



SPAFACON2021

**Papers from the SEAMEO SPAFA International Conference on
SOUTHEAST ASIAN ARCHAEOLOGY AND FINE ARTS**

13 - 17 December 2021

Editor: Noel Hidalgo Tan

SPAFA CON2021 is published by SEAMEO SPAFA, the Regional Centre for Archaeology and Fine Arts established by the Southeast Asian Ministers of Education Organization. SEAMEO SPAFA focusses on archaeology and fine arts in Southeast Asia, and promotes awareness and appreciation of the cultural heritage of the region. Its member-countries are Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste, and Vietnam; and its associate member-countries are Australia, Canada, France, Germany, the Netherlands, New Zealand, Spain and the United Kingdom.



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2021 SEAMEO SPAFA
ISBN: 978-616-7961-55-2
ISBN (e-book): 978-616-7961-54-5
DOI 10.26721/spafa.pqcnu8815a

Publisher

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INTRODUCTION

This volume contains the extended abstracts from the papers presented at the SEAMEO SPAFA International Conference on Southeast Asian Archaeology and Fine Arts, which was held online from 13 to 17 December 2021. Also known as the SPAFACON2021, this conference was organised online due to the pandemic. Despite the disruption brought about by Covid-19 to our in-person events, training programmes and field research, it is heartening to see that archaeology and cultural heritage has continued under new modes of communication and collaboration.

This fourth iteration of the SPAFACON is also scheduled a year earlier than our usual triennial cycle to commemorate the 50th anniversary of SEAMEO initiating a centre dedicated towards archaeology and the fine arts. Over the past year, SPAFA has also been highlighting this legacy of international cooperation and capacity-building by sharing our photographic archives on our social media.

I am delighted by the high level of enthusiasm and intellectual curiosity brought by the participants to the conference. During our call for papers we received close to 90 submissions, but owing to the pressures of time and the online format, we were only able to accept 34 papers for the conference. The variety of papers present here, although a small set compared with our usual proceedings, reflects the breadth of the centre's ambit – covering not just archaeology, but also performing arts, visual arts, museum studies, and other aspects of Southeast Asian cultural heritage.

I would like to thank all the participants, without whom this conference would not be possible in its present form, in particular, our Governing Board members who represent every country in Southeast Asia, and to the Ministry of Culture, Thailand and the Ministry of Education, Thailand for their long-standing support of SEAMEO SPAFA and its activities.



Mrs Somlak Charoenpot

Centre Director

SEAMEO SPAFA

Musical Instruments on the 16th century bas reliefs in the North Gallery-East Wing of Angkor Wat : Dating and Significance

ឧបករណ៍តន្ត្រីខ្មែរដែលស្ថិតលើចម្លាក់លៀននៃសតវត្ស
ទី១៦ ក្នុងផ្នែកថែវខាងជើងឈាងខាងកើតនៃប្រាសាទអង្គរវត្ត
កាលបរិច្ឆេទនិងសារៈសំខាន់

10792/pqcnu8815a-27

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Abstract

Based on the two inscriptions dated 1546 and 1564 on the walls of the North Gallery-East Wing and the East Gallery-North Wing of the 12th century Angkor Wat, George Coedes has dated the completion of the bas reliefs on these wings to the 16th century. This dating finally underscores that the bas reliefs on the walls of the galleries of the third enclosure of Angkor Wat were not all carved during the reign of a single Khmer monarch. More significantly is the presence of bossed gongs solely in the north gallery – east wing, where, in other galleries gongs are not illustrated. Two types of bossed gongs are carved – suspended bossed gongs, single or in pairs, and circle gongs with eight to nine bossed gongs.

លោក George Coedes បានកំណត់កាលបរិច្ឆេទនៃការសាងសង់បញ្ចប់នៃចម្លាក់លៀនប្រាសាទទាំងនោះ គឺនៅក្នុងកំឡុងសតវត្សទី១៦ ដោយផ្អែកទៅលើសិលាចារឹកចំនួនពីរនៅកំឡុងឆ្នាំ ១៥៤៦ និងឆ្នាំ១៥៦៤ ដែលស្ថិតនៅលើជញ្ជាំងនៃផ្នែកថែវខាងជើងឈាងខាងកើតនិងផ្នែកថែវខាងកើតឈាងជើងរបស់ប្រាសាទអង្គរវត្តដែលបានស្ថាបនាឡើងនៅសតវត្សទី១២។ ការកំណត់ពីកាលបរិច្ឆេទនេះបានផ្ដោតសំខាន់ជាចុងក្រោយទៅលើចម្លាក់លៀនលើជញ្ជាំងថែវនៃរបងរំពំទូទី៣ របស់ប្រាសាទអង្គរវត្ត ដែលមិនត្រូវបានឆ្លាក់នៅក្នុងរជ្ជកាលព្រះមហាក្សត្រខ្មែរតែមួយ។ នៅក្នុងផ្នែកសំខាន់បន្ថែមពីលើនេះទៀតគឺ វត្តមានគងធំមាននៅផ្នែកថែវខាងជើងឈាងខាងកើតតែមួយគត់ ហើយរូបចម្លាក់គងធំនេះមិនមានវត្តមាននៅថែវដីទៀតឡើយ។ ប្រភេទគងធំចំនួន២ត្រូវបានឆ្លាក់គឺ គងធំ (ទោលឬក៏មានគូរ) និង គងពាក់កណ្តាលរងដែលមានផ្លែសំនៀងចំនួន៨ទៅ៩ផ្លែ។

Keywords

Angkor Wat; bas-reliefs; bossed gongs; gong circles; gongs-in-a-row
អង្គរវត្ត; ចម្លាក់លៀន; គងធំ; គងពាក់កណ្តាលរង; គូលើនតាំង

Introduction

Two inscriptions dated 1546 and 1564 on the walls of the North Gallery-East Wing and East Gallery-North Wing of the 12th century Angkor Wat (Coedes 1962 : 236-237; 238-239) date the two wings to the 16th century. Several studies have followed this dating on the completion of the bas reliefs of these two wings to the 16th century (Vickery 1977: 226ff.; 2004:49ff.; Mannika 1997: 173-174). These datings underscore that the bas reliefs of the four galleries of the third enclosure of Angkor Wat were not all carved during the reign of a single Khmer monarch. The four galleries, with two wings each that provide protective walls to the inner parts of Angkor Wat along the west-east galleries and north-south galleries, spans a total of some 521 meters of wall spaces, with about 2 meters wide. These very long galleries, and high walls certainly needed a monumental plan to decorate with bas reliefs of 8 narratives and employ, at various times, at least eight groups of designers and artists to work on the reliefs one for each wing, evidenced by the diverse artistic styles of each wing, and with regards to the topic of this paper, the presence or absence of musical instruments in these wings.

With the 16th century dating, the carving of the bas reliefs on the North gallery – East wing and East gallery – North wing appears to be the last projects undertaken on the third enclosure, after all the other wings had been completed. The creation of the bas-reliefs of the eight galleries of the third enclosure of Angkor Wat did not happen in one single reign of the Angkor monarchs. Suryavarman II (r. ca. 770 – ca. 830) founded Angkor and was constructed by his successor, Jayavarman VII (r. 1182/1183 – ca. 1220) (Polkinghorne et al 2018:98). The bas-reliefs along the north-east gallery enclosures were left unfinished and it may be that the construction was abandoned after the death of Suryavarman II around 1150. This idea of abandonment is supported by the discovery of drawings at the north-west corner of the second enclosure (Roveda 2000, quoted in Tan et al. 2014:558). Only two wings have direct references to Khmer monarchs - the west-south gallery, with the narrative of the battle of Kurukshetra and the south-west gallery depicting the war exploits of King Suryavarman II.

Only five of the galleries are adorned with musical instruments, all the musical illustrations of which appear on the lowest tier of the panels. Three galleries – the West Gallery - South Wing, with the story of the Battle of Kurakshetra, from the Mahabharata epic are decorated with drums, oboes, horns, cymbals; the South Gallery - West Wing, with the story of the historic procession of Suryavarman II, the builder of the temple, whose processions are accompanied with drums, oboes, horns, trumpets, cymbals, conch shells, priest's bells; and the East Gallery - North Wing portraying the Battle of Lanka from the Ramayana

epic where Rama and his allies, including the monkey troops, defeat Ravana and rescues Sita is adorned with drums, horns and oboes. Bossed gongs are not etched on these three galleries, where usually such grand narratives are accompanied with gong music.

The bas-relief carvings that adorn the walls of the third enclosure add up to some 521 meters, with narratives taken from the Khmer dynastic history of Suryavarman VII (one gallery); the Hindu epics – Mahabharata (two galleries) and Ramayana (two galleries); and the Bhagavata Purana, the great Hindu creation myth¹.

Table 1. Distribution of bas-reliefs of musical instruments in the eight galleries of Angkor Wat based on my field research in 2009 and 2011. (Nicolas 2021; See also Mannika 1985 and 1997 for the cosmological and calendrical measurement of the temple)

Gallery	Narrative story	Musical Instruments
West Gallery, south wing 49 meters long	Battle of Kurakshetra, from the Mahabharata epic	drums, oboes, horns, trumpets, cymbals
South Gallery, west wing 94 meters long	Historic procession of Suryavarman II, the builder of the temple	drums, oboes, horns, trumpets, cymbals, conch shells, priest's bells
South Gallery, east wing 66 meters long	Judgment of Yama, the God of Judgment and of the Underworld, and Heaven and Hells	conch shells
East Gallery, south wing 49 meters long	Churning of the Sea of Milk, from the Bhagavata Purana, the great Hindu creation myth	none
East Gallery, north wing 52 meters long	Victory of Vishnu over the Asuras (carved much later between 1546 and 1564)	none
North Gallery, east wing 66 meters long	Victory of Krishna over the asura Bana (carved much later between 1546 and 1564)	bossed gongs, circle gongs, drums, oboes, horns, trumpets, buffalo horn, cymbals, conch shells
North Gallery, west wing 94 meters long	Battle of Dewas and Asuras, detailing the 21 important Gods of the Hindu pantheon, with their vahana or mounts	drums, oboes, cymbals, conch shells

1 See Mannika 1985 and 1997 for the cosmological and calendrical measurement of the temple.

North West Corner Pavilion West bay, north side	Rama returning to Ayodhya in triumph, following the victory in the Battle of Lanka; to the right of the window, monkeys dance and play musical instruments in celebration.	drums, horn, oboes, cymbals
East Gallery, north wing 51 meters long	Battle of Lanka (Rama and his allies, including the monkey troops, defeats Ravana and rescues Sita	drums, horns, oboes

Two Inscriptions

Coedes (1962:236-237) published his transcriptions of the two inscriptions, K 296 and 297, and these are quoted here in full.

North Gallery – East Wing

brah pāda mahāviṣṇuloka thve bvum dān srac nau phen byar luh thleng
rāja brah pāda stac brah rājaongkāra parmārājādirāja rāmādhīpati
parmmacakrabartt[i]rāja pre brah mahidhara nā rājasilpi punah chlak
phen niyay anu ---- kumlung astasaka maminakṣatra buddhabara
purnnami bhadrapadda.

S. M. Mahavisnuloka n'avait pas encore achevé deux panneaux; lorsque monta sur le trône S. M. Brah Rajaonkara Paramarajadhiraja Ramadhipati Paramacakravartiraja, il chargea Brah Mahadhira, des artisans royaux, de sculpter sur les panneaux un récit ---- en l'année caka huitième (de la décennie) année du Cheval, mercredi, pleine lune de Bhadrachada (Coedes 1962 : 236-237).

-This inscription on the North gallery – East wing reliefs of Krishna's victory over the asura Bana is translated as follows: His Majesty Mahavishnuloka did not have two panels completed; When His Majesty Brah Rajaonkara Paramarajadhiraja Ramadhipati Pramacakravartiraja became king, he gave the order to Brah Mahadhira of the royal artisans, to sculpt on the panels on the story in the shaka year of the 8th [decade], year of the Horse, Wednesday, full moon of Bhadrachada (Mannika 1985: I, 216 note 1; Mannika 1997: 173; Roveda 2002:56).

East gallery - North wing

vrah pāda mahāviṣṇuloka thve bvum dān samrac nau phdān byar
 thleng rāja vrah pāda samtec vrah rājaongkara parmmaparājādhirāja ta
 parmmapavitra oy chlāk niyāy osā samrac nā luh ta ekacatvaraa stapan-
 casaka kurnaksatra purnnami phalguṇa ādityabāra samrac nu rppyang
 bhnāk tai byar mum ru vreng.

S.M. Mahavisnuloka n'avait pas encore acheve deus panneaux; lorsque monta sur le trone S. M. Brah Rajaonkara Paramaradhiraja Paramapavitra. Il fit sculter en recit. On s'efforça de la terminer en un-quatre-huit-cinq caka, annee du Porc, pleine lune de Phalguna, dimanche. Les deux galleries et balustrades furent achevees solidement comme dans le passe (Coedes 1962 : 236-237).²

-This second inscription is translated as follow : His Majesty Mahavishnuloka did not have two panels completed; when His Majesty Brah Rajaonkara Paramarajadhiraja Paramapavitra became king, he had a story sculpted. An effort was made to complete in 1485 shaka, the year of the Pig, full moon of Phalguna, Sunday. The two galleries and balusters were completed as in the past (Mannika 1985: I, 216 note 1; Mannika 1997: 173; Roveda 2002:56).

The significance of the dating of the north gallery-east wing lies on the fact that it is only on this gallery that bossed gongs are illustrated. All the other galleries with musical instruments do not portray gongs. These bossed gongs are of two types – one, big and small suspended bossed gongs and two, semi-circle bossed gongs or gong circles. This gallery portrays the narrative of the Victory of Krishna over Asura Bana. This is particularly of great significance for the following.

It was during the reign of Ang Chan (1528–1566) that the bas-reliefs of the North-East gallery and the East-North gallery were carved in the 16th century. This is evidenced by the inscriptions on these two bas-reliefs indicating that these were made between Wednesday 8 September 1546 and were completed on Sunday 27 February 1564 (Coedes 1962:239; Jacques and Freeman 1997:162l; Roveda 1999).

The discovery of 'hidden paintings' on the Bakan, the first enclosure of Angkor Wat, on the highest tier of the pyramid, confirms the carving of suspended bossed gongs (*khong*),

2 An earlier transcription but without translation can be found in Coedes 1911 :208.

semi-circle gongs (known today as *khong vong*), and a type of oboe known today as *sralai* on the North Gallery – East Wing of the third enclosure. However, one musical instrument depicted in the painting is a xylophone known today as *roneat*, is not depicted anywhere the bas-reliefs (Tan et al 2014:557, fig. 10).

The ‘hidden painting’ of musical instruments on the first enclosure of the temple appears to be an artist’s sketch of the new musical instruments that were to be carved on the north gallery-east wing in the third enclosure. For the other instruments carved on this wing -- various types and sizes of drums, oboes, arched horns, vertical horns, buffalo horn, cymbals, and conch shells – were already carved in the other wings and were known since the 12th century. Thus, only these four new musical instruments were designed for inclusion. However, the xylophone was not carved there. The two suspended bossed gongs were included (Figures 5, 6, 7). It should be noted, however, that the number of small bossed gongs on the circle gongs in the painting is 8, while two carvings has 8 small bossed gongs (Figures 1, 2), two others have 9 small bossed gongs (Figures 3, 4). Contemporary practices of funeral music in Cambodia today also use circle gongs with 8 or 9 small bossed gongs (Figure 25).

Due to the large areas on the walls of the eight galleries, the carvings of the bas-reliefs were not executed in one single reign of the Angkor monarchs. Suryavarman II (r. ca. 770 – ca. 830) founded Angkor and the temple constructed by his successor, Jayavarman VII (r. 1182/1183 – ca. 1220) (Polkinghorne et al 2018:98). It is surmised that the bas-reliefs along the North-East gallery enclosures may have been left unfinished and the construction was abandoned after the death of Suryavarman II around 1150. This idea of abandonment is supported by the drawings at the North-West corner of the second enclosure which may have been initially planned (Roveda 2000).

Diverse artistic styles are evident in the four galleries with eight narratives. Owing to the large area the long panels for each gallery, each of these was designed and executed by eight or more groups of designers and carvers that were working on each gallery over an extended period of time.

Only five of the eight galleries are decorated with musical instruments. One, the West Gallery - South Wing, portray the story of the Battle of Kurakshetra from the Mahabharata epic and is adorned with drums, trumpets, horns, cymbals, oboes, and conch shells. Two, the South Gallery - West Wing recounts the story of the historic procession of Suryavarman II, the builder of the temple. These grand processions are accompanied with drums, horns,

trumpets, cymbals, conch shells, priest's bells, and bell chimes. Three, the East Gallery - North Wing portrays the Battle of Lanka from the Ramayana epic where Rama and his allies, including the monkey troops, defeat Ravana and rescues Sita. It is illustrated with drums, horns and oboes. Four, The North Gallery-West Wing is etched with drums, oboes, cymbals, conch shells. One gallery --- the South Gallery - East Wing, with the narrative Judgment of Yama, the God of Judgment and of the Underworld, and Heaven and Hells, has only conch-shells. The other two are not depicted with musical illustrations --- the East Gallery - South Wing portraying the exquisite masterpiece, Churning of the Ocean of Milk, and the East Gallery - North Wing, with the narrative the Victory of Vishnu over the Asuras. No gongs, bossed or flat are not etched on these seven galleries, where such grand narratives are usually associated with gong music, in the same manner as the 14th century Ramayana reliefs in Panataran temple in East Java, where three types or sizes of bossed gongs are carved (Kunst 1949).

Gong circles on the North Gallery – East Wing of Angkor Wat.



Fig. 1 Gong circle with 8 bossed gongs at the North Gallery-East Wing, Angkor Wat. The musician beats on the gongs with two beaters for both hands. Visible on the upper right corner is a conch shell, and on the right side a cylindrical drum with a strap around the neck of the player. Photo: A. Nicolas 2009, 2011.



Fig. 2 Gong circle with 8 bossed gongs at the North Gallery-East Wing, Angkor Wat. Only one hand of the musician is shown with a beater, and the man on the extreme right holds the frame of the gong circle with his two hands. Photo: A. Nicolas 2009, 2011.



Fig. 3 Gong circle with 9 bossed gongs at the North Gallery-East Wing, Angkor Wat. The musician plays with two beaters for both hands. Photo: A. Nicolas 2009, 2011.



Fig. 4 Gong circle with 9 bossed gongs at the North Gallery-East Wing, Angkor Wat. The musician has two beaters, the left is equipped with a coiled wrap, possibly cloth, at the end tip. A man holds the frame with his two hands. Photo: A. Nicolas 2009, 2011.

It is thus significant that the North gallery - East wing portraying the Victory of Krishna over the Asura Bana (carved much later between 1546 and 1564) is decorated with a wide array of types of musical instruments --- suspended bossed gongs, circle gongs, various types and sizes of drums, oboes, arched horns, vertical horns, buffalo horn, cymbals, and conch shells.

The Reign of Ang Chan (1528-2455)

During the reign of Ang Chan (1528–1566), Angkor Wat underwent a transformation from a monument to Vishnu to a Theravada Buddhist shrine. Ang Chan ordered the completion of the Vaishavite bas-reliefs, and converted the Bakan, the first enclosure (or the top tier) of Angkor Wat into a sanctuary of Buddha images (Thompson 2004: 3, 88–119). Boisselier noted that the rendition of the half circle gongs on the bas-relief depicting the Victory of Krishna over the Asura Bana may have links to Siamese styles of art, locating the paintings to the post-Angkor period (Boisselier 1962: 244). Boisselier also noted that “D’autre part, les orchestres figures a plusieurs reprises comportent un instrument nouveau par rapport aux bas-reliefs anciens: une sorte de xylophone, kh’ong, monte sur un bati en arc-de-cercle, bien connu de nos jours dans l’orchestre dit ‘siamois’ mais qui n’existe pas dans l’orchestre chinois dont aucun de instruments typiques n’apparaît (Boisselier 1962:245). (The orchestral figures on several occasions have a new instrument compared to the old bas-reliefs: a kind of xylophone, kh’ong, mounted on a frame in an arc of a circle, well known today in the world ‘orchestra said to be’ Siamese ‘but which does not exist in the Chinese orchestra of which none of the typical instruments appear.)

A recent study documents that early Ayutthayan artists resided in Angkor in the first half of the 15th century (Polkinghorne 2018:101). As the Kingdom of Ayutthaya was founded in the mid-fourteenth century, it gradually supplanted Angkor as the dominant regional power, eventually becoming the most powerful polity in mainland Southeast Asia during the sixteenth century (Tan et al 2014:560). Boisselier (1992:244ff.) and Ringis (1990: 38) noted that the development of Siamese mural paintings have been influenced by the bas-reliefs of Angkor Wat (Ringis 1990:38).

Musical terms in Khmer inscriptions

There are no terms that refer to gongs in the list of Sanskrit musical terms below from Khmer inscriptions dated seventh to eleventh centuries. There are more Sanskrit derived musical terms, fourteen in all, than Old Khmer, with only six³.

Sanskrit term	Definition	Dates of inscriptions
<i>kaṇṣa, kaṇṣatAla, kaṇṣatala</i>	brass; copper, alloy	628 – 968
<i>tAla</i>	cymbals	972 – 1308
<i>hUdUka</i>	tambourine, drum	960 – 1101
<i>gandharvva</i>	musician, singer	7th c – 11th c
<i>vINa</i>	lute	879 – 972
<i>vadya</i>	musical instrument	910 – 928
<i>tUryya, turyya</i>	musical instrument	7th c – 13th c
<i>zikharA</i>	stringed instrument	960 – 1101
<i>kinnara, kinara</i>	stringed instrument	972, 994, 1024
<i>dundubhi</i>	tambour, kettledrum	1190 1200
<i>vAditra</i>	musical instrument	1002 – 1049

Old Khmer

<i>cheṇ</i>	cymbals, small	972
<i>katyAṇ</i>	bell, small	972
<i>chko, cko</i>	tambour	972, 994
<i>kluy, kloy</i>	flute	994
<i>sgar</i>	drum	1308

In Cambodia today, these musical instruments are known as follows : *kong mong* (bossed gong), *kong vung* (circle gong), *peat* (half-moon gong or flat disc), *ching* (small hand cymbals), *kandoeng* (bell), *sampho* (small, double-headed barrel drums), *skor yol* (suspended barrel drum), *skor thom* (large double-headed barrel drum), *skor* (cylindrical drum), *memm* (bowed monochord), *ksaey mouy* (musical bow or plucked monochord), *tror* (fiddle), *chapey dong veng* (long-necked lute), *pinn* (angular harp or arched harp), *sralai* (quadruple-reed oboe) and *saing* (conch), and *roneat* (xylophone) (Sam Ang Sam 2002:17-23). Shorto provides the terms *skɔː*, *sgər*, *sgəər* for drum along with cognates from other Mon-Khmer languages (Shorto 2006: 65, 241).

³ Data provided by Eileen Lustig.

The circle gongs with 8 or 9 gongs are known today in Cambodia as *kong wong chamnet key* or *kong wong* similar to the bas relief illustrations in Angkor Wat. It is played in an ensemble for cremation called *wong dontree traming*, together with a quadruple-reed oboe, srolay, barrel drum, *skor thom muy*, and suspended bossed gong, *kong thom* (Gaṇākammakar 2003). In other places, the ensemble is called *kong skor*, and the instruments are called *kong wong*, *sralai*, *kong* and *skor thom* respectively (Figure 25) (An Raksmei, Siem Reap, pers. comm. December 2019). In northeast Thailand, particularly in Surin, Buriram and Sisaket where the Khmer people have settled a long time ago, the circle gongs are simply called *khong wong* with 8 gongs, which are also played during cremation ceremonies.

Over a period of several centuries, from the seventh century to the present, the nomenclature of Khmer musical instruments has changed. Significantly, only the Old Mon-Khmer *sgar* exists today as *skor*, referring to drum, of different profiles and types. Likewise, the Old Khmer *kluy* or *kloy* for flute is known today as *khluy* in modern Khmer (Sam-Ang Sam 2002:27), in Thailand as *khlui* (Miller 1998b: 235), and in Laos as *khui* (Miller 1998a:318).

Gongs in shipwrecks

Bossed gongs are not depicted on the five galleries mentioned above which dates to the 12th century. And yet, the archaeological records of excavated bossed gongs in four shipwrecks on the Gulf of Thailand from the 12th-13th to the 16th century and as far as the Java Sea, Borneo and Mindanao attest to the presence and wide distribution of bossed gongs in maritime Southeast Asia. During this period, bossed gongs have already been circulating in the Gulf of Thailand as evidenced by four shipwrecks with bossed gongs as part of their cargo. All these ships, with three originating from Thailand and one from Southern China, also carried Thai tradeware as part of the cargo. It must also be noted that some were also carrying Vietnamese and Chinese tradeware, but without any Khmer ceramics (Wong Wai Yee 2010). However, the 13th century Butuan ship buried boat in mud and excavated on Mindanao, Philippines with 1 bossed gong, cymbal, and bells carried Khmer, Thai, Cham and Chinese tradeware (Nicolas 2009:68; Brown 1989: 81-85). The first two shipwrecks, Java Sea and Rang Kwien, date from the Sukhothai period and the latter two, Phu Quoc and Sattahip, from the Ayutthaya Period in Thailand. These shipwrecks are described as follows (Nicolas 2009).

1) 12th - mid-13th century Java Sea (Thai or Indonesian ship) with 2 bossed gongs, the ship sailing from southern China and carrying tradeware from southern China and Thai fine-paste wares

2) 13th–14th century Rang Kwien, Thailand with 1 bossed gong and one 1 bell sailing from Thailand and headed towards Indonesia carrying Thai and Vietnamese tradeware with Chinese coins from the Hongwu period (1368–1402)

3) 14th–15th century Phu Quoc, Vietnam with 51 bossed gongs, sailing from Thailand and heading towards Borneo and the Philippines with Sisachanalai, Sawankhalok, Vietnamese tradeware.

4) 16th century Sattahip, Thailand with bossed gongs sailing from Thailand carrying Sukhothai, Sawankhalok, and Chinese tradeware.

Of particular relevance are the 14th–15th century small, bossed gong fragments found in a ceremonial site in Sungai Lumut, Brunei with Ming, Sawankhalok, Sukhothai, and Ming tradeware (Nicolas 2009). The semi-circle gongs on the bas-reliefs of the North Gallery-East Wing in Angkor Wat appear to be of the same dimensions as these gongs. These are likewise similar to the sizes the present day *gulintangan*, small bossed gongs-in-a-row in Borneo, the *kulintang* in Mindanao and Sulu, the *trompong* and *reyong* in Bali, and the double row gongs-in-rows, the *bonang* in central Java, particularly those from the Keraton Surakarta.

No bossed gongs are also illustrated at the 12th century Angkor Thom and the late 12th century Bayon. The musical instruments that are carved on the walls are mainly drums, cymbals, arched harps, and bowed lutes (Nicolas field data 2009, 2011). A study on Khmer bronze metallurgy from the 6th to the 16th century mentions the manufacture of ritual paraphernalia although gongs are not mentioned (Polkinghorne et al 2014 :328, 329; see also Leroy et al 2014; Leroy et al 2020).

Gongs in Southeast Asia

The 16th century dating of the North Gallery-East Wing of Angkor Wat where carvings of bossed gongs are depicted still presents an unresolved question as to why the grand historic procession of Suryavarman I, the founder of Angkor Wat on the South Gallery – West Wing, dated from the 12th century, is not illustrated with gongs. By this century, bossed gongs, as noted above, have already been circulating around the Gulf of Thailand down south to the Bangka-Belitung Islands, as well as along the Mindanao - Borneo – Java waters. That bossed gongs appear only in Angkor in the 16th century could only be traced to Ayutthaya.

No flat gongs are illustrated on the bas reliefs of Angkor Wat. Flat gongs have been found, however, in three sites on the south of the Gulf of Thailand --- the 12th century Pulau Bakau wreck in Riau with 8 flat gongs; the Pulau Tuka wreck with one flat gong in Lingga, Riau, Sumatra dated 1111-1127 CE; the 12th century Flying Fish wreck with 3 flat gongs off Kimanis Bay, southwest of Kota Kinabalu, Sabah; and the flat gong found in Muara Jambi found in a temple, with an inscription on its rim in Chinese with the date 1231 (Nicolas 2009)

Freeman and Jacques (2010:58) describe the big, round musical instrument as a gong (cf. Figure 8), but the features of the bas relief indicate that this is a big drum, with painted décor along the edge of the circumference, and two hand wooden beaters held by the musician. Some other illustrations of the big drum have concentric circular décor filling up the tympanum of the drum. It is also suspended from a wooden bar by means of round iron ring to support the weight of the drum. Several of these big drums are illustrated on Angkor Wat, Angkor Thom and the Bayon, where the player is depicted as a shorter figure, in effect, to show the second person bearing the bar from which the drum is hung. This technique is used where the human figures are etched so close to each other that some parts of the body, like the hands holding the drum and gong beaters can also be seen clearly.



Fig. 5 Suryavarman procession. A row of musicians – two arched horns, a small drum with a neck strap, conch shell, a trumpet, a big barrel drum showing only the tympanum hanging from a bar by a single metal ring, carried on the shoulders of two men. Photo: A. Nicolas 2009, 2011.



Fig. 6 A large barrel drum or a bossed gong suspended from an arched bar, with no player. The instrument is tied from a single spot at the upper rim like large barrel drums, but the circle on its face may look like a boss. On the extreme left is a small barrel shaped drum with a coiled strap around the player's neck. Photo: A. Nicolas 2009, 2011.

In contrast, bossed gongs are suspended by means of a rope inserted on two holes on the rim of the gong (Figures 5, 6, 7). Gongs are generally, with some exceptions like the Maguindanao *agung*, beaten with one beater with a rounded cloth at the end to produce a muffled sound. Furthermore, the size of the round object is too big for a gong. In the West Gallery - South Wing, with the story of the Battle of Kurakshetra, a picture of a procession of soldiers carrying the sacred ark shows on the extreme right an ensemble of two long trumpets, one shoulder drum, one neck drum, one conch shell, one short horn, and a big drum carried by two men and beaten by a musician with two hand beaters (Roveda 2000 : Fig.11). This is also identified as “an enormous gong beaten with a large mallet” (ibid.:30), but this is certainly a big drum with the player holding two mallets.

A similar problem can also be seen in the bas-relief of a bossed gong at the 14th century Panataran temple in East Java. Kunst likened it to the Javanese *gong ageng*, which is today the biggest bossed gong with more than a meter in width found only in the four palaces of Javanese kraton. In this bas-relief, the gong is carried by two big monkeys belonging to the group of Sugriwa that would later burn the palace of Rawana in the epic Ramayana. In the picture by Kunst (1968: fig.68), the small boss or central protrusion is visible, but in my visit there in 2009, the central part had been quite eroded, so that the boss can no longer be seen. Here, the two monkeys, identifiable with their upright tails, are depicted in size like humans, so that the big gong does appear as one that what Kunst had described as a big “gong ageng”. This depiction, however, in contrast to the Angkor Wat big drum, includes the player standing at the back of the gong, holding a long wide beater with three strips at the tip. It is rare to find in Java and Bali today that a gong, big or small, is beaten with a wooden bar or stick without a wrapped cloth at the end to muffle the sound and produce a long, booming sound.

Bossed gongs at the North Gallery-West Wing, Angkor Wat



Fig. 7 Two hanging bossed gongs, suspended by a rope and tied on two holes on the rim of the gong, carried by two men with the bar with arched ends on their shoulders. The player stands at the back, with the beater on his left hand equipped with a beater at the end of which is also wrapped with coiled cloth to muffle the sound of the gong. Photo: A. Nicolas 2009, 2011.



Fig. 8 A medium sized barrel drum suspended from an arched bar. The instrument is tied from a single spot with a ring at the upper rim like large barrel drums. On the extreme left is a small barrel shaped drum with a coiled strap around the player's neck. Photo: A. Nicolas 2009, 2011.



Fig. 9 One suspended bossed gong hanging from a straight bar borne by two seated men. The man at the back beats on the boss of the gong with a beater equipped with a coiled cloth wrap, which is still practiced today in many parts of Southeast Asia where gongs are played during processions and parades. The gong hangs from the bar by means of a rope that had been attached to two holes on the rim of the gong. Photo: A. Nicolas 2009, 2011.

Gongs-in-rows and gong circles – some contemporary forms

While there are no temple bas reliefs of gongs-in-rows (also known as gong chimes) in Thailand, Cambodia or Java, the 16th century dating of the gong circles on Angkor Wat provide a basis for ascertaining the relationship between gongs-in-rows and gong circles in some parts of Southeast Asia. This presupposes that gongs-in-rows, that is, gongs laid in a horizontal frame, predated the gong circles. The term *culintangan*, which is also known today as *kulintang* or *kulintangan*, also gongs-in-a-row in Mindanao (Nicolas 1977; Maceda 1998), was noted by Combes in the 17th century among the Bagobo in Mindanao, with an *aghon* (*agung*, suspended bossed gong with wide turned-in rim and high boss) and a drum (*guimbao*, today known as *gimbal*) being played to accompany trance ceremony (Combes 1667, in B&R 40:135). Dampier saw a *culintangan* with 16 gongs laid in a row (Dampier 1697, in B&R 39:41). In Mataram Java during the mid-17th century, Van Goens noted the several hundred ensembles playing gongs, without any references however to their types, for a large gathering of about 200 gong ensembles for a tournament called *senenan* (Kunst 1949:115-116; Goens 1656). These three 17th century references on gongs from the Mindanao and Java then follow the 16th century dating of the gong circles on Angkor Wat.

One rare example of a gongs-in-a-row called *khong rang* is kept today at the National Museum in Bangkok.

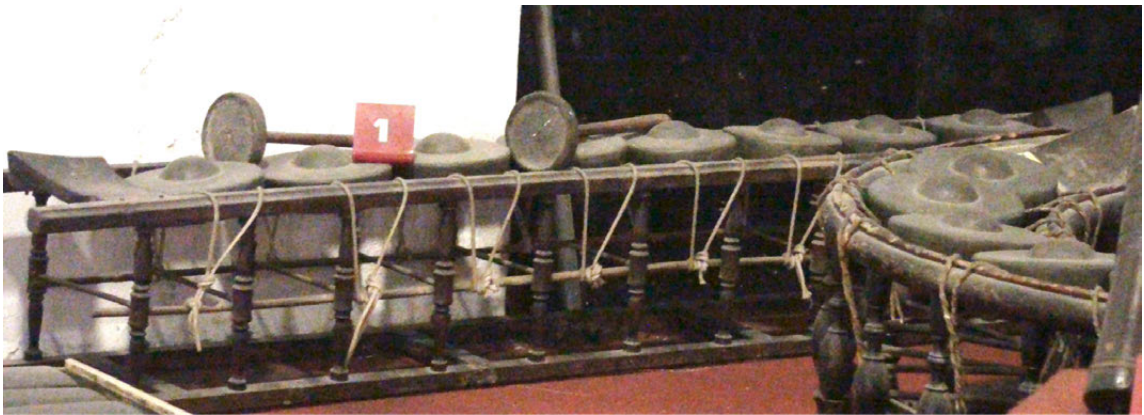


Fig. 10 Khong rang, 8 bossed gongs-in-a-row, at the National Museum, Bangkok. Photo: A. Nicolas 2009.

In Java, an old picture of the *gamelan talu* or East Javanese carabalen shows four curved frames (*canchakan*) with 6 medium sized bossed each, by far the only one of its kind in Java and Bali where only horizontal gongs, or gong-in rows are found (Kunst 1949: II, ill. 114, p. 437).

A remote connection may be inferred from the several visits of Thai kings and princes to Java -- King Chulalongkorn (Rama V) to the Surakarta kraton (palace) of Susuhunan Pakubuwono X in 1896 and 1901; H.M. Prajadhipok (Rama VII) in Surakarta; (H.R.H.) Bhanurangsi Savangwongse, Prince Baripatra and the troupe in 1908; His Royal Highness (H.R.H.) Baripatra Sukhumbhand (Prince of Nakhon Sawan) visit to Bandung in 1932. In these visits, musical exchanges of *gamelan* and *piphat*, including *angklung* were some of the highlights (Jamnongsam 2014: 63-65).

Across Myanmar, Thailand, Laos and Cambodia today, gong circles are found with differing number of bossed gongs in each frame, ranging from 6, 8, 9, 10, 13, 15, 16 up to 18 graduated gongs. The number of gongs certainly determine the melodic range of the musical pieces played on this instrument.



Fig. 11 Thai *ranaad ek* (xylophone with wooden bars) played by Wongsaphat Santhong (left); *ranaad thum* (xylophone with bamboo bars) played by Tarunya Puthirat (right); *sawng-na* (double headed cylindrical drum) played by Pitsanu Boonsrianan (back) at the College of Music, Mahasarakham University. Photo: A. Nicolas 2021.



Fig. 12 Thai *khong wong yai* with 16 bossed gongs and *khong wong lek* with 18 bossed gongs. College of Music, Mahasarakham University. Photo: A. Nicolas 2021.



Fig. 13 *Khong wong yai*, circle gong with 16 bossed gongs, Ban Sawai, Surin, Thailand. Photo: A. Nicolas 2003.

In Cambodia today, gong circles called *khong vong* with 8 or 9 gongs, are played in cremation ceremonies.

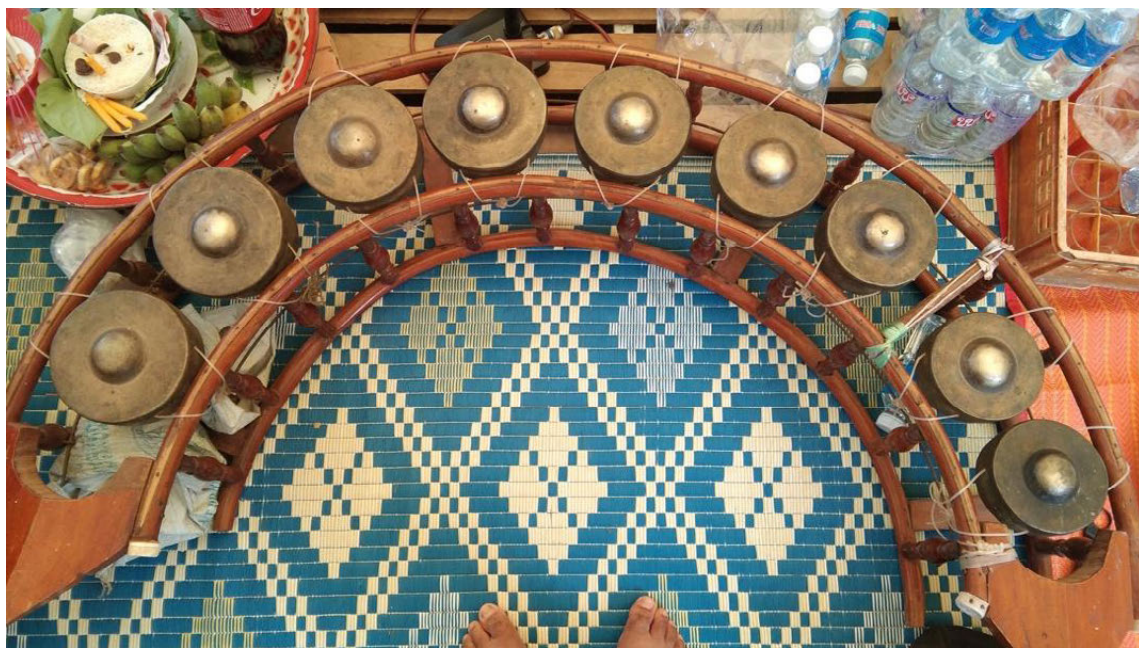


Fig. 14 *Khong vong*, circle gong with 9 bossed gongs. Photo courtesy of ម៉ែ សាម៉េត វ៉ាឡាផុន Mai Samoeut Vathayphon.

Contemporary forms of gong circles with 18 gongs, which are played in pairs, one tuned an octave higher than the other, are more common now in Thailand (*kong wong yai* with 16 gongs, and *kong wong lek* with 19 gongs), Cambodia, Laos and Myanmar.

A unique ensemble known as *piphat mon* in Thailand employs upright gong circles with elaborately carved wooden frames, with some ensembles engaging some 10 or more *kong mon wong*, which are decorated with peacock feathers on both ends of the upright frame and flickering small bulb chains.



Fig. 15 *Piphat mon* ensemble with upright three *khong mon wong* with 15, 16, and 17 gongs. Mahasarakham University College of Music. Photo courtesy of Siva Nimnuan 2015.



Fig. 16 *Khong mon wong* frame artist. Ayutthaya, Thailand. Photo: A. Nicolas 2010.



Fig. 17 *Khong mon wong*, upright gong circle with 18 bossed gongs (1 missing). National Museum, Bangkok. Photo : A. Nicolas 2009.



Fig. 18 *Khong mon wong*, upright circle gong with 15 bossed gongs, Mahasarakham, Thailand. Photo: A. Nicolas 2017.



Fig. 19 *Khong mon vong*, circle gong with 18 bossed gongs. Mon Arts and Cultural Center, Bang Kradi, Bangkok. Photo: A. Nicolas 2013.



Fig. 20 *Khong mon vong*, circle gong with 18 bossed gongs within its carved, ornate full round frame. Mon Arts and Cultural Center, Bang Kradi, Bangkok. Photo: Chaloempol Lohamart 2013.



Fig. 21 Mat-bwan: upright gong circle with 13 bossed gongs. Bo village, Shan State, Myanmar.

Photo: Chaloempol Lohamart.



Fig. 22 *Kyi naung*. In Myanmar, an 18-gong circle called *kyi naung* may also be equipped with additional 13 to 18 upright gongs in 4 sets of 4, 3 and 2 distributed around the circle, thus augmenting the number up to 36 gongs. Photo courtesy of U Soe Lwin (Nhe Sayar), Kan Thar Aye Village, Kantaung, Meikhtila Township, Myanmar.



Fig. 23 *Kantruming* កាំត្រូមីង. Music played for a wake and cremation made up of an ensemble of a gong circle, khong vong, with 8 bossed gongs, a *sralai* (oboe), a *khong* (big gong) and a suspended barrel drum (*khong skor*). These instruments are illustrated in the painting on Angkor Wat. Photo courtesy of An Raksmeay, Siem Reap, Cambodia.

A painting on the walls of Wat Ban Yang, a temple in the Isan region of Borabue, Mahasarakham has illustrations of some instruments in the painting of Angkor Wat – but with additional Isan music instruments – The musical instruments as illustrated below are from left to right – xylophone (*ranaad*), an 8-gong circle (*khong wong*), a pair of cymbals (*chab nay*), an oboe (*pī*), a pair of round drums (*klong thad*), a goblet shaped drum (*thon*) and a pair of cymbals (*chāb hiy*) leading the group. On the upper tier are a group of women in the parade, who dance to the music.



Fig. 24 Outer wall painting of musicians playing and walking in revelry. Wat Ban Yang, a temple in the Isan region of Borabue, Mahasarakham. Photo: A. Nicolas 2021.

Conclusion

The wide distribution of gong circles today in Cambodia, Laos, Thailand and Myanmar attests to the firm tradition of continuity of this musical instrument, along with the others as illustrated on the walls of Angkor Wat. Certainly, what has been changing is the number of bossed gongs in the frame, as needed for the performance of melodies for each ensemble and the diverse musical styles that have developed in the northern part of mainland Southeast Asia.

Acknowledgments

I wish to thank with much gratitude Manop Wisuttipat, Jeremy Martin, Eileen Lustig, Terry Lustig, Nicolas Revire, Pyiet Phyo Kyaw, Mai Samoeut Vathayphon, Siva Nimnuan, U Soe Lwin, An Raksmei, Piphall Heng, Anant Nakkong, Surasak Jamnongsan, Pitsanu Boonsrianan, Chaloeapol Lohamart, Arthid Khamhonga, and Nantawat Rattanawong, who all have provided some of the data and pictures in this paper.

References

- Boisselier, J (1962) Note sur les bas-reliefs tardifs d'Angkor Vat. *Journal Asiatique*, 250: 244-246.
- Boonsrianan, P (2019) Piphat Se-pha ensemble of Thai classical Music. Paper presented at The Second International on Research and the 23rd Asia-Pacific Society for Ethnomusicology (APSE) International Conference, June 13-14, 2019, Roi-Et, Thailand.
- Brown, R (1989) Guangdong: A Missing Link to Southeast Asia. In: R Brown (ed.) *Guangdong Ceramics from Butuan and other Philippine Sites*. Manila: Oriental Ceramic Society of the Philippines and Oxford University Press.
- Cœdès, G (1911) *Les bas-reliefs d'Angkor Vat*. Paris: Bulletin de La Commission Archeologique de l'Indochine.
- Cœdès, G (1962) La date d'exécution des deux bas-reliefs tardifs d'Angkor Vat. *Journal Asiatique*, 250: 235-243.
- Cœdès, G (1962b) Deux bas-reliefs tardifs d'Angkor Vat. *Journal Asiatique*, 250(2): 235-244.
- Combes, F (1667) Historia Mindanao y Jolo. In: E Blair and J Robertson (eds.) *The Philippine Islands*, 1493-1898.
- Dampier, W (1697) Historia Mindanao y Jolo. In: E Blair and J Robertson (eds.) *The Philippine Islands*, 1493-1898.
- Gaṇākammakar Srāvjrāv Silpā Vappadhaṃ (2003) *Dassanīyabhāb Khmaer* [Khmer performing arts]. Phnom Penh: Gaṇā Kammakār Srāvjrāv Sīlpa Vappadhaṃ.
- Garfias, R (1985) The Development of the Modern Burmese Hsaing Ensemble. *Asian Music*, 16(1): 1-28.
- Goens, R (1656) De sammenvattende geschriften. In: HJD Graaf (ed.) *De Vijf Gezantschapsreizen van Rijklof van Goens naar het Hof van Mataram*, 1648-1654. The Hague: Nijhoff for Linschoten-Vereeniging, 173-269.
- Groslier, G (1921) Chapitre XII. Les instruments de musique. In: G Groslier (ed.) *Recherches sur les Cambodgens*. Paris.
- Hendrickson, M and Evans, D (2015) Reimagining the City of Fire and Iron: A landscape Archaeology of the Angkor-Period Industrial Complex of Preah Khan of Kompong Svay, Cambodia (ca. 9th to 13th centuries A.D.). *Journal of Field Archaeology*, 40(6): 644-664.
- Jacques, C and Freeman, M (1997) *Angkor: Cities and Temples*. Bangkok: River Books.
- Jamnongsarn, S (2014) Interaction of Music as a Soft Power in the Dimension of Cultural Diplomacy between Indonesia and Thailand. *International Journal of Creative Art and Studies*, 1(1): 58-69.

- Kunst, J (1949) *Music in Java. Its history, its theory and its technique*. The Hague: Martinus Nijhoff.
- Leroy, S, Bauvais, S, Delque-Koli, E, Hendrickson, M, Josso, N, Dumoulin, J-P and Soutif, D (2020) First experimental reconstruction of an Angkorian iron furnace (13th–14th centuries CE): Archaeological and archaeometric implications. *Journal of Archaeological Science: Reports*, 34: 102592.
- Lohamart, C (2014) Music and Ancestor Veneration among the Mon at Bangkadié Village, Bang Khun Thian District, Bangkok. Paper presented at 18th International Conference of the Asia-Pacific Society for Ethnomusicology, January 10-17, Mahasarakham, Thailand.
- Maceda, J (1998) *Gongs and Bamboo: A Panorama of Philippine Music Instruments*. Quezon City: University of the Philippines Press.
- Mannikka, E (1985) Angkor Wat. Meaning through Measurement. Volumes I and II. PhD thesis, University of Michigan, Ann Arbor.
- Mannikka, E (1997) *Angkor Wat: Time, Space and Kingship*. St. Leonard's, NSW: Allen & Unwin.
- Miller, T (1998a) Laos. In: T Miller (ed.) *Garland Encyclopedia of World Music Volume 4: Southeast Asia*. New York and London: Garland Publishing Company, 335-362.
- Miller, T (1998b) Thailand. In: *Garland Encyclopedia of World Music Volume 4: Southeast*. Miller, T (ed.). New York and London : Garland Publishing Company, pp. 218-314.
- Morton, D (1976) *The Traditional Music of Thailand*. Berkeley: University of California Press.
- Nicolas, A (ed.) (1977) *Ang mga Kulintang sa Mindanao at Sulu* [The Kulintang in Mindanao and Sulu]. Long playing record with annotations. Quezon City: University of the Philippines, College of Music.
- Nicolas, A (2009) Gongs, Bells, and Cymbals: The Archaeological Record in Maritime Asia from the Ninth to the Seventeenth Centuries. *Yearbook for Traditional Music*, 41: 62-93.
- Nicolas, A (2021) Musical Nomenclature for the Sanskrit term kangsa in Southeast Asia. In: HP Ray (ed.) *The Archaeology of Knowledge Traditions in the Indian Ocean World*. London and New York: Routledge, 212 -242.
- Polkinghorne, M, Vincent, B, Thomas, N and Bourgarit, D (2014) Casting for the King: The Royal Palace bronze workshop of Angkor Thom. *Bulletin de l'Ecole française d'Extrême-Orient*, 100: 327-358.

- Polkinghorne, M, Pottier, C and Fischer, C (2018) Evidence for the 15th century Ayutthayan occupation of Angkor. In: *The Renaissance Princess Lectures in Honour of Her Royal Highness Princess Maha Chakri Sirindhorn on Her Fifth Cycle Anniversary*. Bangkok: The Siam Society, 99-132.
- Ringis, R (1990) *Thai Temples and Temple Murals*. Singapore: Oxford University Press.
- Roveda, V (2000) The use of drawings for the making of the reliefs from Angkor Wat. In: W Lobo and S Reimann (eds.) *Southeast Asian Archaeology 1998: Proceedings of the 7th International Conference of the European Association of Southeast Asian Archaeologists, Berlin, 31 August - 4 September 1998*. Hull: Centre for South-East Asian Studies, University of Hull, 169-176.
- Roveda, V (2002) *Sacred Angkor: The Carved Reliefs of Angkor Wat*. Bangkok: River Books.
- Sam-Ang Sam (2002) *Musical Instruments of Cambodia*. Senri Ethnological Series 29. Osaka: National Museum of Ethnology.
- Shorto, HL (2006) *A Mon-Khmer Comparative Dictionary*. Canberra: Research School of Pacific and Asian Studies, The Australian National University.
- Tan, NH, Im, S, Heng, T and Khieu, C (2014) The Hidden Paintings of Angkor Wat. *Antiquity*, 88(340): 549-565.
- Thompson, A (2004) Pilgrims to Angkor: A Buddhist 'Cosmopolis' in Southeast Asia? *Bulletin of the Department of Archaeology, Royal University of Fine Arts*, 3: 88-119.
- Vickery, M (1977) Cambodia After Angkor: The Chronicular Evidence for the Fourteenth to Sixteenth Centuries. PhD thesis, Yale University, New Haven, CT.
- Vickery, M (2004) Cambodia and its Neighbors in the 15th Century. Working Paper 27. National University of Singapore Asia Research Institute. Available at: <https://ari.nus.edu.sg/publications/wps-27-cambodia-and-its-neighbors-in-the-15th-century/> [accessed 28 October 2021].
- Wisuttipat, M (2011) Pipat Tradition in Mainland Southeast Asian Nations: Traditional Music in Thailand and Cambodia. *Expresi Seni. Jurnal Ilmu Pengetahuan dan Karya Seni*, 13(2): 202-219.
- Wong, WY (2010) A Preliminary Study of some Economic Activities of Khmer Empire: Examining the relationship between the Khmer and Guangdong Ceramic Industries during the 9th to 14th Centuries. PhD thesis, National University of Singapore, Singapore.