front: 事審金令公主宅上 Back: 蜆醢一缸入三斗玄礼	Front: Presented to Inspector-general Yeonggong Kim. Top: One pot of salted and fermented mussels, 3 <i>du</i> inside. Hyeonrye.	<i>Taeon Mado shipwreck No. 3 underwater excavation</i> , p. 254
2 du	0704-H5-wooden tablet, 0707-F6-wooden tablet	Front: 奇牽龍宅上卵醢一缸入二斗口 Back: 吳口使者閑三	Front: Presented to Gyeonryong officer Gi. One pot of salted and fermented roe, 2 <i>du</i> inside. Back: O □'s messenger Hansam.	<i>Taeon Mado shipwreck No. 2 underwater excavation</i> , p. 290

Interestingly, the earthenware pots lifted from the Mado Shipwreck can be categorized by capacity. As seen in the table showing the dimensions and volumes of the pots lifted from Mado Shipwreck No. 1, all the pots except for the large ones can be divided mainly into four groups (National Research Institute of Maritime Cultural Heritage 2010, 246-47). All of the twelve pots classified as type IA in the report are over 35 centimeters in height and have an average capacity of 16.8 liters. In addition, ten pieces classified as type 1B are less than 35 centimeters in height and have an average capacity of 13.6 liters (Figs. 20, 21). It is calculated that about 5 and 4 *du* of contents can be placed in type IA and type IB jars, respectively. As shown in Table 1 above, the Mado 3-19 earthenware pot containing mussel filaments salvaged from the Mado Shipwreck No. 3 perfectly meets the conditions of a 3-*du* pot (National Research Institute of Maritime Cultural Heritage 2012, 144) (Fig. 22) This pot contained mussel filaments and plant leaves, and its mouth was covered with a wooden lid. The plant leaves are presumed to have served to cover the fermented mussels. Unfortunately, although a wooden tablet with 2 *du* written on it was found, no pottery of this volume has yet been identified.

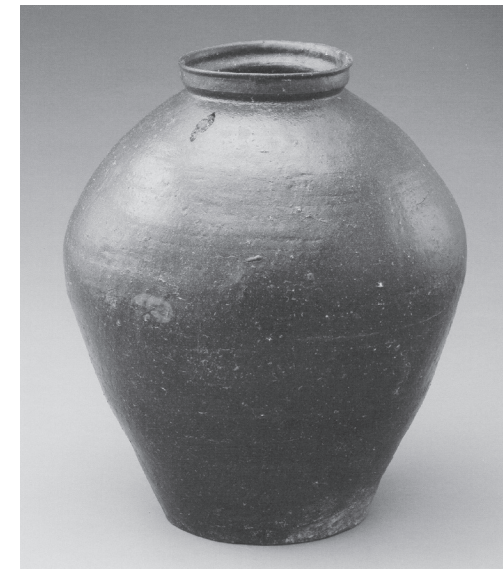


Figure 20. A 5-*du* earthenware pot salvaged from the Mado Shipwreck No. 1, height 38.9 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage

24. Their interrelations were: 10 *jak* = 1 *hap*, 10 *hap* = 1 *seung*, 10 *seung* = 1 *du*, 15 *du* = 1 *seok*. *Seok* was also marked as *seok* 碩 and *gok* 斛.



Figure 21. A 4-*du* earthenware pot salvaged from the Mado Shipwreck No. 1, height 32.5 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage

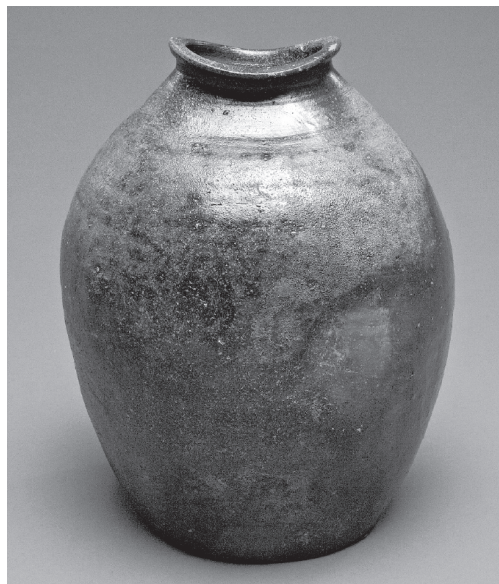


Figure 22. A 3-*du* earthenware pot salvaged from the Mado Shipwreck No. 3, height 33 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage

Although no wooden tablet marked 1 *du* has been found, there was 1-*du* pottery among the small pots lifted from Mado Shipwreck No. 1. There are several earthenware pots whose capacity is approximately 1 *du*, if not precisely 3.4 liters. These pots are roughly 25 centimeters high, and most of them are glazed (National Research Institute of Maritime Cultural Heritage 2010, 272-77) (Fig. 23). These pieces are likely to form a set with the wooden tablets from Mado Shipwreck No. 1 that simply read “*ilhangbong*” 壹缸封. Of course, the term *ilhang* 壹缸 could simply mean “a single pot,” but given the sentence “One pot is sealed,” it seems that *ilhang* refers to 1 *du*.

Table 2. A bamboo slip indicating 1 *du* salvaged from Taean Mado Shipwreck 1.

Name of artifacts	Original text	Content	Source
0705-D17-bamboo slip	崔郎中宅上(魚)醢壹缸封	Presented to the family of Nangjung Choi. One pot of <i>jeotgal</i> , is sealed.	<i>Taeon Mado shipwreck No. 1 underwater excavation</i> , p. 348
0731-F16-bamboo slip	崔郎中宅上古道醢壹缸	Presented to the family of Nangjung Choi. One pot of mackerel <i>jeotgal</i> .	<i>Taeon Mado shipwreck No. 1 underwater excavation</i> , p. 354
0928- I 15-bamboo slip	Front: ...口金嗣元宅上 Back: ...魚醢壹缸	Front: Presented to the family of Kim Sawon. Back: A jar of <i>jeotgal</i> .	<i>Taeon Mado shipwreck No. 1 underwater excavation</i> , p. 386



Figure 23. A 1-*du* earthenware pot salvaged from Mado Shipwreck No. 1, height 26.1 centimeters, excavated by the National Research Institute of Maritime Cultural Heritage

Meanwhile, large earthenware pots used for storing drinking water were also manufactured to reflect a specific capacity. One and two pots with a height of about 80 centimeters were respectively found at Mado Shipwreck Nos. 1 and 2. The large pot lifted from Mado Shipwreck No. 1 is 79.8 centimeters in height, 32 centimeters in diameter at the mouth, and 27.8 centimeters in diameter at the bottom. The two large pots salvaged from Mado Shipwreck No. 2 are respectively 75 centimeters in height and 35.2 centimeters in diameter at the mouth and 74 centimeters high and 35.2 centimeters in diameter at the mouth. It can be seen that these three large pieces are not much different in size. According to the report, the capacity of the pot from Mado Shipwreck No. 1 is about 172.3 liters, which is roughly 3.4 *seok* when converted to the units of the time. The two large pots from Mado Shipwreck No. 2 are almost the same size as the pot from Mado Shipwreck No. 1. When describing a water pot in *Gaolitujiing*, Xu Jing stated that 3 *seok* and 2 *seung* could be poured into it. Given the similar capacity of the storage pots salvaged from the shipwrecks, it can be asserted that this storage pottery was manufactured to meet a previously determined capacity.

The analysis results on the large pots excavated from the subterranean layer where fragments of pottery engraved with “The 12th year of Dazhong era” (858 in the United Silla era), uncovered at the Mireuksa Temple Site in Iksan, are interesting in this regard. Related research theorized that, given 1 *seok* was equivalent to 52.1 liters in the late Unified Silla period, the large pottery pots excavated from the Mireuksa Temple Site can be classified into 2.5-, 3-, and 3.5-*seok* pots. Given that there were two large pots with a capacity of 3 *seok*, the pottery at that time was presumed to be produced reflecting specific units of capacity (Yoon 2000, 192). This fact increases the likelihood that the broad-shouldered jars from Mado Shipwreck Nos. 1 and 2 are reflections of a relatively constant standard capacity. In other words, when making large earthenware pots and small and medium ones for containing *jeotgal*, the concepts of quantity used at the time were universally recognized and reflected in their production. A similar case of reflecting a specific unit of quantity in making earthenware pots can also be found in China (Choi 2018b, 72). According to *Qimin yaoshu*, the standard vessel for making vinegar was a 10-*seok* pot, but it is said that there were also 5- and 17-*seok* pots (Choi 2019, 52).

As seen here, the units of quantity used at the time for items stored in pottery, such as drinking water and *jeotgal*, were applied to the pots and

wooden tablets salvaged from the Mado Shipwreck. Although the government did not officially recognize such units of quantity, there can be no doubt that pots reflecting capacities commonly recognized by many people at the time were widely used.

Conclusion

This paper aims to identify the usage of earthenware pottery for food storage based on surviving written records and materials excavated from Goryeo period sites. Although written records from this period is insufficient by themselves, this research was made possible thanks to well-preserved pottery excavated from Goryeo period sites.

Earthenware pottery was used for the storage of drinking water and food. Cases of water storage can be found among shipwrecks from the Goryeo period: large pots as high as 80 centimeters excavated from the Taean Mado Shipwreck Nos. 1 and 2 are found to have been used for storing water, an indispensable element for onboard life. Evidence of earthenware pottery being used for water storage aboard a ship are also found in written records.

Evidence of Goryeo earthenware used for food storage can be found in literature and at temples and other building sites as well as from the wrecks of trading ships discovered in the waters off of Mado. At the time, earthenware was used to store grain, fermented foods such as traditional Korean sauces (*jang*), salted and fermented seafood (*jeotgal*), kimchi, and alcohol. Notably, large pots at temples or building sites have been found partly or entirely buried in the ground for use. Large pots were buried in the ground before use because their bottoms were narrow and their shoulders were broad, so when used as-is they were highly likely to tip over and be damaged. Simply speaking, burial provided stability. In the Yeongamsa Temple Site in Hapcheon and at the building site where the Bulguksa Temple Museum was built, stone materials were used to separate the buried pottery pots from the surrounding area.

Earthenware vessels were also used as measuring containers to verify a predetermined quantity. The earthenware vessels salvaged from Mado Shipwreck Nos. 1, 2, and 3 were mainly used for storing *jeotgal*. Wooden tablets salvaged from these shipwrecks confirm that various earthenware pots of different sizes and shapes ranged in capacity from 1 *du* (approximately 3.4

liters) to 5 *du* (approximately 16.8 liters) pot, reflecting the units for measuring quantity at the time.

In all ages, including in the Goryeo period, earthenware has been made chiefly for practical use in diverse spaces. That is why the intended usage of such earthenware pottery matters more in a discussion of its identity than its figurative qualities and shape. Therefore, the effort to examine and analyze in detail where and under what conditions pottery were buried should continue in the future.

Translated by YOU Jinsook

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Abstract

This paper aims to identify the usage of earthenware pottery for food storage based on surviving written records and materials excavated from Goryeo period sites. Although written records from this period is insufficient by themselves, this research has been possible thanks to well-preserved pottery excavated from Goryeo period sites. Earthenware pottery was used for the storage of drinking water and food. Evidence of Goryeo earthenware used for food storage can be found in literature and at temple and other building sites as well as from the wrecks of trading ships discovered in the waters off of Mado. At the time, earthenware was used to store grain, fermented foods such as traditional Korean sauces (*jang*), salted and fermented seafood (*jeotgal*), kimchi, and alcohol. Earthenware vessels were used as measuring containers to verify a predetermined quantity. In all ages, including in the Goryeo period, earthenware has been made chiefly for practical use in diverse spaces. That is why the intended usage of such earthenware pottery matters more in a discussion of its identity than do its figurative qualities based on shape.

Keywords: Goryeo period, earthenware pottery, drinking water, food, storage, measuring vessel

