Research on the Spatial Structure of Outer City of Burmese Capital Cities From an Analysis of Mandalay, the Last Royal City of Burma

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Abstract

Mandalay, which is the second largest city in Burma (Myanmar) today, was the last capital city of the Kingdom of Burma. Mandalay was planned and built by King Mindon in the middle of the nineteenth century. This research examines the chronological processes of Mandalay's city planning, based on the Royal Orders of Burma, and revealed the following characterizations of Mandalay: 1) it was based on Buddha's Prophecy; 2) it was intended to be a City of Buddhism; and 3) it followed preceding city models. The characterizations above indicated that there had been a city model unique to Burma, like the well known Ancient India and China models. The research further examined this possible city model for Burma from four viewpoints: 1) structure; 2) orientation; 3) land use; and 4) size. Consequently, a city model unique to the capital cities in Burma was proposed. One of the unique aspects of the Burmese city model is the eastward orientation, which is seen neither in India nor China models.

Keywords: Mandalay, Yangon, Burma, Myanmar, King Mindon, Palace, Capital, City Model

1. Introduction

1.1 Background of Research

After a long period of rule under a military regime, Myanmar, the nation formerly known as Burma, has been in a process of democratization since 2011, and is now becoming a focal point of economic development in Asia. Under such circumstances, international donors, including the Japan International Cooperation Agency, provide technical and financial assistance to Myanmar for the purpose of improving infrastructure and enhancing urban planning practices.

While attention is focused on the major cities of Myanmar as targets for investment and economic cooperation, little remains known about the physical features of the major cities in Myanmar, or how they were planned and built.

This research focuses on Mandalay, the last royal city of the Kingdom of Burma. Mandalay is a major city in Upper Burma, an inland part of Myanmar. Mandalay is located on the eastern bank of the Irrawaddy River, which runs from north to south through a large part of Myanmar.

Mandalay was a royal city that housed the Royal Palace and the seat of the Burmese king when it was built by King Mindon Min¹ in the mid-nineteenth century. Its location is relative to its predecessors, Ava (or Inva in Burmese) and Amarapura.

1.2. Overview of Capital Cities in Burma During Konbaung Dynasty

In Burma, kingdoms existed before British rule started in 1886, and each kingdom had its own capital city where the king's seat was set. The capital city was often relocated when a new king would take the throne, so there have been a number of capital cities in Burma. In the following the capital cities during the Konbaung Dynasty is reviewed. The Konbaung Dynasty was started

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by King Alaungpaya² in 1752, and was enhanced when it reunified Burma in 1759, and ruled it until 1885 when Burma fell to the British. The Konbaung Dynasty was the last dynasty of Burma.

1.2.1 Shwebo and Sagain

The first capital of the kingdom for the Konbaung Dynasty was set at Shwebo in 1752. The founder, Alaungpaya, then reunified the kingdom, and set the capital in Sagain in 1760. Both of the capital cities were located in the vicinity of present day Mandalay.

1.2.2 Ava

In 1764, Ava, or Inva in Burmese, which had already served as the seat of the king several times since fourteenth century, was rebuilt by King Hsinbyushin³ as the capital, and a new palace was constructed (Fig. 1). Ava was also sometimes called Ratanapura, or the “City of Gems.”

1.2.3 Amarapura

In 1782, King Bodawpaya⁴ built a new capital, Amarapura (meaning “City of the Immortals”), 10 km northeast of Ava. The plan of Amarapura followed the immemorial usage of a capital city in Burma, with a square site, a moat, and crenellated walls [O’Connor, 152] (Fig. 2). Amarapura is “an enormous, perfectly square enclosure, with walls over a mile, surrounded by a wide moat and then by numerous supporting towns and villages [Thant Myint-U, 54]”.

1.2.4 Alterations between Ava and Amarapura

Henceforward, the relocation of the capital city between Ava and Amarapura took place a few times in the eighteenth and nineteenth centuries: Amarapura to Ava in 1821, and Ava to Amarapura in 1842, where it remained the capital until the subsequent relocation to Mandalay.

The shift in 1821 from Amarapura to Ava was done by King Bagyidaw⁵. Crawford, who visited Ava in 1826, observed that Ava had circumference of 5–6 miles [8.0–9.6 km] and was surrounded by a brick rampart. He also noted that the northeast area was separated from the larger part of the town by a brick wall, constituting a second town that contained the palace and public offices [Crawford, 743]. Thus, Ava had two walls: an outer wall for the settlements and an inner wall for the palace.

Before relocating to Mandalay, the center of Amarapura comprised a 1.6-km square-shaped grand wooden palace [Kan Hla, (1978), 99]. Amarapura was the capital until Mandalay was newly built in 1859. As will be discussed later, the plan of Amarapura and Mandalay resemble one another. Henry Yule visited Amarapura in 1855 and observed that it was laid out as a square, bounded by a defensive brick wall about 12–13 feet [3.7–4.0 m] high with a battlemented parapet. He also noted that the four sides were each a little short of a mile in length, and that each side had three gates and from 11 to 13 bastions [Yule, 132].

1.2.5 Shift to Mandalay

Mindon was born on 5 July 1814. In 1824, the first Anglo-Burmese war broke out. The British side overwhelmed the Burmese, and Burma was forced to surrender the two coastal provinces of Arakan (present day Rakhine) and Tenasserim (present day Thaninthayi). Since the second half of 1851, the Anglo-Burmese relationship became more and more uneasy, and finally, in April 1852, the second Anglo-Burmese war was declared by the British. In December 1852, the British proclaimed the annexation of the area along the coast of Burma between the two minor provinces,

Arakan and Tenasserin, and made it part of their territory in the East.

The British started the planning of the new capital city of Rangoon. The plan of Rangoon was under the direction of Arthur Phayre, Commissioner of Pegu. The plan was completed in the early part of 1853, and the building of the new city was started shortly afterwards [Yamada (2014)].

By the time Mindon took the throne in February 1853, the Burmese Kingdom had lost all parts of its territory along the sea, and that the kingdom would be landlocked. Since some time after the accession to the throne in 1853, King Mindon was thinking of moving the capital from Amarapura to a new site, Mandalay, and he decided to do so in 1856.

Source: Kan Hla (1978), 94

Fig.1. Ava at the end of the 18th century

Source: Kan Hla (1978), 94

Fig.2. Amarapura – plan of the Citadel in 1782

1.3 Previous Research

1.3.1 Planning of Mandalay and Burmese Capital Cities

Some of early twentieth century works regarding Mandalay described the origin of the urban planning of Mandalay in connection with the ancient model of capital cities in Asia, which some called the “Pan-Asiatic model.” Scott (1916) discussed that the planning of Mandalay was under the influence of Chinese ideas, naming Peking as its model. Duroiselle (1925) followed this idea and discussed more specifically that Mandalay was planned on the model of Khblai Khan’s capital city of Peking built in 1264 [Duroiselle, 11].

Ohno (1983) discussed that Mandalay was designed basically on the same plan as the preceding capitals of Ava and Amarapura. Ohno also mentioned that the construction of Mandalay was based on a prophecy of Buddha that a great Buddhist capital would arise in the 2400th year after the *parinibbana* (passing away) of Buddha [Ohno, 82]. Moore (1993) wrote that “features from most of Myanmar’s known enclosed settlements could easily be cited as predecessors of Mandalay such as Toungoo, Ava and Amarapura among others, without the need for Chinese prototypes” [Moore (1993), 338].

Ishikawa (2014) looked into the allocation of urban functions supported by ethnic groups in the outer cities of Mandalay and Amarapura, and concluded that Mandalay, which had been built on the pattern of Amarapura, follows a structure common to Southeast Asian port cities

1.3.2 Ancient Asian City Models and Mandalay

(1) Ancient India and China Models

In the early part of the twentieth century, many researchers seemed to think that a common plan of capital cities in Asia, which they called the “pan-Asiatic plan,” could be applied to most Asian capital cities. Recently, however, two separate models for Asia have been proposed, namely, the Ancient India and Ancient China models.

The Ancient India model traces back to *Arthashastra*, a book written between the second century B.C. and the fourth century A.D. that contains chapters on the making of the capital (castle) city. *Arthashastra*'s capital city design, according to Kirk, is as follows. Ideally, the city is of geometrical form, normally square, so as to allow the layout to conform to the cosmological principles of urban planning. It is surrounded by a series of moats, fed by a perennial source of water and containing crocodiles, and by an earthen rampart surmounted by brick-built parapets and towers. On each side, it is recommended that three gates should be located, allowing three royal roads to run east–west and three north–south, thereby dividing the interior of the city into 16 wards. The King's Palace, with its internal courtyards, is to occupy the two north-central wards [Kirk, 71].

The Ancient China model follows from the Rites of Zhou, which was probably compiled in the third century B.C. The Rites of Zhou described capitals as being designed as squares, nine *li* in length and having three gates on each side. Located in the very center is the Imperial Palace, with an Imperial Ancestral Shrine on the left, an altar of land and grain on the right, the government office in the front and the commercial district in the back [Ge Feng et al., 12].

Conceptual patterns of both the Ancient China and India models according to Ohji are shown in Fig. 3 [Ohji, 213]. Both models are similar in that they have walls around the square castle, with three gates on each side. However, there are at least two major differences between the two models. One difference is that the Ancient India model has a concentric structure without a clear distinction of orientation, while the Ancient China model has a central north–south belt structure, with the supreme ruler facing the south. Most of capital cities affected by the Ancient China model in China, Japan and Korea have a clear north–south orientation. The other difference is the central facility: the Ancient India model has a religious facility, such as a temple, while the Ancient China model has a palace.

(2) Relation of Burma with India and China

Funo (2006) pointed out that Mandalay is a city of *Mandala*, a symbol of the universe in Hinduism and Buddhism. Indeed, some of the kings of Burma, such as Alaungpaya, Hsinbusin and Bodawpaya identified themselves as *cakravartin* who ruled ethically and benevolently over the entire world [Funo, xix–xx]. Thus it would be natural that knowledge and art in Burma, including those for the planning and building of a city, had come from ancient India.

King Bodawpaya, who built Amarapura, was known to have diplomatic missions sent to China. Thus it may not be surprising if some knowledge of capital city planning in Burma had also come from China though the diplomatic exchanges.

Source: Ohji (2003), P.203, translated into English by the author.

Fig.3 The Ancient India (left) and Ancient China models (right) by Ohji

Fig.4 shows the areas in Asia under the influence of Ancient India and China models according to Ohji [Ohji, 529]. This figure shows that Burma was under the influence of Ancient India model, and the influence of Ancient China model stopped in Vietnam, but Ohji did not provide detail discussion on the city model in the Southeast Asia.

Contrary to this, Funo, who did a variety of analyses regarding capital cities in Asia, including those in Burma, discussed that Amarapura and Mandalay look to have realized the structure of the Rites of Zhou almost exactly [Funo, xxi.]. Therefore, city model in Burma is not well cultivated in theory, and there do not seem to be an agreement over the nature of Burmese capital cities in comparison with the Ancient India and China models. Burma, which is located in an intermediary zone between the two, mixing of ideas as well as transformation of models to adapt to its region could have happened. A viewpoint such as discussed above has not been studied yet in depth, and a research on the Burmese City Model will be helpful to fill this gap.

Note:

A1: Ancient India model and its influences

A2: Ancient China model and its influences

Source: Ohji, 529

Fig.4 Two Zones in Asia in View of Capital City Models by Ohji

1.4 Research Objective

As mentioned earlier, there are two City Models known; the Ancient India model and Ancient China model, whereas no specific mode has been proposed for Burma. This research looks in the historical process of planning and building of Mandalay and other Burmese capital cities, and discusses unique aspects of Burmese capital cities, including 1) structure; 2) size; 3) orientation; and 4) land use. Based on these, a city model that might have been the base for Burmese capital cities is discussed. Consequently, the city model of Burmese Capital City, which has similarity and difference with the Ancient India and China models, is proposed for consideration.

1.5 Method

In this study, first the Royal Orders of Burma (ROB) by Than Tun (1983-1990), a translated commentary regarding the Royal Orders of Burma in chronological order, are used to clarify the historical processes of planning and building of Mandalay. Next, the spatial features of Mandalay are analyzed using maps, drawings, and documents describing physical features of Mandalay and other Burmese capital cities. Based on these, this paper focuses on proposing a city model that have provided a basis of the planning and building of Burmese capital cities, comparable to the already known Ancient India and China models.

1.6 Primary and Supplementary Sources

This research is based on the following primary and supplementary sources. This research utilizes the following supplementary sources, most of which are in English.

(1) Primary Source

Than Tun: The Than Tun (1983-90) is a 10-volume edited compilation of the Royal Orders of the Kingdom of Burma from AD 1598 to 1885, with an introduction including notes and summaries of each order by Dr. Than Tun. The planning of Mandalay is covered in Part Nine: AD 1853–1885.

(2) References Containing Some Primary Information

Oertel: The Oertel (1893) is based on his journey to Burma in March and April 1892 for the purpose of making architectural and archaeological studies. This note was first published in Rangoon in 1892 (or 1893), and contained precious information regarding Burmese architecture. This note had long been missing from most bibliographies until a reprint was published in 1995. This reference detailed spatial information on the King's Palace and included the Plan of Mandalay Palace prepared by British Intelligence as early as February 1887.

DAS: The DAS (1963), while owing most of the text to Duroiselle (1925), contains detailed drawings of plans and elevations of then-existing buildings of Mandalay Palace made in 1908 by DAS, which are an important source for determining the spatial structure of Mandalay.

Murray (1911): This publication was a handbook for travelers in India, Burma, and Ceylon, with various geographical and social information. The fourth edition, published in 1911, contained a color map of Mandalay, which is one of the oldest maps of Mandalay after its completion.

(3) References on Planning of Burmese Cities

Duroiselle: Charles Duroiselle was Superintendent of the Directorate of Archeological Survey (DAS) of the Ministry of Union Culture of Burma in the early twentieth century, when he wrote the "Guide to Mandalay Palace" (1925).

O'Connor: O'Connor (1907) wrote extensively about historical cities in Burma in "Mandalay and Other Cities of the Past." This book was widely read and referenced by researchers and authors

in later periods, and continues to be utilized today.

Damrong: Prince Damrong Rajanubhab HRH of Thailand, who was known as a distinguished scholar and historian, paid a second visit to Burma in 1936 for nearly 4 weeks. Prince Damrong wrote a note in Thai just after the journey that contained numerous descriptions of Mandalay at the time of his visit. In 1991, an English translation was published. This reference provided spatial information about the Royal Palace.

Kan Hla, (1978): Kan Hla, (1978) has an extensive review of historical capital cities of Burma and various plans showing the structure of them.

(4) References on Burmese Architecture

Ma Thanegi, Moore (2000), Moilanen & Ozhegov, Myo Myint Sein: Thanegi (2005) contains extensive review on Burmese historical architecture, including Mandalay, Amarapura and Ava. Moore (2000) contains a review on the religious architecture and the palace in Burma. Moilanen & Ozhegov has chapters on wooden structures, monasteries and palaces and various detail drawings of them. Myo Myint Sein (2015) contains review on wooden buildings in Burma with a focus on monasteries.

2. Planning and Building of Mandalay Recorded in ROB

This chapter provides analysis of the planning and building of Mandalay based mainly on the Royal Orders of Burma (ROB).

Building of Mandalay took place roughly between 1856 and 1874: In September 1856, an intimation was made for a new city, Mandalay. Then, in January 1857, a royal order to build Mandalay was issued. The Royal Palace was completed in July 1858. The construction of the outer city was ordered in April 1859, and was continued until 1876, when all the gates of the outer city wall were finished. In this section, the actual process of planning and building Mandalay is described in detail in chronological order based on various primary sources.

2.1 Chronological Process of the Planning and Building of Mandalay

The following is the sequence of events related to the planning and construction of Mandalay as depicted in the Royal Orders of Burma (ROB⁶) from 1856 to 1876.

(1) King's Expedition (7 Apr. 1856)

The Royal Order dated 7 April 1856 mentioned that the king [Mindon] was sending expeditions and the territory of Mandalay, referred to as the Golden Chain Reserved Area, was set out. [ROB-IX, 43].

(2) Intimation for Mandalay Approved (16 Sep. 1856)

An intimation dated 16 September 1856 said, "The king ... follows all the good examples of his ancestors because he wants to rule with benevolence." It went on to mention, "There are the Buddha's prophesies ... that in AB 2400 (AD 1856) Mandalay would become the Golden Capital called Yadanabon and it would prosper beyond precedence; places around Mandalay are rich in natural resources and it is necessary to get them for use in the king's development schemes [ROB-IX, 43]".

(3) Order to Build a New Capital (13 Jan. 1857)

A royal order was issued on 13 January 1857 to select a proper site for the new city of Mandalay and realize the Buddhahood, which said, "Prince Siddhartha⁷ has chosen a place good enough for him to get the Buddhahood so it is appropriate for the king to get a site that would enhance

his future success, according to them the proper site is Mandalay where the ground level is even and the water in the surrounding channels runs clockwise. Such a site is rare and it is certainly a *Jayabumi* - Land of Victory.” The royal order went on to say that in all the old records of prophesies, phenomena, and stories of monuments, “by AB 2400 (AD 1856) Mandalay would grow into a big capital city ... where a Tuesday-born king would start a dynasty that would last for many, many generations.” It concluded that this was also the place of a big and marvelous city, thus, “Start building it in 1856 and complete the construction in 1859; the king would have the benefits of glory, long life and victory. A new capital city and a new palace would bring prosperity to both the Religion and the Kingdom [ROB-IX, 46–47]”.

(4) Aung Pinle and Nanda Reservoirs Repaired (2 Feb./12 Apr. 1857)

On 2 February 1857, the Aung Pinle and Nanda reservoirs were repaired [ROB-IX, 50].

(5) Boundary of New Capital Approved (28 Sep. 1857)

On 28th January 1857, a map showing the boundary limits of the Gold Chain Reserved Area was submitted, and the limits were approved [ROB-IX, xvii].

(6) Jungle Cleared (1 Feb. 1857)

Then, a royal order dated 1 February 1857 said, “the site [of the new capital] must be cleared of forest on 1 February 1857, as it is the auspicious day named by the Pandits [ROB-IX, 48–49.]”. Thus, on this day, a jungle area encircled by Mandalay Hill on the north, earthwork north of Mahamuni Pagoda to the south, the embankment of Aung Pinle Lake to the southeast, and the Shwetachaung channel to the west was cleared by 2,000 workers.

(7) Plan of City Marked and Pegged (13 Feb. 1857)

The city, palace, and fortification plan, among others, were marked and pegged on 13 February 1857 [ROB-IX, xvii].

(8) A Temporary Palace Built (14 Mar. 1857)

On this day, the temporary palace, which was said to have been located at the northwestern corner of the walled city, was built [ROB-IX, xvii].

(9) King Moved to New Palace (2 Jul. 1857)

A royal order dated 13 June 1857 said, “Pandits suggested that 2 July 1857 would be the best day for the king to move to the new capital city [ROB-IX, 60]”. On this day, the king moved to the new palace to supervise the construction.

(10) New Capital Area Divided (Aug. 1857)

In August 1857, date unknown, the new capital area was divided into residential and commercial quarters [ROB-IX, xvii].

(11) Construction of *Hlutdaw* Started (2 Jul. 1857)

On 26 October 1857, the foundation work for the Primary Ministerial Council, *Hlutdaw*, was started by bearing holes and erecting pillars.

(12) Date of Laying the Foundation of Capital Decided (1 Dec. 1857)

To establish a new capital city and palace would mean three things, as noted in a royal order dated 1 December 1857: “the prosperity of the Buddha’s Religion, the well being of the subject people and the abundance of all sustenance in life for everybody and this prosperity would continue in all the generations to come.” [ROB-IX, 60] It instructed to study the records “at the time of making Ava capital city for the second time in 1763” and “when Amarapura was built in 1782”. It continued, “The time of laying the foundation of the new capital city would be sometime on 4 December 1857; get the program drawn after having consulted the said records first [ROB-IXI, 60.]”.

(13) Palace Construction Finished (16 Jul. 1858)

On 16 July 1858, the construction of all the buildings in the Palace was finished including Tooth Relic Tower and Clock Tower⁸ just in front of the Eastern (Main) Gate to the palace. A ceremonial “Palace Taking” was then performed [ROB-IX, xviii].

(14) Bringing Tooth Relics and Others in front of Procession (3 Feb. 1859)

An order was given on 3 February 1859 to bring the Buddha's Tooth and Bodily Relics, Gems, the Buddha's images and other things right in front of the procession from the temporary palace to Golden Palace in order to give the impression that the Buddha had moved into the new capital [ROB-IX, 93],

(15) Building Mandalay Outer City (27 Apr. 1859)

A royal order dated 28 April 1859, stated, “The Mandalay Golden Hill Area is considered to be the best or right site for building a new capital city” and thus ordered to build the outer city of Mandalay. The order also mentioned that there would be trees along the avenues and street lights at night so that the city would be as magnificent as Mitthila and Cappilavatthu (cities in India of the Buddha's lifetime). [ROB-IX, 106–107].

(16) Laying Foundation of Seven Monuments (23 May 1859)

The same order dated 28 April 1859 cited above mentioned the most important monuments of the Capital city as: 1) city [wall]; 2) moat; 3) pagoda; 4) library; 5) hall; 6) monastery; and 7) ordination hall. [ROB-IX, 106–107]. On 23 May 1859, foundation stones were laid at the seven monuments mentioned above, and name plates were added to the 12 city gates [ROB-IX, xviii].

(17) Kandy Tooth (Replica) Enshrined (7 Mar. 1860)

On 7 March 1860, a replica of the Tooth Relic of Kandy was enshrined in the Lokamarajina pagoda, and one Bodhi tree was planted in the south of the city (near the present University of Mandalay) [ROB-IX, xix].

(18) Shwe Laung Channel Improved (26 Apr. 1863)

The Shwe Laung channel, which had been built by Bodawpaya in the late eighteenth century, was improved and renamed the Yadana Nadi [ROB-IX, xxi].

(19) Ceremony for New Capital (6 June 1874)

A ceremony for the new capital, “Taking the Capital” was held to commemorate the completion of the new capital on 6 June 1874 [ROB-IX, xiv].

(20) Gates of City Wall Finished (Apr. 1876)

In April 1876, Mandalay was extended to the west of the Shewetachaung stream, and all 57 gates of the outer city wall were finished [ROB-IX, xiv].

2.2 Characterization of Mandalay as Depicted in ROB

The descriptions about the planning and building of Mandalay depicted in ROB as summarized in the previous section lead to the basic characterization of Mandalay as follows: 1) Mandalay was based on Buddha's Prophecy; 2) Mandalay was intended to be a City of Buddhism; and 3) Mandalay followed preceding city models. In this section, each of the three of the characterizations above will be envisaged in depth, using some of references on each of the specific topics.

(1) Mandalay was based on Buddha's Prophecy

The royal order mentioned the Buddha's prophecies that in AB2400 Mandalay would become the Golden Capital called Yadanabon, and it would prosper beyond precedence (dated 16 September 1856). The prophecies also said that a Tuesday-born king would start a dynasty that would last for many generations (dated 13 January 1857). These prophecies were well known to

the Burmese court, and King Mindon put himself in the figure of the king to build this new city, as he, himself was a Tuesday-born king. The year in which this new capital would be built, AB2400, was to be built into the design of Mandalay as the length of the periphery of the walled city, as will be discussed in Sub-section 3.4.2.

(2) Mandalay was intended to be a City of Buddhism

Mandalay was intended from the outset for Buddhahood and a site was believed to have been selected by Prince Siddharta, a legendary figure who was thought to become Buddha (dated 13 January 1857). When the Palace was finished, a procession to enter the new Palace accompanied the Buddha's Tooth Relics and Bodily Relics as well as Buddha's image (dated 3 February 1859). Thus Mandalay was intended to be a City of Buddhism.

(3) Mandalay followed preceding city models

The third of the characterizations of Mandalay as depicted in ROB is that Mandalay possibly followed preceding city models in Burma at the time of building Mandalay.

In drawing a program for the new capital, the king instructed to study the two preceding occasions in detail; at the time of making Ava capital city for the second time in 1763 and when Amarapura was built in 1782 (1 December 1857). It is worth noting that Amarapura was the capital when King Mindon moved the capital to Mandalay, and Ava was the capital when King Bodawpaya moved it to Amarapura. Amarapura and Ava were the two immediately preceding capitals before Mandalay.

If preceding capital cities such as Amarapura and Ava provided some kind of guidance to the planning and building of Mandalay, what would be specific features of the guidance? ROB did not say much about this.

In the middle of the eighteenth century, King Alaungpaya (r. 1752 – 1760) wanted to know “how ancient capitals were founded and what the king is supposed to do at the beginning of a reign”. There was a record of this incident in ROB on 3 November 1755. Taking an ancient city of Rajagaha⁹ in India for an example, King was advised of the following suggestions: 1) astrological considerations came first; 2) *mantras* were very important and were recited at all strategic points and written in word or in symbols on walls, ceilings gates, etc.; 3) figures of various gods including Genesa, Visnu, Asura etc. were painted on the doors; and 4) the city was built that it was a miniature universe and the clock tower would be in the centre of the city as Mt. Meru is in the centre of universe (ROB-III, 9).

It is noteworthy that how the capitals be made was explained to the king by using the example of an ancient Indian capital city, and the cosmology of the universe was taken into consideration of the capital city and the clock tower (*Pyat-that*) in the center of the city is seen as Mt. Meru of the universe. It is clearly seen that Burmese city model, if existed, was under influence of India rather than China.

3. Spatial Features of Mandalay Royal City in Comparison with Preceding Models

In this Chapter, four aspects of the physical feature of the Royal City of Mandalay will be considered. The four aspects include 1) structure; 2) orientation; 3) land use and 4) size.

3.1 Spatial Structure

3.1.1 Spatial Structure of Mandalay¹⁰

In Burmese, a castle is called *myo*, and Royal City, or the walled capital city of the kingdom, is called *myo-daw*. A Royal City has an enclosed compound for the king and the court of the kingdom, which is called Royal Palace (*nan-daw* in Burmese). In the case of Mandalay and Amarapura, further enclosure called Palace Enclosure existed which segregated the core of the

Palace buildings. Thus the Royal City was enclosed by three walls.

In the Case of Mandalay, outside of the Royal City extends an outer city, which was again enclosed by the outer wall. This research focuses on the Royal City and the space inside of it.

(1) Royal City

The Royal City of Mandalay in the early twentieth century is shown in Fig. 5. There were 12 gates in the fort wall of the Royal City, three on each side, equally spaced [Oertel, 11]. Surrounding the walls of the Royal City is a moat 225 feet (68.6 m) broad and of an average depth of 11 feet (3.4 m) [Duroiselle, 22]. The moat could be crossed on five wooden bridges, namely, one in the middle of each side and an extra one on the southwest which was formally reserved for funeral processions [Oertel, 12]. There are 11 bastions on each side plus the one at each of the corners (total of 48 on the perimeter), dividing the Royal Palace into 12 sub-blocks East West; and 12 sub-blocks North-South, thus making in total 144 sub-blocks (Fig. 7). There are three major east-west and three north-south roads.

(2) Royal Palace

In the center of the Royal City was the Royal Palace, which was walled once again for enclosure and security. The Royal Palace occupied 16 of the 144 sub-blocks of the Royal City, with an area of 45 ha [Ohno, 93]. Oertel published a plan of the Royal Palace which was originally prepared by the British Intelligence Branch Office in 1887 just after the occupation of the fort, and was provided to Oertel when he visited Mandalay in 1892.

Oertel explained that the plan exhibited a square fortified enclosure, defended by an outer palisade of teak posts 20 feet (6.1 m) high and an inner brick wall, with an open esplanade about 60 feet (18.3 m) wide running all round between them [Oertel, 12].

It is important to note that the mausoleum of King Mindon and the Royal Monastery, two of the important facilities in the Royal City, were located inside the palace closure near the eastern gate.

(3) Palace Enclosure and Platform

In the center of the Royal Palace was what was called the Palace Enclosure. To the north and south of the Palace Enclosure were two large walled-in gardens containing royal pavilions, and laid out with canals, artificial lakes, and grottoes (Fig. 6).

In the large outer court between Palace Enclosure and the east gate, a number of subsidiary buildings were located, such as the armory, printing press, the mint, a post office, servants' and guards' quarters, the Royal Monastery, King Mindon's Mausoleum, and the houses of a few of the highest officials [Oertel, 12].

In the center of the Palace Enclosure was an elevated Platform, some 8–10 feet (2.4 – 3.0m) high on which a number of Palace buildings were built. On the eastern front of the Platform was the Great Audience Hall, which was connected in the back to the King's private quarters. Visitors to the private quarters had to go through two strictly guarded gates on both sides of the Hall [Oertel, 12]. The other was the Rear Audience Hall at the western end of the Platform, where ladies were received. These two audience halls were placed on a clear east-west axis, along which a number of pavilions were built.

The highest and most prominent pavilion in the Palace Enclosure was *Shwepyathat*, the seven-story gilded spire, which stood over the Lion Throne. The Burmese people used to call this "The Centre of the Universe [Oertel, 13]".

Source: Muray (1911). This map shows the whole part of the Royal City with the Royal Palace enclosure and the buildings on the platform in the center.

Fig.5 Royal City (myo-daw) of Mandalay

1. Reception Halls, 2. Lion Throne and Great Pyatthat, 3. Victory Hall with the Goose Throne, 4. Elephant Throne, 5. Crown Hall with the Conch Throne, 6. Glass Palace and the Bee Throne, 7. Residence of the Chief Queen, 8. Hall of Royal Arms, 9. Treasury, 10. Peacock Throne, 11. Stable of the White Elephant, 12. King Thibaw's Private Apartments, 13. Deer Throne, 14. Hall with a Fountain, 15. Platform for Monks, Crowned with Pyatthat, 16. Watch Tower, 17. Residences for Queens and Concubines, 18. Southern Palace and Theatre Drawing Room, 19. Theatres, 20. Chief Queen's Audience Halls and Lily Throne Hall, 21. Mint, 22. Tomb of King Minden and his Four Queens, 23. Clock(or Drum) Tower, 24. Tooth-Relic Tower, 25. Supreme Court, 26. Royal Monastery, 27. Armory, 28. Royal Pagoda, 29. Stables and Elephant Sheds, 30. Royal Carriage Sheds, 31. Soldier's Barracks, 32. Servants' houses, 33. Gardens, 34. Garden Palace, 35. Water Palace, 36. Swimming Bath, 37. Brick Wall, 38. Teak Stockade, 39. Ceremonial Water Gate, 40. Main Eastern Gate

The drawing was made by Sergey S. Ozhegov based on the study completed by the English military administration in 1887.

Fig. 6 Royal Palace (nandaw) of Mandalay

3.1.2 Comparison with Other Burmese Cities

Several references point out that Mandalay resembles some of the historical capital cities of Burma, such as Amarapura and Ava.

O'Connor wrote about the planning of Mandalay: "The greatest care was taken to follow the traditional plan of the older capitals of the country; and it is in this perpetuation of an ancient tradition that the true architectural interest of Mandalay resides [O'Connor, 6]"

From the physical features, it can be said that the plan of Mandalay had a clear similarity with that of Amarapura. Both plans have a square Royal City surrounded by a wall and moat, and each side of the square has three main roads running north–south and three running east–west, dividing the Royal City into 16 (i.e., 4×4) blocks. Each block further divides into nine (i.e., 3×3) sub-blocks. The Royal Palace is in the center of the Royal City in both plans. Thus, the plans of Mandalay and Amarapura were almost identical (Figs. 7 and 8). It can be seen that the spatial structure of Mandala and Amarapura is quite similar to each other.

Source: Plan displayed
in Mandalay Palace Museum

Fig. 7 Plan of Mandalay's Royal City

Source: Symes (1800), P.124.

Fig. 8 Plan of Amarapura in 1795

3.2 Orientation¹¹

3.2.1 Orientation of Mandalay Royal City

The main gate to the Palace in Mandalay is on the eastern side. Oertel wrote, "Of the four gates to the King's Palace, the main entrance was through the eastern gate [Oertel, 12]". The entire Royal Palace was designed to face the east. When one entered the Royal Palace, directly in front would be the Great Audience Hall and the Lion Throne in the back of it, over which the tallest structure, the seven-tiered *Pyathat Tha*, rose. O'Connor wrote, "From his throne in the Great Hall of Audience, the King of Burma, as he looked down upon his assembled people, could see the long white road which leads like an arrow to the East gate and out beyond, towards the blue Shan Mountains and the rising sun [in the east] [O'Connor, 30]"

To verify the eastern orientation, the elevation drawings made by DAS in 1908 of the then-existing Palace buildings were investigated. The eastern elevation showed a grand symmetric

profile of the Palace buildings; however, by contrast, the northern elevation was asymmetric, as shown in Fig. 9.

The road leading from the East Gate of Royal Palace of Mandalay to the east towards the Shan Mountains is one of the present day main streets of Mandalay, the 19th Street. These confirm that the entire Royal City as well as the buildings inside the Royal Palace were designed to face the east.

Source: DAS (1963) Plates 13, 14

Fig.9 Grand and symmetric eastern elevation (upper) and asymmetric northern elevation (lower) of the Royal Palace of Mandalay in 1908

3.2.2 Comparison with Other Burmese Cities

(1) Amarapura

Henry Yule, who visited Amarapura in 1855, wrote, “Entering the inner brick wall from the east, you find yourself in front of the *Mye-min* or Earthen Palace (as it is called from having a clay floor), the principal Hall of Audience.” Yule further observed: “The central part of the building runs back to a depth of sixty or seventy feet [21–24 m], and at the extremity of this is the throne. Just over the throne rises a graceful *phja-sath* or wooden spire [Yule, 133]”. The alignment of the main buildings, including the Hall of Audience, as well as the wooden spire above the main throne, was almost the same as that in Mandalay (Fig. 10). From this, it is clear that Amarapura also faced the east.

(2) Ava

Crawford, who was sent to Ava in 1826, observed that the principal front of the Palace was the eastern side, and in this direction, there were three gates. The main gate was the one in the center of the three gates on the eastern side. The alignment of the major buildings in Ava was thought to be similar to those of Amarapura and Mandalay, and the Palace was also considered to be facing the east (Fig. 11).

(3) Other Capital Cities

Aung-Thwin pointed out that eastward orientation was “the cosmic symbolism of the Upper Myanmar capital cities [Aung-Thwin (1987), 135].” Oka wrote that an eastward orientation is widely seen in castle cities in Southeast Asia [Oka, 348–356].

Note: (1) Audience Halls (2) Pyathat Tha (3) Main entrance to Palace

Source: Moilanen, 145, drawing by S. S. Ozhegov.

Fig.10 Plan of Royal Palace in Amarapura at the end of the Eighteenth Century

Note: (1) Royal palace with the watch-tower in the center of the citadel (2) Okkyaung monastery (3) Eastern main gate

Source: Excerpt from Kan Hla (1978), 95

Fig.11 Royal City of Ava in Mid-Nineteenth Century (Excerpt)

3.3 Land Use

3.3.1 Land Use of Mandalay Royal City

ROB mentioned the new capital area was to be divided in residential and commercial quarters in August 1857. As the order to build the outer city was yet to come in 1859, the division mentioned above must have been for the Royal City. This order by the king leads to a thinking that there was some kind of land use control in the Royal City of Mandalay.

Funo showed data of land use in Mandalay Royal City over about 25 sub-categories over the 12x12 sub-blocks [Funo, 167 (Fig. I-4-39)]. The author compiled a land use map of Mandalay Royal City based on the data of Funo. In order to simplify the land use sub-categories, the author classified the land use into three major land use categories, i.e. 1) Court; 2) Residential and 3) Utility, which contains sub-categories as noted below:

- 1) Court: Minister; Mayor; Secretary, Ambassador, Interpreter, Serviceperson
- 2) Residential
 - Royal Family: King's Mother, Prince, Princess, Relatives

- Officer: Officer, Regional Officer
 - Religion: Pagoda, Monastery
- 3) Utility: Doctor, Pharmacist, Hospital, Rice Granary, Warehouse, Factory, Landry, Labor, Guard, Barack

Fig. 12 (Left) shows the land use in Mandalay Royal City thus recompiled with five (5) land use sub-categories. It is clear that land use for the Court, or secretarial functions of the kingdom, occupies the sub-blocks immediately outside of the Royal Palace in the center as well as in the area between the Palace and the East Gate. On the other hand, the land use for Utility tends to occupy the outermost subblocks in all directions. The land use for Residential occupies the area between the above mentioned two land use categories.

3.3.2 Comparison with Other Burmese Cities

For Amarapura, similar data of land use in the Royal City is available [Funo, 160 (Fig. I-4-32)]. Fig. 12 (Right) shows the land use in Royal Cities of Mandalay and Amarapura thus compiled with five (5) land use sub-categories as mentioned above. A similar concentric pattern of land use can be seen here.

For Burmese Capital Cities other than Mandalay and Amarapura, data of land use are not immediately available for analysis.

Source: Original data of land use and a base map by Jun Hirotomi and Nawit Onga Vangchai (Funo, 167 (Fig. I-4-39). Classification and visualization by the author.

Source: Original data of land use and a base map by Jun Hirotomi and Nawit Onga Vangchai (Funo, 160 (Fig. I-4-32). Classification and visualization by the author.

Fig.12 Land Use in the Royal City of Mandalay (Left) and Amarapura (Right)

3.4 Size of the Royal City

Despite the similarity in the structure, orientation and the land use of the Royal Cities of Mandalay and Amarapura, there is a notable difference in the two: the size of them.

3.4.1 Burmese Traditional Measurement Units

Royal City of Mandalay measures about 1 mile and a quarter (2 km) on the side of the square inside of the wall, whereas most of other Burmese capital cities, including Amarapura, measures 1 mile (1.6 km) or less. It should be noted that, when the Burmese royal cities were built, the measurement units used were not the English system (mile, yard, feet etc.) nor the metric system. The Burmese are known to have their own traditional measurement units such as *ta* and *taung*, and for the design of a city, the length unit of *ta* was normally used. Thus the discussion of the size of the Royal Cities ought to be done in the traditional units.

The conversion of the Burmese traditional units to the metric system does not have a fixed one, and there is a wide range of conflicting schemes. For the length of *ta*, there have been several conversions schemes from around 3.2 meters to around 3.4 meters per 1 *ta*. The author revealed that there is a stone inscription on which the scale of 1 *taung* is engraved, and based on the actual measurement on site, the length of 1 *ta* was calculated¹². The length of 1 *ta* was found to be between 3.36 and 3.40 m, thus this paper uses 1 *ta* = 3.38 m on an average of the range.

3.4.2 Size of Royal Cities of Mandalay and Amarapura

The only major difference between the plans of Mandalay and Amarapura looked to be their size. Using satellite photos of the two cities taken recently, as shown in Fig. 13, the length of the sides of the square of Mandalay and Amarapura was measured. The results are shown in Table 1.

Fig.13.Measurement of Mandalay (Left) and Amarapura (Right) from 2018 Satellite Photos

Table 1. Measurement of Royal Cities of Mandalay and Amarapura

Side	Mandalay		Amarapura	
	m	<i>ta</i>	m	<i>ta</i>
North side (Ln)	2,041	603.8	1,602	474.0
East side (Le)	2,045	605.0	1,596	472.1
South side (Ls)	2,043	604.4	1,600	473.4
West side (Lw)	2,043	604.4	1,610	476.3
Average	2,043	604.4	1,604	474.6

Source: Author

It can be seen from Table 1 that average length of the side of the square of Mandalay is a little more than 600 *ta*, while that of Amarapura is a little less than 480 *ta*. While the size of Amarapura was more or less the size of the historical capital cities in Burma, that of Mandalay was substantially enlarged in size. An observation could be made that the size of the Royal City of Mandalay was decided to match with the Buddha's Prophecy in a way that the periphery of Royal City would be 2,400 *ta*. This could be achieved by applying an enlargement factor of 1.25 to Amarapura, as shown schematically in Fig. 14.

Source: Author

Fig.14. Enlargement of Royal City of Amarapura to Derive that of Mandalay

4. Spatial Features of Mandalay Royal City in Comparison with Preceding Models

4.1. Enumeration of Burmese City Model

In the analysis given in the previous chapter, the Burmese Capital Cities such as Mandalay and Amarapura had a square shaped walled city with three gates on each side, thus dividing the Royal City in 16 blocks. The Royal City is surrounded by a moat and in the center is the Royal Palace, where the king resided. The eastward orientation of the palace and the royal city is found to be a unique feature common to several Burmese capital cities. The land use was found to follow concentric zone pattern similar to the Ancient India model.

All of these features could be put together in the form of a city model applicable to Mandalay and possibly to other Burmese Capital Cities is proposed in this research, as shown in Fig. 15.

4.2. Comparison of Burmese City Model with Ancient India and China Models

The proposed City Model of Burma, derived through an analysis of Mandalay and other Burmese capital cities, has similarities and differences to the Ancient India and China models. A comparison was made in each of the characteristics of the City Model of Burma as well as those of Ancient India and China Models after Ohji, as shown in Table 2.

City Model of Burma has similarities with the India and China models in the square shape, three gates on each side, and 16 blocks composition. Similarity between Burma and India models is the concentric linear belts seen in the land use pattern, with the court administration function arranged in the inner belt. Similarity between Burma and China models is the non-

isotropic structure with a clear sense of orientation, and the central facility being the palace, not a temple. But the while the China model shows strong southern orientation in the main axis of the palace and city, the proposed Burma model shows eastern orientation, which is considered unique to Burma.

Table 2 Comparison of India, China and Burma models

Item	Ancient India	Burma	Ancient China
Basic Plan	<u>Concentric linear belts</u>	<u>Concentric linear belts</u>	North-south linear belts
	Isotropic	<u>Non-isotropic</u> (Eastward axis)	<u>Non-isotropic</u> (Southward axis)
Shape	<u>Square</u>	<u>Square</u> ; with a Moat	<u>Square</u>
	<u>Three gates on each side</u>	<u>Three gates on each side</u>	<u>Three gates on each side</u>
	<u>Sixteen blocks</u>	<u>Sixteen blocks</u>	<u>Sixteen blocks</u>
Central facility	Temple	<u>Palace</u>	<u>Palace</u>
Religious facility	Included in the temple in the center	<u>Mausoleum on the left</u> (North); <u>Shrine on the right</u> (South)	<u>Mausoleum on the left</u> (East); <u>Shrine on the right</u> (West)
Administration and Commerce	Court in inner belt; Commerce in outer belt	<u>Court in inner belt</u> ;	Court in the front belt; Commerce in the back belt
Residence	Outer belt	Intermediate belt	East/West ends

Source: Ancient India and China models due to [Ohji, 89; Table 1] (translated by the author); For Burma by the author.

Note: Underlined words show similar entries.

5. Conclusion

In this research, the process of the planning and construction of the city of Mandalay was examined chronologically based on the Royal Orders of Burma, Consequently, the planning of

Mandalay was found to be characterized as the following; 1) it was based on Buddha's Prophecy; 2) it was intended to be a City of Buddhism; and 3) it followed preceding city models. These indicate that Mandalay might have followed a preceding city model commonly known in Burma. This City Model of Burma was analyzed in depth in terms of structure, orientation, land use and size of the capital cities. It was found that the city model based on which the planning of Mandalay was carried out, which could be called as City Model of Burma, was proposed. This city model had both similarities and differences with the Ancient India and China models, but it may be closer to the Ancient India model, as the both had concentric land use pattern.

One unique aspect of Burma Model is the eastward orientation of the Royal City and Palace. Eastward orientation is also seen in architecture other than that of the Royal Palace. The monasteries in many cases face the east. Myo Myint Sein wrote, "Monasteries in the Konbaung Dynasty normally had the main gate in the east, which was reserved for the King and his family, priests and high officials. The building stretched towards the west with entrances for the public either on the northern or southern side. After entering the East Gate, one can climb the staircase to the floor of the elevated platform, and after passing through an engraved gate was a hall called Py-athat, under which the Statue of Buddha is enshrined [Myo Myint Sein, 11]". Qingxi Lou mentioned that in *Theravada* Buddhism, the main building in the temple is made to face the east, and so does the Statue of Buddha. He mentioned that this eastward orientation of Buddhism architecture is seen in not only in Burma, but also in Thailand as well as some part of Yunnan Province of PRC [Qingxi Lou, 78]. This final point would indicate that the eastward orientation of Buddhism buildings may not be limited to Burma, but may extend to the neighboring countries where the *Theravada* Buddhism is practiced.

Theravada Buddhism, which came to Burma during the Bagan Dynasty, focuses more on the teachings of Gautama Buddha and meditation for self-awareness while *Mahayana* has more mystic and ritualistic aspects to it. [Ma Thanegi, 185]. Than Thun pointed out that a temple with an eastern gate is taken as the one for the teaching of the Buddha to save people from the miseries of life, because "Buddha sits facing east and a monk disciple or a lay devotee have to go from east to west [Than Tun (1989), 106]". He also mentioned that this comes from the fact that "on the moment of the Enlightenment the Buddha Gotama sat under the Bodhi tree facing east [Than Tun (1989), 106]." This would indicate that the eastward orientation is related to *Theravada* Buddhism's teaching.

The applicability of the proposed City Model of Burma thus may not be limited to the boundary of Burma (Myanmar), as the *Theravada* Buddhism has been practiced in wider region than Burma. The proposed Burma Model will have to be tested in wider regional context.

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REFERENCES

- 1) Aung-Thwin, Michael (1987), "Heaven, earth, and the supernatural world: dimensions of the exemplary center in Burmese history" in B. L. Smith and H. B. Reynolds (ed.), *The city as sacred centre*. Leiden: Brill, 88-102.
- 2) Aung-Thwin, Michael (2013), et.al. *A History of Myanmar since Ancient Times*, 2nd Ed. London, 2013.

- 3) Crawford, John (1827), Journal of an Embassy from the Governor-General of India to the Court of Ava, Reprint in SOAS Bulletin of Burma Research, Vol. 3, No. 2, 2005, Pp636-959.
- 4) Duroiselle, Charles, (1925), Guide to the Mandalay Palace, Rangoon. (Second Edition, Calcutta, in 1931).
- 5) Directorate of Archeological Survey (DAS) of Ministry of Union Culture of Burma (1963), The Mandalay Palace.
- 6) Foucar E.C.V. (1963), Mandalay the Golden, London.
- 7) Funo S. (2006), The City as Mandala - Spatial Formation and Transformation of Hindu Cities, Kyoto Univ. Press. [in Japanese]
- 8) Fytch, Albert (1878), Burma Past and Present (Vol.1), London.
- 9) Fitch, Ralph, "The Voyage of Mr. Ralph Fitch", in J. Pinkerton (ed.) A General Collection of the Best and Most Interesting Voyages and Travels, 17 vols., London, 1811, IX, 416-417.
- 10) Ge Feng et al. (2015), Traditional Chinese Rites and Rituals, Cambridge Scholars Publishing.
- 11) Heine-Geldern R. (1963), Conceptions of State and Kingship in Southeast Asia, Dept. of Asian Studies, Cornell Univ.
- 12) Ishikawa, K. (2014), The foreign presence in Mandalay during the Konbaung Period: A review of the urban area. *Journal of Sophia Asian Studies*, No. 32, pp.113– 128.
- 13) Kan Hla, (1977), Pagan: Development and Town Planning, Journal of the Society of Architectural Historians, Vol. 36, No. 1, pp. 15-29, University of California Press
- 14) Kan Hla, (1978) Traditional Town Planning in Burma, Journal of the Society of Architectural Historians, Vol. 37, No. 2, pp. 92-104, University of California Press
- 15) Kirk, W (1979). Town and Country Planning in Ancient India According to Kautilya's Arthashastra, Scottish Geographical Magazine, Vol. 94, No. 2, Pp. 67 - 75.
- 16) Ma Thanegi, et al. (2005), Myanmar Architecture - Cities of Gold, Singapore.
- 17) Mandalay Palace Museum. Pamphlet entitled "Mya Nan San Kyaw Shwe Nan Daw – The Royal Palace", available at the Mandalay Palace Museum.
- 18) Maung Maung Tin, Wundauk (1967) Vol. 1; Vol.2; (1968) Vol.3, Konbaungzet Maha Yaqawindawgyi, Vols. 1-3, Rangoon: Ledi Mandain. [Burmese]
- 19) Maung Maung Tin and Morris, T. O. (1966), Mindon Min's Development Plan for the Mandalay Area, Journal of Burma Research Society, XLIX-i, Pp. 29-34.
- 20) Moilanen, I. & Ozhegov, S. S. (1999), Mirrored in Wood – Burmese Art and Architecture, White Lotus.
- 21) Moore, E. (1993), The Reconstruction of Mandalay Palace: An Interim Report on Aspect of Design, Bulletin of the School of Oriental and African Studies, Univ. of London, Vol. 56, No. 2, pp.335-350.
- 22) Moore, E. (2000), The Religious Architecture, in Falconer J., Moore E. et al., Burmese Design and Architecture, Periplus Editions (HK) Ltd., pp.21-58.
- 23) Muray, John (1911), A Handbook for Travellers in India, Burma and Ceylon, 4th Edition, London.
- 24) Myo Myint (2012), Conflicting Colonialism: King Mindon's Strategy for Defending Independence, 1853 - 1878, Ministry of Religious Affairs, Burma.
- 25) Myo Myint Sein (2015), Preliminary Research on Wooden Architecture in Konbaung Dynasty (1752-1885) in Myanmar, Proceedings of Seminar on "Traditional Wooden Buildings in Myanmar" held on 13 Feb. 2015 by National Research Institute of Cultural Properties, Tokyo.
- 26) O'Connor V. C. S. (1907.), Mandalay and Other Cities of the Past in Burma, London.

- 27) Oertel F. O (1893)., None on a Tour in Burma in March and April 1892, Rangoon (Reprint by White Orchid Press, Bangkok in 1995).
- 28) Ohno, T. (1983), Mandalay, the Royal City of Burma, Tonan Ajia Kenkyu (Southeast Asian Studies), Vol. 21 No. 6 (June 1983), Pp.82-96. [Japanese]
- 29) Oka, C. (1976), Cosmologic Structure of Castle City – Castle Cities in India, Southeast Asia and China, in Ueda, M. (ed), Castle City, Shakai-shisou sha (publisher) [in Japanese].
- 30) Ohji, T. (2003), Castle City in Asia and its Cosmology, in Funo, S. (ed), History of Urban and Architecture [in Japanese].
- 31) Qingxi Lou (2001), translated to Japanese by Teruo Shou, Chinese Traditional Architecture.
- 32) Phayre, P. A. (1884), History of Burma, Trubner & Co., London.
- 33) Prince Damrong Rajanubhab (1991), Journey through Burma in 1936 [translated by Kennon Breazeale; edited by Narisa Chakrabongse], River Books, Bangkok, 1991
- 34) Reid, Anthony (1988), Southeast Asia in the Age of Commerce, Vol.2 Expansion and Crisis, Yale University Press.
- 35) Scott G. (1900), Gazetteer of Upper Burma and the Shan States, Govt. Print. Burma (Reprint by AMS Press New York, 1983)
- 36) Scott, G. (1916), Note on Town-planning, Appendix; Report of the Suburban Development Committee, Rangoon.
- 37) Symes, Michael (1800), An account of an embassy to the Kingdom of Ava, sent by the Governor-General of India, in the year 1795, London. Reprint by Gregg International 1969.
- 38) Thant Myint-U (2004), The Making of Modern Burma, Cambridge Univ. Press.
- 39) Than Tun (1989), The Royal Orders of Burma, A.D. 1853 - 1885, Part Nine A.D 1853 - 1885, The Center for Southeast Asian Studies (CSEAS) of Kyoto University.
- 40) Than Tun (1998), A Bagan Temple's Main Gate: Is there any significance when it opens in any other direction except east?, Myanmar Historical Research Journal, No. 2 Pp106-108.
- 41) Yamada, K. (2013), A Study on the Origins of City Planning of Yangon (Formerly "Rangoon"), Myanmar, During the British Rule, Proceedings of Historical Studies in Civil Engineering, JSCE, June 2013. [in Japanese]
- 42) Yamada, K. (2014), the Development of Planning of Colonial Cities by European Nations, Proceedings of Historical Studies in Civil Engineering, JSCE, June 2013. [in Japanese]
- 43) Yamada, K. et al. (2017), Origin of City Planning of Mandalay, Royal City of Burma (Myanmar) in Mid-19th Century, Proceedings of Historical Studies in Civil Engineering, JSCE, June 2017.
- 44) Yamada, K. et al. (2018a), Research on the Eastward Orientation of Historical Capital Cities of Burma, Proceedings of Historical Studies in Civil Engineering, JSCE, June 2018.
- 45) Yamada, K. et al.(2018b) Spatial Structure of Historical Capital Cities of Burma (Amarapura and Mandalay) in Use of Traditional Measurement Units, the 12th International Symposium on Architectural Interchanges in Asia (ISAIA) 2018.
- 46) Yamada, K. et al. (2018c), An Empirical Approach to the Determination of Burmese Traditional Measurement Units used for Burmese Royal Cities, in Proceedings of the 14th Conference of Asia and African City Planning (AACP2018).
- 47) Yule, Henry (1858), A Narrative of the Mission to the Court of Ava in 1855, London.

END NOTES

¹ King Mindon Min, 1808 - 1878, Reign 1853 – 1878, was the king of Burma. He was one of the most popular and revered kings of Burma.

² King Alaungpaya, 1714 – 1760, Reign 1752 – 1760, was the founder of the Konbaung Dynasty of Burma. He is considered one of the greatest monarchs of Burma for unifying Burma for the third time in Burmese history.

³ King Hsinbyushin, 1736 – 1776, Reign 1763 – 1776, was king of the Konbaung dynasty of Burma.

⁴ King Bodawpaya, 1745 – 1819, reign 1782 – 1819, was the king of the Konbaung Dynasty of Burma.

⁵ King Bagyidaw, 1784 – 1846, was the king of the Konbaung dynasty of Burma from 1819 until 1837.

⁶ In this chapter, ROB refers to Than Tun (1983-90), *The Royal Orders of Burma, AD 1853–1885*, The Center for Southeast Asian Studies (CSEAS) of Kyoto University. The Roman numbers after ROB indicates the part (volume) number. For indication of pages, numbers (1, 2, etc) indicate the page in the main text part, while Roman numerals (i, ii, etc) refer to the page in the summary part at the front of each volume.

⁷ A legendary figure who was believed to become Buddha. See Phayre (1884), P.7.

⁸ A clock tower in this context was also called a drum tower, devised with a drum to announce time in the capital city.

⁹ Rajagaha, or Rajagriha, is an ancient capital city of Magadha in northern India until the fifth century BC. It is known that Gautama Buddha stayed here meditating and preaching, but little is known about the city, [Funo, 17].

¹⁰ For this sub-section, refer to the author's previous work [Yamada 2017].

¹¹ For this sub-section, refer to the author's previous work [Yamada 2018a].

¹² For the discussion on the conversion of the Burmese measurement units for length, such as *ta* and *taung*, refer to Yamada (2018c). The conversion factor adopted in this paper, 1 *ta* = 3.38 m comes from this reference, based on the on-site measurement of the Royal Inscription showing the actual scale of 1 *taung* on a stone slab in Mandalay, while 7 *taung* makes 1 *ta*.