Gaya Armor: The Culmination of Gaya Iron Crafting

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Another Channel for Approaching Gaya History

Iron played a central role across much of Gaya (42–562) society, as reflected by the diverse range of iron artifacts recovered from the tombs of the confederacy's elite. Above all else, iron provided the fundamental basis for its development. Gaya interacted with neighboring regions utilizing its iron production technology to manufacture and then trade in a wide array of iron implements.

One group of items that stands out among Gaya's iron artifacts is its armor, which consisted of body armor and helmets. More than half of the ancient armor excavated from sites dating to the Three Kingdoms period is attributable to Gaya. However, the large volume of suits of armor recovered from Gaya tombs should not be regarded as a direct indication of Gaya's military might or the scale of its armed forces. Nevertheless, this rich material provides an important basis for understanding the types of armor manufactured in Gaya and the nature of the technology that was involved in their production. In addition, clues to the distinctive world-view of ancient Gaya communities can be gleaned from the armor and the ways in which it was utilized in different social contexts.

Although Gaya armor is rich in data and has great historical significance, studies on ancient Korean armor (including that of Gaya) have been sorely lacking. The first serious study of Gaya armor was performed on an example excavated in 1917 from Marisan Tomb No. 34 in Haman. A detailed analysis could not be performed since the armor was recovered in a partial and fragmented state. The pieces of armor were merely identified as such, and their existence was recorded in the published excavation report. Although the excavation of Marisan Tomb No. 34 and the publication of the related excavation report took place during the period of Japanese occupation and no Korean archaeologists were involved in the research process, the significance of this case study in the history of Gaya armor research should nevertheless be acknowledged. Subsequent research on Gaya armor took place sporadically, but full-fledged studies on Gaya armor only began to take place in the 1980s with the excavation of the Bokcheon-dong burial ground in Busan. Prior to this, the site of the manufacture of the armor excavated from Jisan-dong Tomb No. 32 in Goryeong had been a key matter of debate (Fig. 1). Due to its similarity to Wa-style armor (帶金式甲冑, the typical form of armor from the Japanese Kofun Period in which the helmet and body armor featured with long horizontal band design) frequently found in the Japanese Archipelago, this artifact was a subject

Fig. 1. Wa-style Body Armor and Helmet. Excavated from Jisan-dong Tomb No. 32 in Goryeong. Gaya, 5th century. H. 40.6 cm, W. 49.6 cm (armor), H. 14.8 cm (helmet). National Museum of Korea

of great interest within the Japanese academic community as evidence supporting the view of "Imna Ilbon-bu" (任那日本府) that considered Gaya territory to have once been under the control of Japanese forces. For this reason—its utilization in the obfuscation of ancient Korean history—the armor from Jisan-dong Tomb No. 32 was actually a subject of very *little* interest within the Korean academic community. On the other hand, great interest was directed at the finds of armor from the Bokcheon-dong burial ground since they represented the largest assemblage of armor collected in a single burial ground and because the vertical iron plates of which it was composted made it a type distinctive to Korea. It was, therefore, only following the investigation of the Bokcheon-dong burial ground that a full-fledged discussion of the origins, development, and background of ancient Korean armor began to take place (Jeong Jingwon & Shin Gyeongchul 1984). The subsequent excavations of major Gaya burial grounds such as the Daeseong-dong burial ground in Gimhae, the Okjeon burial ground in Hapcheon, and Dohang-ri burial ground in Haman resulted in the accumulation of a considerable body of data on Gaya armor. This made it possible for Gaya armor to develop into a research topic of considerable significance as with Gaya pottery or horse gear, and studies have actively been conducted on its characteristics and the changes in its attributes over time (e.g., Song Gyehyeon 1988; Kim Yeongmin 2000; Song Jeongsik 2008; Jang Gyeongsook 1999; Kim Hyuk-joong 2009).

The results of research on Gaya armor since the 1990s have revealed that Gaya communities began burying a large volume of armor as grave goods from an early date and sustained this funerary practice for a longer period of time relative to the other political entities of the Three Kingdoms period. Among Gaya's neighboring kingdoms, Silla (57 BCE–935 CE) also began to bury armor as a form of grave goods from a relatively early date, presenting a fitting example for comparative analysis. However, crowns and other objects made from precious metals were more popular as prestige goods in Silla than was armor. In addition, there is the key distinction that armor decorated with gilt-bronze ornaments was more widely used as grave goods in Silla. In contrast, iron armor was interred more intensively and over a longer period of time in Gaya. This makes Gaya armor ideal for identifying the characteristics of and changes in the ancient armor of the Three Kingdoms period.

Fig. 2. Vertical Plate Helmet. Excavated from Yangdong-ri Tomb No. 78 in Gimhae. Gaya, 4th century. H. 43.5 cm, D. 22.0 cm. Gimhae National Museum

Fig. 3. Vertical Plate Helmet. Excavated from Bokcheon-dong Tomb No. 44 in Busan. Gaya. H. 30.0 cm. Pusan National University Museum

In addition, the fact that many examples of ancient armor produced in the Japanese Archipelago have been recovered from Gaya tombs makes it useful for exploring the interactions and exchanges between Gaya and the ancient Japanese polity of Wa (倭). As mentioned above, horizontal plate armor has erroneously been applied in the past as evidence supporting the view of "Imna Ilbon-bu." This type of armor should actually be regarded as a reflection of relations between ancient Korea and Japan. Indeed, armor originating from Gaya or produced on the Japanese Archipelago under the direct or indirect influence of Gaya technology has also been discovered at Japanese sites, and the meaning of its presence has been studied by both Korean and Japanese researchers (e.g., Uchiyama Toshiyuki 1994, Park Cheonsoo 2007, and Kim Hyuk-joong 2014).

The Characteristics of Gaya Armor and Its Changing Nature over Time

Most of the armor discovered at sites on the Korean Peninsula, including Gaya sites, is made of iron. However, armor was not always crafted from metals such as iron: organic materials such as wood or leather were also used to manufacture it. Unfortunately, the acidic soil conditions on the Korean Peninsula are unfavorable to the preservation of organic remains and make the recovery of armor made from organic materials unlikely. Nevertheless, there have been a few extraordinary cases in which the remains of armor made from wood or animal bone have been discovered amidst these unfavorable environmental conditions.

Iron began to be used for armor in the fourth century during the transition from the Proto-Three Kingdoms period to the Three Kingdoms period. The majority of researchers believe that the development of weapons based on technological innovations and increased social conflicts provided the impetus for the adoption of metal materials for armor.

The changes in the materials used to produce Gaya helmets and armor broadly mirror this trajectory. However, this paper focuses on the iron armor of the Three Kingdoms Period. Examination of the characteristics of Gaya helmets and body armor will therefore focus on iron examples.

Helmets made using vertical plates, a technique observed throughout the world, were also present in Gaya. Introduced into Gaya via exchanges with the northern regions, these helmets can be divided into mostly two types: ones with "S-shaped" curved plates (彎曲縦長板冑, Fig. 2) and semi-globular ones with more straight, simpler vertical plates (Fig. 3). Seated at the uppermost point of the body, helmets are highly visible and tend to be more decorative than body armor. They

appear to have been actively used to demonstrate distinctions in social status. The helmet could be extended and adorned with decorative features or a visor to block the sun.

Vertical plate helmet was the typical type of the Three Kingdoms as well as of Gaya. It is difficult to establish distinctive regional characteristics for this type of helmet, but those from Gaya stand out in terms of the decorative enhancement of the basic helmet structure, which resulted in the production of unique helmet styles. This decoration involved the application of gilt-bronze or the addition of ornamental elements. A representative example of an ornamented vertical plate helmet comes from Daeseong-dong Tomb No. 57. The cheek-covers of this helmet were adorned with fern-shaped motifs rendered by punching holes at evenly-spaced intervals. Helmets featuring a bill to shade the sun (similar to the baseball caps worn today) were also produced. These types of vertical plate helmets distinctive to Gaya appear to have had a great influence on the Japanese Archipelago. The origins of similar helmets recovered from Kannonyama Tomb in Gunma Prefecture and Ikenoue Tomb No. 1 in Fukuoka Prefecture have been traced back to the Korean Peninsula. The number of vertical plate helmets identified to date has increased gradually due to recent discoveries at the Wolsan-ri burial ground in Namwon and the Jisan-dong burial ground in Goryeong.

Body armor made with vertical plates has been recovered from both Gaya and Silla sites, but examples have yet to be discovered at other sites in Northeast Asia. This has led it to be regarded as an indigenous type of armor that first appeared in the southern regions of the Korean Peninsula. Vertical plate armor is believed to have developed out of earlier wooden armor, with changes occurring mainly in terms of material. In addition to being unique to the southern reaches of the Korean Peninsula, this type of armor is significant in that it allows the technological standards of the era to be assessed and provides important information on how ancient Korean armor developed over time. Differences in terms of form can be observed between the vertical plate armor of Gaya and Silla. The former could be decorated with fern-shaped ornaments or others reminiscent of birds. Many examples feature a semi-circular gorget (Fig. 4). Silla vertical plate armor is characterized by horn-shaped gorgets, which distinguish it from Gaya vertical plate armor. Variations in the shape and structure of Gaya and Silla vertical plate armor can be seen as indicative of differences in the function and perception of armor. In particular, Gaya

Fig. 4. Vertical Plate Body Armor. Excavated presumably from Toerae-ri in Gimhae. Gaya, 4th century. H. 70.0 cm, L. 33.0 cm, W. 30.0 cm. Gimhae National Museum

Fig. 5. Lamellar Helmet. Excavated from Bangyeje Tomb No. Ga-A in Hapcheon. Gaya. L. 6.8–8.0 cm, W. 8.0 cm (lamellar pieces). Jinju National Museum

Fig. 6. Lamellar Body Armor. Excavated from Okjeon Tomb No. 43 in Hapcheon. Gaya. L. 10.0 cm, W. 2.6 cm (lamellar pieces), L. 74.0 cm (entire). Gyeongsang National University Museum

armor was not simply protective equipment, but also elaborately decorated gear for ceremonial purposes or to indicate status. On the other hand, Silla vertical plate armor was left undecorated and worn for practical purposes and replaced by lamellar armor at an early date.

Lamellar armor was made by interlinking hundreds of small iron scales with leather ties (Figs. 5 and 6). In contrast to vertical plate body armor, which is distinctive to Gaya and Silla, lamellar body armor was found throughout the Korean Peninsula and the wider Northeast Asian region. Lamellar armor consists of two types assembled (in terms of how the scales were connected) and worn in different ways. One type can be traced back to the Han people of China, and the other

Fig. 7. Horse Armor. Excavated from Magapchong Tomb in Haman. Gaya, 5th century. L. 225.0 cm (entire). Gimhae National Museum

to the non-Han nomadic populations of the Northern Steppe regions. The latter type continued to be used well into the Joseon period (1392–1897) for its ease of wearing and superior defensive functionality.

Gaya armor also included horse armor, mainly comprised of body armor and chamfrons (Figs. 7 and 8). Horse armor appeared following the widespread use of cavalry tactics in military strategy. More than any other type of equipment, horses played a key role in enhancing the fighting capacity of the army since the speed that they provided spread fear and brought disarray to an enemy's ranks. The need to protect both the horse and its rider from attacks led to the emergence of heavy cavalry fitted with armor. The presence of the heavy cavalry in itself would have been enough to strike fear into an enemy.

Gaya Warriors as Seen through Armor

Goguryeo (37 BCE–668 CE), Silla, and Gaya warriors were fitted with respective characteristic sets of armor. Known to its neighboring Japan as the "Golden Kingdom," possibly due to their favor and usage of ornate gold and silver ornaments such as gold crowns, Silla even gilded their bronze armor. Many examples of this "gold-worked armor" have been recovered from tombs — especially the vambrace parts — including the South Mound of Hwangnamdaechong Tomb. As helmets and body armor made of gilt bronze are relatively fragile, they are unlikely to have been made to serve the original purpose of protecting the wearer against harm. Rather, as in the case of gold crowns, gold-worked armor would have been worn to enhance its wearer's grandeur.

Gaya armor also features additional decorative elements, the most distinctive of which can be found on vertical plate body armor. Much debate surrounds the function of Gaya vertical plate body armor. This is because its form varies widely, the ornaments are far more elaborate compared to other types of Gaya armor, and the numerous connected plates used to make the armor vary so greatly in size that faulty cutting work has been considered. Those who maintain that Gaya vertical plate body armor served a utilitarian function (e.g., Lee Hyunjoo 2002) have highlighted the additional iron plates that have been found fixed to examples from Bokcheon-dong Tomb Nos. 38 and 57 and Daeseong-dong Tomb No. 57, which are interpreted as evidence of repair. On the other hand, those who argue that Gaya vertical plate body armor would have been used only in funerary contexts (e.g., Song Gyehyeon 1995) focus on

Fig. 8. Chamfron. Excavated from Okjeon Tomb No. M3 in Hapcheon. Gaya, 5th century. L. 48.5 cm, W. 29.5 cm, H. 26.5 cm. Gyeongsang National University Museum

Fig. 9. Vertical Plate Body Armor. Excavated from Bokcheon-dong Tomb No. 86 in Busan. Gaya. H. 68.0 cm, W. 34.0 cm. Gimhae National Museum

the fact that the shape and form of the plates used to make the armor are not standardized.

Gaya vertical plate body armor would have served a wide range of different functions, but recent studies have tended to concentrate on their ritual role. In some cases, gorgets were adorned with decorations in a bird motif or with animal fur (Figs. 9 and 10), which has been interpreted as an association with the tradition in which birds (who guided the deceased's soul from this world to the next) were regarded as sacred beings (Oh Gwangseob 2004).

Spiral patterns were also used as decoration. As symbols of the sun, the spiral patterns featured on Gaya vertical plate body armor may have served to deify the wearer as a sun-like being and expressed prayers for good fortune in warfare. Another possibility that has been proposed is that the vertical plate body armor was worn during ceremonies associated with rites of passage. The traces of repair, the lack of precision in the cutting of the iron plates, and the nature of the ornamentation have all been used as background to suggest that vertical plate armor was worn for rites of passage into adulthood (Song Jeongsik 2012). An association between the motifs of vertical plate armor and those of the weapon-like saw knife (有刺利器), which feature fern-shaped or bird-shaped barbs, has also been suggested. The vertical plate body armor recently recovered from Tomb No. II-43 of the Ga-dong burial ground in Busan, the most elaborately decorated example discovered to date, is adorned with bird, spiral, and line patterns along with animal fur as additional decoration.

However, among other things, the primary function of helmets and body armor would be to protect the wearer during battle. As briefly examined before, the evolution of helmets and body armor over time is associated with the development of weaponry systems. Ancient weaponry can be divided, depending on their usage, into projectile weapons (which launch objects to far distances using projectiles) and pole weapons, with their lengths exceeding the height of a male warrior. The most representative weapons of each type would be the arrowhead and spearhead. Although relating to an earlier period, the accounts that appear in *Sanguozhi* (三國志, Records of the Three Kingdoms) and *Jinshu* (晋書, Book of Jin) concerning the superior spear-fighting skills of Jinhan and Mahan warriors can be used as a reference for reconstructing weaponry of that time. Armor and helmets, likewise, shows differences between the fourth-century products and the fifth-century ones with vertical plate armor

Fig. 10. Vertical Plate Body Armor. Excavated from Daeseong-dong Tomb No. 2 in Gimhae. Gaya, 4th century. H. 66.0 cm, L. 40.0 cm, W. 31.0 cm. Gimhae National Museum

being prevalent in the fourth century. Weapons excavated along with the vertical plate armor were mostly polearms including spearheads. Later on, as the length of arrowheads—projectile weapons—become elongated, their range distance was also extended (Jang Sanggab 2018). These lines of evidence illustrate that the infantry played a central role in military tactics at the time that iron armor first came into use in Gaya.

The image of an ancient Gaya warrior and warhorse charging into battle, each fully suited in armor, easily comes to mind. Evidence of such heavy cavalry from the Three Kingdoms period has been found in the form of artifacts, textual accounts, and images on the walls of mural tombs. Information on the cavalry tactics of the Three Kingdoms period can also be obtained from ancient texts and Goguryeo mural tombs. Detailed studies of these sources have revealed that ancient military tactics either relied solely on cavalry or involved both infantry and cavalry. The pure cavalry tactics included single-combat tactics, ambush tactics, chase tactics, and shock tactics. Of these, the heavy cavalry was primarily involved in shock tactics.

The widespread adoption of heavy cavalry in Gaya was associated more with the appearance of the saddle and stirrups to provide stability to the horse's rider, compared to the bit, which was useful for controlling the horse. Lamellar armor was worn by the heavy cavalry, and the image of a heavy cavalry warrior in the murals of Goguryeo's Anak Tomb No. 3 shows that the rider's suit of lamellar armor included additional elements such as a gorget (Figs. 11 and 12). It is likely that Gaya heavy cavalry was established by the fifth century given that chamfrons and horse body armor appear around this time along with saddles and stirrups.

The role of Gaya heavy cavalry in military tactics is, however, likely to have been limited. This can be gleaned from the type of tombs that have yielded artifacts associated with heavy cavalry. Rather than small- or middle-scale tombs, finds of chamfrons, horse body armor, saddles, and stirrups have been uncovered in large-scale tombs belonging to the ruling class of Gaya. This indicates that the segment of society that had access to the accouterments required for heavy cavalry was limited. Therefore, it is unlikely that Gaya operated a large-scale cavalry force or a concentrated heavy cavalry regiment, as was the case for Goguryeo or Baekje (18 BCE–660 CE). Rather, a small, simple class of heavy cavalry warriors that answered directly to the king or highest commanding officer would have likely existed in Gaya (Kim Hyuk-joong 2019).

Fig. 11. Lamellar Body Armor. Excavated from Yeorae-ri Zone II Tomb No. 40 in Gimhae. Gaya, 5th century. L. 12.5 cm, W. 3.0 cm (lamellar pieces), L. 57.0 cm, W. 45 cm (entire). Gimhae National Museum

The Significance of Gaya Armor in Terms of World Heritage

The characteristic features and changing nature of Gaya armor were briefly examined above, but it is also important to consider

Fig. 12. Lamellar Body Armor and Helmet. Excavated from Chilsan-dong Tomb No. 35 in Gimhae. Gaya, 4th century. L. 11.5 cm, W. 3.7 cm (lamellar pieces), L. 57.0 cm, W. 56 cm (entire). Gimhae National Museum

its significance from a wider perspective, particularly in terms of UNESCO World Heritage. The criteria provided by UNESCO may serve as guidelines for establishing the attributes considered to be of value from a World Heritage perspective: (ii) to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design; (iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

Research on Gaya iron artifacts including armor has explored a wide range of topics, including its origins, interactions and exchanges between polities, symbolism, and technology. A key feature of Gaya iron artifacts has been the presence of diverse elements being drawn to form a distinctive culture that owes much to the operation of networks. It should be noted that "networks" was also the theme of an international symposium hosted by the National Museum of Korea in 2019 to mark the opening of its special exhibition on Gaya. In one of the papers presented at this symposium, a critical examination was performed of previous approaches towards Gaya's interactions and exchanges, and the need for an alternative perspective focusing on social networks was proposed (Kim Daehwan 2019). It was maintained that any analysis of Gaya's ruling elite should also take into consideration the interactions that occurred between individuals and social groups, marking a significant step forward in Gaya studies. The analysis of the diachronic changes evident in these interactions has provided an apt window for examining the nature of the Gaya society. It cannot be denied that the establishment of networks through negotiations and exchanges between polities provided an important motor for Gaya's development. For example, the relationship between Gaya and Wa, which was not one-sided but more mutual and formed through interactions taking place over an extensive period of time, played a significant role (Takata Kanata 2019). In particular, the "maritime village" concept newly suggested by Takata can be seen as an apt representation of a situation that prevailed at the time.

Among Gaya's trade goods, iron was the most important. Among its iron products, armor manufactured using the most sophisticated production technology was prominent. At the time, iron served as an important medium facilitating the

operation and reproduction of networks within East Asia. Iron, therefore, provided the foundations for Gaya's growth and generated Gaya the diverse formation of iron culture. It may be argued that, given this background, Gaya armor has sufficient merit to be considered a valuable asset to UNESCO World Heritage.

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