Onggi: A Study of Korean Fermenting Pottery from the 7th Millennium BCE until Present Day

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A Study of Korean Fermenting Pottery from the 7th Millennium BCE until Present Day

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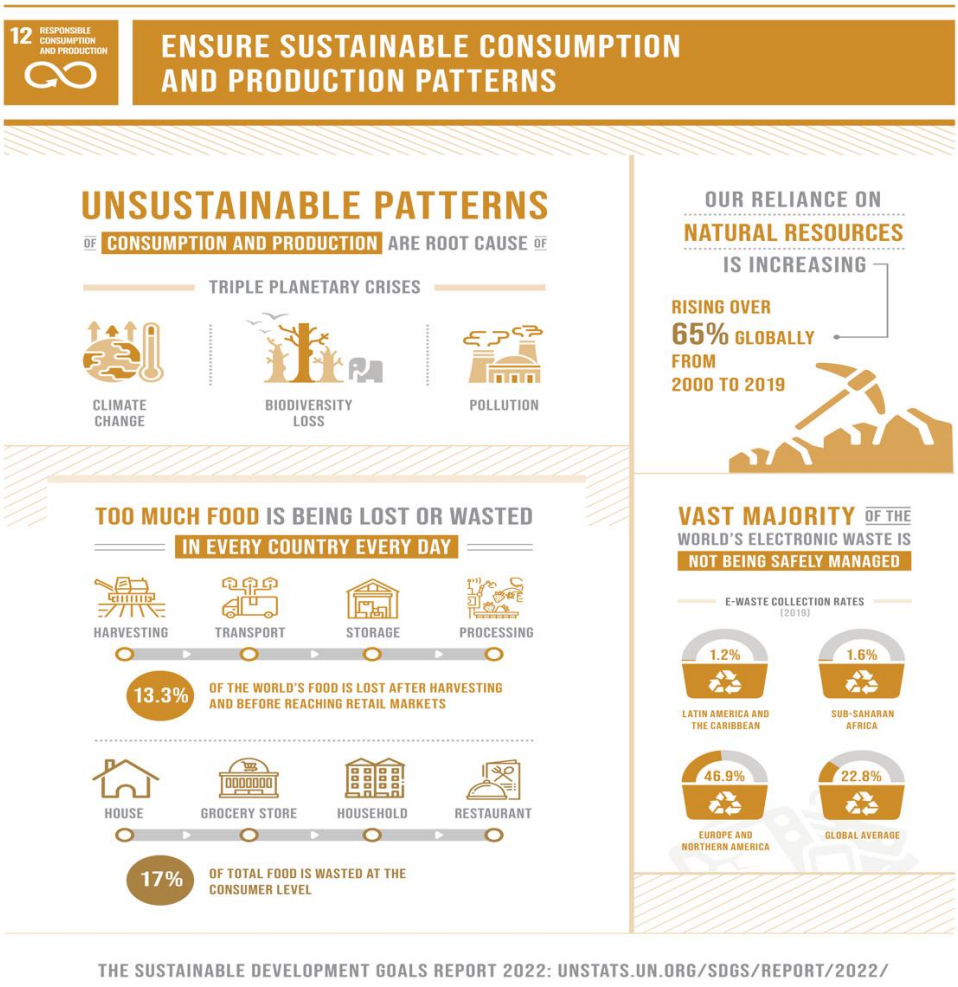
1. Chapter 1| Introduction

Production and preservation of foods for human consumption have been identified as a main cause for concern as they encompass land use, greenhouse gas emissions, water waste, fossil fuel depletion, and biodiversity loss (United Nations, 2022). When food is wasted in lieu of consumed, the impact on the environment is aggravated. Globally, one-third of the food ends up in landfills and 88 million tonnes (Mt) of food are thrown out in the E.U. per year (Heidenstrøm & Hebrok, 2021, p. 1; Scherhaufer et al., 2018, p. 98). As a result, reducing the waste of food has become a global challenge and is inscribed by the UN as one of the 17 Sustainable Development Goals aiming for a fifty percent reduction by 2030 (United Nations, 2022) (see Figure 2).

Figure 2.

The UN Sustainable Development Goal 12. Department of Economic and Social Affairs.



I have often thought about how archaeology could contribute and actively participate in finding alternatives to face such global challenges. The question of what could be done as an archaeologist to drive sustainable and environmental solutions and help innovate present technologies is at the center of

this present research. I am indeed convinced that we can make breakthroughs from the ways of our ancestors in the field of food conservation.

The issues regarding our current approach to food production, consumption, and waste have been highlighted in numerous studies and stem from multiple intertwined factors. The waste of food is caused by three main elements: population food consumption patterns and practices, use of outdated industrial technologies, and finally, prioritizing private stakeholders' sales targets (Canali et al., 2014, p. 5). In other words, there is an ethical issue with how we consider food waste and its significance on the future of mankind and our planet. Intensive industrial production has become the norm as we have distanced ourselves from ancient traditional craft production. In addition, the mass-production processes presently put in place are unfortunately understood and controlled by only very few within the food industry with the sole aim of feeding the masses and little concern over its consequences or implications for generations to come.

I believe that archaeologists have a duty to share the savoir-faire of the past with present and future generations. Archaeology as a science is relevant because, through the observation of the "deep history" of our planet and humankind, we can identify the long-term trends, developments, and processes that have influenced the rise and decline of civilizations. Archeology also helps in identifying the underlying reasons behind the functioning of contemporary society; elucidating the factors that shape our present societal dynamics (Kerr, 2020, p. 1338; Fontijn, 2016, p. 4). Archaeological research can contribute effectively to re-introducing ancient crafting methods into our current and future production system of goods and services. Re-exploring past civilizations' ways of isolating houses, cultivating soils, dying textiles, or preserving foodstuffs without our reliance on "modern" inventions such as pesticides, plastics, and chemicals, could be a way to diminish our footprint and introduce sustainability and durability in our future ways of living.

Within this context, I have decided to address foodstuff preservation and waste through the study of hand-crafted *Onggi* pot utilization. More precisely, I would like to explore the re-introduction of the ancient craft of Onggi pot making and utilization and its potential as a driver for innovative solutions to food waste and food conservation on a global scale.

1.1 The *Onggi* pot

An Onggi pot is the earthenware involved in the food fermentation process and long-term foodstuff preservation used mainly in the Korean Peninsula (see Figure 3) (Kang, 2008, p. 187).

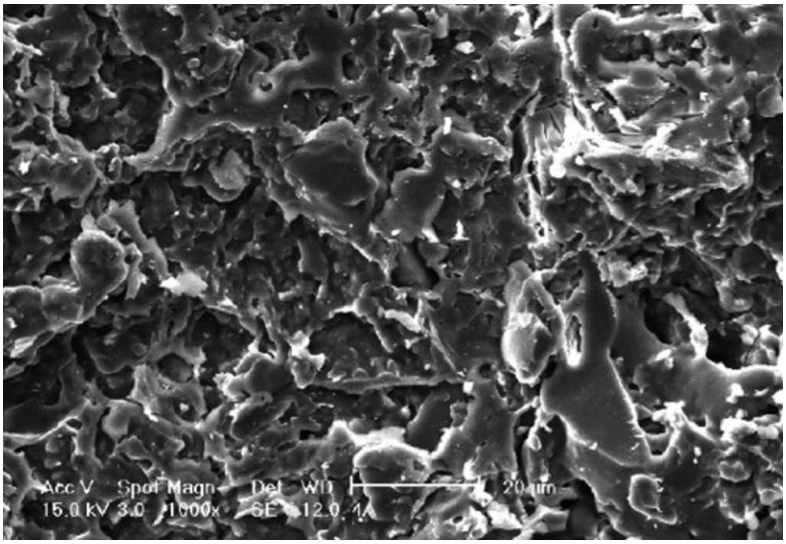
Figure 3**.**

Onggi pot covered with brown glaze, 20th century, earthenware, H. 80 cm, temporary exhibition at the Keramiekmuseum Princessehof.

Per Figure 4, this pottery type has a particularly porous microstructure that facilitates fermentation and that is also why today they are called “breathing ceramics” (Seo et al., 2005, p. 82; Kang, 2008, p. 187).

Figure 4.

Unglazed Onggi walls microstructure, image obtained with a scanning electron microscope. (Seo et al., 2005, p. 85, Figure 2).



The Onggi pores allow for the even distribution of gas and liquids in the pot, creating an internal phenomenon of a modified atmosphere, producing ideal conditions for aerobic bacteria to proliferate (Seo et al., 2005, p. 85).

This prehistoric craft and the primitive form of the Onggi pot can be identified through archaeological findings and are traced back to the 7th millennium BCE into the Korean *Chŭlmun* (comb-marked) period (Cho & Ko, 2016, p. 149).

The specific circumstances influencing past populations on the Peninsula[1] to develop this technological tool have mostly been understudied (Shoda, 2021, p. 242). Despite that, nowadays this food processing method is "fully engrained" within the Korean identity through the role the pots have in the everyday lives of people as well as government efforts to create a national canon of culture integrating Onggi vessels among the "100 Cultural Symbols of Korea" (Shoda, 2021, p. 242; Song, 2010, p. 6). Since 1990, Onggi potters hold the status of "Living National Treasure" (LNT) and "True Masters of Traditional Korean Onggi Culture" (Song, 2010, p. 155). The titles associated with the craft highlight the fact that it has become, in the eye of the Korean government, of utmost importance to conserve that tradition for future generations. At the same time, it is acknowledged that fewer people are willing to learn and carry on the craftmanship on the peninsula, thus, making it a near-extinct tradition in South Korea (Song, 2010, p. 155).

Interestingly, on a global scale, a steadily increasing number of people are making Onggi pots, and even more, are buying them for utilitarian reasons. I will argue that the Onggi craft is now going through a renaissance phenomenon in some parts of the world.

1.2 Research questions

As an archaeologist evolving in a fast-paced and ever-changing environment, I have been trained to hypothesize on what is missing from the archaeological records. In this thesis, I will attempt to highlight several trends and phenomena linked to the emergence and continued utilization of Onggi fermenting pots. I would also like to mention that while I will present lots of data in this thesis, consider it just "the tip of the iceberg" in terms of research that could be done on this topic. Thus, as there are still many unanswered inquiries on the subject in the field of Korean Archaeology, I have been concentrating on answering the following sub-questions to structure the research at hand:

- What drove the emergence of pottery in the Korean Peninsula during the 7th millennium BCE?
- How could fermentation have developed during the Chŭlmun and Mumun periods (7500-150 BCE)?
- What influenced the long-lasting utilization of Onggi pots until today?
- Will the utilization and crafting of Onggi last?

[1] I will always use the capital "P" at Peninsula in this work because I always refer to the Korean Peninsula.

After answering the questions mentioned above, I hope to have a better comprehension of Onggi pots' functioning and be able to answer my main thesis question:

- Can the introduction of Onggi crafting and use on a global scale drive innovative solutions to food waste and food conservation?

1.3 Methodology

In this study on Onggi pots and their functions in past and present societies, a mixed methodology was applied to explore the trends and processes behind their production. The research integrates both quantitative and qualitative data highlighting the vessels' characteristics on one hand such as fabric, morphology, surface treatment, decoration, and technological changes through time. On the other hand, ethnographic observations taking the form of interviews and *questionnaires* with potters and institutions utilizing and crafting Onggi pots were done.

In addition, a diligent examination of pertinent archaeological reports, scientific research, and historical literature took place to trace this ancient technology in time. I also searched for Northeast Asian iconographic representations of Onggi pots and analyzed these pictural depictions for my research.

The application of multiple study methods permitted a global understanding of fermentation processes through pottery utilization and crafting over a time span of approximately 10, 000 years.

I would like to add that while writing this thesis, I have successfully enrolled in a course on Intangible Cultural Heritage in Northeast Asia (10 ETCS) as an elective at the faculty of Humanities of Leiden Universiteit that played a determining role in helping me approach the subject while incorporating the teachings from my archaeological studies background.

I was obligated to familiarize myself with certain Korean and Chinese terms for this research and there are many included in this research. Please note that a complete Glossary is provided at the end for reference.

1.4 Challenges

As much as I believe that the re-introduction of ancient craft could be a positive undertaking for the future of both our planet and mankind, I cannot predict how it will impact future generations and what, if any, negative effects it would entail. There are many examples of technologies whose onset was motivated by good intentions but that ended up taking negative turns. Let us mention the invention of celluloid (a form of plastic) and that of asphalt. The first was invented to replace the use of bones, tortoise shells, and ivory in manufacturing utilitarian objects such as belt buckles, combs, or buttons (Seymour & Kauffman, 1992, p. 311). As for asphalt, it became the reference material in the building industry (Blankendaal et al., 2014, p. 27). We now know that these materials have and still cause environmental damage, bring about many species' extinctions, and interfere with precious ecosystems.

In the field of food preservation, the invention of cooling and freezing devices such as refrigerators has revolutionized the world population's way of life and most notably food consumption habits. Society owes a lot to Jacob Perkins (1766-1849) for his invention in 1834 of the first functional frigorific machine using ether in a vapour compression cycle (Bjornlund, 2015, p. 13). In 1850, Ferdinand Carré (1824-1900) followed suit with the invention of a refrigerating machine using water and ammonia/sulfuric acid (Freidberg, 2009, p. 25). Four years later, James Harrison built a vapour-compression refrigeration system that resulted in the first industrial use of a refrigerating machine (Bruce-Wallace, 1966). The beginning of the 20th century marked the emergence of the era of refrigerators for private use and their democratisation made them accessible to the general public resulting in a consequent leap forward. In 1927, the General Electric "Monitor-Top" model became one of the most popular as it incorporated a new technology using sulfur dioxide (SO_2) as a refrigerant (Freidberg, 2009, pp. 39–40). Needless to say, sulfur dioxide is a highly toxic and combustible substance: there were many accidents (explosions, fires), and the escaped gas eventually caused blindness and other eye ailments (Morton Grant, 1947, p. 765). This dangerous substance was later substituted with Freon, a gas that appeared at the time to pose little health risk for humans. Today we know its significant role in damaging the ozonosphere (Freidberg, 2009, p. 44). This explains why its use has gradually been abandoned since 1980s. Today's new generations of fridges are more energy efficient, better insulated and equipped.

However, the climate problems of the last 50 years are mainly caused by our refrigerators and cooling systems (Duan et al., 2018, p. 6350). These have an environmental impact 16 times greater than that of airplanes yearly (L'Écho, 2019). Undoubtedly, refrigerators and their use have facilitated our conservation, transportation, and consumption of food, but the price to pay for current and generations to come is enormous. These devices actively contribute to ozone depletion, global warming, increased health risks, rising sea levels, changes in wildlife habitats, and extreme weather conditions (PureSphera, 2022). This shows that even if food conservation was intended for the greater good, it nonetheless inflicts immense damage on our planet and eventually threatens our presence on it. Today, the urgency to change our habits and find alternate solutions to conserve our foods without risking our planet's future has become a first-priority challenge.

1.5 Thesis outline

Archaeological research allows a practical understanding of past technologies by looking at what is missing from an artifact or site but also allows one to observe processes of persistence of said technologies once it has arisen (Hodder, 2011, p. 172).

The first part of this thesis, Chapter 2 *Part I From Semi-Nomadic Groups to Proto-States*, will focus on the context that saw the emergence of the primitive form of the Onggi pot, thus going back to the Chŭlmun period (8000 BCE- 1500 BCE). It is important to note that what Westerners call the Neolithic

period is defined by particular human behaviors in the Western world. Some of the phenomena defining the Prehistoric period acronyms (Mesolithic, Neolithic, Bronze Age, etc.) did not occur at the same time and rate in the Korean Peninsula (Shoda et al., 2017, p. 164). Therefore, I will be using Korean periodization words based on pottery as much as possible and in accordance with Korean archaeology standards. While Chapter 2 *Part II From Kingdoms to the Last Emperor*, will then highlight Onggi vessels' importance in Korean history for the later periods.

The 3rd chapter will address some of the current constraints applied to Onggi crafting, its production, and its utilization in South Korea.

In Chapter 4, I will present individuals and institutions that are currently innovating in a sustainable and environmentally friendly manner through the utilization and crafting of Onggi pots.

Chapter 5 will break down the functioning of Onggi vessels based on the most up-to-date scientific research. It will also discuss whether Onggi vessels present any potential as a sustainable fresh food packaging technology.

In the closing chapter, I will discuss how archaeology can contribute to a better future by addressing and participating in discussions around the global challenges we are all facing today.

2 Chapter 2 | Korean preservation pottery through time

2.1 Introduction

Looking at the archaeological records is essential in order to understand the multiple drivers behind the elaboration of the Onggi food preservation technology throughout the Korean Peninsula. It allows one to acquire practical knowledge of how the technology functioned in the past and highlights its manufacturing techniques as well as the types of materials used. This chapter will present the general characteristics of Korean utilitarian food preservation pottery from its inception up to 1905. The period presented hereafter begins at approximately 7000 BCE until the colonization of the Korean Peninsula by Japan. Therefore, chapter two is an overview of the major observable trends seen in pottery from a fermentation point of view. This chapter is constraining itself to the limitations of a master thesis. The following information is based on multiple secondary sources, historical documents, and iconographical sources.

Part I From Semi-Nomadic Groups to Proto-States

2.2 Limitations

What is primarily missing from the archaeological research in the field of Korean archaeology is the context of the emergence of fermented foods (Shoda, 2021, p. 242). The research in the field of archaeology in general and fermentation through the ages in particular until very recently in Korea has been mainly concentrating on the latest pre-historic records, starting more precisely with the Three-Kingdoms period (57 BCE-667 CE) (Nelson, 1993, p. 9; Byun, 1995, p. 19). There are a couple of reasons for this. First, there are various Chinese written sources on this period such as the *Records of the Tree Kingdoms (Sanguo Zhi*) regarding the period between 8– 265 CE and the history book of *Hou Hanshu* (5th century CE), that highlight the fermentation process of foods and liquors in Korea (Kwon et al., 2014, p. 5; Lee & Kim, 2016, p. 7). Secondly, two painted murals in the Anak Tomb number 3 in North Korea (see Chapter 2.6.3) confirm the utilization of primitive Onggi pots during the Three Kingdoms period which also explains why fermentation during this period is well known (Kim & Hu, 2023, p. 1). Finally, this period served as a grand narrative of nation-building since the separation of the Korean peninsula into two territories and thus has been extensively researched in the past (Guex, 2016, p. 9). This can be problematic at times as some of these sources originate either from an outsider's point of view or are motivated by political intentions and are generally biased.

Regarding the practical constraints that apply to the peninsula's archaeological records, the local soil's effect on organic material is another issue. Indeed, the lack of data, and almost systematic absence of organic remains such as animal bones, teeth, shells, etc. in archaeological research for the pre-historic period would be due to the high content of acidity in the soil (Guex, 2016, p. 18; Bale, 2011, p. 40). Therefore, stable isotope analysis, research of past populations and living beings' pathological conditions, reconstructing past populations consumption patterns, etc. is very difficult to establish on

account of the small number of organic materials left behind and does not leave much for researchers to analyze.

Furthermore, what overcomplicates the state of research is the discrepancies between Korean and international research in dating the pre-historic periods on the Peninsula (Nelson, 1993, p. 2). Korean pre-historic periodization for what is the "Neolithic" period in the Western world is based on pottery typology. Thus, the Chŭlmun period starting loosely around 7500 BCE and finishing around 1500 BCE is called this way because of its distinctive pottery production. The following period, called Mumun, also refers to a pottery type of production. However, when comparing international and Korean researchers' dating periods length and acronyms given for timeline sakes, many different versions can be found (Yi, 2015, p. 186). Table 1 shows a couple of these obvious discrepancies.

Table 1

Dating for the Pre-History of the Korean Peninsula by different scholars. This table highlights the dating discrepancies for the Prehistory of the Korean Peninsula by three different parties. (Bale & Ko, 2006, p. 160, Table 1).

<table>
<tr><th>DATE</th><th>RHEE AND CHOI (1992)</th><th colspan="2">LEE S. J. (1998)</th><th colspan="2">BALE AND KO (2006)</th></tr>
<tr><td>-A.D.-
600
500
400</td><td rowspan="2">Three Kingdoms</td><td rowspan="2">Three Kingdoms</td><td>Late</td><td colspan="2" rowspan="2">Three Kingdoms</td></tr>
<tr><td>Early</td></tr>
<tr><td>300
200
100
-A.D.-
0
-B.C.-
100
200
300</td><td rowspan="2">Metal Production</td><td rowspan="2">Proto-Three Kingdoms</td><td>Late</td><td rowspan="3">Proto-historic</td><td>Late</td></tr>
<tr><td>Early</td><td>Early</td></tr>
<tr><td></td><td rowspan="2">Bronze</td><td>Late</td></tr>
<tr><td>400
500</td><td></td><td>Mid</td><td></td><td>Late</td></tr>
<tr><td>600
700
800</td><td>Mumun</td><td></td><td>Early</td><td>Mumun Pottery</td><td>Mid-Late
Mid-Early</td></tr>
<tr><td></td><td></td><td colspan="2" rowspan="2">Neolithic</td><td></td><td>Early</td></tr>
<tr><td>1500
-B.C.-</td><td>Jeulmun</td><td colspan="2">Jeulmun</td></tr>
</table>

It is important to mention that Korean archaeology has seen the day under the rule of Japan during the beginning of the 20th century (Guex, 2016, p. 16). This has resulted in the findings being biased (Nelson, 1993, p. 9; Kim, 2013, p. 9). The events following the Japanese colonization (World War II, but also the Korean War and the separation of the Peninsula into two) led to the development of South Korean archaeology during the 1960s with the creation of its first department of archaeology at the University of Seoul (Kim, 2013, p. 12). South Korean archaeology saw the day in a climate of nation-building and fast economic growth, not always permitting thorough research.

2.3 Ecology

In scientific archaeology, the term "ecology" refers to the study of the distribution and organization of life and interactions between organisms and their environments (Yesner, 2008, p. 39). This is important because humans are embedded within their surroundings, also referred to as their biosphere. Humans are influenced by, interact with, and exploit other animals, plants, bacteria, fungi and other biotic and abiotic elements in their environments (Yesner, 2008, p. 43). To understand changes in human behavior, such as the introduction of utilitarian pottery, a knowledge of the context where it takes place is needed. Thus, the recognition of how the environmental context could influence cultural patterns and cultural change, especially technology, demography, and sustenance play a crucial role (Yesner, 2008, p. 40). Within this ecological framework, a couple of important concepts can highlight the grand entrance of utilitarian pottery in the history of the Korean Peninsula. These are the food web, the carrying capacity, and the human niche (Yesner, 2008, p. 39). Approaching the topic of Onggi crafting in its human niche made it possible to highlight a couple of intriguing facts (see Appendix C).

Firstly, it highlights that hunting was less important than gathering for the acquisition of food sources by the end of the Paleolithic period (Lee, 2020, p. 135; Lee & Kim, 2016, p. 2). The concept of carrying capacity could help find explanations behind this phenomenon but little is known in terms of the possible lack of game in the region that would have driven the abandonment of hunting as a sustainable food resource (Bae & Kim, 2010, p. 494).

On the other hand, archaeological records show that Korea saw the establishment of pockets of habitation primarily in the proximity of rivers and along the coasts during the Chŭlmun period taking into consideration that 70% of the territory is mountainous (Byun, 1995, p. 59; Bae & Kim, 2010, p. 494). This can explain why the birth of pottery on the peninsula (7670–7550 BCE) coincides with the high consumption of maritime products (Byun, 1995, p. 52; Kim et al., 2020, p. 1721). In addition, research has demonstrated that earthenware was used to cook fish and vegetables in seawater (Lee, 2020, p. 142). It should be mentioned that by storing foods with salted water, the process of fermentation occurs naturally, and it could explain why Korean researchers support the idea that primitive pottery drove the foodstuff process of fermentation (Lee, 2020, p. 140). Parallelly, the Korean peninsula since the Last Glacial Maximum has incurred arduous months of winter (-20 °C) and hot monsoon-like

summers (30 °C) (Nelson, 1993, p. 19). The Onggi vessels, due to their crafting method and internal functioning (see Chapter 3) allow the food stored in it to stay cool during the summers (and not to rot) while not freezing its content during the winters (Song, 2010, p. 19). The Onggi was, therefore, a tool permitting the continuous production and preservation of various foodstuffs providing one of the best forms of positive post-encounter return rates from food resources (Bird & O'Connell, 2006, p. 147).

If today, the precise drivers for the elaboration of earthenware are still unknown because, as previously mentioned, of the lack of organic remains in the archaeological records, one question arises; could the elaboration of primitive Onggi result from a coping mechanism when facing the environment? Or, on the opposite, was the collection of marine resources so abundant that it resulted in hunting terrestrial animals being a secondary food source?

Nowadays, Onggi pots have become a Korean cultural trait, but we could speculate that first and foremost the environment drove the elaboration of Onggi crafting exemplifying past humans' food choices.

2.4 The Chŭlmun period (7500-1500 BCE)

2.4.1 Context

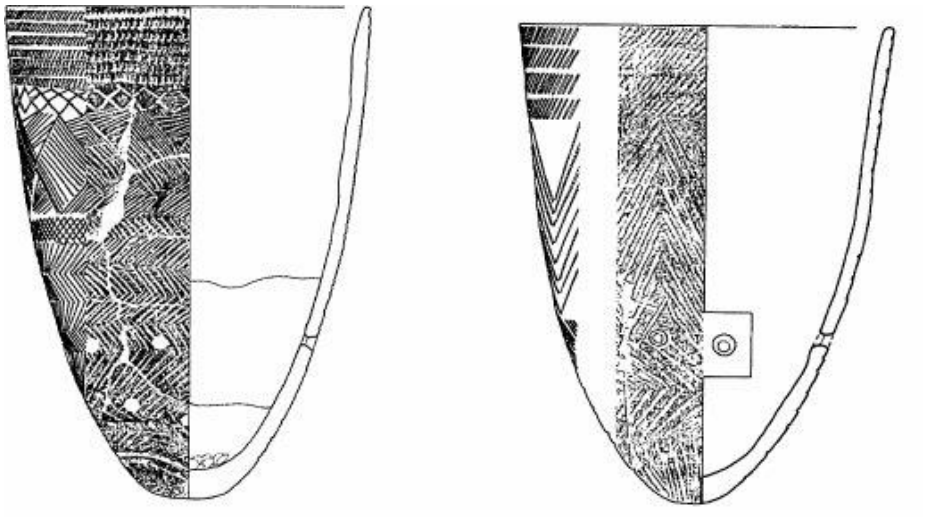
The Chŭlmun period is deriving its name from one[2] of the earliest pottery found on the Peninsula. In contrast with the Neolithic period in West Asia, this comb-marked pottery (Chŭlmun) appeared without the existence of agriculture (Shoda et al., 2017, p. 165). If in the West, pottery development appeared after the exploitation of agricultural productions, in the East; pottery emerged before agriculture (Le Mière, 2017, p.9). Trying to highlight the drivers for pottery production before agriculture is therefore crucial to the proper understanding of Korean utilitarian pottery.

The Chŭlmun earthenwares elaborated on the Peninsula, such as showed on Figure 5, predates the agrarian exploitation of three millennia (4th millennium BCE), which makes the primitive vessels a product of hunter-gatherer populations (Shoda et al., 2017, p. 165; Cho & Ko, 2016, p. 149)

Figure 5.

Chŭlmun round-bottomed pottery displaying comb pattern decoration. (Kim, 2003, p. 297, Figure. 1).

[2] The oldest pottery on the Peninsula is called Gosan-ri and has been radiocarbon (^{14}C) dated to 7600-7550 BCE found on Jeju Island, situated between the Korean Peninsula and the Japanese archipelago (Kim et al., 2020, p. 1715).

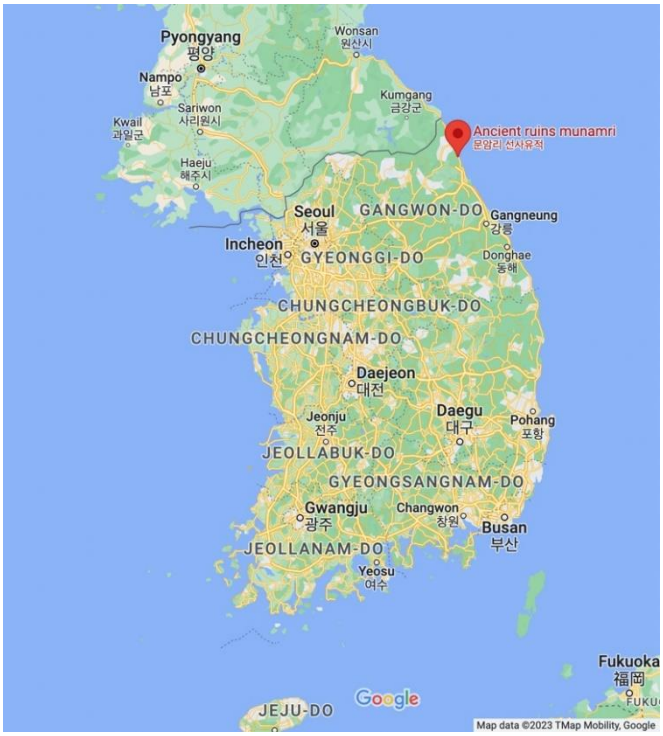


This thesis will begin with looking broadly at the ecological context in which Chŭlmun pottery was found, the material discovered along its side, the results from archaeological scientific sampling, and the functional attributes of this pottery type to construct possible hypotheses on the emergence of fermentation processes on the Peninsula.

Firstly, when observing some of the material associated with Chŭlmun pottery on the earliest archaeological sites available such as Gosung Munamri on the East coast of the Peninsula (see Figure 6), a correlation can be established with the exploitation of maritime resources.

Figure 6.

Google Maps. (2023). Location of Gosung Munamri on the map of South Korea.



In Gosung Munamri, the archaeological material was composed of fishhooks, harpoons, and stone net sinkers that highlight these past populations' food web economy (Cho & Ko, 2016, p. 150; Shoda, 2021, p. 246; Byun, 1995, p. 53) (see Figure 7).

Figure 7.

Gosung Munamri archaeological finds composed of earthenware vessels, fishhooks and harpoons from 5000 BCE. (© 2000 Cultural Heritage Administration).

Secondly, if on one hand, the archaeological material emphasizes the exploitation of maritime resources, other Chŭlmun period archaeological sites, such as Sejuk and Jukbyeon (located on the East coast of the Peninsula), confirm the presence of organic residue on pottery sherds as a result of seafood preparation for consumption (Shoda et al., 2017, p. 166). Furthermore, isotopic analyses support these findings showing that seafood represented an important source of protein, omega-3 fatty acids, vitamins, and minerals in the human diet of the past hunter-gatherer populations of Korea (Byun, 1995, p. 130; Shoda, 2020, p. 165).

Finally, the great quantity of shellfish, fish bones, marine mammal bones, and shell mounts remains on the sites along the Peninsula's coasts leave little doubt about the importance of sea exploitation during the Chŭlmun period (Lee, 2011, pp. 311–318).

2.4.2 The first signs of fermentation?

It is thus interesting to observe how pottery evolved morphologically from its inception and throughout the Chŭlmun period. Indeed, if food sources were primarily based on maritime resources,

looking at its elaboration process of pottery highlights how the vessels were used, and how food was prepared and consumed.

The earliest Chŭlmun pottery was handmade, coarse, and heated at relatively low temperatures (500 °C) (Lee, 2022, p. 30). Composed of organic materials such as plant fibers, these vessels would not have been fit as containers for cooking or heating since they would lack hardness and be very absorbent (Lee, 2020, p. 138). Shellfish and crustaceans were harvested in large quantities during the summers; however, these kinds of seafood are prone to fast decomposition, toxic bacterial growth and are difficult to dry (Lee, 2020, p. 136; Lee & Kim, 2016, p. 4). Rather than being consumed right away, fermentation would have revolutionized the preservation of these large quantities of seasonally available resources. Thus, considering that these early forms of pottery were used for food fermentation is a hypothesis worth exploring. How, then, could fermentation have developed?

First, the salting of seafood or meat initiates a natural process of fermentation mediated by salt-resistant bacteria (Lee, 2020, p. 140). This means that it would occur quite easily since salt is naturally present in maritime resources.

Secondly, archaeological findings demonstrate that seafood wasn't the only resource extracted for food preparation, numerous plants were also consumed, such as wild onion, plum, wild kiwi and grape, soybean, and azuki beans just to name a few (Lee, 2011, p. 321). When a slightly wilted vegetable is placed in a container with saline water, it naturally undergoes a lactic acid fermentation process (Lee, 2020, p. 142). Numerous ethnic foods around the world (*sauerkraut*, *dhamuoi*, *dakguadong*, *burong masala*) are a product of similar preparation processes preventing spoilage and harmful bacteria from growing (Lee, 2020, p. 142). Subsequently, mixing seafood such as shellfish and crustaceans with already fermented vegetables in earthenware vessels would have lowered the pH levels of harmful bacteria growth in marine resources and made them edible for longer periods of time (Lee, 2020, p. 143). These discoveries would have made the preservation of seasonally available resources possible and explain why so much emphasis was given to gathering and less on hunting. It is safe to say that pottery, during the first two millennia of its emergence in the Korean Peninsula was used to contain and conserve food (Lee, 2020, p. 136; Shoda et al., 2017, p. 170). What is particularly fascinating is how this initial utilization of salt water in pots has influenced later food preparation techniques and driven Onggi's technological development.

2.4.3 Earthenware innovations

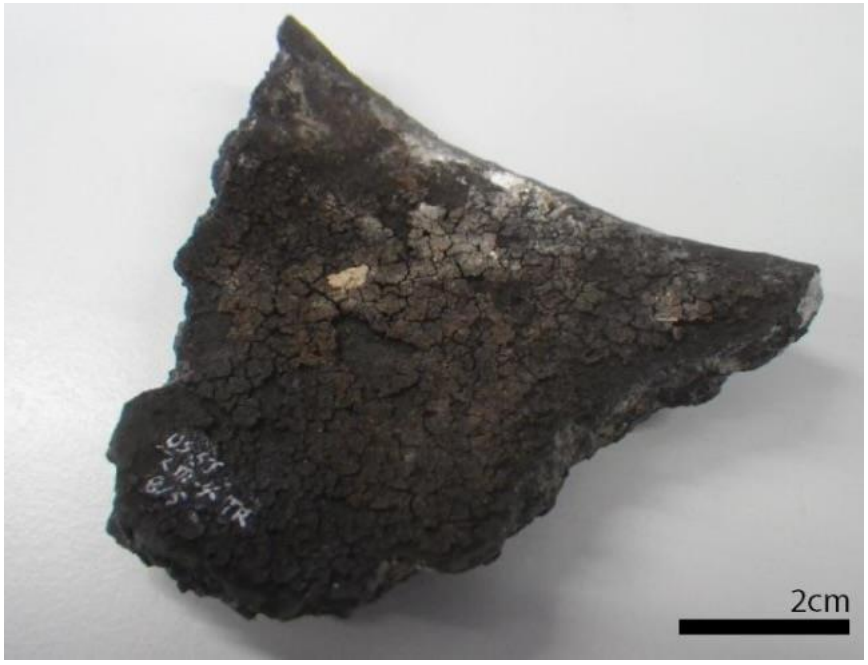
Noticeable modifications in pottery production and changes in the raw materials used can be observed from the 4th millennium BCE (Cho & Ko, 2016, p. 156). These adjustments can be interpreted as an adaptation to storing wet ingredients and high-temperature exposition (Lee, 2020, p. 138). This period coincides with the development of primitive kilns, the movement of populations inland, and the intensification of plant-based foods in the human diet (Cho & Ko, 2016, p. 156, p. 159). The

intertwining of these three phenomena will influence tremendously the role of pottery and its typology in ancient Korean societies. With the development of primitive kilns, higher firing temperatures (700––750 °C) were successfully reached resulting in a sturdier pottery microstructure (Lee, 2022, pp. 30–33). Even though the fabric remains mostly composed of sandy clay (which was the case for the early Chŭlmun period as well), the incorporation of calcium carbonate resulted in better control of the density of the pot's walls making them less absorbent (Lee, 2022, p. 30). Calcium carbonate is principally found in limestone, chalk, shells, and seashells among other things. It can be found in caves and coastal areas contexts such as beaches, tidal flats, and coastal cliffs (Britannica Academic, 2019). Thus, since most pockets of habitation were close to material containing calcium carbonate, it is not a coincidence it is found in pottery microstructure from that period.

Referencing back to the changes in food preparation, the analysis of cooking pots residues highlighted the regular utilization of salted water in food preparations (Lee & Kim, 2016, p. 4; Shoda et al., 2017, p. 168) (see Figure 8).

Figure 8.

Foodcrust on Chŭlmun ware sherd from, Inventory number USJ08, Sejuk site. (Shoda, 2017, p. 166, Figure 2).



The preparation of stews with seawater is still in use in some parts of the world today (Lee & Kim, 2016, p. 4). In addition, “Mongolian hot pots” could also be mentioned here as a long-lasting tradition linked to this ancient habit (Lee & Kim, 2016, p. 4). I will be elaborating further in this chapter on the impact of Chŭlmun period cooking methods for stews cooked in earthenware pots on current food traditions in Korean cuisine (still a major food staple), however, it is noteworthy to mention the

connection between the utilization of saltine water with wilted vegetables in fermentation jars and its utilization as an ingredient in warm preparations (Lee, 2020, p.147). In other words, could we hypothesize on the fact that these primitive stews are a product of preserving foodstuff with saltine water and can fermentation be the driver behind stews?

During the 4th millennium BCE, movements of pockets of populations occurred inland always near alluvial water points (Lee, 2011, p. 315; Cho & Ko, 2016, p. 156). This change of habitat and therefore of environment coincides with the introduction of cereals such as foxtail millet (*Setaria italica*) and broomcorn millet (*Panicum miliaceum*) in past human diets (Lee, 2011, p. 307). These food sources nonetheless stayed in the background until the full introduction of agriculture and can be considered as a form of incipient domestication (Lee, 2011, p. 307).

2.4.4 Summary

I have highlighted how incorporating the environment with the development and utilization of pottery technology permits us to hypothesize about the early fermentation processes. Attempting to reconstruct the human niche of past Korean populations allows a better understanding of the major role of the sea in their food economy (Shoda et al., 2017, p. 165). Pottery in its early stage of conception shows how humans adapted to their surrounding environment and exploited the food resources and materials available. It is undeniable that the exploitation of the sea drove the elaboration of a technology capable of conserving food within the context of a hunter-gatherer lifestyle based primarily on fishing and gathering (Buyn, 1995, p. 127).

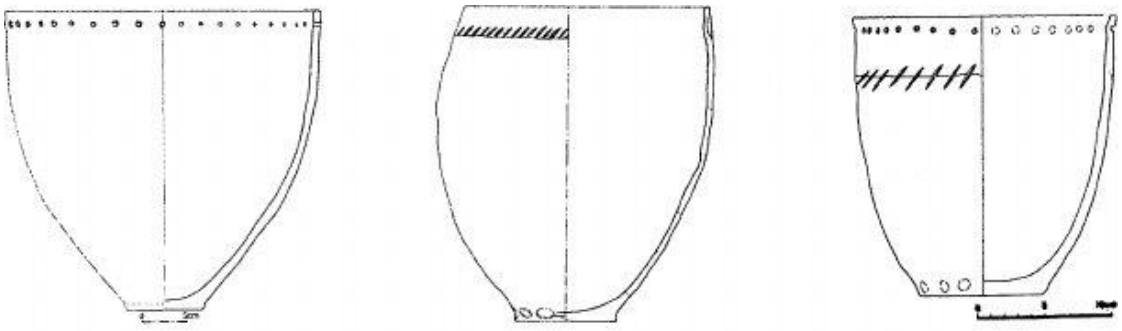
2.5 The Mumun period (1500–150 BCE)

2.5.1 Context

In the following period, the transition from gathering and hunting to farming was marked by the progressive end of the Chŭlmun production and replaced by a new pottery type. The Mumun pottery also referred to as “plain pottery”, is a less decorated type of ware characterized by punctuations along its rim and double rims (Bale, 2011, p. 25) (see Figure 9).

Figure 9.

Early Mumun pottery from central-Western Korea displaying a plainer decoration with punctuations along the rim. (Kim, 2003, p. 300, Figure 3).



It is important to note that these pierced rims pots predate the introduction of bronze in the Peninsula, and thus can't possibly be influenced by techniques used in metallurgy (The Metropolitan Museum of Art, 2000; Bale & Ko, 2006, p. 159). On the other hand, the holes located at the bottom of the vessels, if present, infer that they were used as steamers (Shoda, 2021, p. 250; Denès, 2004, p. 11).

Mumun vessels' lightly decorated necks, rims, and shoulders differ greatly from the heavily decorated Chŭlmun pottery, and it highlights a change in value and perhaps function given to these pots (Cho & Ko, 2016, p. 162). This slow transition to plainer pottery (see Table 2) has still to be researched extensively but coincides with a new way of living and an increase in agricultural exploitation.

Table 2

Comparative table showing the transition from decorated to plainer type of pottery. (Data collected by H. Muratore).

	Materiel	Description	Date/Era	Location	Dimensions	Picture
	Chŭlmun comb-pattern pottery	Storing-cooking, decoration made with fish bones, pointed bottom (Kim, 2021, p. 229).	4000 - 3400 BCE	Amsa-dong site, Seoul, near Han River	38, 1 cm	
	Chŭlmun comb-pattern pottery	Storing-cooking, decoration made with fish bones, pointed bottom. (Kim, 2021, p. 229)	4000 BCE	Amsa-dong site, Seoul, near Han River	38, 4 cm	
	Chŭlmun coarse pottery	Hypothesis: used for storage, the presence of sterol (fungi) derived from the deliberate fermentation	6000-5000 BCE	Jukbyeon-ri site, East-coast	14, 8 cm	

		of sugars rather than from burial environment (Shoda et al., 2017, p. 170).				
	Chŭlmun "red-burnished" pottery	Traces of aquatic oils to provide high-energy greasy soups. Thermal alteration. (Shoda et al., 2017, pp. 168-169).	6000-5000 BCE	Jukbyeon-ri site-East-coast	18 cm	
	Mumun perforated pottery	Perforated earthenware with holes at regular intervals on the rim, Inv. number pearl 2093, Jinju National Museum.	1100 BCE	Jungbuji station site, central South Korea	30 cm	
	Mumun "red-burnished" pottery	Food storage, flat-bottom, made of soft clay, Inv. number Sinsu 2287, National Museum of Korea.	1000 BCE	Sancheong-gun	12, 8 cm	
	Mumun plain pottery	Food storage, flat-bottom, clay, Inv. number Sinsu 6393, National Museum of Korea.	300 BCE	Chuncheon-si	23 cm	
	Mumun plain pottery	Food storage, flat-bottom, absence of decoration, clay, Inv. number Sinsu 7306, National Musuem of Korea.	300 BCE	Jeongseon-gun	13,2 cm	

It is still debated whether Korea experienced agriculture as a result of migration waves entering the Peninsula (just like what occurred during the 3rd millennium BCE with the migrations of the population coming from the Pontic steppes into the European continent bringing a new way of living with them

Allentoft et al., 2015, p. 169) or if it was influenced by other factors (Lee, 2011, p. 325;). Thus far, however, archaeologists have found no DNA sample to corroborate such migration movement hypothesis due in part to the few human skeletal remains found on the Peninsula (Lee, 2011, p. 326; Nelson, 1993, p. 146).

If one takes into consideration that the domestication of some plants such as broomcorn millet and foxtail millet, was already taking place during the Chŭlmun period (4rth millennium BCE), it is conceivable that agriculture in the Peninsula took place gradually over two millennia before becoming the principal lifeway (Bale & Ko, 2006, p. 182; Shoda, 2021, p. 247). Indeed, in *The Transition from Foraging to Farming in Prehistoric Korea* (2011), Lee highlights that resources such as shellfish were more suitable for harvest during the colder seasons (due to fast decomposition during the summers) whereas millet species were harvested during the summer (2011, p.324). This shows that resources were exploited according to the seasons and were not a response to a "resource stress" phenomenon (Lee, 2011, p. 323). This period would be better considered as experiencing an intensification of agriculture, than a complete shift towards it (Crawford, 2016, p. 107).

During the Mumun period, some other characteristics such as an increased sedentarization occurring inland clearly defined living and working spaces influencing the specialization of pottery (Bale & Ko, 2006, pp. 165−166). The ecological changes made to the environment in the form of dry-field crops, paddy fields, water irrigation, crafts goods production sites such as kilns, and outdoor food preparation sites demonstrate that a more complex social organization is taking place (Bale and Ko, 2006, pp. 166−170). This period marks the introduction of metallurgy[3] as well, which needs to be taken into consideration since it results in better development of kiln technology and control of the heating temperatures of raw materials (Crawford & Lee, 2003, p. 87). As such, the development of one technology affects and influences others and further enhances craftsmen's specialization and savoir-faire.

2.5.2 The role of C_3 Plants

Within this context, the rising agriculture of two C_3 plants[4]; *Glycine max* (Soybean) and *Oryza sativa* (rice) should be noted (Bale & Ko, 2006, p. 165; Lee, 2020, p. 144; Lee & Kim, 2016, p. 5; Shoda, 2021, p. 248). By observing the progression of bean sizes in the case of soybean, archaeobotanists are

[3] It is only from the 6th century BCE that a noticeable production of bronze ware starts developing. It is for this reason that "Mumun" defines better the period. Mumun pottery starting almost a millennium prior to the "Bronze Age" in the Peninsula (Bale & Ko, 2006, p. 159).

[4] These plants use C_3 photosynthetic pathway by which they convert carbon dioxide (CO_2) into organic compounds. C_3 plants are found in various climates and ecosystems around the world, which has an impact on the agricultural practices involved with their growth (Ehleringer & Cerling, 2002, p. 1).

capable of determining when and where it was domesticated as part of the staple ingredients of past societies' diets (Shoda, 2021, p. 248; Lee, 2011, p. 319). As for rice, it was reported that it began to be widespread and cultivated from 1500 BCE supported by the various findings of carbonized rice found in pottery (Hahm, 2016, p. 3759).

Both cultigens play an important role in the history of the cuisine of the region and are still currently widely used daily. It is thus worth exploring how these foods were processed and consumed from when they first appeared and what role their production and consumption played in the persistence of fermentation techniques as well as their influences on pottery evolution.

But first, it is important to note that soybeans are a legume plant rich in protein content, fibers, and healthy fats contents (O'Keefe et al., 2015, p. 1). It possesses the advantageous characteristic of nitrogen fixation, rendering it a valuable choice for crop rotation due to its capacity to enhance soil fertility (Nieuwenhuis & Nieuwelink, 2005, p. 6). In other words, this legume due to its impact on soil fertility was easily farmed throughout history and contributed to becoming one of the main sources of protein for the population of the Peninsula during the Mumun period (Lee & Kim, 2016, pp. 5–9) (see Table 3).

Table 3

Human dietary reconstruction based on isotope and trace-element analyses. (Lee, 2011, p. 318, Table 3).

Period, site, province	Sample	Results	Implication
Late Mumun: Nukdo, South Gyeongsang[a]	48 human remains: skull, limb, rib, femur, vertebra	$\delta^{13}C = -18.3‰ \pm 0.4‰$, $\delta^{15}N = 11.2‰ \pm 0.7‰$ for adult ($n = 15$); $\delta^{13}C = -18.7‰ \pm 0.7‰$, $\delta^{15}N = 12.5‰ \pm 1.1‰$ for juveniles ($n = 33$)	Diet based on C_3 plants and terrestrial protein with a supplementary marine protein
Middle Chulmun: Tongsamdong, South Gyeongsang[b]	1 human metacarpal	$\delta^{13}C = -14.8‰$; $\delta^{15}N = 18.1‰$	Diet based on marine protein
Late Chulmun: Konamri, South Chungcheong[c]	1 human femur	Sr = 309 ppm; Ba = 73 ppm; Zn = 54.2 ppm	Mixed diet of plants, low terrestrial protein
Daejukri, South Chungcheong[c]	1 human femoral diaphysis	Sr = 435 ppm; Ba = 280 ppm; Zn = 66.3 ppm	Diet based on plants
Konamri, South Chungcheong[d]	1 human bone	$\delta^{13}C = -17.83‰$; $\delta^{15}N = 9.12‰$	Diet based on C_3 plants with a supplementary animal protein
Mumun: Konamri, South Chungcheong[d]	1 human bone	$\delta^{13}C = -12.2‰$; $\delta^{15}N = 10.1‰$	Diet based on C_4 plants
Early Chulmun: Yondaedo, South Gyeongsang[e]	2 human male and 1 female	Ba/Sr = 0.408, 0.416, 0.442; Zn = 203, 195, 280 ppm	Diet based on plants with supplementary fish and shellfish
United Shilla: Imdang, North Gyeongsang[f]	2 human males and 1 female; possibly 3 human males, and 3 females; 8 unidentified	$\delta^{13}C = -17.5‰ \pm 0.7‰$; $\delta^{15}N = 10.3‰ \pm 1.3‰$	Diet based on C_3 plants

However, it requires careful manipulation for consumption because of the trypsin inhibitors it contains (O'Keefe et al., 2015, p. 2). Trypsin plays a crucial role in the digestion process of protein in the human body; thus, it is crucial to counteract these inhibitors if soybeans are consumed in large quantities (O'Keefe et al., 2015, p. 2). This is where soybean processing through the utilization of pottery comes into place. It goes without saying that the scientific functioning of soybean growth and its composition could not have been known to the Mumun populations, but they were able to safely process it for consumption regardless.

Earthenware excavated in Pohang (see Figure 10) shows soybean residue in pottery, stored beans and carbonized beans, proving that the vessels played an important role in the storing, preparing and processing of this foodstuff at the time as shown in Figure 11 (Lee & Kim, 2016, p.5; Lee, 2020, p. 144).

Figure 10.

Adapted from Google Maps. (2023). Location of Pohang on the map of South Korea.

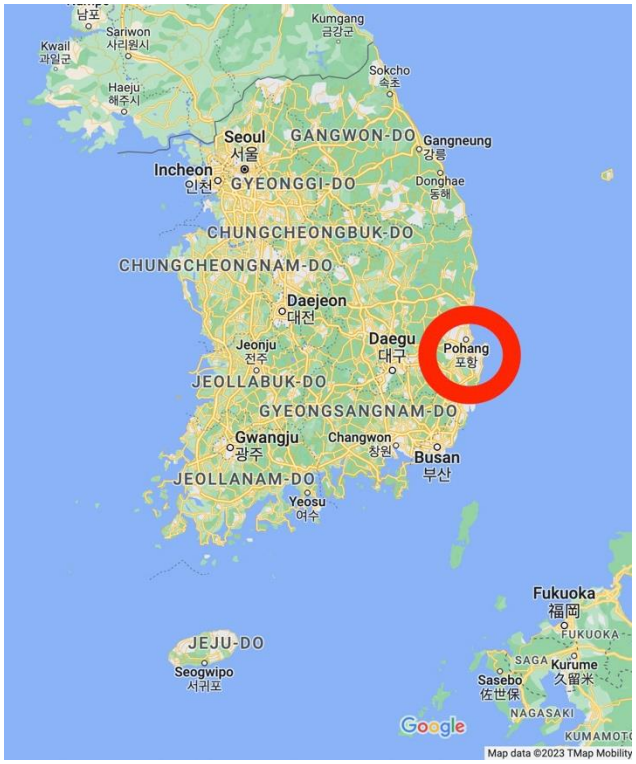
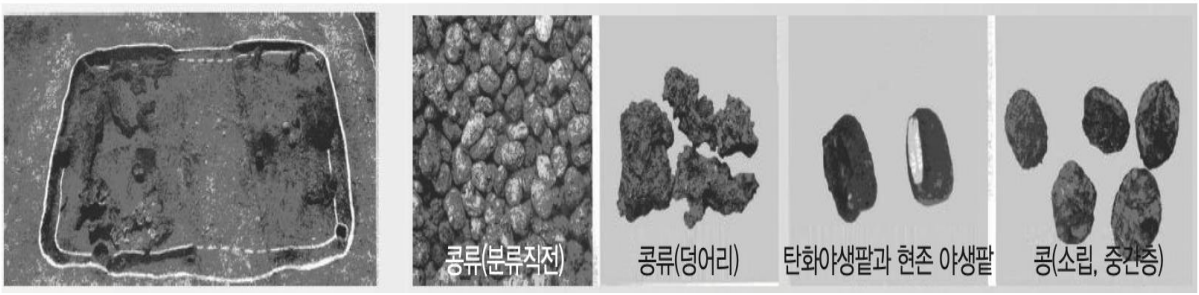


Figure 11.

Carbonized soybeans dating from the Munum period from the Pohang site. (Lee, 2020, p. 144, Figure 4).

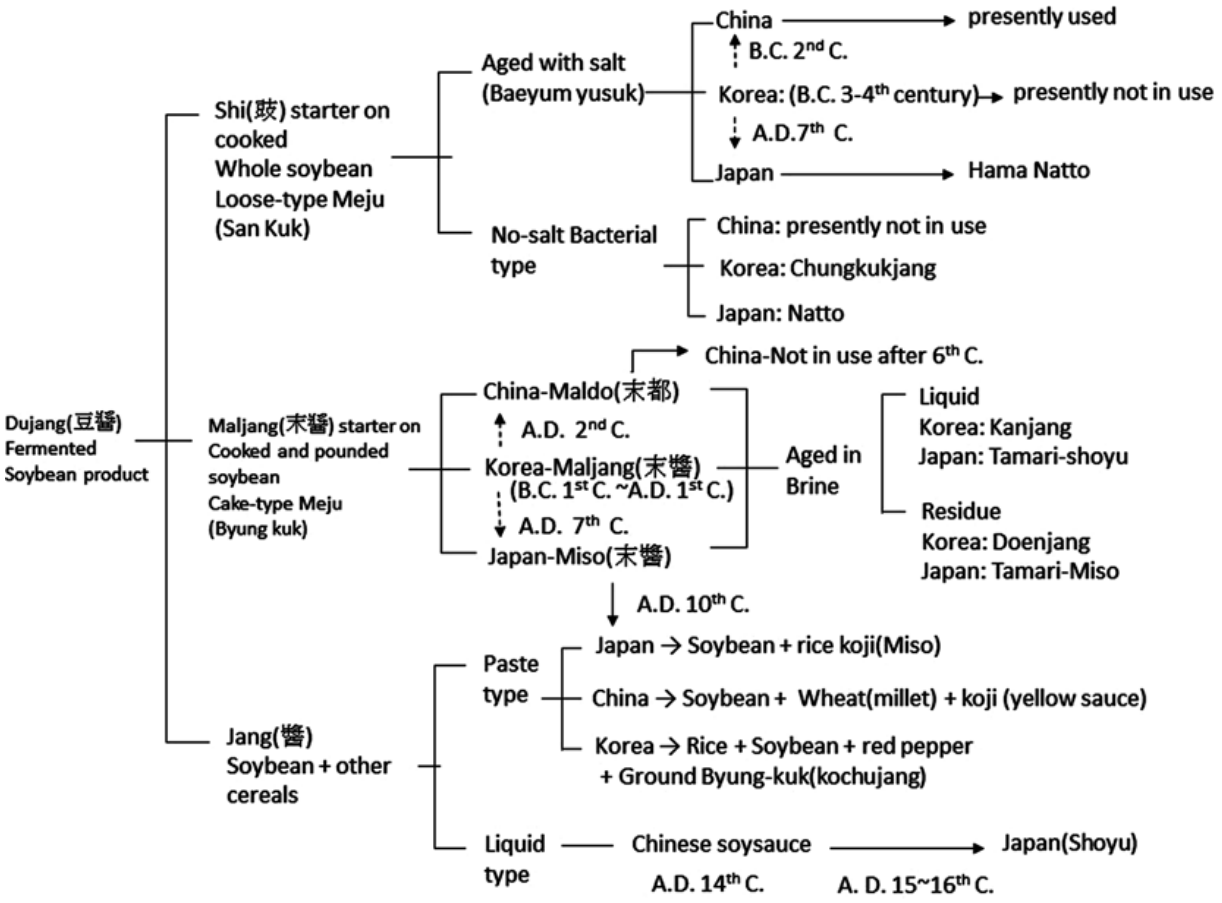


Indeed, by boiling the beans in earthenware, the past populations were able to suppress trypsin inhibitors and make it a staple source of nutrition (Lee, 2020, p.144).

At the end of the Mumun period, around the 4th century BCE, fermented products made of soybeans were developed in three different manners; the first is issued from cooked soybeans (*ganjang*), the second is a product of cooked and pounded soybeans (*gochujang*) and finally, the last one is a product of mixing cereals, notably rice, with soybean (*doenjang*) (Lee & Kim, 2016, p.10) (see Figure 12).

Figure 12.

The origin of fermented soybean products in East Asia. (Lee & Kim, 2016, p. 10, Figure 1.1).



Rice on the other hand is a cereal grain that provides an important source of calories and carbohydrates (Juliano, 1993, p. 38). The introduction of this cereal resulted in many derived products using fermentation processing. Rice straws are a powerful fermentation agent, when mixed with *nuruk* (fermentation starter), they undergo the chemical breakdown process and result in *makgeolli* (Korean rice wine). When cereals are stored in earthenware, mold soon appears and transforms into yeast, an important element for alcohol to develop (Lee, 2020, p. 145). However, it has been hard for Korean archaeologists to find residue of such alcoholic beverages in the archaeological records because it evaporates. An indication of its production can be linked to the large capacity jars (ranging from 9.8 to 38.1 liters in volume) along with cups used for special occasions highlighting the introduction of feasting alongside the introduction of rice during this period (Bale, 2011, p. 57, p. 182; Bale, 2017, p. 94).

Another product that reflects rice straws used for fermentation and soybean is *doenjang* which incorporates the two cultigens together. The research conducted hereafter highlights that rice was adapted to the culinary habits of food preparation already in place such as fermenting but also played an important role in the transformation of landscapes in East Asia, the Korean Peninsula included. Along with a complex organization of towns and cities, as cereals grew in paddies, water irrigation

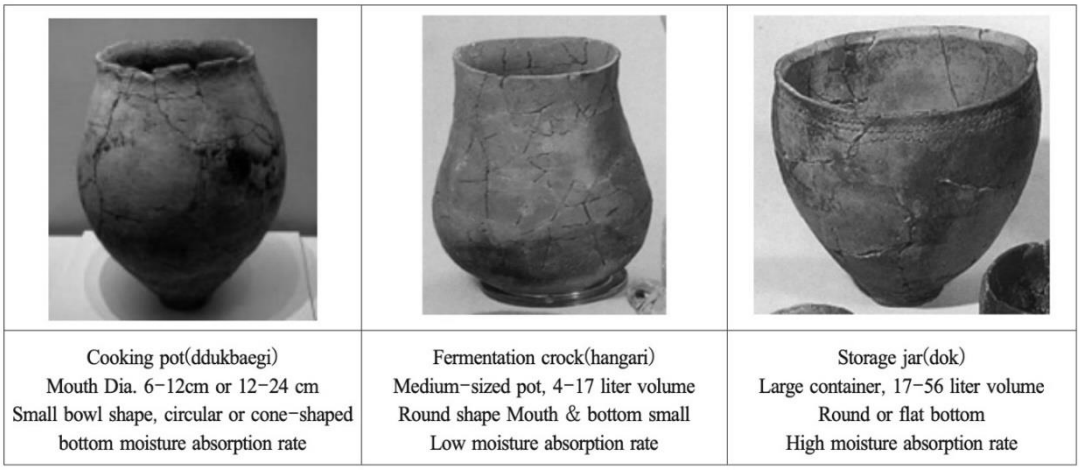
became mastered by local populations during this period in correlation with an intensification of agriculture (850-400 BCE) (Lee & Bale, 2016, p. 183).

2.5.3 Typological differences and innovation

Starting during the Mumun period, a clear distinction in pottery morphology can be observed. The vessels can be categorized into three including storage jars, cooking pots, and fermentation crocks (Lee, 2020, p. 139) (see Figure 13).

Figure 13.

Three different types of Mumun vessels for different usages. In A study on the origin of fermentation culture in Northeast Asia. (Lee, 2020, p. 139, Figure 3).



Cooking pots are often the smallest ones with an average diameter ranging from 6–12 cm and 22–55 cm in height containing up to 24 liters in volume according to Bale (2011, pp. 179–181) and Lee (2020). These pots are easily discernable because they present discolorations and burning marks on the inside and outside surfaces due to the repeated cooking of food. These vessels also display pointy bottoms with a general conical shape.

Fermentation pots usually display a flaring mouth with a capacity from 4 to 17 liters in volume. They also dispose of broader shoulders and smaller bottoms and have a low moisture absorption rate (Kim, 1978, p. 33; Lee, 2020, p. 139).

Finally, the storage jars are characterized by wide mouth openings, they are the biggest types of pots with a holding capacity ranging from 17 up to 56-liter in volume (Lee, 2020, p. 139). In contrast with fermentation pots, they have a very high absorption rate. They do not exhibit burning or discolored marks due to cooking use but can present firing marks from their firing in kilns (Bale, 2011, p. 181).

The noticeable esthetical differences between the pots and important technological advancements in controlling the absorption rate of the vessel walls during the crafting process show the specialization of earthenware making.

Furthermore, when trying to show the existence of a process such as fermentation, it is necessary to explore the technological advancement in food preparation devices (material culture) taking place in East Asia. The emergence of steamers is a good example. These new food processing devices, made of pottery, appeared, first in China during the second millennium BCE and then in the Korean peninsula during the middle of the first millennium BCE (Shoda, 2021, pp. 249–250). A direct link between steaming and fermentation could be made. Indeed, for instance, fungi are an important part of fermentation starters, and they grow faster through the process of steaming (Shoda, 2021, p. 249). There is no doubt that steamers facilitated the cooking of ingredients such as rice, but it should be taken into consideration that they could have been used to facilitate the fermentation of goods as well. As a matter of fact, steamers were developed in the Peninsula around the same time (mid-1st millennium BCE) as the elaboration of fermented *ganjang*, *gochujang*, *doenjang*, etc. that are still staple ingredients in Korean cuisine (Lee & Kim, 2016, p. 10; Shoda, 2021, p. 250).

2.5.4 Summary

The end of the period is marked by the flourishing of large-scale settlements and social differentiation (Lee & Bale, 2016, p. 183; Nelson, 1993, p. 139). Indeed, from the inception of Mumun pottery, this epoch highlights the specialization of multiple crafts (metallurgy, pottery, rice-wine making) through the kiln sites and assigned production spaces for prestige goods making found in a majority of settlements (Nelson, 1993, pp. 111–113). Overall, the human diet of populations throughout the Mumun period was highly dependent on C_3 plants and maritime resources (Lee, 2011, p. 318). This explains the elaboration of fermented products derived from cultigens such as ganjang, gochujang, doenjang, nuruk, makgeolli, etc. as well as the continued practice of fermenting maritime produce alongside the development of agriculture (Byun, 1995, p. 127). Lastly, it is worth mentioning that large-capacity vessels, including fermenting pots, were found in most households which means that they were not considered a prestige good but a commodity throughout the population, inscribing it as a basic necessity for all to have (Bale, 2011, p. 208). As a result, an intensification in the production of large-scale jars is also observed (going from 6% to 11%) making it the artifacts that dominate the archaeological assemblage for the period (Lee & Bale, 2016, pp. 187–189).

2.6 The Proto-Three Kingdoms and Three Kingdoms Period (150 BCE–667 CE)

2.6.1 Historical background

The period of the Proto-Three Kingdoms[5] and the one that follows is particularly interesting because of the diversity of historical sources available to us of this time. In this chapter, I will be using analysis of ancient Chinese written texts, iconographical sources, and archaeological data to retrace the history of fermentation and Onggi pots in the Peninsula.

Even if it is technically incorrect to talk of a "Korean" civilization to describe the population of the Peninsula during this time, a clear distinction is made in the contemporary Han written sources with their neighbors (Baker, 2020, p. 2). The Han dynasty (206 BCE–220 CE) was a Chinese empire known for developing a centralized administration, efficient bureaucracy, and meticulous record keeping (de Crespigny, 2016, p. 46). In conjunction with the development of an organized government, the establishment of a highly literate society, and the adoption of Confucianism as the state ideology, the Han acquired a powerful army in order to expand its territory (Li, 2009, p. 347).

It is within this context that the Han wrote texts referring to the *Dongyi*[6]people (Lee & Kim, 2016, p. 6; Lee, 2022, p. 85; Kwon et al, 2014, p. 5). The Dongyi people were described as nomadic tribes occupying Northeast Asia, in particular Manchuria and the Korean Peninsula (Lee, 2022, p. 87). Nowadays Koreans infer that they are descendants of the various Dongyi groups that occupied the Peninsula (Lee, 2022, p. 85).

The exchanges with the powerful Chinese Han, are often used as an explanation for the development of chiefdom confederacies in the Peninsula (Gibson, 2011, p. 226; Guex, 2016, p. 56). This gave way to the establishment of social organization, stratification, and societal complexity in general.

The numerous archaeological finds including prestige goods coming from the Chinese Han territories throughout the different chiefdoms on the Peninsula highlight trade patterns and cultural exchanges (Gibson, 2011, p. 226; Nelson, 1993, p. 190). In addition, these contacts with the Han and later the Tang dynasties, frequently called the "Chinese stimulus", are also considered an internal driver of competition between the various chiefdoms within the Proto-Three Kingdoms territory (Baker, 2020, p. 5). It goes without saying that an intensification of conflicts occurred as well during this time (Gibson, 2011, p. 226). Disputes and wars between the different confederacies and polities occurred relentlessly

[5] The Proto-Three Kingdoms period used to be called the Gimhae period until 1986 in Korean archaeology (Park & Wee, 2016, p. 309).

[6] There are many other names for these nomadic tribes, such "Hu", "Donghu", "Ye", "Maek", "Yemaek", "Dongbei" in its Chinese roman alphabet form (Lee, 2022, p. 85; Yeo, 2016, p. 71; Bae & Kim, 2015, p. 7).

throughout the entire territory of the Peninsula until, with the support of the Chinese Tang Dynasty, in 668 CE Silla took over the others (Baker, 2020, pp. 7–8).

It is worth mentioning here that the Peninsula never functioned as a "colony" of the Chinese Han and Tang per se, but the relationship could be described as a tributary one or as a subordinate state (Baker, 2020, p. 5; Guex, 2016, p.50). This may be a result of the Korean mountainous topography that could have discouraged the Han, struggling with dissensions within its territory by the mid-second century CE from occupying an already linguistically distinctive culture (de Crespigny, 2016, p. 2; Tse, 2018, p. 98). After the strengthening and reconstruction of the Great Wall of China by Han emperor Wudi (141–87 BCE), the word Dongyi disappeared gradually from the Han's written records (Britannica Academic, 2019; Lee, 2022, p. 85). The Dongyi populations that stayed north of the Great Wall became assimilated as part of the Han population and the various Dongyi tribes scattered south of the Wall formed numerous chiefdoms segmenting the peninsula into various groups (Lee, 2022, p. 85; Yeo, 2016, p. 71).

Nowadays, many scholars consider the period at hand as a formative one leading to the progressive emergence of the "Three Kingdoms ruling system" (Lee & Kim, 2016, p. 6; Gibson, 2011, pp. 217–226).

I would like to make a quick remark on the periodization names of Proto-Three Kingdoms and Three Kingdoms for this period of Pre-history and history in the Korean territory. The fact that three kingdoms are reunited as a coherent period has appeared only recently (1986) as a way for Korean archaeologists to create a sense of population homogeneity for what would have been the past populations of Korea (Park & Wee, 2016, p. 310). I would like to quickly remind the role of archaeology in nation identity building, especially in the political context of the Korean territory. Thus, the names for these periods can be considered as a result of an *etic* point of view.

The diverse chiefdoms eventually developed into the Kingdoms of Koguryŏ (37 BCE–668 CE), Baekje (18 BCE–660 CE), Silla (57 BCE–668 CE) and the confederacy of Gaya (van den Berg, 2021, p. 22) (see Figure 14).

Figure 14.

Map of the territories occupied by the Three Kingdoms and Gaya from the 1st century BCE to the 7th century CE. The territory occupied by the Koguryŏ Kingdom is now divided into several countries (i.e., China, North Korea and South Korea), creating a phenomenon of contested heritage. World History Encyclopedia.

With the development of the Three Kingdoms, each polity displayed its unique specification in pottery technology, but fermenting pots stayed a staple in each region attesting to their utilitarian importance throughout time and geographies.

Finally, I would like to point out that Mahāyāna Buddhism was first introduced from China in 372 CE by King Sorurium (371–384 CE) in the Kingdom of Koguryŏ and a decade later to the Kingdom of Baekje (Noh, 2014, p. 49, p. 431; Baker, 2020, p. 9). The adoption of Buddhism coincides with a decline in meat consumption and emphasized vegetarian diets and the elaboration of plant-based dishes, suggesting a possible influence on the development of vegetarian fermented food recipes (Lee & Kim, 2016, p. 6).

2.6.2 Fermentation in written sources

In order to respect a chronological timeline, this segment will start with references concerning the Dongyi people. The Chinese dynasties had already been developing scripture lettering since the first millennium BCE, whereas for the confederacies of the peninsula, no such records as far as we know existed (Höllmann, 2017, p. 18). Therefore, the ancient Chinese written records concerning their neighboring inhabitants, even if biased, allow for a clearer image of the lifeways of the populations of Korea in the past. The first two sources worth mentioning are the *History of the Later Han (Hou Hanshu)*, written during the 5th century and covering the history of the Han Dynasty from 6 to 189 CE by Fan Ye and the *Book of Wei, The Records of the Three Kingdoms* (*Sanguo Zhi*), written during the 3rd century CE by Chen Shou. In the first account, the reporting of the chronicles of the Dongyi people occupies an entire section (Lee & Kim, 2016, p. 6). In these chronicles, *gochu*, a red pepper native of

the Korean geographical area, is recorded for the first time and the source explains how Dongyi people are known for cultivating the pepper intensively (Kwon et al., 2014, p. 5). This is of significance for the fact that *gochu* is the prime ingredient in gochujang but most importantly because the pepper was used (and still is) for its antibacterial properties to avoid mold formation in food fermentation preparations (Kwon et al., 2014, p. 3). It is thus interesting to highlight that the Eastern Han noticed how important gochu's cultivation was for the Dongyi people hinting at the high consumption of the pepper in fermented foods.

In a second source, the *Records of the Tree Kingdoms*[7] *(Sanguo Zhi*) (8–265 CE), it is stated that the Dongyi were known for making alcoholic beverages from grains, also a product of fermentation processes (Lee & Kim, 2016, p. 7).

Thirdly, the *Qimin Yaoshu (Important Arts of the People's Welfares*) (written during the 6th century CE) compiles a series of food preparations originating from the regions occupied by Dongyi during the Han dynasty (Wang, 2019, pp. 91–92; Lee, 2020, p. 145). The use of fermented soy-bean paste is repeatedly mentioned for the following preparation: cooked deer head, sheep intestine soup, sausage, sheep hoop soup, etc. The text states that these recipes were favored by the Han Emperor Ling (156–189 BCE) which would explain why they were recorded (Wang, 2019, p. 92).

From the formation of the Three Kingdoms in the Peninsula during the 1st century BCE, additional information exemplifies how fermentation was well developed in the region. In the *Book of Wei (Wei Shu), a book written in the 6th century CE in China*, the Koguryŏ people are described as highly skilled in intestinal fermentation, demonstrating that from a Chinese standpoint at the time, their neighbors were recognized for their *savoir-faire* as far as food conservation methods were concerned (Kwon & Lee, 2005, p. 198). Interestingly, in Chinese, the word for *meju* (dried fermented soybean blocks) can literally be translated as "the smell of the Koguryŏ people" (Lee, 2020, p. 145; Shoda, 2021, p. 251). This attests that *meju* was not from China and more precisely was a specialty of Koguryŏ.

2.6.3 Iconography

The tombs of the Koguryŏ Kingdom (1st century BCE-6th century CE) hold immense cultural value due to being the earliest preserved mural paintings in the Korean peninsula and therefore are a product of an emic perspective (Ahn, 2015, p. 9). More or so 15,000 Koguryŏ tombs have been found so far and a hundred of them feature painted murals (Shatzman Steinhardt, 2016, p. 373). They are primarily located in the northern territories, including present-day Ji'an (in Jilin province, China), Pyeongyang (North Korea), and Seoul (South Korea). As a result, archaeological finds from Koguryŏ Kingdom are

[7] These are the Chinese Three Kingdoms period from 184 until 220 CE and covering the kingdoms of Cao Wei, Shu Han and Eastern Wu, not to be confused with the Korean Three Kingdoms period (Besio & Tung, 2008, pp. 44–47).

at the center of cultural heritage ownership disputes between the modern countries stated above (Bryington, 2016, p. 3).

The past inhabitants of Northeast Asia had a longstanding tradition of constructing one or more stone chambers for the burial of the deceased beneath large earthen mounds (Kang, 2020, p. 108). The following images and their analyses are derived from such a burial site. The said Anak Tomb number 3, situated in the vicinity of Pyongyang, North Korea, is a burial site consisting of a small square entrance, three chambers and an L-shaped corridor (referring to Figures 15 and 16) (Nelson, 1996, p. 216).

Figure 15.

The Koguryŏ tombs of J'ian in China and the ones in North Korea are shown in squares. (Ahn, 2015, p. 9, Figure 2).

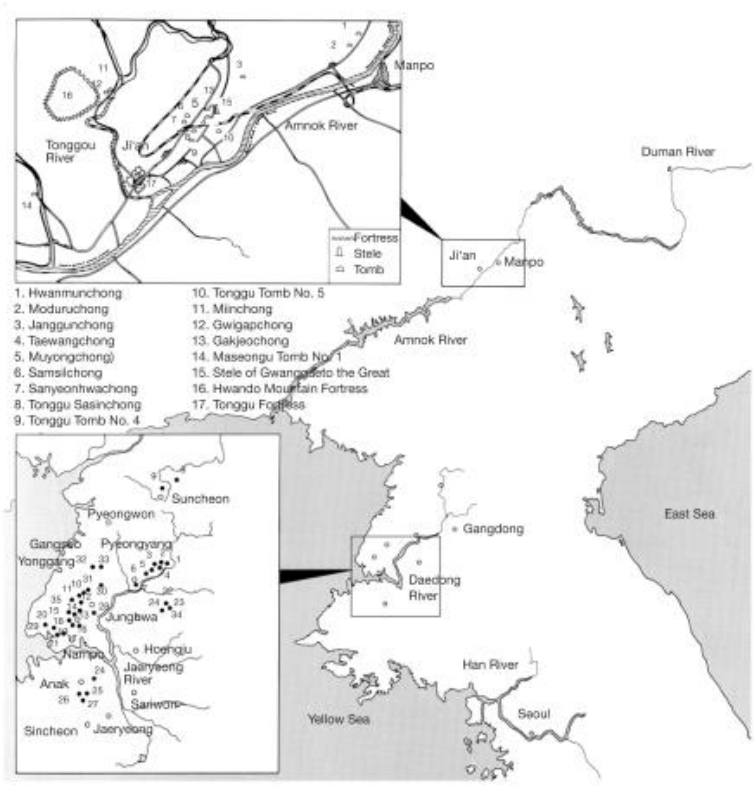
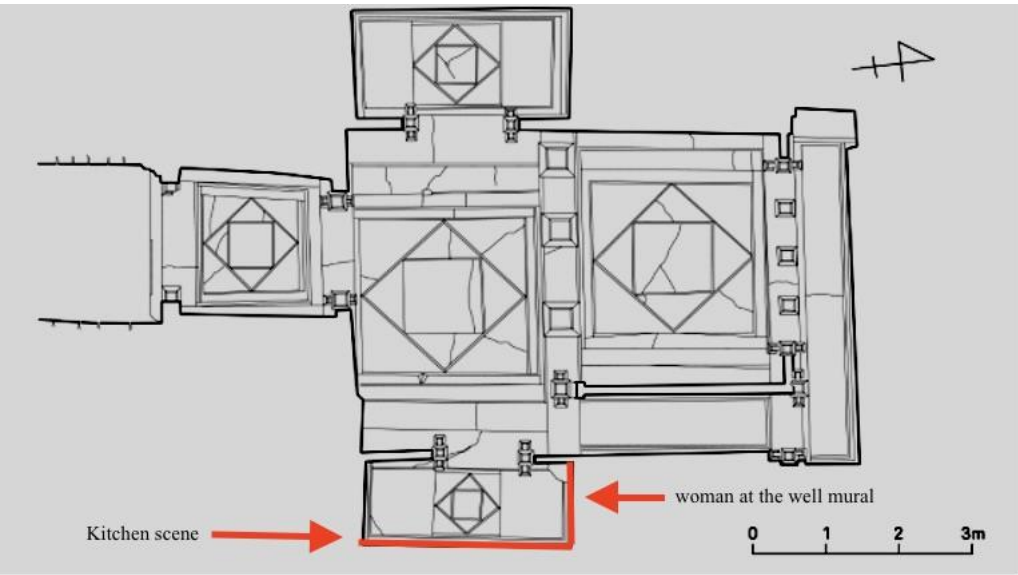


Figure 16.

The Layout of the Anak Tomb number 3 in North Korea. (Adapted from Ahn, 2015, p. 10, Figure 3).



The archeological excavation of the tomb in question took place in 1949 and an inscription from 357 CE was found inside (Nelson, 1996, p. 216). Characteristics such as the depiction of daily life and the tomb owner indicated that the site was from an earlier period and thus corroborates the inscription date (Ahn, 2015, p.10). Later, these iconographic characteristics disappeared for spiritual ones depicting the Four Spirits, immortal beings, and the supernatural world (Ushio, p. 2016, p. 342).

In the Eastern side chamber, a representation of a kitchen scene depicts three maids preparing a meal for the household highlighting an important part of Koguryŏ's noble class lifeways (see Figure 17). The painting shows a first maid cooking in a large earthenware pot (circled in Figure 17) that has been interpreted as a rice steamer (Northeast Asian History Foundation, 2011). The two other maids are assisting with the fire and bringing dishes for the meal being prepared. A drying space for meats displaying pork and deer meat hanging from hooks is at the center of the mural, and finally on the right, stands two wagons.

Figure 17.

Mural Painting of Anak Tomb number 3 of a kitchen, drying meat space and carriages. 4th century CE. (Adapted from Northeast Asian History Foundation database).

To the right of the kitchen mural, there is a scene of a woman at a well (see Figure 17). She is surrounded by four various morphological types of jars of various sizes.

Figure 18.

Mural painting of the Anak Tomb number 3, 4th century CE, showing a woman near a well surrounded by four earthenware jars on the left. A Koguryŏ steamer found in the tomb on the right. (Adapted from History of Korean Ceramics, Center for International Affairs).

The jars all have flat bottoms, but the largest two display elongated shapes with narrower openings, another one is almost spherical and the last one closest to the figure is a wide-open mouth earthenware. They are all painted in a yellowish-brown color and do not display any type of decorations, hinting at their utilitarian functions.

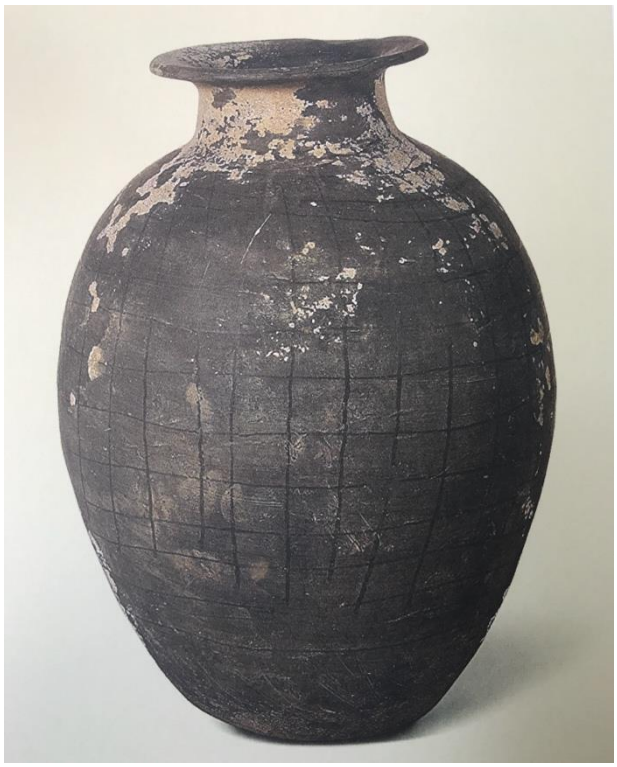
Unfortunately, few actual jars from Koguryŏ remain today because many of the tombs were looted for the past millennium, but a comparison between the images coming from the Anak tomb number 3 and the few available jars from this period at the National Museum of Korea in Seoul, highlight their similarities as shown in Figure 19 and Figure 20 (Unesco, 2004).

Figure 19.

Jar, Kingdom of Koguryŏ, 5th century CE. H. 19,3 cm. National Museum of Korea, inventory number bon 13432. (Laporte, 2016, p. 31, Figure 1).

Figure 20.

Jar, Kingdom of Koguryŏ, 6th century CE. H. 35,7 cm. National Museum of Korea, inventory number bon 13882. (Laporte, 2016, p. 32, Figure 2).



The Anak Tomb number 3 does not explicitly point at the process of fermentation being used in its murals, however, it places the use of Onggi and earthenware jars in its context and shows that they were crucial to everyday household practices (Kim & Hu, 20213, p. 2).

2.6.4 Archeological finds

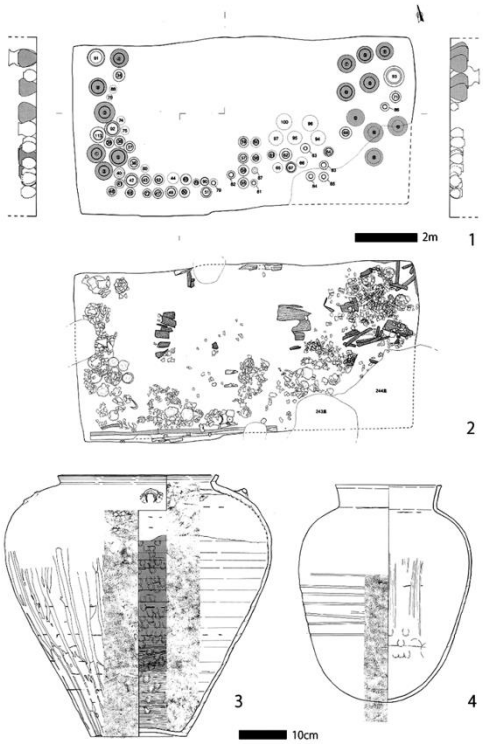
South Korean archaeology has made incredible strides since the years 2000s and many phenomena, such as progress in the technological production of artifacts have been easier to discern. The growth of available data collected on multiple archaeological sites have facilitated comparative study such as the one made by Laurence Denès in 1996 resulting in the research paper: *Le battage dans la fabrication des céramiques coréennes à l'Âge du Fer* published in 2004. The author was able to determine that from the first century CE, a new type of kiln appeared in the Kingdoms of Baekje, Silla, and the Confederacy of Gaya, and with it a new method of pottery production (Denès, 2004, p. 3). The new tunnel kilns (*tŭng yo* in Korean) measured on average 6 meters long and were placed on an inclined terrain to facilitate the propagation of heat throughout the kiln (Denès, 2004, p. 3; Cho, 2012, p. 2). Most importantly, they succeeded in reaching higher temperatures than before (900 °C–1000 °C) (Neu & Nelson, 2017, p. 611; (Laporte, 2016, p. 30). Higher firing temperatures together with the utilization of the potter's wheel and the beating of clay during production resulted in thinner, stronger, and nonporous pot walls (Denès, 2004, p. 13). As a result, these pots were more adapted for the storage of foods and liquids, for cooking, and finally for food fermentation.

Various technological advancements in the field of scientific archaeology, like residue sampling, ^{14}C dating, and Thermoluminescence dating (especially suited for pottery as it can provide a date range for previously heated artifacts), enable the identification of organic materials present in the pots and can provide a calibrated date range for organic residue and pottery (Renfrew & Bahn, 2016, p. 160). In fact, sampling was utilized to establish the nature of lumps found on the archaeological site of Seongsan-ri on Jeju Island in South Korea. Archaeologists were able to identify the lumps as meju dating between the 2nd century BCE to the 1st century BCE (Shoda, 2021, p. 251). These findings indicate the practice of fermentation in the cuisine of the Proto and Three-Kingdoms periods.

Following the excavation of the Pungnap fortress site of the ancient capital of the Baekje Kingdom near present Seoul, 116 pieces of pottery were found in a room viewed as a long-term storehouse (Shoda, 2021, p. 251). The pots in question are considered of a large capacity measuring on average more than 50 cm in height. The archaeologists assume it was used as a storehouse because there is no evidence of a hearth feature within the room structure (Shoda, 2021, p. 251). A range date of 80 to 420 CE was established after the analysis of the soil surrounding and in the pots by ^{14}C was calculated. Interestingly, a large quantity of fish bones remains were found in the soil of the room, and with the typological resemblance of the vessels with present-day Onggi pots, it has been hypothesized that, if not all, at least some of the foodstuff stored in this room was a product of fermenting processes (Shoda, 2021, p. 252) (see Figure 21).

Figure 21.

The reconstruction of the Pungnap Fortress storage room showing the distribution of the pots found (1 and 2). Example of two pots found on the site dating from the 3rd to 5th century CE (3 and 4). (Shoda, 2021, p. 252, Figure 8).



2.6.5 Summary

In conclusion, this period was a formative one as a complex political environment started developing within the Korean Peninsula. In addition, the intensification of exchanges and interactions with the Chinese Han Dynasty influenced and played an important role in the creation of an organized government and religious beliefs. As mentioned before, the coming of Buddhism and its food restrictions need to be taken into consideration as a driver for increased foodstuff fermentation when investigating the subject matter through written, iconographical, and archaeological finds. The development of technological advances in crafting pots from the introduction of tunnel kilns, the potter's wheel, and the beating of clay during production further highlights the importance of pottery at the time. It is clear that the early versions of Onggi pots are egalitarian pots by excellence because they are used by all classes of people and are found throughout the kingdoms.

2.7 Unified Silla Dynasty (668-918 CE)

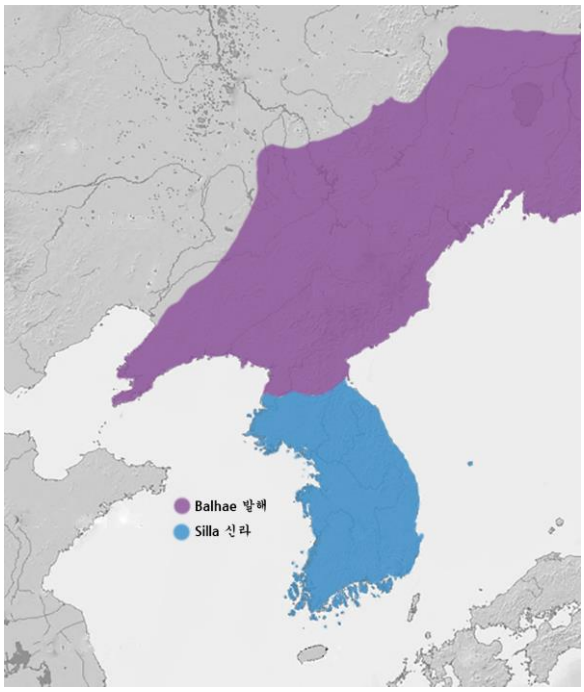
2.7.1 Historical background

In 668 CE and for almost three centuries, the Silla Dynasty took over Baekje, parts of Koguryŏ, and Gaya and merged all territories in an attempt to expand and affirm a territorial hegemony (Muratore, 2022, p.1; Portal, 2000, p. 68). The term "unified" is not completely accurate as some the Koguryŏ territory became included in the Kingdom of Balhae (698–926 CE) which was in power in Manchuria (Lim, 2012, p. 11). This is why some historians refer to this period as "matured Silla" (Baker, 2020, p.

10). Figure 22 shows how the territory was divided during the period and the important landscape occupied by Balhae.

Figure 22.

Map of the Unified Silla Kingdom (668–935 CE) and Balhae (Parhae) territory. (World History Encyclopedia).



The strength of the new political power was the result of creating an army merging warriors from the entire Unified territory. In addition, the tributary relationship Unified Silla had with the Chinese Tang Dynasty (618–906 CE) played an important role in shaping the political framework put in place in the peninsula (Guex, 2016, p. 73). The creation of "national academies" in 682 CE was responsible for instructing the basis of Confucianism in order to form government officials. Not only did some of these officials often go physically to study in Tang China, but the classic Chinese language was also adopted as the formal written language used during the Unified Silla period (Guex, 2016, p. 77). Other systems mimicking the Tang organization of its territory were applied as well, such as the creation of provinces, and counties and the establishment of five new capital cities (Guex, 2016, p. 79). In terms of social organizations, a very strong elite named the "sacred bones" (*sŏnggol*) was constantly competing for power with the royal family which eventually created discord within the political system in place. The "bone rank" system was very complex and consisted of four different casts that were subdivided in turn (Guex, 2016, p. 75). Slavery was also in place and not much is known of these individuals' living situations and of the "common" population composed, in majority, of agricultural workers in the written sources (Guex, 2016, p. 80).

This period is also marked by increased international exchanges through the seas. The Silla merchants going to Japan and China were recognized for their ability to brave the dangerous seas of East Asia (Guex, 2016, pp. 88–89). The exchanges with the Japanese archipelago, even if mostly conflictual, also intensified but were never as important as the exchanges with Tang China, it is important though to acknowledge the agency of the Yamamoto imperial power in the area (Guex, 2016, p. 88).

After three centuries "Unified Silla" came to an end following multiple global and local phenomena including the downfall of the Tang Dynasty, the emergence of the Khitans (916–1125 CE), and multiple ecological events leading to famines (droughts and floods) (Guex, 2016, p. 94). Internal discord and the authoritarian monarchy of the Kims (Royal house name of Unified Silla) left the peninsula as fragmented as it was before the unification of the territory under the Silla dynasty (Muratore, 2022, p. 1). In 935, Wang Geon, a wealthy maritime merchant, attempted once more at reunifying the territory through the creation of the Kingdom of Koryŏ (Muratore, 2022, p.1; Lee, 2019, p. 377).

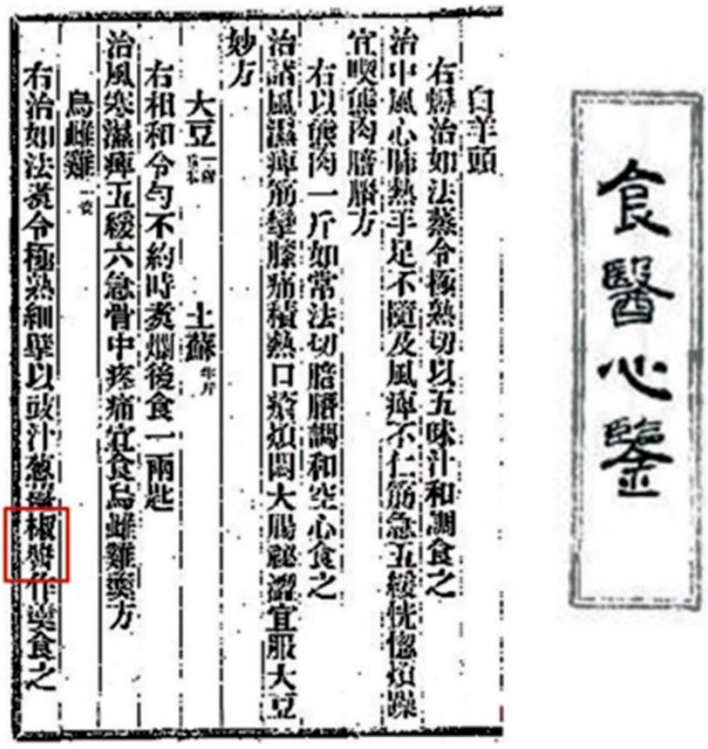
2.7.2 Written sources

First, it is important to mention a notion of the Korean language and its difference comparatively with the Chinese language. The Korean language finds its origin in the Altaic language family, which is a distinctively different linguistic system than Chinese and its Sinitic origin (Kwon et al., 2019, p. 3). For this reason, the use of the Chinese scripture was never adequate for the Korean language, but it was only in the year 1446, much later that the *Hangul* (Korean alphabet) was invented (Guex, 2016, p. 67). While trying to trace the terminology for Korean fermented foods in ancient Chinese texts and in Korean ancient texts using Chinese characters, the process can be challenging due to the disconnect between these ancient terms and the contemporary Hangul script. Thus, this task often requires significant time and specific knowledge of the subject. Therefore, when seeking to confirm the existence of specific foods in historical sources, one must look for them using their Chinese-derived names and scripture.

For example, in the ancient Chinese *Book of Alimentotherapist* dating from 850 CE, the Chinese word "*chojang*" refers to Korean gochujang demonstrating that fermented foodstuffs originating from the peninsula were known to the Chinese and in addition, had their own Chinese words attributed to them (Kwon et al., 2014, pp. 6–7) (see Figure 23).

Figure 23.

From the Book of Alimentotherapist (850 CE), the word "chojang" is highlighted in red referring to Korean fermented red pepper soybean paste. (Kwon et al., 2014, pp. 6–7, Figure 3).



The first written Korean history book is the *Samguk Saki* (History of the Three Kingdoms[8]), written by Kim Bu-si in 1145 CE (Lee & Kim, 2016, p. 6). It is of great interest because it is the first time that a secondary source of power in place in the peninsula is available. The book is said to be based on written records that have been lost through time (Lee, 2022, p. 99). The entry worth mentioning dates from the year 671 CE, thus only three years after Silla was Unified, and corresponds to the 11th year of King Munmun's reign (Noh, 2014, p. 192). The passage describes an incident causing the shortage of *Yeamsi* (or *si*) due to a road blockage. Yeamsi is the Chinese script translation referring to *Chongkukjang* (in Korean), a white soybean fermented paste mostly used in stew preparations (Kwon et al., 2019, p. 10). I would like to underline that this event was deemed important enough for it to be written into the annals that the *Samguk Saki* refers to. Thus, this fermented food type must have been a crucial element in everyday's people lives for its shortage to be noticed showing its importance.

A second segment I will be referring to is the recording of a list of foods being presented for a wedding ceremony during King Sinmun's reign of Unified Silla 683 CE (Lee & Kim, 2016, p. 6). The food preparations for the royal Silla wedding consisted of the following foods: rice wine, soy sauce, soybean paste, fish sauce, oil, dried meat, and honey (Lee & Kim, 2016, p. 6). The list of ingredients attests to the importance of fermented foodstuff during this period because it represents half of the food preparation techniques used for this special event.

[8] Refering to the Korean Three Kingdoms, thus Baekje, Silla and Koguryŏ.

Finally, let's mention the Chinese records of the Balhae region (698–926 CE), north of Unified Silla that incorporated parts of Koguryŏ into its territory (Duncan, 2012, p. 11) The *Haedong History* (698–926 CE) mentions that *"si"*, which is the word in ancient Chinese to refer to chongkukjang in Korean, is an import from the Koguryŏ cuisine in the Manchurian territory (Kwon et al., 2019, p. 10).

In the aforementioned examples I have shown that it becomes easier to find fermented foods in the records concerning the Korean Peninsula and have demonstrated their overall importance and use. Not only it is well represented outside of the territory, but its origin is also attested in many ancient written sources.

2.7.3 Archaeological finds

It is clear that by the Unified Silla period, it is not a matter of proving the existence of fermented foods and the Onggi pots. At this point in time, it is possible to understand the role the vessels played in society, and it is worth studying their technological evolution. Hereafter, I will present the results of the excavation data from the Youngcheon Cave in Jeju Island in which a considerable amount of pottery utilitarian was found. The cave site is part of a greater system of underground lava-formed tunnels situated on the Northeastern side of the Island (see Figure 24) of approximately 10 km long (Park, 2023, p. 131).

Figure 24.

Adapted from Google Maps. (2023). Map of Jeju Island, South Korea. The location of the Youngcheon Cave is indicated by the arrow.

It was discovered during reparation work on electrical public poles in 2005 and was excavated between 2009 and 2010. The archaeological material found was majority composed of hard earthenware pottery (grey ware) used for storage, conservation and transport (Park, 2023, p. 138). Based on topology and firing techniques, the archaeologists were able to determine that the pottery excavated was coming

from the Unified Silla mainland territory, and dominatingly from its capital city, Kyŏngju. In addition, no production site has been found nearby nor traces of habitation of the cave (Park, 2023, p. 141). Interestingly, the pots (22 complete in total) and the impressive number of potsherds were found throughout the tunnel system in approximately sixty different locations and indicate that the tunnel was intensively utilized (Park, 2023, p. 133, p. 138). Some hypotheses have been made exemplifying that the cave was considered a sacred space utilized for ritual purposes, however, as Park (2023) highlights in his analysis of the post-excavations data, the pottery found on the site is of an utilitarian nature according to the non-existent decoration patterns, the many deformities due to fabrication method and typology (p. 138, p. 142). The question then arises, what were these pots doing in this cave and for which purpose?

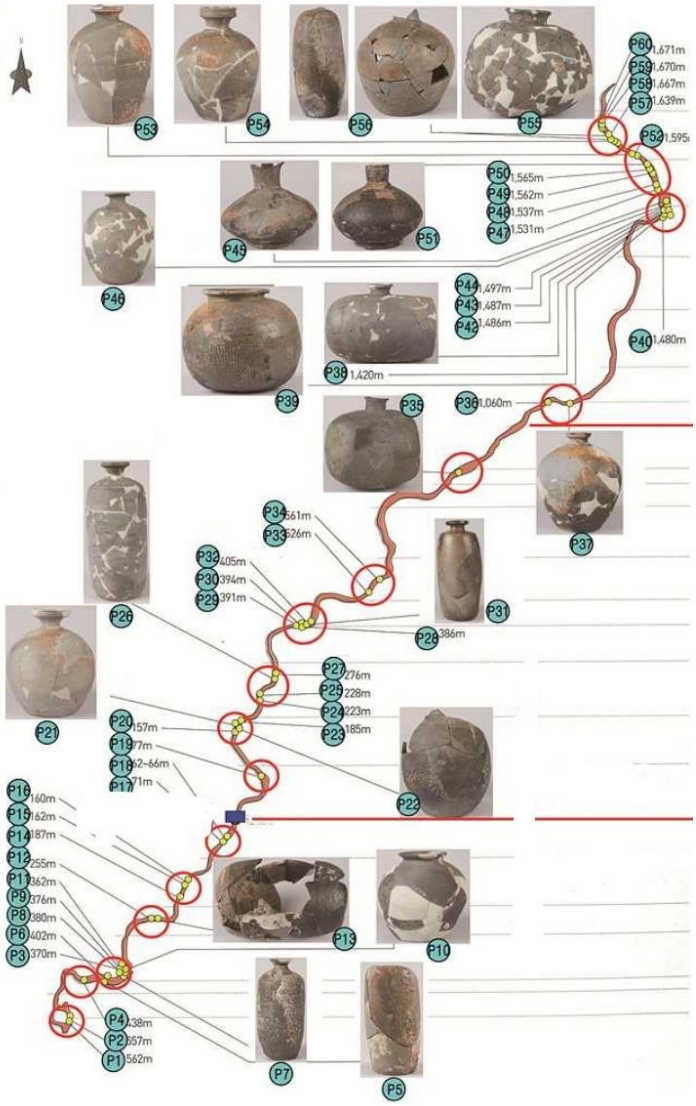
As mentioned earlier, in the historical segment of this subchapter, the era of Unified Silla is one of sea voyages and connections through maritime routes increasingly used by merchants for the exchange of goods.

The fact that the cave was used throughout with a standardized type of pottery infers that the location was used by a group of people as a storage site or warehouse (see below Figure 25). Looking at the landscape of Jeju Island, formed by volcanic processes, can give clues on which resources could have been missing on the island for its native Tamra population at the time. However, examining the pottery is another way of knowing what local populations needed.

The pottery found in the cave can be divided into five types depending on their morphologies and sizes. The first is linear, elongated and narrow-necked, and employed for the transportation of water and rice liquor (Park, 2023, p. 138). The second type is flat-bottomed, ovoid, and used for the transportation of liquids as well (Park, 2023, p. 142). The third presents a constricted opening with a disk-shape body, it that can be used for the transportation of soy sauce and oil (p. 143). The fourth one present wider-rimmed and open-mouth characteristics and would have been used for the transportation of fermented products (Park, 2023, p. 146). Finally, the last one would have been ideal for the transportation of salt, grains and other solid goods and is characterized by wider-rimmed and open-mouth (Park, 2023, p. 147).The emergence of a standardization system of shapes and sizes of vessels depending on the contents is a phenomenon emerging during the Unified Silla period and permits further elucidation as to why they were found on the island.

Figure 25.

Map of the Youngcheon Cave tunnel showing the locations of pots found during excavation. (Park, 2023, p. 135, Figure 2).



As mentioned before, the island is volcanic and thus it would have been hard to transform the landscape for agricultural purposes. On the other hand, from the written records, it is known that Jeju Island populations prepared abalone-based foodstuff and seaweed (considered delicacies), as well as traded pearls highly demanded in mainland Unified Silla as well as in the Japanese archipelago (Park, 2023, p. 129). The exchange of goods between Unified Silla merchants with the Tamra population would then explain the need for a storage space to bring goods on the island to stay and to stock goods to continue the voyage further onto Japan.

The discovery of the Youngcheon Cave not only highlights the connections between past populations through maritime networks but also calls attention to how Onggi pots began to standardize and travel.

2.7.4 Summary

The period is characterized by the emergence of educational institutions, the consolidation of the army, centralized power, and a very strong emphasis on the elite class. The exchanges of goods through maritime routes intensified resulting in additional ancient written sources available tracing the importance of fermented foods coming from the peninsula and its consumption in Unified Silla. Finally, the unification of the kingdoms of Koguryŏ and Baekje under the Silla Dynasty played a crucial role in the standardization of pottery throughout the territory and facilitated the transport of foodstuff.

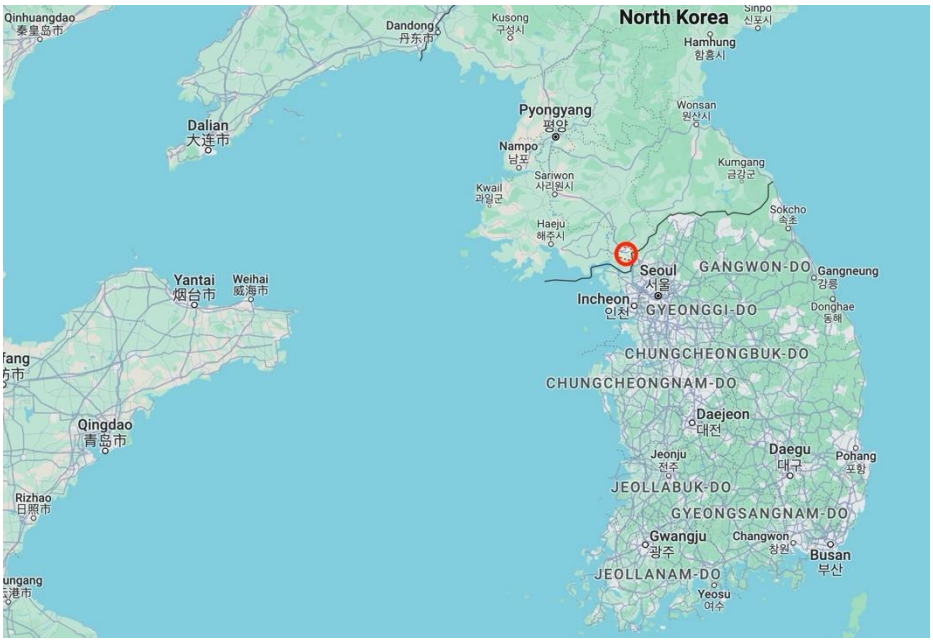
2.8 Koryŏ Kingdom (918–1392 CE)

2.8.1 Historical background

From the historical sources available we know that the Silla dynasty faced administrative issues such as the incapacity to extract taxes effectively throughout its territory (Bruneton, 2017, p. 850). A trend of dissatisfaction among local lords in some regions resulted in a state-wide rebellion against the Silla sovereigns (Guex, 2016, p. 96). The end of the reign occured when the last Silla king, Kyŏngsun abdicated to Wang Kŏn (877–943 CE) in 935 BCE (Guex, 2016, p. 96). Wang Kŏn was a wealthy maritime trader that was able to unify the Peninsula through the control of the exchange of goods passing through maritime routes. He made the Peninsula an economic crossroad between China and Japan while fortifying his commercial relationships with the Chinese realms of the Wuyue (907–978 CE) and Liang (907–923 CE) (Bruneton, 2017, p. 850). Shortly after the establishment of the Koryŏ dynasty, the capital was moved near the Bay of Kyŏnggi (see Figure 26) facing China to facilitate contact, the strict caste system in place during the Silla period was abolished and an intensification in global exchanges saw the day (Bruneton, 2017, p. 852; Guex, 2016, p. 99). In other words, and to quote Geoff Wade (2013), it was the era of an Asian “commercial ecumene” (p. 99).

Figure 26.

Adapted from Google Maps. (2023). The map highlights the location of the new capital under the Koryŏ dynasty founded by Wang Kŏn.



It is within this context that the Koryŏ period saw the emergence of a new type of pottery, the celadon also called *Cheongja* in Korean. If its origin can be traced back to the Han Chinese (206 BCE–220 CE), the Peninsula became a major producer of some of the finest celadon (see Figure 27) made in Northeast Asia from the 10th century until the 14th century CE (Cho, 2019, p. 10; Wood, 2008, p. 41).

Figure 27.

(A) Koryŏ celadon, 12th century, bowl with flowers floating on water and birds flying, the Brooklyn Museum, inventory number TL2004.30.223. (B) Koryŏ celadon, 12th century, bowl with inlaid decoration in black and white slip under glaze, the British Museum, inventory number 1936,1012.131.

Since celadon is not the subject matter of this research, I will not dive deeper into the subject but technologically speaking, the specialization and expertise of craftsmen through celadon-making has greatly benefited pottery. Celadon production's overall impacts on pottery included standardization, better firing techniques, and finer glaze quality.

The Koryŏ dynasty period was far from being calm as the Peninsula suffered multiple invasions by the Khitans between 993 and 1018 CE and then again by the Mongols nine times between 1231 and 1257 CE (Lee, 2019, p. 384; Bruneton, 2017, pp. 852–859). The aftermath of the Mongols seizing power on the Peninsula resulted in the forced marriage of the royal Koryŏ kings with Mongol princesses (Guex, 2016, p. 123). The heirs issued of these relationships would see the benefits of the Mongol empire on the Peninsula. The reasons for these invasions were partly motivated by the peninsula's geographic situation. Indeed, one of the Mongols' goals was to reach and subdue the Japanese archipelago, and the fastest way for them to get there was through the Koryŏ Kingdom (Bruneton, 2016, p. 123).

Wang Kŏn legacy opened the peninsula to the world, exposing it to exchanges of goods and ideas but also brought new threats such as invasions and piracy (Carré, 2017, p. 879). Eventually, the attacks were so numerous that by the end of the Koryŏ period, the Peninsula started to develop a policy of insolation, forbidding what made the realm prosper in the first place, exchange through the seas. This policy brought the end of the dynasty and the advent of the Chosŏn Kingdom that made a point to limit

contact with the outside world for so long that when it finally occurred, the Peninsula was renowned for being the “Hermit Kingdom” (Choo, 2012, p. 40; Momoki & Reid, 2013, p. 5).

2.8.2 Written sources

Through interdisciplinary research, it becomes easier to discern how important food conservation vessels were during the Koryŏ period. As mentioned earlier, the Koryŏ period was intensely exchanging goods through the Yellow Sea and the Sea of Japan. The waters surrounding the Peninsula were violent and risky for sailors for many reasons including ramping piracy (Bruneton, 2017, p. 859). It is within this context that many shipwrecks have been found in the last 30 years and have been crucial to reconstructing the political and economic context of the period (see Figure 28).

Figure 28.

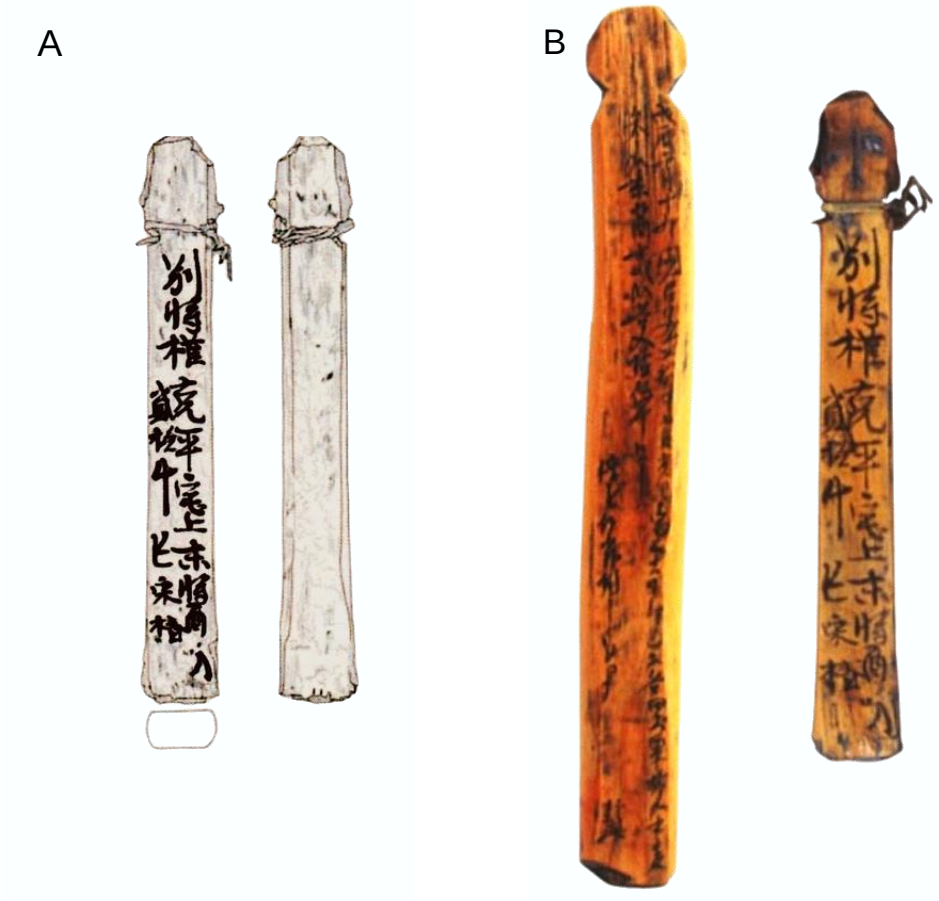
Reconstruction of a Koryŏ period commercial ship with Onggi pots onboard (Adapted from Song, 2010, pp. 166–167).

I will be mostly using the archaeological reports concerning shipwrecks. Three shipwrecks named Mado 1, 2, and 3 have been searched extensively by archaeologists after their discovery. They were found by local fishermen along Mado Island in Taean in 2007 when pottery rose up from the water in their fish nets (Kim & Moon, 2011, p. 130). On the bottom of the ocean were found an important amount of earthenware and a great quantity of inscribed tablets (73 in total) supposedly attached to the goods for transport (Kim & Moon, 2011, p. 130). These tablets give precious pieces of information as they

show where the products came from, as well as their final destinations, and most importantly they describe what types of foodstuff and goods some of the pots contained (see Figure 29) (Han, 2020, p.186).

Figure 29.

(A) tablet found on Mado ship number 1 shows the name of the sender, the name and government position of the recipient as well as the shipped item, in this case, it was twenty containers of fermented soybean. (B) tablets found on the Moda ship number 1 are shown in colors with the eligible ink remaining (Adapted from Kim & Moon, 2011, pp. 140–144).



The residue analysis along with the study of the tablets reveals that multiple types of grains (rice, broomcorn millet, foxtail millet, and buckwheat), fish, *Jeotgal* (salted fermented seafood made of crab, abalone, shrimp, mussels, etc.), and meju composed the great majority of the Mado shipwrecks number 1 and 2 shipments (Han, 2020, p. 179, p. 186; Kim & Moon, 2011, p. 129).

Another essential element, maybe the most important of all for survival onboard, was transported in the vessels: water. Luckily, there are many written sources regarding the storing and transport of drinkable water during the Koryŏ period, including a record written by Xu Jing (1091-1153), an

ambassador from Song China traveling through the peninsula (Han, 2020, p. 180). Han (2020) reports that the envoy described the vessels containing water as such: "The water pot is earthenware; it has a wide belly and compact neck, and its mouth is somewhat large…These jars are only used to transport water between the rocky islands along the sea lanes.".

It is thus assumed that some of the largest-sized earthenware vessels found on the bottom of the sea were likely used to conserve drinkable water during the voyages. Finding a container capable of preserving water for longer periods of time would have saved time during these trips enabling the crew to avoid making too many stops along the way. I am aware that the conservation of water in earthenware is not synonymous with fermentation per se, still, it does highlight the polyvalent function of the pots and shows that they were unique to the Peninsula enough for a foreigner such as Xu Jing to make a note of it in their report.

Other written sources refer specifically to fermented foods. Indeed, it is noted in the *Koryŏsa* (manuscript relating the history of the Koyrŏ Kingdom written in 1451CE) that an important fire destroyed the Royal Sauce Storage during King Gojong rule in the year 1245 CE (Han, 2020, p. 185). The recording of such an event demonstrates that fermented sauces were an important element in people's diet and that it was produced in a specialized facility for the royal family.

Finally, it is worth mentioning that Buddhist monks played an important role in the production of fermented foods such as gochujang, pickled vegetables, and different kinds of vinegar (Han, 2020, p. 190). It is in the ancient document called *Rules of Purity* (1103 CE) that the responsibilities of proper management of such foodstuff are precisely referred to (Han, 2020, p. 189). Furthermore, since the Buddhist precepts emphasized a vegetarian diet, most of the food consumed and used in rituals in the temples was a product of fermentation (Ko, 2014, p. 516).

2.8.3 Archaeological finds

Much could be written regarding the archaeological finds unearthing fermenting pots from this period. As mentioned earlier, the finds from the Mado shipwrecks could easily be the subject of a thesis on its own. I will thus highlight a discovery from the Moda ship number 1. First, the ship contained cargo originating from the southwestern coast of the Peninsula with a total of 54 pieces of earthenware dividable into five different types (Kim & Moon, 2011, p. 135). Because it is considered of a lesser manufacturing quality compared to the celadon (found in greater quantity on the ship), archaeologists deduced that the crew used the earthenware vessels.

Some of the organic residues survived so well in the pots found on Mado 1 that it was very easy to reconstruct the diet of the crew during the Koryŏ period. Figure 30A is a picture of crab remains found in a pot (see Figure 30B).

Figure 30.

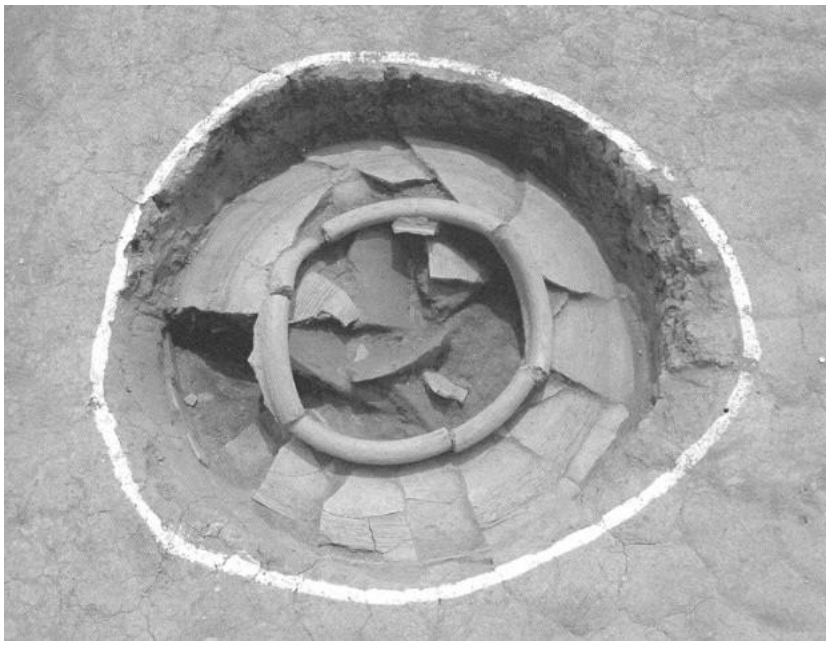
(A) Crab remains found in earthenware from the Mado ship number 1. (Adapted from Han, 2020, p. 187, Figure 4). (B) Fermented crab pot found in the Mado shipwreck number 1. (Adapted from Ko, 2014, p. 508, Figure 4).

Through the association of the written tags and the archaeological finds, the pot in question was most likely transporting fermented crab (Han, 2020, p. 187).

If fermenting pots played an important role in the transportation of goods, other archaeological sites, this time on land also bear witness to how they were used. Large-sized earthenware vessels were found semi or entirely buried underground. It seems it was purposely used this way for multiple reasons. First, the thickness of the vessel walls comparatively to their sizes shows that by burying them underground, the dirt surrounding them played a reinforcing role against breakage (Han, 2020, p. 194). Secondly, while the pots are buried, the internal temperature remains stable throughout the seasons, permitting a yearlong supply of food (Han, 2020, p. 192) (see Figure 31). Finally, the dirt played a role in limiting contact between the foodstuff and a humid environment creating a natural additional barrier and thus preserving the food longer.

Figure 31.

Fermentation pot buried underground excavated on the site of Baekbong-ri dating from the Koryŏ period. (Han, 2020, p. 194, Figure 11).



2.8.4 Summary

From the 10th to the 14th century, the Wang Dynasty attempted and succeeded in reunifying the territory thus allowing the emergence and creation of the Kingdom of Koryŏ (Muratore, 2022, p. 1). The development and events that occurred during this period played a crucial role in the history of the Peninsula, it is from this period that the Peninsula holds its current name, Korea. It was a time of intense global exchange resulting in innovations in pottery crafting, food conservation, and seafaring.

2.9 The Chosŏn Dynasty (1392- 1910 CE)

2.9.1 Historical background

The Chosŏn period marks an important change in mentalities and material culture in the history of Korea. With the end of the Koryŏ dynasty, Buddhism as the state ideology was left aside and replaced by Neo-Confucianism (Baker, 2020, p. 15). The Confucian doctrines concentrate on interpersonal ethics that profoundly impacted gender roles, contact with the outside world, and the arts, architecture, and crafts (Baker, 2020, p. 10). These new values adopted by the royal family led to more realistic paintings, plainer pottery, and simpler architectural designs. With that being said, the green slips of Koryŏ Celadon will over time disappear and be replaced by *Buncheong* and later by *Paekcha* (white porcelain) (van der Berg, 2021, p. 63). This new white ceramic was less decorated and exuberant and fitted better with the recent change in state ideology. Buncheong was produced under strict circumstances as the potters were reunited into closed communities called '*so*' and supervised by a central government agency called the Royal Cuisine Office (van den berg, 2021, p. 34).

The invention of the Korean alphabet used today is also an important event exemplifying the wanting to take distance from their Chinese neighbor. In 1466 CE, King Sejong presented his new alphabet to

the people of the Peninsula stating that the sounds of the spoken Korean language are not compatible with Chinese scripture (Guex, 2016, p. 154). By introducing the Hangul to the people, he was hoping to combat illiteracy among the population.

The Chosŏn dynasty as mentioned earlier is a period during which the Peninsula isolated itself but it is known as a great period of philosophical and intellectual pursuit, on the other hand, technologically speaking, it fell behind. The Peninsula, not capable of defending itself, was colonized by Japan in 1592 CE for refusing to join the Hideyoshi (1537–1598 CE) army in invading Ming China (Guex, 2016, p.164). The war against the Japanese army (also called the Imjin War) lasted seven years and ended with an interesting event: the abduction of thousands of Korean potters. The event dubbed the "Ceramic Wars" shows that the long tradition of pottery crafting in the Peninsula was admired and coveted abroad. Unlike China and Japan, Chosŏn who had limited contact with the outside world did not produce craft intended for export thus keeping its skilled craftsmen products on the Peninsula. The precise number of Koreans abducted isn't known but would range somewhere between 20,000 and 100,000 (Hur, 2021, p. 68). If this war contributed to the flourishing of Japanese pottery in the archipelago, on the Peninsula, the kidnappings resulted in an intangible loss and produced lesser-quality pottery. For example, after this period, the potters weren't able to access cobalt oxide, crucial for the underglaze paintings of buncheong, and replaced it with iron oxide which resulted in darker and less defined lines (van den Berg, 2021, p. 34).

It is not long after, that Chosŏn is again under attack, this time by the Manchu in 1627 and 1636 CE (Baker, 2020, p. 18). The aftermath of these invasions weakened the royal house over time and further pushed its government to withdraw itself from the outside world.

During the 17th century, a new religion appeared in the Peninsula with the coming of Jesuit priests along with the European colonial era (Guex, 2016, p. 188). Christianism was deemed "heretic" in 1785 and many Christians were persecuted for believing in it until the 20th century. The slow decline of the Chosŏn dynasty is due to many socioeconomic and political factors but it is with the forced signing of the Kanghwa Treaty in 1876 that the end of the reign will see the day (Guex, 2016, p. 205). The Kanghwa Treaty was pushed by the Japanese into the Peninsula to force it to open its port cities, permit commercial access, implied low tax rates for the export of goods from the Peninsula to the Japanese archipelago, and gave diplomatic immunity to the Japanese (Guex, 2016, p. 206). It is the outcome of the Russian-Japanese War (1904–1905) that will shape the history of the Peninsula during the 20th century. The conflict between Russia and Japan was mainly territorial and led to the colonization of parts of Manchuria by the Russians and the colonization of the Korean Peninsula by the Japan in 1905 (Guex, 2016, p. 231).

2.9.2 Written sources

The main addition to literary sources from this period, which we lacked previously, is in the form of cookbooks. In Review *of Literature on Food Preservation of Early Joseon Dynasty* (2020), Kim et al., present 25 ancient food preparation books, medicine books, and diaries compiling different methods to conserve foods from the 15th, 16th and 17th centuries. The study highlights 232 ways of preserving foods for consumption with vegetables and fruits being the most represented (84), followed by seafood (60), and meats (41) (Kim et al., 2020, p. 31). The various methods were selected within the 25 books because of keywords used by the writers, such as "it (the food) does not change for a long time", "it (the food) can be left for a long time", "it (the food) can be eaten for a long time" or "the winter does not change the food" (Kim et al., 2020, p. 30). The preservation methods presented include drying, smoking, salting, marinating, and immersion (Kim et al., 2020, p. 34). Before I present a few examples utilizing specifically Onggi pots, it is important to add that other keywords were used in these written sources, namely "winter", "cold" and "freezing" (Kim et al., 2020, pp. 28–50). It can be inferred, and it appears that the past population of the early Chosŏn dynasty was preserving food essentially to provide for the cold winter months and were knowledgeable on the ingredients, processes, and facilities required to do so. Regardless of the method used to preserve the foods, the utilization of Onggi pots is recurring. For example, when looking at the recipes for drying cucumbers, taro, chestnuts, fatty meats, and abalones, the methods always involve the use of Onggi pots (Kim et al., 2020, p. 42). This goes as well for marinating pears, crab, fruits, foxtail millet, mung beans, etc. (Kim et al., 2020, pp. 43–44). Thus, even if the foods are processed differently, they always require an Onggi pot.

2.9.3 Iconography

The change in state ideology from Buddhism to Neo-Confucianism played an important role in the subjects represented in paintings, murals, and drawings from the 15th century on. The iconography went from Buddhist imaginary scenes in an idealistic setting to a more realistic depiction of everyday life (Baker, 2020, p. 9). As a reminder, the last time realistic types of painting were made on the Peninsula dates from the beginning of the Koguryeo Kingdom (presented earlier in this thesis) such as in the Anak Tomb number 3. As Onggi pots have been part of the landscape for many centuries by this time, numerous representations of the vessels can be found from this time (see Figure 32).

Figure 32.

The painting Sŏnmyojo chegae kyŏngsuyŏn-to (Banquet for the Aged Mothers of Ministers at King Sŏnjo's Court) depicts male cooks at the center of the image near Onggi pots. 1605, Hongik Museum of art.

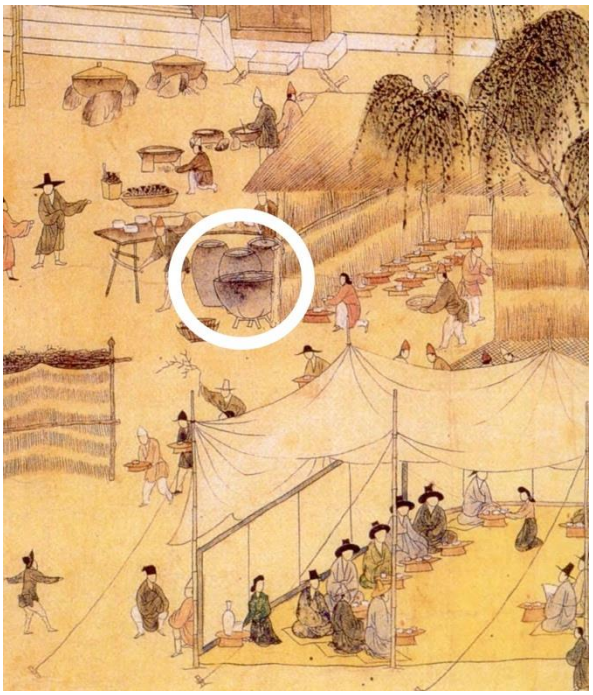


Figure 32 shows a palace scene in which food is prepared outside. At the center of the image figures three large-sized Onggi pots. Within the many paintings in which Onggi pots are represented the following observations can be made: the pots are used outdoors, their sizes vary, they have no visible decorations, and they display a distinctive oval shape. The pots are represented in various settings from fishing activities to royal palace households and in common people's hostels serving food (see Figure 33).

Figure 33.

Fishing by Hongdo Kim is a painting part of a series depicting common people's day to day lifestyles during the late Chosŏn dynasty (Kim, 2021, p. 237, Figure 11).

Finally, the following sheets are incredibly precious because they are the first that show the making of Onggi pots. The ink drawings clearly show the final completed Onggi pots, the potter's wheel, and the tools used to shape the vessels. At the end of the 1800s, this drawing genre became very popular with foreigners as they represented traditional Korean lifestyle and crafts. For example, the Figure 34 B was commissioned by Presbyterian missionary James S. Gale (1863–1937) as part of a large collection of 152 paintings made by Kim Jun-geun.

Figure 34.

(A)" Tok mandŭnŭnsaram" or Onggi maker from the Robert Wilson Shufeldt drawing collection describing everyday life in the Korean Peninsula, 1886 CE, inventory number 08577800, Smithsonian Museum. (B) Onggi potter ink painting made by Kim Jun-geun, late 19th -early 20th century, inventory number OA+,0.482.129, The British Museum.

Onggi pots have often been neglected within academic research because contrary to Mumun pottery, celadon, and buncheong, they remained in production. In a way, because they are a central component of everyday's people lives in a utilitarian manner, they have been taken for granted until very recently. However, because they are so common, they are also very easy to find in iconography dating from the Chosŏn dynasty.

2.9.4 Archaeological finds

Just like it is easier to identify written and iconographical sources concerning fermenting vessels during the Chosŏn dynasty era, archaeological findings reveal more information on the context of their productions. For example, Ulju-gun County situated north of Busan on the east coast of the Peninsula, was an important manufacturing center of Onggi pots starting from the 16th century up until the present day (Bae, 2011, p. 136). The area is mountainous and well-served with large rivers (Taehwa River and Hoeya River) (Bae, 2011, p. 138). Twelve kiln sites were excavated in Ulju-gun County and highlighted multiple factors for the operation of Onggi production. First, the Onggi production sites dating from this period were placed on or not far from hills and slopes, this can be explained by the type of kilns used to bake Onggi pots (Cho, 2012, p. 2). The hill-climbing kilns are composed of multiple connected

chambers, they have “windows” or openings on the top that can be covered and opened for heat control (Sang & Clements, 2022) (see Figure 35).

Figure 35.

(A) Picture of the hill-climbing kiln of Ohbuja Onggi in Ipo-ri,South Korea. (Ministry of Culture, Sports and Tourism and Korean Culture and Information Service). (B) Schematic drawing of the hill-climbing kiln of Ohbuja in Ipo-ri, South Korea. (Song, 2010, p. 115).

By firing the bottom chamber with wood, the above chambers preheat as well and do not require individual firing, it is more efficient and less wood-consuming to maintain high temperatures. As a result, and because this type of kiln is big and composed of multiple inner chambers, it permits the production of earthenware vessels *en masse*. It is interesting to note that this particular type of kiln technology started appearing in Japan just after the “ceramic wars”, it can be considered as a Korean technology import that helped improve pottery making in the Archipelago after the Imjin war (Sang & Clements, 2022).

Secondly, mountainous areas in Korea are dense in trees which is the ideal environment for supplying the kilns with wood and for glaze making. The 12 sites of Ulju-gun are also located near river access, which is a prime situation since water is required for the treatment of the clay and crucial for the transport of the vessels once they are made and ready to be sold (Bae, 2011, p. 116).

The artifacts recovered from the excavations in Ulju-gun County verify that the shape of the vessels and the method employed for Onggi making during the Chosŏn period are still in use presently. Indeed, from the material composition (large quantities of quartz and fine particles), the rendering of the vessel colors (reddish brown, greyish brown, or dark brown), and the beating marks and coil shapes traces inside the pot’s sherds, it can be observed that Onggi pots as we know them today are a product of this period.

2.9.5 Summary

The Chosŏn dynasty is an important period that confirms the well-established tradition of Onggi utilization and production. It shows that the production of fermenting pots was part of an organized commercial system demanding a specific set of factors and environment in order to take place. In addition, the iconographical, archaeological, and written sources demonstrate that the populations knew well the benefits of preserving foods in Onggi pots. The end of the dynasty comes as the Peninsula is about to face the beginning of industrialization through the Japanese occupation. The aftermath of the Industrial Revolution in the Peninsula will have important consequences on Onggi potters and the vessels' production, this will be further explored in the following chapter.

3. Chapter 3 | Cultural Heritage denominations and modern Onggi pots in South Korea

3.1 Introduction

In the previous chapter, I tried to describe the context in which Onggi pots saw the day and I looked at the traces left behind of their utilization and development. Through interdisciplinary research, I was able to present a multitude of sources throughout time and space proving their long-lasting history. In Chapter 3, I would like to look deeper into their modern production and utilization and explore some of the circumstances and constraints that apply to their crafting during the 20th and 21st centuries.

3.2 Historical context and modern production of Onggi pots

The Japanese occupation of the Peninsula lasted until 1945. During these fourty years, the territory saw many socio-economic changes take place including a fast modernization of its urban areas, especially of Seoul. However, the introduction of the railway system, electricity, running water, buses, and high-end shopping centers was mostly gathered to Japanese citizens and resulted in a sentiment of hatred from the Koreans towards the occupants. At the same time, the Korean population saw their freedom of speech and writing impeded, they were banned from gathering, and forbidden to speak in Korean as Japanese was made the official language on the Peninsula (Guex, 2016, p. 233). All of these factors fueled the birth of communist ideology on the territory against the Japanese Imperial power (Guex, 2016, p. 241). The exploitation of natural resources on the Peninsula by large corporations such as Mitsubishi, Mitsui, and Noguchi in need of working labor resulted in massive movements of population from the countryside towards the cities (Guex, 2016, p. 237). This phenomenon led to an interruption in production and development of arts and crafts affecting the manufacturing of Onggi pots.

The historical events following World War II on the Peninsula further aggravated the working conditions for Onggi potters. The separation of Korea into two resulted in drastically different modern nations that are well-known historically. I would like to mention now that my thesis research hereafter will principally be concentrating on the Republic of Korea (South Korea) because of the difficulty in finding reliable sources regarding the utilization and production of Onggi pots in the Democratic People's Republic of Korea. From the 1960s, the government created central agencies to develop its economy. It resulted in the establishment of its steel and automobile industry, shipyards, and household appliance products development (Guex, 2016, p. 295). The government succeeded in exceeding the economic growth patterns for developing countries by instituting in its population a sentiment of sacrifice for the greater good of the nation and its future generations. Indeed, the affordable workforce in South Korea has been responsible for particularly high productivity of goods and services focusing on export.

With this being said, I would like to answer the following question: How was the production and utilization of Onggi pots affected by the 20th-century economic soar on the Korean Peninsula?

To answer this question, I will go over the first known modern account of Onggi pot production written by folklorist and writer Ralph Rinzler and anthropologist Robert Sayers as part of the *Smithsonian Folklife Studies* (presently under the Smithsonian Center for Folklife & Cultural Heritage). It was during its first conference, in 1967, that the Smithsonian Institution brought up the need to record and document worldwide traditional craft in perdition (Sayers & Rinzler, 1987, p. 7). It is within this context that the institution put together a team of cultural geographers, historians, anthropologists, and folklore scholars to take care of the task. Rinzler started fieldwork in 1971 in South Korea on Onggi crafting. When he arrived in the Republic of Korea no monographs, research or documents were available on the manufacturing or the history of Onggi pots in English. When contacting the former director of the National Palace Museum of Korea (the first established museum in Korea) to gather information on Onggi pots, Rinzler was met with surprise (Sayers & Rinzler, 1987, p. 13). From that point on, it was clear to Rinzler that it would be under his hand that the first information on these vessels would be written in English. But it was only ten years later, in 1981, that Rinzler went back to the Republic of Korea, this time accompanied by Sayers and a translator (Sayers & Rinzler, 1987, p. 10). *The Korean Onggi Potter* (1987) is a fascinating authored monograph because, between the first reports and the completion of the book, sixteen years had gone by, and South Korea underwent tremendous changes such as economic growth, landscape transformation and socio-demographic changes.

The study consisted of surveying 11 Onggi workshops in six different provinces of South Korea. The interactions with the production sites and potters were loosely guided by a pre-determined set of questions focusing on techniques, glaze formula, the function of the pots, economics of the operation, status of the workers, and history of the kiln sites (Sayers & Rinzler, 1987, p. 13). It should be mentioned here that the first observation made by Rinzler in 1981 is that most of the dirt roads connecting the cities to Onggi factories had been replaced by asphalted roads (Sayers & Rinzler, 1987, p. 16). As far as the Onggi factories were concerned, fifty percent of them were gone, replaced by urban areas, leaving only 250 manufacturing facilities still functioning at the time (Sayers & Rinzler, 1987, p. 249) (see Figure 36).

Figure 36.

Photograph taken by Allen Blair Thompson displaying an Onggi factory, circa 1957-1961, Buqyeong District, Incheon, South Korea. This picture shows well the context of the fabric (Naujok, B. K. H., personal communication, August 31st, 2022).

First, the authors started where Rinzler had left it off, they tried to find the factories recorded during the first survey mission in 1971. The observation made ten years later revealed that most Onggi factories saw their operation shut down because of a decline in demand. For example, in 1971, the Kŭnjin Pottery Factory, which was the largest at the time with a team of fifty young workers supervised by a fourth generation Onggi potter became by 1981 a flowerpot manufacturer (Sayers & Rinzler, 1987, pp. 95–109). Throughout the study, the authors highlight the status of the potters, their lifestyles, and their overall precarious situation (see Appendix E). Most potters lived in "community housing" shared by multiple families, their salary was determined by the number of finished products delivered, and finally, the craft required to start the working day around two in the morning for six days a week (Sayers & Rinzler, 1987, pp. 16–108). By the end of the book, Sayers and Rinzler describe an industry in perdition, they predict that progressively more potters will join the mass migration from the countryside for the metropoles and they explain how Onggi pots will be increasingly replaced by metal, aluminium, and plastic containers (Sayers & Rinzler, 1987, p. 249). For the most part, their vision was right but what they did not predict was the measures the government would take to protect Onggi crafting.

3.3 Turnaround point

Three years after the publication of *The Korean Onggi Potter*, the *Onggijangs* (Onggi potters) were given the Living National Treasure (LNT) status by the Korean government (Yeum, 2018, p. 217). From that point on, Onggi potters have been propelled as Korean cultural assets and Intangible Cultural Heritage (ICH) (Cho, 2012, p. 5). It is interesting to look at the last fifty years of Onggi utilization and Onggi potters' change in status in the South Korean context for multiple reasons. Indeed, it was only in the 1970s that the South Korean government started to invest in its Cultural Heritage programs and specifically understood the importance of pottery in its history (Cho, 2012, p. 5). However, Onggi pots were shown less interest compared to every other type of pottery developed in the history of the

Peninsula (Song, 2010, p. 8). Perhaps, the research by Rinzler and Sayers helped highlight their importance, be that as it may, they are now referred to as a "Cultural Symbol of Korea" (Song, 2010, p. 6; Muratore, 2023, p. 6). Thus, in a very short time, the Onggi pot and potters went from being taken for granted and unnoticed within society to an identity marker of Korean culture.

Nonetheless, is it possible to quantify how much-fermented food is consumed by the South Korean population? It is hard to determine how much of the food consumed in Korea is fermented but it should be noted that between 1998 and 2016, the daily intake of *kimchi* (fermented cabbage) alone ranged from 22,8 to 31,7 percent of the daily dietary intake by an adult in South Korea (Kim et al., 2019, p. 520). That represents on average almost up to one-third of the food consumed being fermented kimchi alone.

If today, Korean fermented food is still an important part of the food diet in the Peninsula, it has become more and more popularized internationally (see Appendix A). However, is fermented food consumed in Korea and internationally a product of Onggi fermentation?

In reality, fermented food has been mostly processed in modern ways nowadays, in factories and packed for immediate consumption (Surya & Nugroho, 2023, p. 11). We can explain this phenomenon by many societal changes such as the lack of space in densely populated areas (81.4 % of the population lives in metropoles) to store Onggi pots on rooftops, yards, and terraces (United Nations, 2022). We could also add the fact that the family unit has become much smaller in the past two decades in South Korea resulting in a reduced need for Onggi fermented foodstuff compared to the past. Consequently, the replacement of Onggi pots with lighter and cheaper containers made of plastic and aluminum transpired (Yeum, 2018, p. 220).

Finally, the biggest hindrance explaining why Onggi pots are less and less used might result from the lack of people willing to manufacture them.

3.4 Current constraints on the craft

First, the assigning of ICH and LNT titles upon Onggi potters and Onggi pots highlighted the need for their conservation and preservation. The positive impact of the creation of legislations resulted in the recognition of their Cultural Heritage value for the first time in history and saved them from extinction due to the massive industrialization of the country.

Yet, to make the Onggi pot into a Korean cultural asset, criteria to be respected were dictated by the Cultural Property Protection Act. It means that from this point (1990) multiple actors participated in efforts for conservation of Onggi crafting. The first actors are the Onggijiang (the potters), and the second are the legislators who define what the craft consists of (Yeum, 2018, p. 220). The second body of actors did not exist until the 1990s and is thus a product of modern times which resulted in a very new set of regulations applied to the making of Onggi pots. Most importantly, it was imposed on the LNT holder to preserve the original manner in which Onggi were historically made and to produce Onggi pots based on that "archetype".

However, as demonstrated throughout Chapter 2 of this thesis, Onggi pots never ceased to evolve through time. What does this mean in this context?

The example of Onggi production on Jeju Island perfectly exemplifies the contradictions resulting from this problematic. It is imperative to underscore that Onggi fabrics require the following conditions to function efficiently: access to good soil, to firewood, to a river or coast for transport, and labor. The Island was highly impacted by the introduction of wheat and persimmons cash crops in the 1970s (Yeum, 2018, p. 218). Due to these new agricultures, potters with a heritage extending multiple generations in Onggi crafting changed professions and became farmers. The ones that still pursued their craft transitioned from a traditional to a mechanized *modus operandi* of fabricating Onggi pots (Yeum, 2018, p. 219). For instance, modern devices were introduced to grind the soil, and electric wheels took over manual wheels to fit with demand and the loss in labor. As a result, with the twenty years separating the decline in Onggi factories on the island and the 1990 LNT title given to Onggi potters, the craft itself had gone through a technological transformation. However, the set of new guidelines brought by the LNT title excludes the utilization of modern machines as it defines the craft based on "traditional" criteria.

Furthermore, in order to learn the craft, one has to be designated for the title of "transmission assistant" applied for a determined period (Yeum, 2018, p. 227). In addition, since there is only a limited amount of LNT Onggi potter titles allocated, the craft now rests on one single person compared to the past when it involved a collaborative group of people. In other words, the new set of rules applies a tremendous amount of pressure onto the LNT title holder because he is confined by the criteria established and has to meet the conditions for the fabrication of Onggi pots. Thereinafter, setting new rules and establishing a strict hierarchy among the Onggi crafter circle makes it hard for anyone not only to enter the field but to let the craft evolve.

3.5 Summary

South Korea went from a feudal system to a soaring economic nation in a very short time. Throughout this mesmerizing transformation, the ancestral utilization and production of Onggi pots have survived. Certainly, the production of the craft has suffered in South Korea because of a set of circumstances and constraints involved with Onggi making. Interestingly, internationally more and more people are interested in using Onggi pots. The next chapter will show that through exportation trends, the vessels are used and made in innovative new ways.

4. Chapter 4 | Innovations through the utilization and craft of Onggi pots

4.1 Introduction

The 20th century brought the Korean Peninsula to the forefront of the international scene for multiple reasons. Along with this phenomenon, Korean cuisine has been progressively more available to the *grand publique* internationally. Slowly but surely, Kimchi, the most-known fermented food and cultural symbol of Korea has found a strong following of new consumers around the globe (Patra et al., 2016, p. 7). In fact, it is the most eaten fermented food worldwide (Patra et al., 2016, p. 7). As kimchi is traditionally made in Onggi pots, they too started to be exported and eventually produced outside of Korea. This trend, however, is recent, and as a result, Onggi pots are made and used on a global scale in many more ways than they used in the past.

In this chapter, I will explore and demonstrate how Onggi pots drive sustainability through three study cases. The following individuals and businesses have been exploring Onggi crafting and utilization in new ways and have been growing their practices recently. In terms of timeline, Adam Field has been practicing Onggi crafting for a little more than 15 years, Plēb Urban Winery has been using Onggi pots since 2022 and Mina Kim established the Kimchi Hotel in 2020.

4.2 Adam Field, Onggi potter

I interviewed Adam Field, Onggi potter, during the summer of 2022. Adam is an American citizen, he went to art school in San Francisco and now lives in Montana, he also happens to be one of the few people recognized for making Onggi outside of Korea. I approached Adam Field because I was curious about how he learned the craft and how he made it into a successful venture. As I exemplified in the previous chapter, one does not just learn to make Onggi pots. In any case, in 2007, Adam Field underwent a ten-month apprenticeship in Yeoju, South Korea under the guidance of Kim Il-Maan, a 6th generation Onggi Master and National Living Treasure (Chang, 2019).

Since then, he has made and sold his Onggi pots as a lucrative activity as well as teaches Onggi crafting workshops in Montana (U.S.A.) and other locations for special events (see Appendix D). Nowadays, Adam Field is actively introducing the craft and sharing his knowledge in new localities, without the restrictions and constraints in force throughout the South Korean Peninsula on Onggi masters.

Since Adam Field is operating from Montana, he is surrounded by a different environment from which the Onggi craft saw the day. Consequently, he has adapted the *chaîne opératoire* and the raw material extracted for Onggi making to his native home in Montana. An example pertains to the composition of the Onggi glaze, which is typically made of pine wood ashes in the peninsula (Song & Yi, 2010, p.81). Instead, A. Field produces his glaze from the refuse ashes produced by a BBQ restaurant he lives nearby (A. Field, personal communication with, July 18th, 2022). This shows that by being

introduced to a new locality, the craft changes and is adapting to the potter's environment. At the same time, A. Field manifests appropriation since this situation is unique to him.

It is worth mentioning that by utilizing the "trash" from a nearby restaurant to produce his glaze, the potter plays no role in "contributing" to the production of ashes. On the contrary, he is more ecologically friendly than Onggi potters seeking and using the traditional fresh pine wood to produce their glaze.

Instead of persisting in time-consuming routines and unsustainable methods dictated by the criteria established by the Korean government for what is "authentic" Onggi crafting, Adam Field consistently seeks opportunities to enhance his Onggi-making approach.

As stated earlier, the fact that the Intangible Cultural Heritage title dictates how Onggi should be made from beginning to end, starting with the clay type and treatment, the coil method used to shape the vessels, the drying period and glaze composition, the firing temperatures, and even finishing with what attire the potter should be wearing while exercising his craft (white clothes), as mentioned earlier, deprives Onggijangs of any capacity for evolution in South Korea (see Figure 37).

Figure 37.

Designated Intangible Cultural Master potter Kim Il-Man glazing an Onggi vessel in the traditional white items of clothing worn by Onggijangs in South Korea. (Song, 2010, pp. 88–89).

Whereas, by producing his pots where the ICH title holds no ground, Adam Field can practice and innovate freely. For example, another traditional characteristic dictated by the ICH title that was left behind by A. Field is the utilization of a mechanical foot-spinning wheel (see Figure 38) for shaping the Onggi vessels.

Figure 38.

Korean traditional foot-spinning wheel made of wood. (Çobanli & Canbolat, 2014, p. 173, Figure 8).

Since this method is particularly demanding on the body and its utilization requires more time, Adam Field replaced it with a modern electrical wheel.

Furthermore, by introducing Onggi vessels to a new demographic, Adam Field collaborates with a public that is not scared to branch out nor is not limited to a specific type of pot utilization. What is particularly gripping is the fact that A. Field's vessels aren't specifically used for Korean food fermentation. As stated by the potter, the vessels are also utilized to make kombucha, ferment bread, sauerkraut, beer, wine, etc (A. Field, personal communication, July 18th, 2022). The vessels outside of the Peninsula are now utilized in varied ways.

Opening a plethora of new foodstuffs to Onggi fermentation and conservation therefore allows more time for each one of these dietary components to be consumed while also, replacing modern high-energy technology used to make and conserve them. Adam Field is therefore "revolutionizing the Onggi-making paradigm" by appropriating the craft, introducing it to a new locality, and helping it last. An example of this will be exemplified in the next subchapter.

4.3 Plēb Urban Winery

Plēbe Urban Winery has been sustainably cultivating grapes in the mountainous region of North Carolina (U.S.A) and producing minimal intervention wine within Asheville's River Arts District since 2018. Chris Denesha, co-founder and winemaker has been making use of Adam Field's Onggi pots to ferment and age their Onggi Catawba wine since 2022 (C. Denesha, personal communication, March 10th, 2023). This collaboration was motivated by the fact that Adam Field was willing to "throw big[9]" which is necessary for the storage in the wine-making business, and the fact that the potter was disposed

[9] The bigger the vessels, the harder it is for the potter to control the stability and reliability required for fermentation.

to make Onggi vessels from local North Carolina clay (C. Denesha, personal communication, March 10th, 2023).

Plēb Urban Winery utilizes local resources in every aspect of its grape growing and wine-making process. This involves fermenting local grapes using regional clay, which they believe will result in a more authentic, sustainable, and unique end product (C. Denesha, personal communication, March 10th, 2023).

It is, therefore, interesting to evaluate the different methods and technologies commonly used for this science and compare them to utilizing Onggi pots for wine aging and fermentation.

Nowadays, the wine-making industry usually operates with oak barrels and stainless-steel tanks to age and ferment wine (Montalvo et al., 2021, p. 1) (see Appendix B). The firsts are suitable for the fermentation process of wine because they are porous and allow the liquor to interact with the wood in an oxidation-controlled environment, essential for the aging process (Garde-Cerdán & Ancín-Azpilicueta, 2006, p. 438). Through the interaction of the liquid with the wood, the wine will develop unique flavors and aromas each time it is produced in the oak container (Garde-Cerdán & Ancín-Azpilicueta, 2006, p. 444). Typically, oak barrels can be utilized for 5-8 years, depending on the quality of the wood, storage conditions, and appropriate maintenance (Carpena et al., 2020, p. 7). They have been used for two millennia in that manner in Northern Europe and are part of the history and tradition of this craft and science (Carpena et al., 2020, p. 2). On the downside, Oak barrels are costly, especially high-quality ones made from specific types of oak, for example, French oak is more expensive than American oak (Carpena et al., 2020, p. 6). In addition, the fact that the barrels need replacement every 5-7 years needs to be acknowledged in terms of wood consumption as a raw material (Flor et al., 2017, p. 213). Indeed, if unsustainably harvested, oak trees can lead to a loss of habitat for wildlife forms, high carbon footprint for production and transportation and finally, oak forests are already at risk due to climate change (Flor et al., 2017, p. 213). The introduction of a longue durée container that presents the same advantages would therefore be a better solution environmentally speaking for winemaking.

Another commonly used container for wine fermentation and aging are stainless steel tanks. Stainless steel as a material is widely used in winemaking due to its durability, corrosion resistance and easy-to-clean properties (Montalvo et al., 2021, p. 3). However, it has a negative environmental impact because of the energy consumption demanded during its production (leading to greenhouse gas emissions), water consumption during its fabrication, raw material extraction, and finally, presents disposal challenges since it takes hundreds of years to decompose (Montalvo et al., 2021, p. 7).

Comparatively, Onggi pots can be used throughout generations, their raw materials can be extracted locally implying a very small footprint while they are made out of natural and easily decomposable materials (clay, ashes).

It is worth reminding that due to the microstructure of Onggi pots, the level of porosity and oxygen exposure provided to the wine cells during fermentation is superior to stainless steel tanks. Besides, just

like oak barrels, the wine contained in Onggi will develop unique flavour profiles through the interaction of the extracted local clay to make the vessels.

The example of how Plēb Urban Winery uses Onggi vessels portrays how the pots could limit tremendously the environmental impact of the equipment needed in the wine-making process.

This novel collaboration between Adam Field and Plēb highlights the advantages of exporting an ancient craft to new localities. It shows that the individuals interacting with the pots, by appropriating them, are innovating.

4.4 Mina Kim and the Kimchi Hotel

Mina Kim is a native of a small town called Jinju in the southern part of the Republic of Korea. She moved to the Netherlands in 2017 and decided to actively introduce Korean cuisine and more particularly the health benefits of fermented foods locally (Kim, M., personal communication, 2022).

Motivated by her core values, Mina Kim has established her business model focusing on sustainable food solutions and the health benefits of food on the human body with a very holistic approach.

She started operating from rented kitchen spaces and selling her homemade kimchi in local Amsterdam markets and nearby. In 2020, she was able to settle down and elaborate her project which resulted in the House of Fermentation in Amsterdam (Appendix A). Her vision brought her to sell homemade kimchi in reusable jars (see Figure 39) as part of a zero-waste cycle and offer workshops to teach the local community the principles of fermentation.

Figure 39.

Handmade kimchi from the House of Fermentation in its reusable jars. (photograph: H. Muratore).

To do so to a full extent, she needed Onggi pots which are not manufactured in Europe at this point. Thus, Mina Kim imported 200 Onggi vessels from South Korea by cargo ship to be delivered to the port of Rotterdam.

Parallelly, while waiting for her shipment to arrive, she worked on building a public garden in the back of the House of Fermentation, growing fruits and vegetables needed for Kimchi making and preparing (Appendix F).

Mina Kim has been developing a network of farmers surrounding Amsterdam letting her collect their refuse, such as broccoli and cauliflower leaves cut off from the vegetables for sale in supermarkets and markets. These cut-off bits end up in landfills even though they are perfectly good to be consumed. Mina Kim, just like Adam Field did while utilizing his neighborhood BBQ restaurant ashes, is adapting to local circumstances, and adding ingredients native to the Netherlands in her Kimchi recipe.

When the Onggi pots finally arrived at their destination, M. Kim was able to root her (plan) down and start developing her project to fruition. At the house of fermentation, she produces homemade kimchi with local ingredients (some grown in the community garden she has built in the back of her business), offers multiple workshops in which kimchi making is taught, organizes tasting tables for people to discover what fermented food should taste like while explaining the health benefits of consuming these foods for the human body, and finally teaches how to utilize Onggi pots through the Kimchi Hotel. With the Kimchi Hotel Mina Kim has introduced Onggi utilization as a way to reduce food waste and shows it could be an alternative conservation food technology in her community (see Figure 40).

Figure 40.

The Kimchi Hotel at House of Fermentation in Amsterdam. (photograph: H. Muratore).

In her garden, her Onggi pots are available for individuals who wish to “check-in” their homemade kimchi for an authentic fermentation process, just like they would check in a hotel room. Her brilliant innovation is quite revolutionary because while she created a space for community building, she also is sharing her Onggi vessels allowing them to exist sustainably. Onggi pots come in all sizes but while the family unit of the past allowed for a bigger size Onggi pots to be relevant to the household, people living in small apartments or with no outside space might not be able to host the pots. The model proposed by Mina Kim offers the possibility of continued shared use of the vessels enabling multiple family units or individuals to use the pot. In other words, one pot could serve more people for a longer time. Another way to look at it is that it requires less pot production, therefore, this concept is also very sustainable.

Needless to say, this concept of “Onggi Hotel” and renting the “space” does not exist in South Korea and it is a case in point of how importing ancient craft can push people to innovate in sustainable and modern ways.

Here I would like to point out that at the House of Fermentation in Amsterdam, owner Mina Kim does not keep her Onggi pots dug in the ground. Many variables will dictate whether to leave them out, in the ground, or at a higher distance above the ground, depending on the time of the year, the temperature, its content, the moisture in the air, etc. (Seo et al., 2005, p.82). In the Netherlands, however, since the weather is more temperate than in South Korea, the pots can be left throughout the year above ground, which means that intrinsically, Onggi pots can adapt to any kind of environment.

4.5 Summary

Adam Field, Chris Denesha and Mina Kim promote artisanal production and preserve cultural heritage while integrating the environment they are part of into their practices. From the example above, what is clear is that the production and utilisation of Onggi pots drive sustainable solutions from the raw material extraction standpoint guided by the practitioners' values.

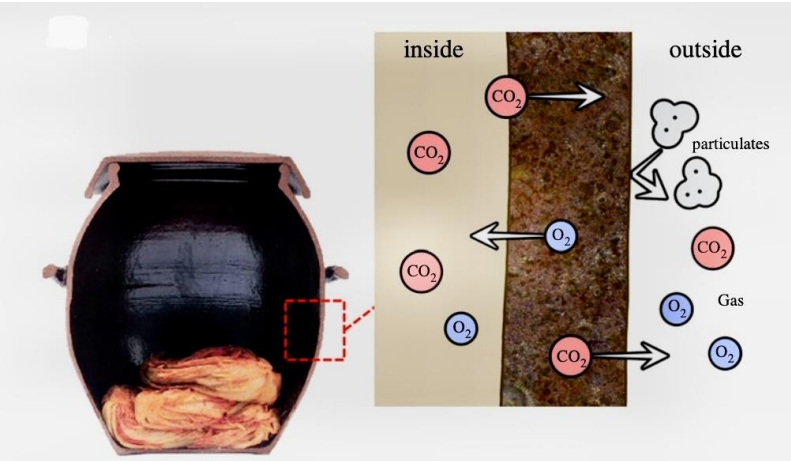
5. Chapter 5 | Discussion on the future of Onggi pots

An increasing amount of attention is given to sustainable technologies and their development nowadays. Within this quest, some scientists and researchers have highlighted the advantages the utilization of Onggi pots would present for future food preservation strategies. Chapter 5 will present and explore the most up-to-date discoveries relevant to Onggi pots meanwhile trying to answer the main thesis question: Can the introduction of Onggi crafting and use on a global scale drive innovative solutions to food waste and food conservation?

Current studies demonstrate that as a society we can explain and understand the hard science behind the process of fermentation better than our ancestors did. This dichotomy between ancient knowledge and science is necessary when approaching this subject and it is important to know that researchers can explain what is occurring in an Onggi pot (Jeong et al., 2011, p. 2015). As I mentioned in my introduction, a characteristic of an Onggi pot is the fact that its walls are composed of micropores. The porosity and the permeability of the Onggi earthen microstructure together with salt produce an environment in which lactic acid spontaneously grows (Kim & Hu, 2023, p. 1, p. 3). As noted in Chapter 2.4.2, archaeologists were able to trace saline water in food preparations back to the Chŭlmun period. Thus, the lactic acid grows good probiotic bacteria that make it possible to ferment foods and enjoy them while at the same time having a positive impact on our guts and health (Kim & Hu, 2023, p. 3; Jeong et al., 2011, p. 2015). It is also important to mention that the process of fermentation produces carbon dioxide (CO_2), when occurring in an Onggi pot, its micropore permits this gas to escape (Kim & Hu, 2023, p. 6). While some of the gas is escaping, letting oxygen in, it allows for the process of fermentation to continue and even accelerate the generation of more carbon dioxide, and this makes for the perfect fermentation environment (Kim & Hu, 2023, p. 9; Jeong et al., 2011, p. 2015, p. 2020) (see Figure 41).

Figure 41.

Schematic close-up of the CO_2 and O_2 flow in and outside an Onggi pot. (Kim & Hu, 2023, p. 6, Figure 5b).



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It also should be underscored here that with the increasing fermentation process, the lowest the pH level becomes (Jeong et al., 2011, p. 2017). As mentioned earlier in Chapter 2.4.2 regarding the benefits of lowering pH levels when seafood is fermented, the gradual drop in pH level during lactic acid fermentation permits the creation of an acidic environment that contributes to the elimination of harmful bacteria development.

Fermentation is possible in other types of containers made of steel, plastic, or glass, but it then demands a manual way for carbon dioxide to exit the container because the gas also facilitates the growth of aerobic and putrefaction bacteria (Jeong et al., 2011, pp. 2017–2018). In other words, the low level of carbon dioxide in the Onggi pots helps to accelerate the process of fermentation while slowing down the growth of harmful bacteria. This phenomenon is subtly balanced and extremely hard to reproduce in a modern way of fermenting food (Han et al., 2013, p. 250).

On this note, Onggi pots are made in such a way that they are unique compared to other types of pottery and ceramic. By way of illustration, the lack of porosity in porcelain would accelerate aerobic bacteria and would also demand a mechanic or manual process of letting CO_2 exit the container (Kim & Hu, 2023, p. 7). In contrast, terra cotta because of its very high permeability would not be able to process fermented foods because it would release an important amount of liquid through its walls (Kim & Hu, 2023, p. 9). Essentially, when fermenting food, water is necessary to keep the food from drying. In addition, with the exiting of CO_2, the internal temperature of the pot drops, and this is one reason why Onggi pots preserve food. Consequently, I would like to hypothesize on the potential for Onggi pots as a low-energy and sustainable food packaging technology in the future.

Nevertheless, all Onggi pots are not fabricated the same way either. The ash-glaze type and quantity applied to the vessel also affect the porosity of the pot (Seo et al., 2005, p. 82). Thus, a dichotomy can be made between unglazed and glazed Onggi vessels (Jeong et al., 2011, p. 2015). As glaze also plays a barrier role, it will let less carbon dioxide go out of the vessel and thus allow more aerobic bacteria to proliferate. It is crucial to understand that depending on the foods and their level of carbon dioxide production during fermentation, one type of Onggi might be more adequate for particular food processing than others. The levels and rates of rancidity development, respiration, microbial growth, enzymatic browning, and nutrient loss are all unique to specific foods and therefore demand different environments for conservation (Seo et al, 2005, p. 82).

Besides, when establishing the conditions for an efficient storing or packaging method for fresh food consumption, multiple conditions or criteria need to be taken into consideration. These criteria are dictated by our society's values in the time we live in. Organizations on the forefront such as the Sustainable Packaging Coalition have determined that future food preservation technologies should be able to meet the consumer lifestyle and respect the environment while being part of a growing economic system (Yam & Lee, 2012, p. 4). The consideration encompasses the ability of the technology to withstand the physical environment (transport, physical disturbance, etc.), the thermal environment

(moisture production, stench, bacteria productivity, etc.), and the human environment (consumer friendliness, appreciation, or aversion for the product) (Yam & Lee, 2012, p. 7).

Based on the information given and the criteria enunciated above I argue that it is possible to develop food preservation technologies mimicking the functioning of Onggi pots or made out of their raw material. Because the elaboration of new technologies goes beyond the scope of this master's thesis and my academic background, I would like to draw attention to studies made by Professor Dong-Sung Lee at the Department of Food Science and Biotechnology at Kyungnam University and MIT. Professor Lee has established that Onggi pots were capable of contributing to the preservation of fresh foods.

In other words, Onggi could potentially be used as a "frigorific" option and preserve foodstuff instead of fermenting it. The opportunities for these vessels and science are therefore endless.

6. Chapter 6 | Conclusion

My motivation to address Korean Onggi pots stems from my visits to the Peninsula dating back to 2012 and 2018, and the friendships I have developed there. Through the interactions I have had, the food I ate, and the observation of the landscape, I have developed a curiosity toward the Onggi pot. As you can see, it has been more than ten years that I have been passionate about this subject. However, there was little information on Onggi vessels' emergence in archaeological research. I, therefore, decided to address this lack of data and started my research while keeping in mind the current environmental issues we are facing today.

In this study, I began tracing back the first signs of pottery utilization within the Korean Peninsula. I was able to collect sufficient data going back to the Chŭlmun period exposing the likelihood of the first pottery made on the Peninsula's capacity to ferment foodstuff. With time, there is no doubt that archaeologists will find out more about the subject.

Then, I exposed how the ancient craft of Onggi making and utilization is still relevant in Korean society while also exemplifying some of the constraints stemming from the Intangible Cultural Heritage and Living National Treasure titles affecting Onggi production. After that, observations were made through three study cases highlighting how Onggi vessels while being introduced to new localities, are changing, adapting, and innovating in fascinating ways. Finally, I ventured further and hypothesized about the possibilities the re-introduction of this ancient technology has to offer for future generations. However, to do so, it was crucial for me to understand and explain exactly how Onggi pots function and why they are ideal for fermentation processes.

As a master's student in Global Archaeology, I have reflected on the effect of the food globalization phenomenon, food elaboration, and foodstuff preservation pottery through my curriculum at Leiden University. With the writing of this thesis, I hope I was able to translate coherently the results of my transdisciplinary research encompassing major themes such as Cultural Heritage in East Asia, scientific research in Archaeology, biomechanics, food technologies, and environmental sustainability.

I am confident that, as a society, we can build low-energy, environmentally friendly technologies that mimic the functioning of an Onggi pot to preserve foodstuff in the future. But first, through archaeological research, one should try to comprehend the reasons for its emergence, evolution, and survival. Ultimately, grasping the science and functioning of the Onggi pots allows us a better appreciation of past populations' knowledge and the development of ancient technologies. In other words, this thesis aims to draw attention to ancient methods of food conservation and to inspire the investigation of sustainable ways to preserve food in the future.

The limitations and constraints I encountered during my research process consisted of the restricted number of archaeological reports and literature available, the language barrier, and the fact that I had to narrow the depth of exploration dictated by the expectation to meet within a Master Thesis. I would like

to highlight how extensive academic research could contribute to a better understanding of the subject at hand.

In undertaking this thesis, I aspired to answer the main question consisting of:
Can the introduction of Onggi crafting and use on a global scale drive innovative solutions to food waste and food conservation?

Unfortunately, for multiple reasons, I was not able to address the food waste issue. Firstly, to tackle this matter involved quantifying how much food is wasted per household in a framed location and on a determined period. Secondly, it would demand to identify what types of food are wasted and test whether the utilization of Onggi pots could help reduce these losses. Finally, the acquiring of the data necessary, understandably, goes beyond the scope of a master's thesis in Archaeology.

However, I was able to demonstrate that individuals including Adam Field and Mina Kim and organizations such as Plēb Urban Winery have been successfully innovating through the crafting and utilization of Onggi pots in a sustainable manner. In addition, I presented arguments supported by recent scientific studies indicating the potential Onggi pots present for conserving foods in a more environmentally friendly manner than our current technologies.

Taking into consideration the current state of crisis impacting our environment worldwide, it is clear that we need to find solutions.

Future research endeavors may consist of conducting trials in which Onggi pots are used to assess their capacity to diminish food waste through food conservation and whether their utilization is user-friendly enough to meet consumer needs. From a technology development standpoint, carrying tests incorporating Onggi material as a component in new refrigeration equipment could present new avenues as well.

Lastly, I would like to add that the study I undertook could be done with many more past societies' technologies and ultimately, I suggest that looking at our ancestors' lifestyles could offer sustainable solutions and inspire us in the future.

The rest is History in the making…

Abstract

This master's thesis examines the context of the emergence and utilization of traditional Korean fermenting pottery called Onggi and explores the avenues for future utilization possibilities.

The research done so far on the subject has been neglected and understudied in academia due to the utilitarian nature of the vessels, casting a shadow on their historical and cultural significance. However, through a transdisciplinary approach based on the collection of data in archaeological reports, historical documentation, and iconographical sources, the history of Onggi vessels becomes apparent, highlighting its crafting and utilization through thousands of years. A chronological presentation of these vessel's functions and fabrication techniques starts approximately from the 7th millennium BCE until the present and composes a major part of this work.

In an effort to overcome the gradual disappearance of this ancient technology, the Korean government has designated the craft as an Intangible Cultural Heritage (ICH) and a number of potters have been nominated as National Living Treasures (NLT). Yet, in South Korea, a rapidly decreasing group of individuals are willing to learn and practice the profession.

On the other hand, due to globalization, the demand for Korean fermented foods is thriving internationally, and along with it, a growing interest in Onggi crafting and utilization has developed. The presentation of three study cases will highlight the Onggi crafting and use *renaissance* phenomenon occurring on a global scale presently. Through ethnoarchaeological observations, this thesis argues that Onggi pots are a driver for innovative environmentally friendly endeavors for the conservation of food.

As it becomes an imperative necessity for contemporary societies throughout the globe to explore sustainable solutions to food conservation and waste, this study suggests drawing from ancient technologies through archaeological research to inspire future possible solutions.

Finally, the examination of the chemical modification through fermentation occurring in the Onggi pot is broken down for the reader to exemplify how uniquely the vessels interact with its content.

This work thus encompasses various and major themes such as food technology, biomechanics, finding historical sources, utilizing scientific methodology in archaeology, studying Intangible Cultural Heritage in Northeast Asia, and environmental sustainability. Through the writing of this thesis, it is aimed to answer the question of whether the introduction of Onggi crafting and use on a global scale drive innovative solutions to food waste and food conservation

In essence, the study of Onggi pots past in the present could offer unlimited possibilities for the future.

Key words: Onggi, fermentation, sustainable solutions, food conservation, craft.

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Appendices

Appendix A

Interview transcription Mina Kim, House of Fermentation

Administrative information:

- Interviewee: Mina Kim, title / House of Fermentation
- Interviewer: Hélène Muratore, MA Student Archaeology: Global Archaeology at Universiteit Leiden

This interview was conducted in person on Wednesday, August 24th, 2022, at the House of Fermentation in Amsterdam, The Netherlands.

Interview transcript:

Hélène Muratore:

Why wouldn't women be allowed to make Onggis in South Korea?

Mina Kim:

It also has something to do with the Yin Yang energy. Craftsmen that are making Onggi deal with the elements of earth, water, fire, and air. Women carry Yin energy. The soil is considered yang energy. When someone makes a pot, it needs the most yang energy. In comparison, making foodstuff requires delicacy that is provided by women. Into the layers of that, it is also about who can touch what due to the materials and ingredients. It is not part of a pleasant part of history, but women were/are not even allowed to enter the places that require Yang energy.

Hélène Muratore:

Would opening up Onggi crafting to women help salvage the craft? Why is this not happening?

Mina Kim:

In today's South Korean society, the craftsmanship that requires such hard labor, getting yourself dirty to the level of it will damage your skin…I talk about this with a lot of people…People tell me about how beautiful Koreans are. The underlining is that what has been happening in S.K, is the introduction of plastic surgery and eventually women have been looking for a man that might be able to take care of them. I'm not sure how this has begun but women started seeing improving their own image as an investment for the future. And women's bodies became part of a business scheme. Your body is business basically. I have a lot of friends who are highly educated and got high paid respected jobs in

the corporate world but if you talk to them in a private setting, they'll tell you that they really want to stop working. So, they'll be looking at men that are single, eligible, older, and in a higher position to settle down with. That links back to saying that if you have too many wrinkles on your face, scars, or my hands (rough hands), that looks bad. For that reason, Korean women will not do any hard labor work.

I come from a very poverty-ridden background, I used to be bullied hard by these girls all the time for what I'm wearing, or not wearing a fresh school uniform every year. I've experienced all of that and then in my twenties, the conversations became even more perverse. I was an underground fighter about these things but then I asked: Why don't we have a look at it?

And then I was lucky to pick up English by watching TV shows. And then I got bullied for that (''you must have stolen money to pay for private lessons''). If I'm speaking up, I will be told that I'm not in a position to speak up depending on my social background. And if I do not participate, I'll be reproached for doing so.

So, the box for you as a person to be who you are becomes narrower and narrower. And once I reached my mid-thirties, I realize I never wanted to be with a Korean man, and I could not offer them anything, I'm too loud, too opinionated and my family is too poor. So, I'm just going to be me. And then, what happened is that people started to tell me that I was going to be too lonely. But I am happy! So, I started to feel suffocated actually.

I originally moved to Berlin first. It was a place where I felt like, finally, I can breathe. But then, every time I visited Amsterdam, it was like, this is really who I am. To the core of it, I can directly look somebody directly in the eye and speak. Especially older men. Even in my twenties, I was told that my eyes were too much and that I had to look down. I could be who I am on an honest level, and this is why I decided to move here.

Hélène Muratore:

What were you doing before this (Kimchi Hotel)?

Mina Kim:

My past career for about 17 years was in corporate training, and my final six years in Korea were training construction and tech engineers. It covered cultural integration, public speaking, and training them in English. It was an integrated program that I got to design and teach. That is because Korean companies don't have billion dollars projects in Korea, they are abroad. Especially in the Middle East. So, these people needed to be able to negotiate with royal families, etc. I was hoping to find a job within that line in Berlin and in Amsterdam, but the native language became a barrier…Then I was trying to get some Korean food here and there and then it started to hit me. Amsterdam is such an international city and yet Korean food is really bad. And then, at the same time, Kimchi was starting to be noticed by Dutch people: "Oh fermentation, gut health, we need that". And I started to look at the products sold

here, tasted them, and then I realized that I did not like it. But why would they make it that way? Korean food snack bars, run by Koreans, in Amsterdam would put stroopwafels into it just to make it sweet. It's easier for Dutch customers to find it delicious.

This is really bad, people are looking for kimchi, and fermented food for health reasons, but you are selling something that is really the opposite. I then started doing my own research. The timing was that I wasn't really getting lucky with the job hunting and needed to do something that I knew.

My workshop, it's not about showing how to make, and then boom you have Kimchi. It's about, why this ingredient.

Hélène Muratore:

You do a vegan version of Kimchi…

Mina Kim:

So, the fish sauce or the shrimp paste is not fermented. Those are salted. My hometown is Jinju on the South coast. We make the shrimp paste; we make the fish sauce. The Korean government made that region and the south coast waters protected, it's a marine biology protected area. It's reserved to stay clean. You catch the baby shrimps and salt them right away because the seafood, shellfish in particular carry a lot of bacteria and different parasites. The salt will spit it up. Then you rinse that out and re-salt it with a high-end salt and that process dehydrates them and releases the juice back and out, back and out and that whole thing becomes the shrimp paste. This means it's not really an essential thing for fermentation. It's just adding a tangy flavor that the Koreans like, especially people in the South.

Vegan kimchi exists among Korean Buddhist monks. I started to make vegan because vegans really need Kimchi, it carries a lot of vitamin B groups which carry all the proteins into their systems. So, I figured they are the ones who actually need it more and it is such a good product everybody should be able to eat it. I'll explain what goes in it first. There are 3 types of sea plants that go in my kimchi. In my hometown, we eat all kinds of sea plants. These plants grow in clean water but of course, every sea plants have a different texture. I feel this has never been touched by the western culinary area. Some you can eat raw; some you can process differently and some you have to cook to eat. I want to use these sea plants if I can find them in Amsterdam… My aunt uses Kodium. That is the one that adds meaty flavor, seafood flavor and also carries so many health benefits. My aunt told me: if you can find it, use it! I had to look for it and found it at a very high price. There are only a few resellers here and did not really have a choice…Kelp is one of the most common sea plants and it grows everywhere meaning it grows also really well in extremely polluted waters. They do carry a lot of toxins in them…because of that it's easy to find them and people use them everywhere. But you can't boil it longer than 15 minutes and what it adds in terms of flavor is really a joke compared to Kodium. The health benefits are insane…old ladies would say: 'it cleans your blood'. And as a matter of fact, it lowers all the toxins in

your bloodstream. But this kind of information got lost. I think even my generation lost it, people don't ask why it works like this. It just is for them.

Hélène Muratore:

Tell me about the Kimchi Hotel…Is this a concept that exists in South Korea?

Mina Kim:

No! My dutch boyfriend asked me how are you going to make money like that? How does the pricing going to work? And I cannot think like that. It's an education actually and like you said, you have to think really in reverse and that thinking way needs to be thought to everybody! The majority of the world when they talk about kimchi, it's only about the young Kimchi. Koreans are really shy about really aged kimchi because it smells, because it's really funky and sometimes when you open the pot right away, there is a concentration of healthy bacteria and sometimes it can give you a too active bowls movement. And since you don't want to give foreigners a wrong impression of Kimchi, you give them young kimchi. When I started it, I felt like people need to learn this because that's not real kimchi. Aged kimchi is fermented. That's fermenting! In the factory, they add more and more sugar so it stays young and doesn't age, meaning it's pickled and it tastes like kimchi but it's not kimchi. My brain kept going to find out a way to introduce this. Sometimes it's better for people to see it themselves than for me talking so that's what added to my making the Kimchi Hotel.

Hélène Muratore:

It's brilliant! What's interesting about it is that now we see people making sour bread dough, Kombucha, wine, etc. in Onggi…

Mina Kim:

Yes, so in South Korea, it's definitely a storage item. You do keep everything in it. What's beautiful about it is that when you use Onggi or hangari you have to understand the climate of where you are. That's why when they store Kimchi, they bury the onggi in the ground in South Korea because that geothermal will stabilize the temperature inside the pot. And the soil (clay) they use is for better control of the temperature and humidity inside the pot. And this is why Onggi's are special and made differently.

Hélène Muratore:

Onggi allows breathing…

Mina Kim:

So, the scientists, what they study, the glazing material is pine tree ash. But the skill that they need when they make the pot, is to be able to create micro-pockets. And initially, the first three months (of kimchi fermentation), is when the gas is most produced. There is a very high concentration, part of this gas is CO^2 and this with the pressure gets release through the walls. For example, when you look at the planet earth right now, what happens when you release $C0^2$ from the air is that the temperature goes down and there is a cleaner environment for all the elements to live around. That's what's happening inside of the pot. The temperature gets lower because the CO^2 gets released. And the more it's produced, the more it gets released and the environment inside the pot is cleaner and everything else is regulated. That's the basics of it…But for example, if you preserve pickled items then you must seal them off. In a way, this is not ideal for pickled things. You need to understand what's the climate, where you are, are going to put it in your cave, your basement, or in an outer cabin, then you must understand what's the temperature there. You grow different types of bacteria depending on the climate. So, if you go to the countryside of South Korea, you will see old grandmas putting them in all the different spots in their garden. So also, depending on what you are keeping in your onggi, you'll put them in different places, and kimchi goes in the ground.

Once you experience how to make Kimchi and how to store it, and then how to take the Kimchi out and enjoy it, that really summarizes the identity of this pot. Everything else is a little bit easier, but kimchi requires a lot more understanding to do it the right way. Because you also need to know the right recipe. It is all linked together. When I researched the recipe, one of the things was that in traditional recipes we used both Gochugaru (고춧가루) and chili pepper…Why?!!! They are the same thing…so why are we still doing this? But they do play different roles. They are made differently. For example, fresh chili pepper is all about anti-bacterial agents. It used to be that when you made kimchi you filled up the pots and then lay a piece of cloth on top and then still put a big chili pepper on top of that before completely closing it up. I used to ask my grandma what it was used for, and she'd answer that it would keep the bad spirit away. Now I understand that it's an anti-bacterial agent that releases itself into the pot and keeps the bad fungi from developing. Last year I initiated the Kimchi Hotel with a kick-starter workshop and the group of people doing it was composed of French, German and Dutch people that wanted the kimchi to be less spicy. I did not realize that would affect so much the kimchi. A lot of them had green fungi that developed on top of the kimchi which was bad for you to consume (but still skirt it out and it's ok). The ones that liked it spicy had nothing developing onto their kimchi.

Hélène Muratore:

Is white kimchi fermented as well?

Mina Kim:

It's fermented but that's Lacto-fermentation so when you make white kimchi you put a lot of salt in it. It's one type of bacteria that does survives into that environment. Kimchi is a combination of multibacteria living together, that's why also its longevity is timeless. But white kimchi, just like sauerkraut, once you open it, or kombucha, you need to consume it fast. What is good about white kimchi is that since it's filled in salt water it does not completely freeze during the sub-zero climate of winters in Korea. But Kimchi (Red) is meant to be fermenting forever, if you are going into lacto-fermentation, it's fermented not fermenting. Kimchi is the only thing in the world that continues to ferment…

Hélène Muratore:

So why are your pots not in the ground (here in Amsterdam)?

Mina Kim:

Because in the Netherlands the soil is too wet.

Hélène Muratore:

Is there any difference in the taste?

Mina Kim:

It's really funny but it depends more on who made the Kimchi actually. Here is the thing, the winter in Korea is a – 15 degrees on average and it's super dry, the soil is dry, and you can keep it that way. Here, the winter is still 5 degrees, sometimes it goes up to 10 and I'm thinking about climate change actually since I started the business too. In the wintertime, in the back of the garden, the temperature doesn't change as much actually, so when the temperature hits zero, it takes time to climb back up again. So that's why I keep it above ground. Summer here is cooler than in Korea. In my hometown and near Busan as well, when they make kimchi, they put a lot of salt in it, so that it can fight the bad bacteria that can grow during the hot and humid summertime. In the summertime, it is then more advantageous here. But the flavor it is more about what kind of chili pepper level you use, the ratio of other ingredients…

But it's a very western question and a western way of thinking…kimchi will hit people differently, depending on their taste. Kimchi has a deep taste to it and it triggers something in you. It's 3 dimensional.

Some customers here think that they want to help out a small business and buy kimchi. But I'm like: I really appreciate your intention, but do you like it? And that is really fine because it's not like anything that you have tasted in the supermarket around here. This is why I give a full list of the different ingredients and the recipe to my customers because I want them to understand kimchi. If they like it

and see what I mean, then buy it. But if you don't, that's also fine and at least you know what is the authentic one. Some people do come back to buy it but it's the challenging part of my business.

Hélène Muratore:

Who follows your workshops? The demographics…

Mina Kim:

Local Dutch and expats but not Koreans.

Hélène Muratore:

Women and men?

Mina Kim:

Both, and the age group is really wide as well. I don't have one standing out demographic.

Hélène Muratore:

I've asked the same question to Adam Field, is your clientele an elite?

Mina Kim:

Well, my kimchi is at a premium price for people. I've seen students that live together buying one jar of kimchi and sharing it. That's a way for them to save money and so on and so forth. But that's also what kimchi is about; it's sharing. That's why I sell it in bigger quantities than per gram you are saving money in that sense. Wait! What did Adam say?

Hélène Muratore:

Well, I asked him how much cost his Onggis. Because I'm researching all of this…I am under the impression that today, crafted items, homemade items, granted it's very noble and made with the right intention are unfortunately mostly purchased and consumed by an upper class or an elite. That is truly a problem because these 'products' need to hit a bigger demographic in order to make a change…So Adam gave me his price list (showing MK the price list). After looking at them, I thought it was reasonable. You know the prices of Onggi in Korea…

Mina Kim:

It is really reasonable, these guys (1-gallon Onggi), this was a year and a half ago, before the inflation going on, before even covid driven problems were happening…But what the guy told me is that their sales went up (Onggi vendor in South Korea). Because in Korea on lockdown everybody started making their own Kimchi. So, this size for Korean price was around 35 dollars. I had to ship everything over, that was the time the Suez Canal block happened and there were a bunch of logistical problems

involved…In the end, the logistics to ship the Onggis from Rotterdam to Amsterdam charged me more by a Dutch company than international shipping.

Hélène Muratore:

Tell me the story of your Onggis.

Mina Kim:

I don't want to bash Dutch people or anything but when people ask me: "if you were to sell them, how much would it cost?"…Well, considering all the logistics, a small one like that (1 gallon) I sell it for two hundred euros. And I'm not making any profit. So, you must pay a lot of import tax, storage tax that was a thousand euros per day, and…

Hélène Muratore:

That's when it arrived at the port of Rotterdam?

Mina Kim:

Once the kick-starter was done, I was looking for which company should I go for (buying Onggi). This was easy in Korea because every little business, even a traditional one has a really good website. I found two that I really liked, and I found out that they were doing it for generations. I then contacted them through email but even for them, I think it was really random to read some email from a Korean woman wanting to bring 100 Onggi to Amsterdam. And how do we go about this? Then I was ignored for a month or two. I had to ask my friends in Korea to call and ask them (Onggi vendor). Eventually, my friends got frustrated with the vendors and I got frustrated with my friends. It was very hard to ask for a general quote of it all. And are they able to ship it overseas? What kind of special packaging do we need? Then my friend also got ignored and it turned into a very old-school Korean experience. I was disappointed and felt like maybe I had to go back to Korea somehow to make it all happen.

Then on Instagram, a Korean guy messages me saying: "I really appreciate what you are doing with this project, I'm rooting for you…". You don't really hear that anymore from Korean people, they really became individualists and just think about their own lives, if anybody is struggling, well people should stay away from it because you can get sucked in…But it wasn't the case for him, he really followed me diligently and would check for updates. Eventually, I emailed him and explained what I was struggling with. I explained to him that I just needed a price quote and did not know how to make myself taken seriously. He answered back that he could help and said that a friend of his ran a logistic company and he can figure out every step of the plan to get the Onggis in Amsterdam. Within three days, I got the price quote and we figured out how to wrap them. I had to contact the Dutch Import Ministry, I needed to get a license number as well. Then it went really smoothly with the Korean team. The logistic team had to customize special wooden crates to wrap properly the pots for transportation in one box. That

box itself measured 3m by 3m. The Korean team understood the importance of it all, literally, they are sending their heritage overseas. It was then transferred on a boat and the team always kept me updated but then the Suez Canal problem happened. At that point, I had to decide to wait and see if the Canal was going to open up soon, or should I take the decision to transfer the cargo and take it all around Africa to reach Rotterdam? Eventually, I let the team decide, at that point, I figured I could wait, the hardest part was done. Once it arrived in Rotterdam, then the problems started to happen with the Dutch team. I had to pay a lot upfront. I made the payments and they said that the truck would arrive soon. The truck finally arrived really early in the morning, it was an unexpected time for me, and I see one of the biggest logistic trucks and the wooden box was out but tilted and there was only one truck driver with a tiny forklift, and he was trying to get it off. Then he told me, I can't bring off, you need to bring people over here. But this is not a human operation, it needed a bigger forklift! And it should have come with it. Then I got an email from the team in the office, they were saying: it's unable to unload so we are going to send it back. They said they would send it again with the appropriate forklift but that would imply additional cost (another 2000-3000 euros). I've fought them explaining what was included in the invoice, explaining this was not my responsibility. While we were having this email war back and forth, at one point the truck driver just took off with the Onggis. This was my worst "dutch experience". I did not know what to do. My Dutch boyfriend suggested I call them back, but I did not know how the office would appreciate me speaking in English at this point. My boyfriend left his office in the middle of the day and made the call in Dutch. One hour later the driver came back, and nothing could get off the truck. We took a hammer and started ripping through the wood from the truck. We had to carry box by box inside.

Hélène Muratore:

Where would you like to see your project 5 years from now?

Mina Kim:

More product launch was intended…I don't know if you also read my problems with the lawsuit I'm facing.

Hélène Muratore:

I saw there were some problems there, I was also going to ask you what difficulties you're facing with this project.

Mina Kim:

Because of this lawsuit, lots of things got put on pause. I had to think about quitting the business, now I think I'm getting hopeful again. If that works out and doesn't cause any other issues down the road, I want this place to be more or less like a small school where you can learn various types of fermentation

the right way. Also in a traditional way, meaning sustainable way. I would like that part, business-wise, to be sustaining itself. I wouldn't have to worry so much about marketing, and filling the calender, etc. I would like to see my product in a little more different location. I'm not chasing the retailers actually because then I have to change my product to be pickled. What I'm looking for now is more bakeries.

Hélène Muratore:

I saw that…How is that working out? How do you sell your kimchi to them and how do they use it?

Mina Kim:

There are different ways. B to B, I sell the smallest size to them because that is easier for them to sell. Some of the bakeries will make kimchi pastries with it as well. That works really well. Then I supply a very ripe Kimchi, with the brine. From my selling perspective, they need to make a profit, so I don't make a lot of margins on that. I'll keep the kimchi for them to bake with at a very low price if they are willing to sell the jars as well. The Kimchi I sell in jars is young kimchi only in the smallest jars. They sell it pretty fast. Some bakeries are interested in…because kimchi is fermenting, you can just mix flour with it and it becomes kimchi sourdough. Most of them have said that it sounds amazing but none of them have attempted it…This is more of knowledge exchange. You saw my Kimchi pancakes, it's also vegan, and people are asking me 'how are they staying so chewy?'. That's because it's aged kimchi brine that goes in it and it instantly bines with flour. Also, bakers are usually more open to trying these kinds of things than chefs. So, this is why bakeries are the best channel for me to reach out to. Kimchi toast is very big at the moment…

Appendix B

Personal communication with Chris Denesha, Plēb Urban Winery

Administrative information:

- Interviewee: Chris Denesha, Plēb Urban Winery (North Carolina, U.S.A.)

- Interviewer: Hélène Muratore, MA Student Archaeology: Global Archaeology at Universiteit Leiden

The email communications were exchanged between Tuesday, March 2nd, and Thursday, March 9th, 2023.

Communication transcript:

Hélène Muratore:

Dear team at Plēb Urban Winery,

I am reaching out to you for a very particular reason. To make it short, I'm an MA student in Global Archaeology at the University of Leiden in the Netherlands.

I have decided to orient my thesis on the subject of Korean pottery, more particularly on *Onggi* pots used for millennia for food conservation and fermentation. I believe that ancient crafts should be re-introduced in our world system and could offer innovative and sustainable solutions to avoid waste (of raw materials and food).

I have been conducting research for almost a year on the subject and am actively looking for people/ organizations that are using *Onggi* pots presently. That is precisely why I'm reaching out to you. It is my understanding that you are using Adam Field's Onggi pots to produce wine in small quantities.

Would you be willing to answer some of my question?

They would mainly concern your motivation to do so, the advantages/disadvantages that comes with this process and the end result when it comes to quality.

If you do have the time, I would love to connect through an online meeting, but I can also write if that is more ideal.

I thank you in advance for considering my request (I know it is a little outside the box) and look forward to hearing back from you.

Best,

Hélène Muratore

Chris Denesha:

Hey Hélène,

I'm sorry to just be getting back to you! Let me know if you still have any questions or something I can help with.

Chris Denesha

Chris Denesha:

I've attached my responses below. Let me know if you have any questions and thanks for being interested.

Hélène Muratore:

Hello Chris!

Thanks for getting back to me! I'm sure you are all busy with day-today logistics at Plēb (I use to work in the specialty coffee industry at a roasting plant in San Francisco Bay Area and I'm pretty sure you have your hands full with daily obligations, so I really appreciate your answering back. I'll keep it short. In what manner are you using Adam Field's Onggi pots? (Are you using the pots for fermentation or for aging the wine?)

Chris Denesha:

Both for fermentation and aging.

Hélène Muratore:

What are the "benefits" of using Onggi pots for winemaking?

Chris Denesha:

We are still discovering our specific benefits for our regional grapes but because we use native yeast on the grapes, the amount of porosity and oxygen given to these cells during fermentation is better than in a stainless steel tank without as much oxygen egress.

We are also hopeful that after several season/batches through the local clay, we will develop a unique season or flavor profile from the clay.

Hélène Muratore:

What are some of the drawbacks of this process?

Chris Denesha:

Potential over oxidation of flavors, aromas, and spoilage bacteria can lead to undrinkable wine. The ability/accessibility from open top lids allows us to check this and make education decision based on grape chemistry. We will also learn after years of experimenting when to use this method and when not to…hopefully.

Hélène Muratore:

What was the motivation behind using Adam Field's Onngi pots?

Chris Denesha:

Adam was one of the few potters that was willing to work with our local NC (North Carolina, U.S.A.) clay for fermentation. He was touted as top tier potter for "throwing big" in the clay community. While we have a lot of potters here in the region, most that "throw big pot" are not confident in their stability or reliability for fermentation. The others that made pots for fermentation, did not feel comfortable usually making pots big enough for our needs or did not want to use local clay as an "unknown". Adam was willing to make this gamble with us.

Hélène Muratore:

On your website, it shows that you are "limiting the use of certain modern winemaking tools". Would you say that you are using "older" ways of making wine?

Chris Denesha:

Yes. The idea is that a lot of modern winemaking is more recipe based. (Think Pepsi) In ourregion, we've experienced mot using "tools" as "crutches" all the way through growing and making of the a product.

I wonder how this industry, as well as others, can make the mental gymnastics leap of saying "our wine is an expression of our local terroir, or a representation of the region and season" while allowing aggressive pesticides in their farming practices to grow grapes and make heavily manipulated wine with purchased ingredients and excessive tools all the way through the cellar.

We hope by using what is local in all ways, that it will lead to a more genuine product to our region and more representative of what we are trying to do. This includes fermenting local grapes in local clay and pottery.

Hélène Muratore:

The answer to this last question is actually quite interesting to me because I'm trying to prove that by exploring ancient crafts, (craft)people find ways to innovate past techniques/technologies in more sustainable manners than perhaps products/ technology designers would.

Chris Denesha:

I would strongly agree.

Hélène Muratore:

The following questions are linked to a part of my thesis that is concerned with craft products/ items being targeted to and benefiting an elite.

As in any academic paper, I have to anticipate critique and be prepared to have people telling me that ancient crafts are great sustainable solutions BUT are pricey ones.

What is your customers' demographic?

Chris Denesha:

I'd say diverse. Young and old, rich and poor. Once folks understand what we are doing, we tend to host all. We offer many optiens here at the winery. Plēb is our name, short for plebeian. We are farmers, the bakers, the average folks. Wine is for all here. When I am met with this question about elitism and cost of a product, I have developed a belief that it is actually cheaper if a few things are considered…And much cheaper if you consider all things. Thic can go deep into societal values and economics…and thus be a potential rabbit hole.

If I had to be concise, we do not accurately see or calculate the cost of the wine. We're paying for it in other ways, not just in a monetary transfer at the store.

In most places it is hidden into government subsidies (yes, it is true and wild) for large corporate farms, and outsourced to oppressed labor and environmental degradation. We cannot do this responsibly for any less. This is not just a moral decision we all make, it's small deposits to a more sustainable system.

Hélène Muratore:

Do you find that your costumers are interested in the process making of your wine and the ideology behind it?

Chris Denesha:

The process and ideology is a large part of why our customers first begin to learn and try our wines, yes. We've embraced a model of transparency and a belief that we do not know anything for certain and invite everyone to come on our local journey through agriculture and wine with us.

Hélène Muratore:

My last question for you is: Can I use your answers in my thesis?

Chris Denesha:

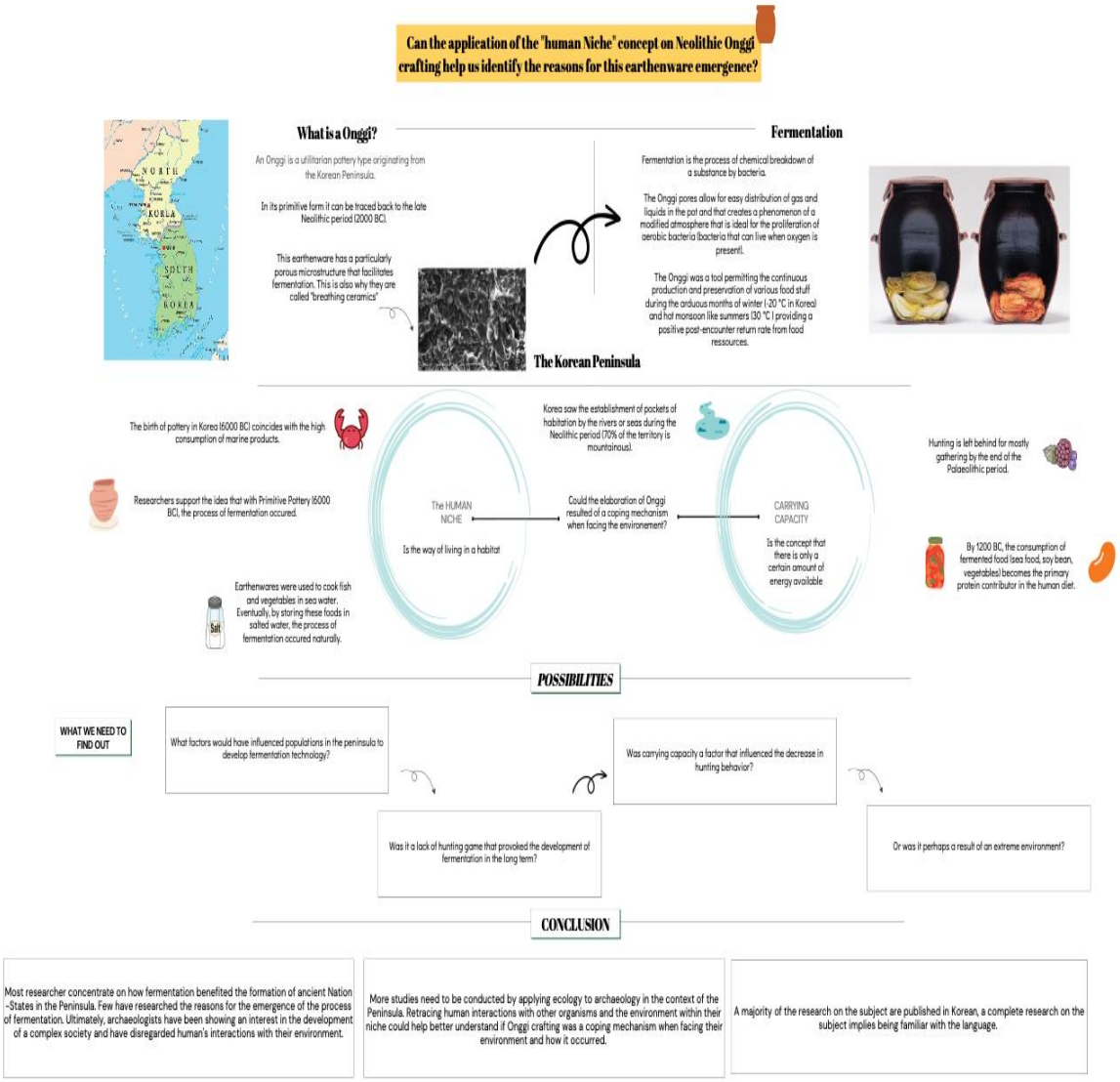
Of course. If you have any other questions or want any clarification, just ask. I tried not to wax on or get to preachy in any of my responses, but I really do believe in what and how we are growing and making wine.

Hélène Muratore:

Thank you so much! I wish you all the success and think that what you are doing is revolutionary and I hope more will be inspired by how you are (re)thinking and making wine. Cheers!

Appendix C

Final assignment for the course titled "Scientific Methodology in Archaeology" at Leiden Universeit



Appendix D

Personal communication with Adam Field in which a list of prices is given for his Onggi pots

Administrative information:

- Correspondent: Adam Field, Adam Field Pottery (Montana, U.S.A)

The email communication was received on Wednesday, July 20th, 2022.

Adam Field:

Hello Hélène,
It was so nice to talk the other day. Thanks for the reminder about my Onggi pricing, I've pasted it below.
Good luck with your thesis!
Best,
Adam

My Onggi jars are generally made to order and take 12-16 weeks to be made and delivered, depending on where I am at in the production process.

Pricing and shipping within the continental US are as follows:
1-gallon $125 (packing and insured shipping $25)
2-gallon $180 (packing and insured shipping $30)
3-gallon $280 (packing and insured shipping $50)
5-gallon $375 (packing and insured shipping $90)
Larger Onggi sizing and complete pricing attached below

If you'd like to place an order, please specify the **size(s)** and **quantity** you'd like along with the preferred **email address for PayPal invoicing** and I will put together a PayPal invoice for payment to complete your order.

Kind regards,

Adam


Adam Field Onggi
60 gallon ($5,600)
46H x 36W"
50 gallon ($4,500)
40H x 32W"
40 gallon ($3,500)
36H x 29W"
30 gallon ($2,800)
32H x 26W"
20 gallon ($2,000)
28H x 22W"
15 gallon ($1,250)
24H x 19W"
5 gallon ($375)
19H x 14W"
3 gallon ($280)
13H x 11W"
2 gallon ($180)
11H x 10W"
1 gallon ($125)
9H x 7.5W"
Adam Field Pottery • 3225 Le Grande Cannon Blvd., Helena, MT 59601
(720) 244-5243 • www.AdamFieldPottery.com • adam@adamfieldpottery.com

Appendix E

Personal communication with Blair K. H. Naujok, Korean Image Archive, and attachment of four photographs of Onggi pots taken in South Korea, circa 1957-1969.

Administrative information:

- Correspondent 1: Blair K. H. Naujok, Korean Image Archive (South Korea)
- Correspondent 2: Hélène Muratore

The email communications were exchanged between Wednesday, August 30th, and Wednesday, September 7th, 2022.

Blair K. H. Naujok:

Hi Helene,

I heard about your thesis on 옹기 (Onggi) after House of Fermentation shared your post and thought you might find these historic images from my archive useful. My grandfather photographed the first two around 1957. I can send digital copies if you think they'd have a place in the thesis.

Blair

https://www.koreanimage.com/

Hélène Muratore:

Hello Blair!

Thank you for your message! Yes! I could use these pictures! Of course I need your information to cite my sources right. Thank you again for coming forward, I appreciate it a lot. Do you know the locations by any chance?

Blair K. H. Naujok:

Hi Helene,

The photos & info file are in this Dropbox folder. Hope this helps your thesis.

Blair KH Naujok

Blair K. H. Naujok:

Please keep in touch. Maybe we can feature your research on our Instagram or website one day so others can learn and be inspired to use images in their own work. I built the archive intending for others to use. Good luck with your thesis!

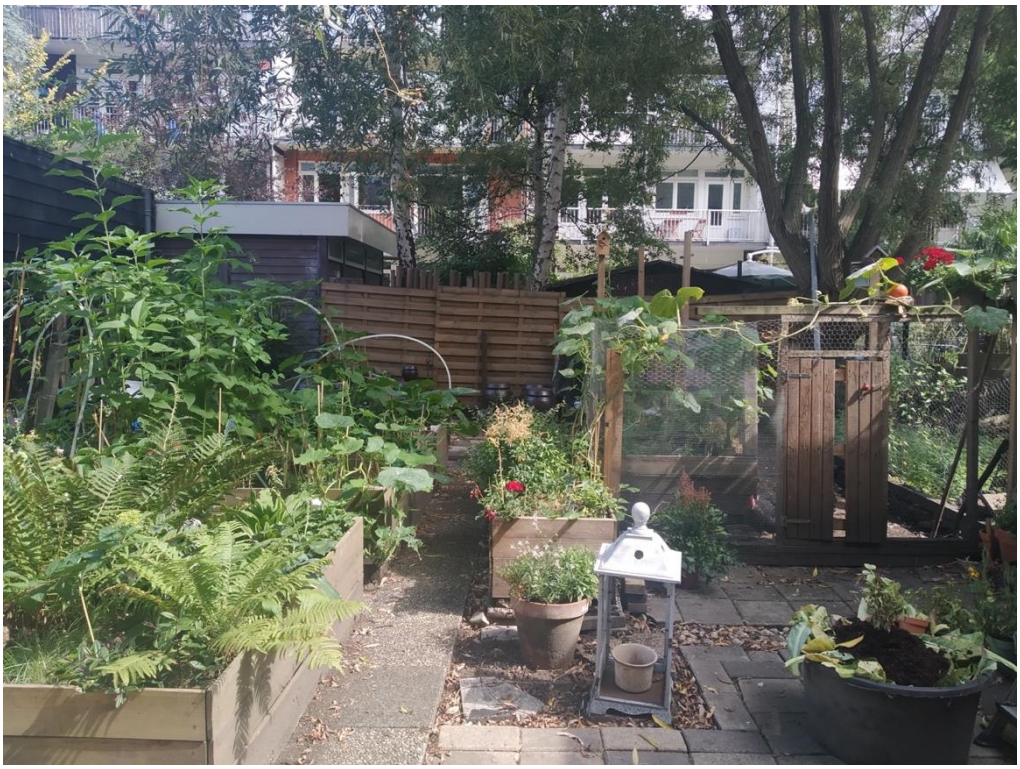
Note: Photograph details, 인천광역시 부평구, Bupyeong District, Incheon, circa 1957 – 1961. (photograph: A. B. Thompson).

Note: Photograph details, 광주광역시 광산구, Gwangsan District, Gwangju, 1969. (photograph: A. B. Thompson).

Note: Onggi pot in front of house, South Korea, April 1966. (photograph: A. B. Thompson).

Appendix F

The community garden created by Mina Kim, the House of Fermentation, Amsterdam, The Netherlands. (Photograph: H. Muratore).



Glossary

Buncheong [punch'ŏng]: blue/grey stoneware covered with a white slip and transparent glaze made during the Chosŏn dynasty (1392–1910).
Cheongja [ch'ŏngja]: celadon or green glazed ware made during the Koryŏ dynasty (918–1392 CE).
Chongkukjang: a white soybean fermented paste.
Chojang: a fermented red pepper soybean paste.
Chŭlmun [Jeulmun]: means comb-pattern to describe the pottery dating from 7500–1500 BCE.
Doenjang: soybean thick fermented paste.
Gangjang: or soy sauce, a traditional condiment made from fermented soybeans.
Gochu: Korean red pepper.
Gochujang: a mixture of grain, powdered soybeans, red pepper, malt, and salt. It is made into a sauce.
Hangul: The Korean alphabet developed at the beginning of the Chosŏn dynasty by King Sejong (15th century). It is phonetic and phonemic at the same time and composed of 24 letters, the letters can be combined to make a sound.
Jeotgal: salted fermented seafood that can be made with crab, shrimp, abalone, mussels, etc.
Kimchi: fermented cabbage made with Korean red pepper, fermented shrimp paste, garlic, salt, carrots, spring onions, etc.
Makgeolli: Korean rice wine.
Meju: fermented soybean lump. Also used as an ingredient for ganjang and doenjang.
Mumun: also called "plain pottery" bears minimal or no decoration dating from 1500–150 BCE.
Nuruk: It is a natural fermentation starter composed of multiple microorganisms.
Onggijjang: Onggi potter
Si: one of the ancient Chinese words for Korean white soybean fermented paste (chongkukjang).
Sŏnggol [kolp'um]: elite of the caste system into place during the Silla dynasty (668–918 CE), also refered to as "bone rank".
Tŭng yo: tunnel kiln introduced in the Korean Peninsula during the 1st century CE.
Yeamsi: one of the ancient Chinese words for Korean white soybean fermented paste (chongkukjang).