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Building a Castle in Japan: Analysis of the Masonry Construction Process Through the Folding Screen *Chikujō-zu byōbu*

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ABSTRACT: In this paper, we intend to lift the veil on masonry construction process in Japan, through the analysis of the early 17th century folding screen called *Chikujō-zu byōbu*. The great pictorial richness of the screen allows us to reveal many aspects and stages of the masonry construction process of a castle in early modern Japan (1573-1867): stone transportation methods, folk traditions related to stone hauling, implementation of stone materials (especially large ones), and social hierarchy on the construction site. Their analysis and comparison with other paintings and actual remains of early modern Japanese castles will reveal one of the building culture in Japan. Indeed, this paper shows the influence of the social context on the building process and over all on the building result itself. Thus, the great Japanese castles known today as major heritage sites must be understood as the materialization of the early modern social context.

1 INTRODUCTION

Discussions about Japanese architectural techniques most often focus on wooden construction, a centuries-old and highly refined tradition. However, there is also a tradition and culture of masonry construction in Japan, which has long been ignored by Western scientific literature and which we would like to discuss here.

1.1 *Masonry culture in Japan*

It is undeniable that the Japanese preferred wooden structures, notably for seismic resistance reasons, but one should not deny the fact that masonry structures were erected very early. Archaeological evidences show an early presence of stone constructions in Japan. During the ancient (592-1185) and medieval (1185-1573) periods, masonry construction was solely practiced in the highest classes of society and knowledge was passed down from generation to generation (Tabuchi, 1975). Besides, according to Ōmori Masae (2004), masonry related knowledge came from Korean and Chinese masons, from the 3rd century through the 8th century, who played a great role in the development and dissemination of masonry culture in Japan.

One of the most important milestones in the history of masonry in Japan is the so-called Age of Warring States (1467-1590), a violent period during

which warlords built castles in all parts of Japan. In 1576, Oda Nobunaga (1534-1582), one of the great warlords of Japanese history, started the construction of his castle in Azuchi (current Shiga Prefecture), involving for the first time, a group of masons called Anō, living nearby in Ōmi Province (Kitagaki, 2006). Before that time, castles were mainly earthen structures. Azuchi Castle therefore represents a turning point in castle architecture and masonry construction. European travellers were even impressed by those monumental structures, such as Luís Fróis (1532-1597), a Portuguese Jesuit who said in his reports: “On top of the hill in the middle of the city Nobunaga built his palace and castle, which as regards architecture, strength, wealth and grandeur may well be compared with the greatest buildings of Europe. Its strong and well-constructed surrounding walls of stone are over 60 spans in height and even higher in many places” (Cooper, 1965).

The beginning of the early modern period (1573-1867) marks the start of the “castle boom” and the generalisation of masonry structures in castles. Major castles, such as Osaka and Himeji, could be built on plains or hills, not high mountains anymore, because their strong masonry structures allowed an effective defence of the site. Stone walls were mainly used to fortify the land and the terraces that were laid out. Above these massive structures were erected the buildings, such as donjons, made of wooden structures.

1.2 Historical context of the folding screen *Chikujō-zu byōbu*

In 1601, a year after the great Sekigahara battle, Tokugawa Ieyasu (1543-1616), who was to become the new shogun of Japan, engaged in the reconstruction or the repair of the main castles under his control, such as Edo, Sunpu, Nagoya, Hikone, and Osaka. To do so, he ordered all local warlords (daimyo) to contribute financially and provide labourers. This system is called *tenka bushin*. On the one hand, it allowed the Tokugawa shogunate to build and repair its castles quickly, and on the other hand, it was a way to control both the finances and loyalty of the daimyo, as it was an expression of their allegiance to the new shogun.

The folding screen called *Chikujō-zu byōbu*, “Illustrated folding screen of a castle under construction”, is probably related to the *tenka bushin* system. Details of the context of its creation are not perfectly clear, but according to Takahashi Osamu (2011), the castle under construction depicted in this document is Sunpu Castle (current Shizuoka Prefecture) owned by Tokugawa Ieyasu. Important repair works had to be done on the castle in 1607, and the screen is a vivid depiction of the construction site, showing in particular the masonry construction process that we intend to reveal in this paper. This six-panel screen, of a relatively modest size of 55.8 cm high and 210.2 cm long, was made during the Keichō era (1596-1615) and is preserved in Nagoya City Museum (a digital version is available online on the museum's website).

1.3 Methodology and objective of this paper

This folding screen is a unique and interesting piece of art that lifts the veil on a series of practices related to masonry construction of castles in early modern Japan. We aim to lay bare the techniques and construc-

tion process of the Japanese masonry. This document is a valuable source depicting the entire scene of a construction site, including material transportation, labourers, techniques, and the associated folklore. We are particularly interested in scenes relating to the construction of masonry. How did they transport the stone blocks, some of which exceeded 10 tons? What tools did the masons use? What were the folk traditions associated with stone construction? What was the social and hierarchical organisation?

We will bear in mind that the scenes depicted in the screen do not represent the entire process of stone construction, and that this paper therefore offers a partial view. In addition, comparisons with other paintings and actual historical sites will be made to overcome the problem of the single source, and to confirm or moderate our observations. Since Sunpu Castle has undergone many modifications, a comparison with its remains will not be relevant.

2 TRANSPORTATION OF STONE MATERIALS FROM THE QUARRY TO THE CONSTRUCTION SITE

The main theme of the *Chikujō-zu byōbu* is the transportation of stones from the quarry to the building site, using different methods (tools, machines, animals, etc.), according to their size and weight.

2.1 Pulling the stones

First of all, transportation of the largest and heaviest blocks of stone, that can exceed 10 tons, is the highlight of the screen. It involves not only substantial manpower and great manual strength, but also folklore practices, which we will analyse in part 3. As we can see in the picture below (fig. 1), the stone is



Figure 1. Left part of the folding screen *Chikujō-zu byōbu* showing the pulling-stone process. Reproduction made by the author.

placed on a kind of sledge, called *shura* in Japanese. The word *shura* comes from Ashura (or Asura), a Buddhist divinity who fought the god Taishakuten. According to the *Great Dictionary of Buddhist Vocabulary* (Ishida, 1997), although Ashura lost the battle, he made the deadly and ferocious Taishakuten tremble. From this legend, it was said that only Ashura (transformed in *shura*, sledge) could make Taishaku move (written 大石 which means big stone). The Buddhist reference reminds that a nearly supernatural power was necessary to transport these huge stone blocks. Indeed, the *shura* is pulled by a hundred bare foot workers. At the rear of the sledge, labourers use the principle of leverage with wooden sticks to push and pry, while a large number of labourers join forces to pull the stone with hemp ropes from the front. Moreover, timber logs, covered in oil or seaweed like *wakame*, are placed underneath the sledge to make the heavy stones slide better (Takahashi, 2011).

Other paintings and folding screens from the early modern period, called *Ishibiki-zu* “Illustration of the stone-pulling” depict this technique of transportation and confirm its common use. Indeed, we observe the similar use of a sledge, pulled from the front and pushed from the rear with the leverage principle. Furthermore, in these cases, the transportation of stones by pulling force is the main theme of the paintings, if not the only, as the title suggests it. For example, the two folding screens called *Ishibiki-zu byōbu*, preserved in Hakone City and in the Hyōgo Prefectural History Museum, depict both in particular the manpower involved in this process and the difficulty of the task. Indeed, according to studies about Kanazawa

Castle construction (Ishikawa-ken Kanazawa-jō chōsa kenkyūjo, 2009), transportation of heavy stones was a dangerous process, especially in uphill and downhill roads. The path had to be secured with wooden spikes, around which ropes were wrapped in order to control the speed of the sledge.

The painting kept in Hakone City also shows that boats were used to transport stone materials, especially the heavy ones. As an archipelago, many Japanese cities benefit from the proximity of the sea and sea routes. For example, during the construction of Osaka Castle, stones were transported from different places around the Seto Inland Sea, more than 350 km apart at the most from the construction site (Hirai, 2002).

2.2 Using wheeled carts

Secondly, heavy stones are also transported with two-wheeled carts, called *daihachi-guruma*, which was commonly used in early modern Japan to transport all kinds of goods. We observe in the screen below (fig.2) two sorts of wheeled carts: one pulled by three labourers, and two ox carts called *ushiguruma* or *gissha*. In the case of ox carts, two or three workers are walking by the ox without making any effort of pulling the carts. The use of animals is indeed a very big help in terms of efforts and manpower.

This observation can also be confirmed in the folding screen *Ishibiki-zu byōbu* preserved in Osaka Castle. According to the inscription written at the bottom of the painting, mentioning Lord Ii, it would be a stone used for the construction of Hikone Castle.



Figure 2. Right part of the folding screen *Chikujō-zu byōbu* showing several scenes such as transportation methods (two-wheeled cart, ox carts, baskets, etc.), stone wall building, samurai drinking sake and contractors with abacuses. Reproduction made by the author.



Figure 3. Central part of the folding screen *Chikujō-zu byōbu* showing the lifting-stone process. Reproduction made by the author.

This painting depicts a two-wheeled oxcart, carrying a large stone, pulled by an ox and some 20 labourers. Their expressive faces and their bodies are showing the physical effort, especially by the front workers who are pulling the cart with the rope wrapped around their chests. Unlike the screen analysed in this paper, the *Ishibiki-zu byōbu* shows that the ox is not pulling the cart by itself but the labourers join it in the effort.

2.3 Lifting the stones

Thirdly, medium-sized stones, between one and two tons, are lifted by groups of workers. As we can observe in the picture above (fig.3), groups of 30 labourers are lifting a wooden frame on their shoulders, made of criss-crossed round beams, to which a stone is attached and suspended with hemp ropes. This is why this technique is called *ishi-zuri* “stone fishing” in Japanese language.

The screen also shows that this technique is adaptable to the size of the stone. For example, there is a group of 24 labourers lifting a slightly smaller stone, and a group of only eight labourers lifting a smaller stone with only two wooden beams.

2.4 Carrying the stones

Lastly, smaller stones, cobblestones or paving stones, are being carried individually or by groups of two people (fig.2). They are carrying baskets on their back, called *shoiko*, which is a cone-shape wooden rack, with shoulder straps for carrying loads on one’s back. The other type of basket is called *mokko*, which is made out of bamboo or rope and is suspended in the middle of a horizontal wooden pole, carried from the front and the back on the shoulders of two labourers. They unload their merchandise on the upper part of the painting, in a stone storage area set up on the building site and guarded by a man.

The folding screen is depicting about 30 of these labourers, coming to the site with baskets full of cobblestones and leaving the site with empty ones. Some of them seem to be rushing, showing the frenetic pace of these construction sites.

3 JAPANESE FOLK TRADITIONS RELATED TO MASONRY CONSTRUCTION

One of the particularly interesting elements of this screen is the depiction of the Japanese folk traditions related to stone transportation.

3.1 Encouraging the workers

The transportation of the largest stones is the great moment of the construction process and is highlighted in the painting by a golden background, which makes the scene stand out among all the others. As it requires a very high level of manual strength, artists are cheering up the labourers with music and dances. The scene is particularly festive and reminiscent of *matsuri*, the Japanese traditional festivals.

If we take a close look at the scene (fig.1), we can see six people on top of the stone, playing music, singing and dancing. On the front, a character is playing a large size drum vigorously, which indicates that the noise must be significant. On top of that, another character is playing the triton’s trumpet, a large sea shell called *horagai*, while the man placed at the front of the stone seems to be dancing and singing loudly. Moreover, we can see dancers and entertainers performing in the crowds, encouraging the labourers from the ground. All of these characters let us imagine a very cheerful scene, loud and festive in the centre of the construction site, which is of great contrast with the hard work of the labourers.

We are able to confirm this folkloric practice in other paintings, showing, however, some differences. For example, the painting called *Ishibiki-zu*, preserved in the Ristumeikan University (Art Research Centre), depicts the transportation of a large stone on a sledge, with only one character on top of it, who seems to be encouraging the workers in a much simpler way, without music or dance. On the contrary, the screen *Ishibiki-zu byōbu* of Hyōgo Prefectural History Museum is depicting a very cheerful event, with five people standing on top of the large stone covered with a red carpet, and playing music instruments such as a drum.

According to Tabuchi Jitsuo (1975), a popular song called “Ise ondo”, listed today as a cultural heritage in Ise City (Mie Prefecture), has its origins in a folk song sung during the transport of stones for the construction of Nagoya Castle. The song known today goes like: “*Ise wa Tsu de motsu, Tsu wa Ise de motsu, Owari Nagoya wa shiro de motsu*” (“Ise [Jingu Shrine] thrives due to [the port of] Tsu, [the port of] Tsu thrives due to Ise [Jingu Shrine], Nagoya in Owari thrives due to a new castle”), whereas the original 17th century song goes like: “*Ishi wa tsutte motsu, tsutte motsu ishi wa, Owari Nagoya no shiro he motsu*” (“We are hanging the stone, the stone that we are hanging, is going to the castle of Nagoya Owari”). The stones were indeed “hanging” from the boat to

float on the water, when transported by the sea, which was the case during the construction of Nagoya Castle. The phonic filiation is obvious between the two songs, even if its meaning has changed, excluding the mention of the transport of the stones but keeping the reference to Nagoya Castle. This song became particularly popular in the pleasure districts of Ise, where the lyrics were changed over time. Thus, this case shows that the folklore practices related to the construction of castle masonry have a lasting influence on local folklore cultures.

3.2 Costumes and accessories

On the screen *Chikujō-zu byōbu*, the characters standing on the stone and walking with the labourers are wearing outlandish masks and costumes (fig.1). In particular, we can recognize *tengu* (red mask with a long nose and black hair) and *okina* (old man face) masks. *Tengu* reference is of particular interest because according to popular beliefs, *tengu* are legendary creatures supposed to be experts in military art (Frédéric, 1996). *Okina* masks, however, represent an old man face, with white hair, used in noh theatre, a popular art in early modern Japan. Furthermore, a person can be seen yelling or singing on the front of the stone, dressed as a foreigner (*nanban*), with black pants, a red jacket and a white ruff, which was the usual way to depict the “southern barbarian” in this period. However, Ronald Toby (2019) points out that there is nothing really Portuguese about this character and that foreigners are usually depicted in paintings of festive scenes with lavish attires.

4 IMPLEMENTATION OF STONE MATERIALS ON SITE

The next step of the construction process is the implementation of stones, that is to say, the wall construction. The screen does not depict stonemasons cutting stone blocks on the site, since the cutting and faceting of the stones were executed in quarries.

4.1 Use of large stones and aesthetic considerations

Stone wall construction played an important role in the display of power by the warriors. Indeed, castles were the reflection of the lord power and aesthetic taste. Masons’ skills were, of course, valued for their defensive interest, in order to build strong walls that resist to firearms attacks, but as the Edo period (1603-1867) progressed, there was a growing interest in the aesthetic value of these walls. The largest stone blocks, which require a lot of manpower for transport, are used in many castles as a symbol of power and authority.



Figure 4. Large stone of Sakura-mon gate in Osaka Castle, with an estimated weight of 108 tons. Source: Wikimedia Commons.

The donjons were the most impressive architectural element of castles and were supposed to show the political and economic power of a daimyo, but the exhibition of huge stones at the entrances of the fortresses was yet another way to impress visitors and opponents. The blocks could exceed 4 m high, and their implementation was a demonstration of technical skills. The case of the huge stone of the Sakura-mon gate in Osaka Castle (fig.4) shows the massive material and the human force mobilised for its transport and implementation.

Moreover, this demonstration of human and financial resources was particularly strong in the context of the *tenka bushin* system. During the construction of the Tokugawa castles, daimyo were indeed competing for the best construction work, especially stone walls. It was a way to show the shogun their total loyalty and obedience, as well as a way to show their financial and technical superiority to other daimyo engaged in the construction work. In this context, implementation of huge stone blocks was perhaps the most spectacular way to win this competition. The rivalry can still be observed in the monumental masonry works of Osaka Castle, for example in the Sakura-mon gate area built by Lord Ikeda of Okayama clan and in the Ōte-mon gate built by Lord Katō of Kumamoto clan.

In the folding screen *Chikujō-zu byōbu*, a big stone implemented in the right side of the gate leading to the donjon and shogun palace can be observed in the already built main compound.

4.2 Building stone walls

The document also depicts some techniques used in the implementation of the stones and the wall construction (fig.2). First of all, we see that an earthen ramp is set up for the transport of large stones to the upper part of the walls, whereas a wooden scale is used by labourers carrying baskets to bring the smaller stones up to the upper area.



Figure 5. 1:1 scale model of a *uchikomihagi* stone wall in Kanazawa Castle. Source: author.

A wooden scaffolding (probably bamboo) is planted in the wall, as it is being built, so that the masons can be positioned facing the wall to place the blocks. Stones are handled and positioned using crowbars, called *kanateko*, or carried by hand for the lighter ones. The tools used by the masons seem quite simple. One is using a kind of pickaxe while the other is using a kind of hammer (called *gennō*) and chisel, for scraping and flattening the surface in order to improve the aesthetic aspect and to make impossible the climbing of the wall.

In this painting, the drawing of the walls suggests that masons used the masonry technique called *uchikomihagi*, which is characterised by the use of lightly cut stones, the joints of which are being filled with small stones without any mortar (fig.5). In Japanese masonry, three main techniques can be used to build a stone wall: the *nozurazumi* (random), the *uchikomihagi* (patchy) and the *kirikomihagi* (compact) (Hirai, 1980 and 2017). The first one, *nozurazumi*, was mainly used in a period between 1573 and 1596, at the beginning of the boom of castles. It uses natural stones, such as river stones and stones collected as they are in the quarry. This technique is the less stable because the round and irregular shape of the materials leads to its eventual fall. Besides, it is very difficult to build high walls with this method. That is why the *uchikomihagi* and *kirikomihagi* techniques were developed, the latter being the most sophisticated one with precisely cut stones without any gap between them. In the case of *uchikomihagi* technique depicted in the screen, corners are reinforced with the *sangizumi* method, using cut blocks to avoid landslides.

4.3 Masonry related knowledge and secret treatises

After the construction of Azuchi Castle in 1576, Anō masons developed their skills in castle construction and were appreciated by many daimyo (Tabuchi, 1975). Thus, they played a central role in early modern castle construction in Japan. When Tokugawa government established the rule called “One province one castle” (*Ikkoku ichijō*) in 1615, many medieval castles were destroyed and mason masters returned in

the countryside, developing massively the use of masonry structures and improving techniques.

One event of importance in the dissemination of masonry techniques in Japan is the construction site of Nagoya Castle in Hizen (current Saga and Nagasaki Prefectures) in the west of Japan, for the great siege of the Korean War in the late 16th century (Takahashi, 2011). All the daimyo took part in this construction site and the techniques used in the west spread throughout the country. Therefore, techniques were learned by masons during the construction process and the knowledge was brought back to each province. Nevertheless, specificities developed by some groups of masons should not be ignored. Indeed, as we have already mentioned, there was a rivalry between daimyo in the construction of stone walls. This competition led eventually to a certain secrecy about specific techniques. For example, we know that in Kanazawa, local masons wrote many “secret masonry treatises” (*ishigaki hidensho*) which include explanations and drawings regarding the stone-cutting techniques, the way to calculate the inclination of the walls and so on (Kitagaki, 1974).

5 SOCIAL HIERARCHY ON THE CONSTRUCTION SITE

Many people are working together on the construction site: warriors, labourers and masons. A strict hierarchy was observed in order to build the castle in a fast and effective way.

5.1 Warriors' leadership

During the early modern period, warriors (daimyo and high-ranking retainers) were supervising the construction work of castles. On the screen we can observe several figures with swords, which do not mix with the crowd of workers. When a daimyo was taking part in a construction work, he sent several high-ranking retainers with the labourers and masons in order to supervise their work. For instance, Maeda clan of Kanazawa sent many workers and masons from Kaga domain during the construction of Osaka Castle masonry walls. In order to supervise the site, Lord Maeda Toshitsune (1594-1658) sent two of his most loyal retainers, Honda Masashige (1580-1647) and Yokoyama Nagachika (1568-1645). They were to return to Kanazawa only once the masonry work was finished, but the construction magistrate (*fushin bugyō*) of the Shogunate, who was supervising the whole site, ordered them to repair the wall where a deformation was spotted. Yokoyama threatened the magistrate of *seppuku* for such dishonour and the case was eventually closed (Ishikawa-ken Kanazawa-jō chōsa kenkyūjo, 2009).

Besides, some daimyo were particularly involved in the masonry construction process and were known

as building experts all over the country. Tōdō Takatora (1556-1630), daimyo of Imabari and Tsu domains, who was also a *fushin bugyō* in the Shogunate administration, has remained in history for its role in the construction of castles such as Uwajima, Zeze, Nijō, and Tsu. He paid particular attention to the construction of high stone walls, and was often compared to Katō Kiyomasa (1562-1611), another daimyo expert in masonry. The document called *Owari meisho zue*, an illustrated guide of famous places in Owari, dated from the 19th century provides interesting information (Tabuchi, 1975). One illustration depicts the transportation of a huge stone, on a four wheeled cart, pulled by many workers for Nagoya Castle construction. Katō Kiyomasa is standing on top of the stone and leading a group of six people cheering the labourers. Kiyomasa was particularly famous for his skills in masonry construction in the beginning of the 17th century, and still has today its own statue, standing on a stone block, in Nagoya Castle (fig.6).

In the screen, however, the warriors are particularly depicted as enjoying the construction site, rather than controlling it. Indeed, above the stone-pulling scene, a samurai, probably a daimyo, can be spotted on a white horse. He is accompanied by his daughter or wife and his retinue composed of more than 30 retainers (fig.1). They are carrying all sorts of goods, probably gifts to the shogun residing in the castle at the time. At the other end of the screen (fig.2), a festive scene takes place, where warriors are drinking sake, probably celebrating the progress of the work (Takahashi, 2011). These two scenes of calm, sophistication and luxury, are in striking contrast to the hundreds of surrounding labourers who are displaying considerable physical strength and efforts. The building site can therefore be described as a social place, where all the hierarchies of the Edo period manifest themselves.



Figure 6. Statue of Katō Kiyomasa leading the stone-pulling in Nagoya Castle. Source: Wikimedia Commons.

5.2 Working force management

On the construction site, the erection of stone walls is the most demanding in terms of working force. During the so called *tenka-bushin*, Tokugawa Ieyasu ordered his daimyo to provide this labour force according to their income (calculated in *koku*, a rice production value): every 500 *koku* of income, they had to mobilise three men of their domain (Takahashi, 2011). For example, Kuroda Nagamasa (1568-1623) and Katō Kiyomasa, daimyo of Fukuoka and Kumamoto, whose wealth was estimated at about 500 000 *koku*, were to provide 3,000 men for the Nagoya Castle erection. This workforce was selected from their rear vassals and from peasants in the countryside. Thus, many labourers were members of the warriors' class (*bushi*), samurai of low status, such as foot-soldiers (*ashigaru*) and came to work in different construction sites from various provinces all over Japan. At this time, low-ranking warriors were not exclusively recruited by blood, especially in the lower status. Physical abilities and strong physiques were important factors in the recruiting process. Those soldiers must then have been particularly suited for manual work such as stone transportation.

In early 17th century Japan, management of the workforce must have been a great task for all daimyo as the castles built with the *tenka bushin* system were being erected in the span of 15 years. Not only did many groups of workers had to work together on the building sites (up to 64 daimyo families in Osaka, so potentially as many or more groups of workers) but the daimyo had to dispatch their workers over the building sites of the shogun's castles all over Japan. For instance, Maeda clan was engaged in at least four different projects (Takada, Nagoya, Osaka, Edo) situated in four different provinces (Takahashi, 2011).

Involvement of the daimyo was even materialized in stone walls. Indeed, masons engraved the symbols of their clans to show what part of the castle they built. Today, stone walls containing around 2 000 different symbols on between 50 000 and 60 000 stones can be observed in Osaka Castle (Hirai, 2002).

5.3 Building economy

The cost of this labour force (travel, meals, accommodation, etc.) was fully paid by the daimyo who mobilised it (Takahashi, 2011). This economic aspect of the building site is represented on the screen by three men: two with abacuses and one who seems to be writing on a register (fig.2). If the role of these characters is not perfectly clear from the painting itself, we can make some assumptions about it. They must be contractors managing force tasks and budgets. Workers were coming in the construction site in great numbers and their management was crucial for the organisation of the site. In addition, the three men are surrounded by a group of workers, waiting for orders

or payment. They are carrying tools, such as long pickaxes and crowbars, suggesting they are masons.

6 CONCLUSION

The folding screen *Chikujō-zu byōbu* is a wonderful fresco that illustrates the masonry construction process in almost its entirety. Its analysis reveals one of the facets of building culture of Japan, rather unknown in the West. As Howard Davis (1999) describes it in his book *The Culture of Building*, human systems are at the core of building culture, and the masonry construction process, studied in this paper, exemplify this in a very clear way. The construction of stone walls, can undeniably be viewed as the result of a social process. We have particularly observed its manifestation through the use of monumental stones, a result of daimyo competition. It reflects the *bakuhan* system, i.e. the political hegemony of the shogun through the unification of the whole country, together with a certain autonomy of the provinces led by the daimyo. Masonry related knowledge was definitely shared and disseminated throughout the country, but daimyo and masons' groups were able to develop their own skills through treatises and sites experiences. Although very expensive for the daimyo, the *tenka bushin* system allowed them to practice masonry, to gather knowledge, which ultimately led to building remarkable castles in their own castle towns. Another illustration of this dual global and local scales are folk traditions related to stone construction practised in various parts of the country, but which eventually led to the development of local cultures.

Therefore, famous castle sites we know today, such as Himeji (fig.7) or Kumamoto, can be seen as the result of the Edo period social system. Their resistance to the passage of time is yet another illustration of the constructive quality that has resulted from the practices set out in the paper. In the end of the 19th century, Japanese imperial government issued a law in order to destroy many castles, but the sturdiness of the stone walls has often made their dismantlement impossible. Westerners, who visited Japan in the late



Figure 7. Donjon and stone walls of Himeji Castle. Source: author.

19th and the early 20th century were often impressed by these structures, which surpassed many western stone monuments according to their written testimonies (Vomscheid, 2021).

Further research on Japanese masonry techniques, knowledge, workers and construction process must be conducted in order to provide broader perspective on this rich subject. Late 16th and early 17th century Japanese castles are indeed more than aesthetics and technical wonders. They are the result of the unification of Japan, based on a feudal regime, that can be seen as the foundation of modern Japan. This consideration makes it possible to read this built heritage in a different way, not just as a work of military art, but as the materialization of the society of the Edo period and the hierarchy of warriors' class.

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