

# 2009 YEARBOOK FOR TRADITIONAL MUSIC

*Volume 41*

ARND ADJE BOTH  
Guest Editor

DON NILES  
General Editor

FREDERICK LAU  
Book Reviews

MARGARET SARKISSIAN  
Audio Reviews

LISA URKEVICH  
Film/Video Reviews

SUZEL ANA REILY  
Website Reviews

*Published by the*  
INTERNATIONAL COUNCIL FOR TRADITIONAL MUSIC

*under the auspices of the*  
UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION  
(UNESCO)

# GONGS, BELLS, AND CYMBALS: THE ARCHAEOLOGICAL RECORD IN MARITIME ASIA FROM THE NINTH TO THE SEVENTEENTH CENTURIES

by Arsenio Nicolas

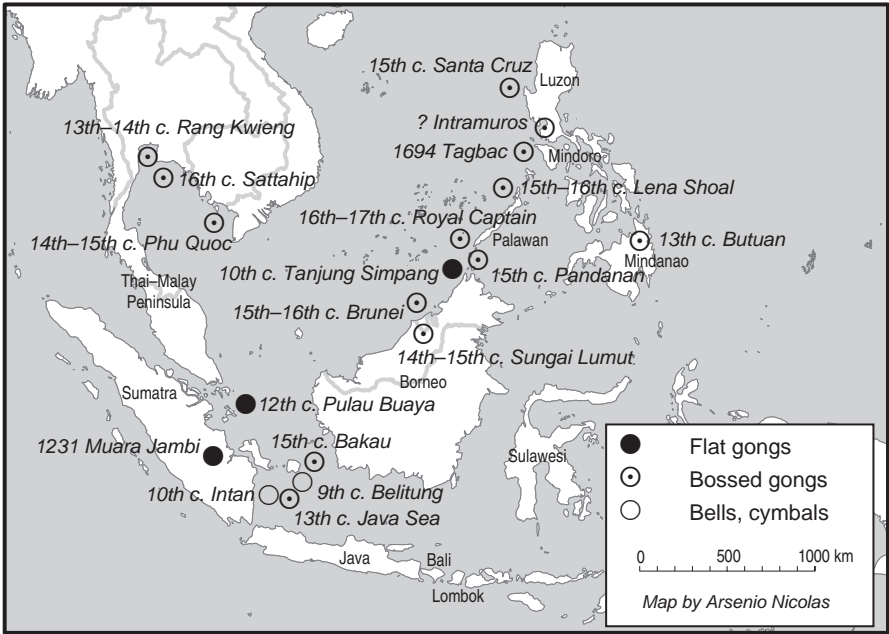
The growth and expansion of maritime trade in the first millennium CE altered the musical landscape of Asia, from earlier Austronesian and Austroasiatic migrations, to the early contacts with India, China, Arabia, and the continuing navigation towards the Pacific and Oceania.<sup>1</sup> Much later in the tenth century, Chinese chronicles describe that peoples from the south called Luzoes (Luzon, Philippines) had invaded its southern shores, while Indian histories record the voyages of sailors from western Indonesia. By the eighth century, Austronesian languages from Borneo had spread towards Madagascar. A trade centred on beads, tin, copper, pottery, ceramics, natural products, and food also carried musical instruments and musicians bearing new ideas in music making and ritual life.

By the tenth century, it is certain that flat gongs were in use in Borneo, Sumatra, and the Thai–Malay Peninsula, with links to Hoysala in India, Vietnam, and China, a route that certainly passed through the Philippines, where flat gongs are today played by around eleven indigenous groups in highland northern Luzon. The evidence presented in this paper comes from shipwrecks with gongs, bells, and cymbals from an area defined by Luzon, Palawan, Mindanao, Borneo, Java, Sumatra, the Thai–Malay Peninsula, Thailand, and Cambodia. While this area corresponds to present-day Southeast Asia, certainly the network of exchange and distribution extended to the east to Oceania, to China in the north, and to India, Africa, and the Mediterranean in the west. The closure of the overland silk trade routes was a direct result of the rise of maritime trade in Asia, which in many ways resulted in the rise of new empires, kingdoms, and colonies, the spread of Indic and Chinese religions and philosophies, and the still undocumented and little studied role of polities in the region in cultural and musical exchanges before the sixteenth century. The slow pace of archaeological research in relation to music history and the dominance of studies on empires and kingdoms—largely based on writing, temple architecture, and dynastic histories—have produced a focus less on musics at the margins, less on cultures without music notation, and less on peoples without histories.

There are presently nineteen sites with identified musical instruments in a maritime archaeological setting, the chronology of which may be divided into two general periods (figure 1; table 1). The first period covers the ninth to the thirteenth centuries, during which cymbals, bells, and flat gongs appeared in maritime and inland archaeological sites. The second period begins in the thirteenth century and

---

1. The first ideas of this paper were conceived sometime in November 1974, during a conversation with Prof. Jose Maceda, when we were notating, playing, and recording his composition, *Atmospheres*, thereafter renamed *Ugnayan*, a piece for twenty radio stations, broadcast in Manila on 31 December 1974. Prof. Maceda suggested that the study of a history of gongs in Asia can be related to the much better documented ceramic finds.



**Figure 1.** Distribution map of gongs, bells, and cymbals in Southeast Asian archaeological sites, ninth to seventeenth centuries.

continues up to the seventeenth century, during which time bossed gongs dominate the maritime records in shipwrecks and buried boats along coastal regions. These sites are located along the principal maritime trade routes that connected Asia with Africa and the Mediterranean. The dating of the shipwrecks derives primarily from the ceramics and tradeware in these ships, with some from radiocarbon dating and dated coins. The following descriptions for each shipwreck are based on the archaeological studies that have been so far published. For each site, a summary of the ceramics cargo is provided to ascertain dating and provenance, as well as possible ports of origin and destinations, thereby tracking possible routes of transport and spread. A discussion of the gongs found in shipwrecks in the Philippines is highlighted at the end. Three types of gongs are found in these shipwrecks: (1) flat gongs with narrow, straight rims; (2) bossed gongs with low bosses and narrow, turned-in rims; and (3) bossed gongs with low bosses and narrow, straight rims. And, in addition to cymbals, three types of bells are also found: pellet bells, prayer bells, and suspended bells.

1) *9th century: cymbal. Belitung wreck, Gelasa Strait, between Bangka and Belitung Islands off Sumatra and West Java (Indonesia)*

The earliest maritime record of a musical instrument is a single cymbal found in the Belitung shipwreck. Although not perfectly preserved, it measures 30.5 cm in diameter and has a small hole through the centre of the boss (Michael Flecker,

<i>date</i>	<i>shipwreck</i>	<i>musical data</i>	<i>port of origin</i>	<i>destinations</i>	<i>dating</i>
<b>CYMBALS, BELLS</b>					
1) 9th c.	Belitung, south Sumatra (Indian or Arab ship)	cymbal	Hunan	Srivijaya Indian Ocean Middle East	Changsa ware Tang period (618–906) bowl, dated 826 radiocarbon dating: 9th c.
2) 10th c.	Intan, south Sumatra (Indonesian ship)	<i>ghanta</i> , pellet bells <i>khakkhara</i> , finial rattles	Sumatra	Java	radiocarbon dating tradeware: Chinese, Thai
<b>FLAT GONGS</b>					
3) 10th c.	Tanjung Simpang, north Borneo	61 flat gongs	China	Philippines Borneo	Song ceramics (960–1127)
4) 12th c.	Pulau Buaya, Riau, Sumatra	8 flat gongs	Guangdong Fujian	—	Southern Song ceramics (1127–1279)
5) 1231	Muara Jambi, Sumatra	1 flat gong, with inscription on the rim of the gong	found in temple site	—	Jambi trade with China, Southeast Asia, India, Arabia
<b>BOSSED GONGS</b>					
6) 13th c.	Butuan, Mindanao	1 bossed gong cymbal, bells	(buried boat in mud)	—	radiocarbon dating tradeware: Chinese, Khmer, Thai, Cham
7) mid-13th c.	Java Sea (Thai or Indonesian ship)	2 bossed gongs	southern China	—	tradeware: southern China Thai fine-paste wares
8) 13th–14th c.	Rang Kwien, Thailand	1 bossed gong 1 bell	Thailand	Indonesia	radiocarbon dating tradeware: Thai, Vietnamese, Chinese coins, Hongwu period (1368–1402)
9) 14th–15th c.	Sungai Lumut, Brunei	<i>gulingtangan</i> fragments (small bossed gongs-in-a-row)	(found in ceremonial site)	—	tradeware: Ming, Sawankhalok, Sukhothai

**Table 1.** Chronological list of gongs, cymbals, and bells in archaeological sites, possible routes, and dating—*beginning*

<i>date</i>	<i>shipwreck</i>	<i>musical data</i>	<i>port of origin</i>	<i>destinations</i>	<i>dating</i>
10) early 15th c.	Bakau, Sumatra	1 bossed gong	Guangzhou	Ayutthaya Indonesia Philippines	radiocarbon dating Yongle coin (1403–24) tradeware: Longquan, Vietnamese, Sawankhalok, Sukhothai Thai storage jars
11) 14th–15th c.	Phu Quoc, Vietnam	51 bossed gongs	Thailand	Borneo Philippines	tradeware: Sisachanalai, Sawankhalok, Vietnamese
12) 15th–16th c.	Brunei	2 bossed gongs	—	—	tradeware: Chinese, Burmese/ Thai, Vietnamese
13) 15th–16th c.	Lena Shoal, Busuanga, north Palawan	bossed gongs	Zhejiang or Fujian	Vietnam Thailand Philippines	tradeware: Jingdezhen, Longquan, Guangdong, Burmese/Thai
14) 15th c.	Pandanan, south Palawan	6 bossed gongs	Champa Thailand Malacca Borneo	Philippines	tradeware: Champa (Bin Dinh), Dai Viet, Thai, Longquan copper coin: Yongle reign (1403– 24)
15) late 15th c.	Santa Cruz, Zambales	bossed gongs	China Vietnam	Luzon Mindanao Borneo	tradeware: Longquan, Zhejiang, China; Vietnam; Si Satchanalai, central Thailand; Burma
16) 16th–17th c.	Royal Captain Shoal, south Palawan (wreck 2)	35 bossed gongs	Zhejiang or Fujian	Philippines Borneo	tradeware: Wanli period (1530– 1620)
17) 16th c.	Sattahip, Thailand	bossed gongs	Thailand	—	tradeware: Sukhothai, Sawankhalok, Chinese
18) 1694	<i>San Jose</i> galleon, Tagbac, Lubang Island, Oriental Mindoro	1 bossed gong	—	—	—
19) ?	Intramuros, Manila	1 bossed gong	—	—	—

**Table 1.** Chronological list of gongs, cymbals, and bells in archaeological sites, possible routes, and dating—*conclusion*

email, 5 January 2005).<sup>2</sup> The shipwreck is the earliest evidence of trade between the Indian Ocean, Southeast Asia, and China during the latter part of the first millennium. It is also the first and only Arab or Indian ship to be found in Asia. The boat was headed from Hunan to the Indian Ocean or the Middle East carrying a cargo of Changsa ware (Tang dynasty, 618–906). Dating the ship is based on a bowl inscribed with a date equivalent to 826, while a carbon-14 analysis confirms the ninth-century date of the cargo (Flecker 2001:348).

2) *10th century: bells and khakkhara finial rattles. Intan wreck, 64 km off Sumatra, between Bangka Island and Jakarta (Indonesia)*

The Intan ship was probably bound from Palembang to Java (Flecker 2002:29–30). The diverse cargo includes bells of various kinds—*ghanta* and pellet bells, and bells with the *vajra* sceptre. There are also *khakkhara* or rattle finials mounted on the wooden staffs of Buddhist mendicant monks (Kunst 1968:53–54, fig. 71). These finds are significant in the context of the development of Tantric Buddhism in ninth-century Indonesia, with a spread in the eleventh- and twelfth-century Padang Lawas sites in north Sumatra and on Java during the final decades of the Central Javanese Period and the Eastern Javanese Period. The recovered cargo consists of Chinese Yue or Yue-type ware, Middle Eastern vessels, Thai fine-paste ware, Indonesian gold jewellery, base metal ingots of bronze, tin, lead, and silver, bronze religious artefacts, and iron pots, including Arab glass (Flecker 2002:101–20). Radiocarbon dates indicate the tenth century (*ibid.*:121).

3) *10th century: 61 flat gongs with narrow, straight rims. Tanjung Simpang, Sabah (East Malaysia)*

The earliest maritime records of flat gongs in Asia so far are the sixty-one flat gongs recovered in a sunken ship with a cargo of Chinese Northern Song ceramics (960–1127). The flat gongs range in diameter from 41 to 43 cm, and weigh between 3 and 4 kg (figure 2a; table 2). There may be another two hundred gongs remaining on the site,<sup>3</sup> indicating their high demand among the Chinese communities in the region. The ship probably sailed directly from China and passed by the Philippines on its way to Borneo.

All the flat gongs have scripts on the ventral side. One stack of gongs has a different mark from the others, similar to the “potter’s marks” on ceramics found in the same cargo.<sup>4</sup> This is either the name of the merchant carrying the gongs in the ship or the name of the receiver of the gongs at their destination. One of the names appearing is the surname Guo (in Mandarin; in Hokkien: Kwek or Quek) (figures 2b–2c) (Geoffrey Philip Wade, email, 16 October 2004).

4) *12th century: eight flat gongs, with narrow, straight rims. Pulau Buaya, Lingga Archipelago, Riau (Indonesia)*

The Pulau Buaya shipwreck yielded eight flat gongs, six in reasonable condition and all with green patina. These gongs range from 27.0 to 29.5 cm in diameter,

2. See also: <http://maritime-explorations.com/belitung.htm>.

3. See also: <http://www.maritimeasia.ws/tsimpang/>.

4. See also: <http://maritimeasia.ws/tsimpang/marks.html>.

with a narrow, straight rim width from 4.5 to 6.0 cm, and a thickness from 0.5 to 0.8 cm (table 2). They are resonant when struck (Abu Ridho and McKinnon 1998:53; pl. 50 shows two flat gongs with straight rims). The cargo of this ship yielded a ceramic assemblage from the beginning of the Southern Song (1127–1279) from Guangdong and Fujian, and a few pieces from Jingdezhen, Jiangxi province. The Guangdong wares bear a resemblance to those found at Muara Jambi and other sites associated with the ancient polity of Melayu on the Batang Hari River in Jambi around the eleventh century (*ibid.*:v, 83).

5) *13th century: flat gong with narrow, straight rim, with dated inscription 1231. Muara Jambi, Sumatra (Indonesia)*

A bronze flat gong with an inscription on its rim bearing a date of 1231, coinciding with the Song dynasty, was found during the restoration of Candi Kembar Batu in Muara Jambi, Sumatra. Some of the most important finds were two headless Prajnaparamita images, similar in style to that of Singasari (early to mid-thirteenth century), a fragment of a black stone Thai Buddha (early Ayodhya style, mid to late fourteenth century), tenth- to fifteenth-century Chinese ceramics, Sawankhalok wares, and local earthenware. McKinnon concluded that Muara Jambi was a strong religious and economic centre, maintaining political and trading connections with Java, China, Thailand, India, and Arabia. This centre was equipped with a riverine harbour network linking it with the inland forests that provided products for the international maritime trade (McKinnon 1984:28). Machi Suhadi has published a transcription of the inscription (1985); a translation by Salmon is provided here:

The fourth year of the Shaoding era, the seventh month, the twenty-fifth day [1231. 8. 24], [it is declared that] Prefect (*zhijun*) and Great Master Hong, within the scope of his position (*rennei*), has placed two big military (*junqi*) bronze gongs (*tongluo*) into the armory for use. (Salmon 2003a:109; additions in parentheses and square brackets are found in Salmon's translation; the original Chinese text can be found in this source as well)



**Figure 2.** Tanjung Simpang flat gong (a) and ceramics with “potter’s marks” (b-c) (photos: Sten Sjostrand).

The two flat gongs were procured for the armoury, probably used for military purposes as signal instruments or for war. Salmon proposed that the recovered flat gong was brought to Jambi from China when Great Master Hong was appointed prefect of a local administrative post in the trading port (*ibid.*:110). This flat gong measures 45 cm in diameter and about 6–7 cm on its straight rim, with two holes on its rim (*ibid.*:98) (table 2). It is thus certain that the term *tongluo* as used in this inscription refers to flat gongs during the Song period.

6) *13th century: bossed gong with narrow, turned-in rim, cymbal, and bells. Butuan, northeastern Mindanao (Philippines)*

The earliest archaeological record of music in the Philippines so far appears in Butuan, Agusan, in Mindanao, yielding a bossed gong, a cymbal, and bells, in association with wooden coffins and boats. The bossed gong measures 54.0 cm in diameter and 11.7 cm in height (table 3). It was found in a ship with a carbon dating of 1250. The range of trade goods included tenth-century Chinese trade-ware, dated from the Five Dynasties (907–960) through the Ming dynasty, and Thai, Vietnamese, and Middle Eastern products, ceramic shards, and earthenware (Ronquillo 1987, 1989; Abinon 1981:1).<sup>5</sup>

The greater part of the artefacts is related to metalworking—more than a hundred intact clay crucibles, worked stone and clay gold-melting discs, and wooden tools like a pincer, pick, and knife (Ronquillo 1987:95). Further studies are necessary to ascertain if there was gong manufacturing in this area. There were also iron, bronze, lead, silver, and gold objects, rings, bronze mirrors, gold fragments, a Chinese coin attributed to Emperor Tai Tsu (1368–98), and a strip of a silver plate with an inscription of possibly a Buddhist prayer (Lim 1987:57). Butuan's trade relations with Asia are evidenced by the trade ceramics found in the area, arranged here according to their quantity: Chinese (tenth to fifteenth centuries); Khmer (ninth to tenth centuries); Thai (fourteenth to fifteenth centuries); Haripunjaya (800–900), pre-trade Vietnamese (or Champa?; eleventh to thirteenth centuries), and Persian (ninth to tenth centuries) (Ronquillo 1987:74–75; Lim 1987; Cembrano 1998:37; Burns and Brown 2003; Brown 2003).

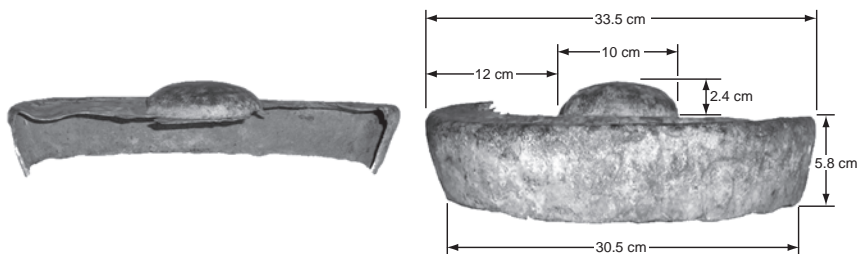
Another bossed gong was found in the vicinity of Butuan, in the Colorado Site, Jabonga, Agusan del Norte. This measures 33.5 cm in face diameter, 30.5 cm base diameter, and 5.8 cm in rim width (figure 3).

7) *Mid-13th century: two bossed gongs. Java Sea (Indonesia)*

Two bossed gongs were recovered from the Java Sea wreck. The better preserved piece has a diameter of 27 cm, with a central boss 6 cm in diameter (table 2). The other fragment also has a central protrusion 6.5 cm in diameter (Mathers and Flecker 1997:86). Despite the deformation resulting from corrosion, it is evident that the gongs are not large.

5. Radiocarbon dates are suggestive, rather than conclusive. Estimated carbon dating: Boat 1 (1630±110 years, or 320 CE); Boat 2 (700±790 years, or 1250); Boat 5 (900±70 years, or 900 CE). The first dating, 320 CE, is still problematic. One of the three boats is now on exhibit at the National Museum in Manila.





**Figure 3.** Butuan bossed gong, Butuan Provincial Museum (photos: Linricon Absuelo).

The ceramic cargo is dated to the mid-thirteenth century, and a radiocarbon dating of the resin sample yielded the same date. It is surmised that the ship was not built in China, but possibly in Thailand (ibid.:76) or in Indonesia (ibid.:401). The ship carried: celadon-type exportware from southern China; fine-paste-ware *kendi* (a vessel for liquids with a round body, tall neck, mouth, spout, flat base, and no handle); bottles of probable southern Thai origin; and bronze figurines and finials of pre-Majapahit style, which were probably carried by Indonesian sailors (ibid.:396). It is likely that the ship passed by Sumatra on its way to Java. Iron pots and wrought iron bars (about 190 tonnes) were the primary cargo items, chiefly Chinese products (ibid.:86). The ship is important evidence of Thai or Sumatran ships that transported Chinese export cargo (Wade 2003:20–21).

8) *13th to 14th centuries: bossed gong with narrow, turned-in rim, and bell. Rang Kwien wreck, Gulf of Thailand (Thailand)*

One bossed gong (figure 4; table 2) and one bronze bell were found in the Rang Kwien shipwreck in Thailand, dated from around the thirteenth century (Intakosi 1983). The ship's cargo consists primarily of Thai earthenware with ceramics from Vietnam and China. One personal item recovered is a carved wooden tuner of an unidentified stringed instrument. The dating is partly based on a Chinese globular, four-eared jar with olive-brown glaze that is identical to a type found in Pila, Laguna, Philippines. A large majority of the Annamese or Vietnamese ceramics can be dated prior to the fourteenth century (Tenazas 1981).<sup>6</sup>

The timber sample taken from the keel, SUA-2699, was dated to 1270±60 (Atkinson et al. 1989). Other items found were 200 kg of coins from the seventh to fifteenth centuries and 4,834 coins from the fourth century to the reign of Hongwu (1368–98) (Green 1990; Brown 2003:139). The bronze gong and bell were probably used as signalling instruments to communicate on board the vessel (Prishanchit

6. Pila, Laguna, is an old site with a long history. The Laguna Copperplate Inscription was found in the same province. Two interpretations of this inscription are now available. One is dated 900 CE, with a language mixture of Old Javanese, Old Tagalog, and Sanskrit, the locality being placed in Laguna (Francisco 1995); the other interpretation is 922 CE, with a language mixture of Old Javanese/Old Malay, Sanskrit, and Tagalog/Austronesian, and the locality identified as Java (Kartakusuma 2007). The materials for the 1603 Tagalog dictionary of San Buenaventura, which contains early Tagalog terms for gongs—entered as *palaye*, *paiyac* (flat gongs), and *mongmongan* (bossed gongs)—were also collected in this town and surrounding areas (Nicolas 2007:189–96).



**Figure 4.** Rang Kwien bossed gong, Maritime Archaeology Museum, Chantaburi, Thailand (photos: Bobby Orillaneda).

1999:195). A picture is provided in the article by Tenazas (1981), showing the bossed gong lying upturned on the ocean bed with the back of the central boss and the rim visible.

9) *14th to 15th centuries: small gong fragments. Sungai Lumut (Brunei)*

Twenty-four fragments of gongs the size of *gulingtangan* (small bossed gongs-in-a-row) in a ceremonial ground with Ming and Thai or Siamese pottery were recovered in a site about one kilometre inland from the sea in Sungai Lumut, about 77 km from Bandar Seri Begawan (Matussin bin Omar 1981:60–65). About 90 percent of the imported ceramics come from south China, dated to the fourteenth and fifteenth centuries (Yuan and Ming periods); about 7 percent are Thai (Sawankhalok, Sukhothai) wares. Ceramics sherds are placed either singly or in clusters with beads or glass, and bronze and iron objects, which suggests that these were deliberately buried or planted. No human bones were found, indicating that this was not a burial ground. Matussin bin Omar interpreted the sherds and other objects, including gong fragments, as offerings. Pottery was smashed before being deposited in the ground together with the other objects. Measuring about 14 cm in diameter (*ibid.*:65), one gong fragment is only about half of a rim, the other parts having been broken or cut to pieces (*ibid.*:114, pl. 41) (table 2). This custom is unique for the period and no such contemporary practice is known today in Brunei. Matussin bin Omar concludes his study of several protohistoric sites in Brunei by alluding to the search for the site of Po'ni, which in Chinese accounts had been identified as Brunei. The presence of large quantities of Yuan and Ming ceramics suggests that the area had been a very busy trading centre during this period, contemporaneous with the Islamic Sultanates in the twelfth to thirteenth centuries. In their analysis of a Chinese tombstone in Brunei dated 1264, however, Franke and Ch'en (1973:91) suggest that there were two centres of trade in the area: one, an Islamic sultanate in Brunei, known as Po'ni in Chinese accounts; and another in Santubong, known as Wen-lai or P'o-lo in Chinese records, an old site for iron-working on Borneo (Christie 1988).

10) *Early 15th century: bossed gong. Off Bakau Island, at the Karimata Strait, Sumatra (Indonesia)*

One bossed gong was found in a shipwreck off Bakau Island in the Karimata Straits, east Sumatra. A calibrated carbon dating with a range from 1320 to 1440 confirms an early fifteenth-century date, with a coin from the Yongle (Yong-Lo) period (1403–24, Ming dynasty) (Flecker 2000:228–29). Brown notes that the Bakau shipwreck is one of three known Chinese shipwrecks from the Ming period, the other two being Turiang and Ko Si Chang II (Brown 2003:43). As evidenced by the ceramic load, its route may have been from Guangzhou and then to a Thai entrepôt such as Ayutthaya. From Thailand, where it reloaded, the ship sailed towards Indonesia, calling in at several northern ports, bringing ceramics cargo that is similar to finds at Indonesian land sites (*ibid.*). The cargo consisted of Sukhothai and Sawankhalok wares from Thailand, dozens of huge Thai storage jars, Longquan wares from China, and a few underglaze-decorated bowls from Vietnam (Wade 2003:31).

11) *14th to mid-15th centuries: 51 bossed gongs. Phu Quoc II, Dam Island (Vietnam)*

Fifty-one bossed gongs were excavated from the Phu Quoc wreck, together with 2,369 iron tools, weapons, 953 bronze bangles, and Thai and Vietnamese tradeware (Brown 2003:138). There was no Chinese tradeware in the wreck. The Phu Quoc wreck was first dated to the fourteenth century on the basis of the construction of the ship, which was probably built in Thailand under the guidance of Chinese shipbuilders (Blake and Flecker 1994:81). This indicates a flourishing industry of building ocean-cargo ships in Thailand during the fourteenth to sixteenth centuries (*ibid.*:82). The ceramic cargo yielded around 1,100 intact or nearly intact pieces, consisting of Sawankhalok plates, Vietnamese bowls (late thirteenth and early fourteenth centuries), small plates and beakers from the Sisachanalai kilns, squat bottles, and large stoneware storage jars. Numerous storage jars were found at the bottom of the ship, dated to the fourteenth to seventeenth centuries and made at the Mae Nam Noi kilns in Singburi, central Thailand. Singburi jars have been found in many Asian shipwrecks, as well as on Spanish, Dutch, and Portuguese wrecks in the Pacific, Indian, and Atlantic oceans (Mathers et al. 1990). The tin ingots in this ship were most likely to be brought to the Philippines, where tin is not significantly found, rather than to Malaysia, Java, or Sumatra (Blake and Flecker 1994:89–90). Its route might have passed by Cambodia and Vietnam, and proceeded directly to Borneo and the Philippines (*ibid.*:84–85), where such jars were used for secondary burial, or as wine and food containers. On Palawan Island, Philippines, the Tagbanua and the Pa'lawan use similar jars in rice-wine ceremonies accompanied by the playing of gongs and drums. Porcelain plates are used for various purposes in the Philippines—as ritual plates with food offerings, secondary jar burial covers, and as percussion plates used in trance and curing rites among the Subanun, Tagbanua, and Kalinga.

This period coincides with the so-called “Ming Gap,” a result of the 1371 Ming ban on private shipping, which stimulated trade shipping in Southeast Asia and

was characterized by increased imports of Thai and Vietnamese tradeware (Blake and Flecker 1994:90). On the basis of ceramics and the nine coins from the Song and Yuan dynasties and one from the Yongle period, Roxanna Brown proposed a mid-fifteenth-century dating, c. 1450–87 (Brown 2003:138).

If this ship originally came from Thailand, the fifty-one bossed gongs in the cargo were manufactured in Thailand, and were being exported to Borneo, Palawan, Basilan, and Mindanao,<sup>7</sup> and farther on to Java. Jacobson and van Hasselt (1975:142) noted that gong makers in Semarang, Java, attested that a particular technique of groove hammering around the central boss of a small gong was adopted from gongs made in Siam or Thailand during the Majapahit period.<sup>8</sup>

*12) Late 15th to early 16th centuries: two bossed gongs with narrow, turned-in rims (Brunei)*

The Brunei shipwreck yielded two, well-preserved bossed gongs with narrow, turned-in rims and medium-height bosses. These two gongs have the following measurements: diameter: 59.6 cm, 38.0 cm; rim width: 13 cm, 8 cm; weight: 10.0 kg, 6.5 kg (L'Hour and Gawronski 2001:156) (table 2). A photograph of the first gong shows a very well-preserved piece (*ibid.*:141, ill. 13). Metallurgical analysis yielded a bronze alloy with 84.29% copper and 15.71% tin (*ibid.*:156).<sup>9</sup> Six other gongs and thirteen gong fragments were found, but have not been described. More than 13,000 ceramic items dating from the late fifteenth century were found in the wreck (Wade 2003:29), including monochromatic, and blue and white Chinese ceramics and jars, Thai ceramics and jars, Vietnamese ceramics, sandstone jars, as well as pearls and bracelets (L'Hour and Gawronski 2001:154).<sup>10</sup> Brown (2003:8–9) identified the Thai ceramics in this shipwreck as Burmese. This ship is one of three presently dated to the Hongzhi reign (1488–1505). The other two are the Lena Shoal and Santa Cruz (both described below), both found in the Philippines (*ibid.*:3, n. 5).<sup>11</sup>

*13) 15th to 16th centuries: bossed gongs. Lena Shoal reef, west of northern Palawan Island (Philippines)*

In another shipwreck at the shallow reefs of Lena, off the coast of northern Palawan, bossed gongs (figure 5) have been found together with Chinese, Vietnamese, and Thai ceramics, bracelets, cannons, iron and tin ingots, woks, elephant tusks, lacquer, ivory, betel nuts, glass beads, among others. Some of the ceramics are similar to those sent to the Middle East, and some are of types found only at Asian sites.

7. Beyer (1947) noted jar burials covered with gongs in caves in Basilan and Zamboanga on Mindanao and on Palawan.

8. This was probably the source of the name *gong siyem*, now used in central Javanese gamelan ensembles.

9. The atomic percentage tests were conducted by the laboratory of Arc' Antiques de Nantes in France.

10. The excavation grid in L'Hour and Gawronski (2001:154) shows the distribution of these gongs together with other metals, ivory, and flints on the ocean floor. The process of cleaning the gongs and cannons in preparation for metallurgical analysis is also described (*ibid.*:141–43).

11. See Perrin (2000) and Karim (2001) for a general description of this shipwreck.



**Figure 5.** Lena Shoal gongs in situ, Franck Goddio/Hilti Foundation (photo: Frédéric Osada).

The Chinese ceramics can be identified from kilns at Jingdezhen, Longquan, and Guangdong (Goddio 2001).<sup>12</sup> Brown again identifies the Thai ceramics in this shipwreck as Burmese (Brown 2003:8–9). This possibly Chinese ship, carrying some 5,000 objects, must have sailed from a port in Zhejiang or Fujian for southern China, then to Vietnam and Thailand, before proceeding to the Philippines. Four bossed gongs from this wreck have the following dimensions. One big gong has a face diameter of 54.5 cm, base diameter of 43.4, and rim width of 14.4 cm. The three others are 38.2, 37.2, and 36.7 cm in face diameter; 29.5, 29.7, and 28.5 cm in base diameter; and 7.0, 6.7, and 6.0 cm in rim width (Goddio et al. 2002:237) (table 3). Metallurgical analysis of a gong fragment yielded an unusually high tin content alloy, with 26%–39% tin and 61%–74% copper (Goddio et al. 2002:270–71).<sup>13</sup>

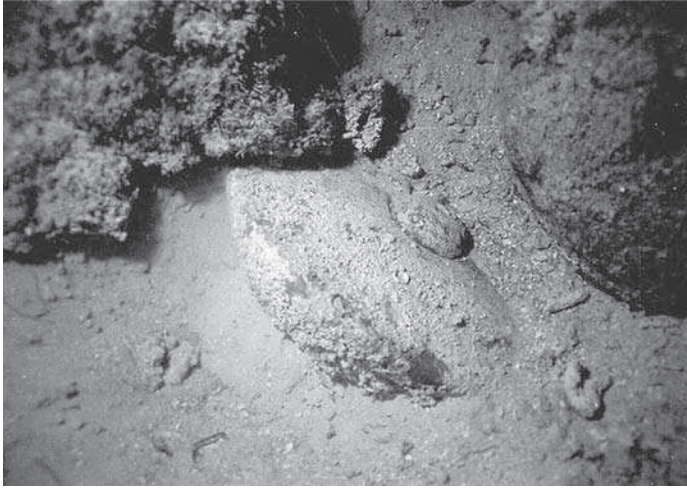
*14) 15th century: medium-sized gongs with bosses with narrow, turned-in rims. Pandanan Island, southern Palawan (Philippines)*

Six medium-sized bossed gongs, with diameters ranging from 37 to 57 cm, were found in a sunken ship off Pandanan Island, southern Palawan, Philippines (figures 6–7, 11a–11b; table 3). On the basis of ceramic typology and the date of the Chinese coin recovered (Yongle period, 1403–24), the ship can be dated from the Yuan period to the Ming dynasty (Dizon 1996:63–94).<sup>14</sup> More significantly, 70 percent of the ceramics are of Vietnamese origin, dating from around the thirteenth century (Diem 1998). The ship travelled from Borneo and carried both fine and utilitarian ceramics from Champa, Dai Viet, Thailand, and two small cannons. The ship originated from Champa, then headed to Thailand, Malacca, and Borneo before sailing northwards to Palawan. The central Vietnamese ceramics originated from Binh

12. See also: <http://www.underwaterdiscovery.org/english/projects/lenashoal/default.asp>.

13. Research on the effect of the alloy's tin proportion on the sound of the gong may reveal qualities of the hardness of the metal and the vibrancy of the sound.

14. See also: <http://www.geocities.com/Athens/Cyprus/8446/Balanghai.html>.

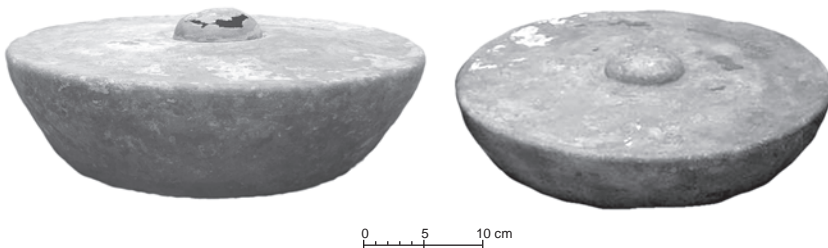


**Figure 6.** Pandanan gong in situ, courtesy of J. Brannelec, Jewelmer; and Brigitte Revol-MacDonald (photo: Gilbert Fournier).

Dinh, near the Cham capital Vijaya, which was sacked by the northern Vietnamese in 1471. Dizon dates the shipwreck to the fifteenth century and proposes that these gongs may have come from Vietnam, inferring that Dong Son bronze manufacturing was already known around 800 BCE (Dizon 1996). Brown identified these central Vietnamese ceramics as primarily Champa ceramics (Brown 2003:47) and suggests that the cargo can be dated to c. 1470 CE (ibid.:81, n. 1).

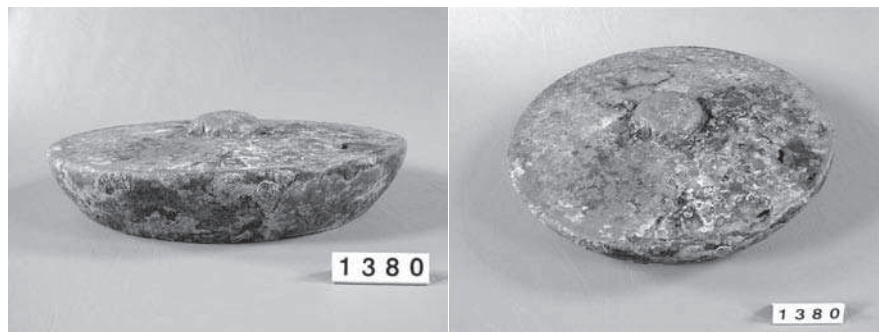
*15) Late 15th century: bossed gongs with narrow, turned-in rims. Santa Cruz shipwreck, off Zambales, west central Luzon (Philippines)*

Bossed gongs were found in a shipwreck near Santa Cruz, the northernmost town of Zambales, on Luzon (figure 8; table 3), with a total yield of 14,965 archaeological specimens. Trade ceramics comprise about 97 percent of the cargo, including blue-and-white dishes, bowls, cups, jars, boxes, ewers, *kendi*, and vases from China and Vietnam; celadon dishes, saucers, and bowls, incense burners, and small jars from



**Figure 7.** Pandanan gongs (photos: Arsenio Nicolas, National Museum of the Philippines Collection).





**Figure 8.** Santa Cruz gong, Far Eastern Foundation for Nautical Archaeology, National Museum of the Philippines (photos: Bobby Orillaneda).

the Longquan area in Zhejiang province, China; tradeware from the Si Satchanalai kiln complex in central Thailand and Burmese celadon dishes. A significant percentage of porcelain underglaze blue had Islamic motifs similar to those found in the Lena Shoal and Brunei shipwrecks, indicating that these were destined for markets possibly in northern Luzon or southern Philippines. Metalwares included iron pans and ingots, and a small cannon, guns, bracelets, handles, oil lamps, and coins, as well as tin ingots (Orillaneda 2008a:109; 2008b).

*16) 16th to 17th centuries: bossed gongs with narrow, straight rims. Wreck 2, Royal Captain Shoal, off Palawan Island (Philippines)*

Thirty-five gongs with low bosses, narrow, straight rims, and with six-point star designs on the faces were found in a shipwreck called Wreck 2, near the Royal Captain wreck. The ship was grounded on a coral reef on the southeast quarter of the China Sea, 76 km from the island of Palawan (Goddio and Jay 1988). Three sizes of the gongs range from a diameter of 30.0, 37.0, and 54.5 cm, with a rim width of 6.0, 7.0, and 14.4 cm. The gongs of 30.0 cm diameter have a six-point star design on the face, emanating from the central boss (figures 9, 11c; table 3). Moreover, two small holes are bored on the rim, spaced apart to allow the insertion of a string (Goddio 1988:270–71).<sup>15</sup>

The recovered cargo consists of about 307 pieces of porcelain and earthenware pottery, dating to the Wanli period, 1530–1620 (ibid.:97). The location of the shoal and the cargo of the ship indicate trade between China, Manila, and Borneo; the ship could have set sail from a port in Zhejiang to Fujian, heading towards the Philippines and Borneo (ibid.:155).

*17) 16th century: bossed gongs. Sattahip wreck, on Sattahip Bay, Chon Buri (Thailand)*

Bossed gongs were among the excavated artefacts from this sixteenth-century shipwreck that was found lying in forty-five metres of water at Sattahip Bay, Chon Buri, Thailand. The dating is based on the more than 4,000 pieces of ceramics collected, 75 percent of which were of Sukhothai and Sawankhalok origins, while the

15. Five gongs of this size are kept at the National Museum of the Philippines.



**Figure 9.** Royal Captain gong

(photos: Arsenio Nicolas, National Museum of the Philippines Collection).

rest were Annamese.<sup>16</sup> Pensak Howitz (1977:1, n. 2) identified the crew's utensils as mainly Siamese. On these findings, Prishanchit noted that from the fourth or fifth century onwards, sea traders were present along the river plains in central Thailand down to the Thai–Malay Peninsula. By the seventh to eleventh centuries, maritime trade routes were important to Dvaravati and Srivijaya, with ceramics from China, and glass and stone beads from India and Persia as the most important sea cargo (Prishanchit 1999:185–86).

*18) 1694: bossed gong with narrow, straight rim. San Jose galleon, Tagbac, Lubang Island (Philippines)*

The *San Jose* galleon capsized in July 1694, off Tagbac Island in the Philippines. A small bossed gong with a narrow rim was found there. The gong is about 30 cm in diameter (table 3).

*19) ?: bossed gong with narrow, straight rim. Intramuros, Manila (Philippines)*

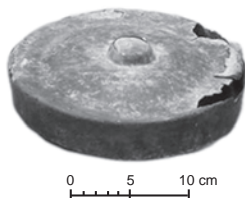
A small bossed gong with a narrow, straight rim was found in the Spanish fort, Intramuros, in Manila. The instrument is 25.5 cm in diameter (figures 10, 11d; table 3). As no written reports on this gong or the preceding one are presently available at the National Museum of the Philippines, further descriptions cannot be provided at this time.

## Discussion

Nineteen archaeological sites, fifteen of which are shipwrecks (nos. 1–4, 7–8, 10–18) and four inland finds (nos. 5–6, 9, 19), provide a chronology of the exchange and trade of gongs, cymbals, and bells within an area bordered by Thailand,

16. Flecker provides a description of the ship at: <http://maritime-explorations.com/thailand.htm>.





**Figure 10.** Intramuros gong

(photo: Arsenio Nicolas, National Museum of the Philippines Collection).

Vietnam, Cambodia, the Thai–Malay Peninsula, Singapore, Sumatra, Java, Borneo, Mindanao, Palawan, and Luzon, extending to China in the north and India and the Middle East in the west. The dating of these ships and sites has been almost entirely dependent on identifying the trade ceramics that these ships carried as cargo—Chinese, Vietnamese, Cham, Thai, Burmese, Middle Eastern. Six of these ships originated from ports in a region now known as Southeast Asia, and three from China. This does not imply however, that the trade and distribution of gongs were exclusively undertaken in places that exchanged ceramics with local products. Inter-island trade certainly flourished, and the study of these trade patterns has not been extensively undertaken (Junker 1999; Ray 2003; Wade 2009).

### *Bells and cymbals*

Three general types of bells can be identified: pellet bells, prayer bells, and suspended bells. Samples of the many excavated pellet bells are found the following sites: Banten Girang, west Java (Guillot et al. 1994:189–90, ill. 122); Santa Ana, Manila (Locsin and Locsin 1968);<sup>17</sup> Butuan, Mindanao (Ronquillo 1989:65–66); and Bohol Island, central Philippines (Solheim 1964:229, pl. 27).<sup>18</sup> Prayer bells are found in both temple bas-reliefs and in excavated sites (Kunst 1968:54, n. 39).<sup>19</sup> Suspended bells with clappers are rarely found in excavated sites. Two types of temple bells may also be distinguished—bells used in Javanese Hindu and Buddhist temples, and bells used in Chinese temples. Most of the bells now existing on Java and used in Chinese temples date from the eighteenth and nineteenth centuries, although there are a few that are dated earlier, such as the now-lost eleventh-century Srivijaya bell and a fifteenth-century Banda Aceh bell (Salmon 2003b:Liste 1, 301–5). It is interesting to note that the Spanish documents surveyed so far do not mention any type of bells played by the Chinese in Luzon (Nicolas 2007:chap. 5).

17. Probably a metal cap of a bell, found in grave no. 110. These are found in association with Chinese Sung coins dated 998, 1068, and 1102 in three different graves, writing on a Mongol seal dated 1310, and a 1068 coin associated with Ch'ing-pai wares. See also Lim (1987:69, 137).

18. A spherical, slit bell with ring suspender.

19. Kunst provides a long list of excavated bells mostly found in central Java, but also some from east Java. These are now housed at the National Museum in Jakarta, the National Museum at Leiden, and the Royal Tropical Institute in Amsterdam.

The majority of the bells, *vajra*, and *khakkhara* that are extant today have been found on Java, and the Intan finds extend the distribution to Sumatra. Bells and *khakkhara* in museums in Jakarta and Europe have been dated to as early as the ninth century. The earliest bells in this area are one dated to the first half of the eighth century for a bell illustrated at the temples in Dieng Plateau, central Java, and the small cymbals depicted at Candi Sari in the Kedu plains, dated to the second half of the same century. Bells and cymbals are also found on the reliefs of the ninth-century Borobudur and Prambanan temples in central Java (Kunst 1968:120–23, table C; Lunsingh Scheurleer and Klokke 1988; Chutiwongs 1990).

Pellet bells are widely found in the area. Malleret (1959) identified pellet bells in the Mekong region, and they have also been associated with the Sa-huynh-Kalanay pottery complex in Vietnam, Philippines, Borneo, Sulawesi, and other places. Several of the bells had spiral decorations commonly found on Dong Son bronzes. Small slit bells today are for decoration on clothing in Mindanao. Among the Tiboli in Mindanao, women wear a latticed band of pellet bells at the tips of long threads hanging around the full length of their upper chemise (Maceda 1998:fig. 374–98). In the Philippines, cascabels (pellet bells) are found on Mindoro Island (Buhid *giring-giring*; Hanunuo *gurung-gurung*) and on Mindanao Island (Maranao; Bilaan *bebed*, *singkil*, *tiolong*; Tagakaolo *tungkaling*; Kalagan *bebed*, *paningkulun*, *singkil*, *tiolong*; Ata *kulong-kulong*; Bagobo *tiolong*; Mansaka *tungkaling*; Manobo Agusan *salyaw*) (Yraola, in Maceda 1998:304–5, map 13 (cascabels, pestles, shells, horns), reference table). On Java, Bali, and other islands in Indonesia, dancers wear pellet bells as dance paraphernalia.

Cymbals do not appear as common artefacts in the context of underwater excavations. If there were such cymbals in the cargo, these could have been buried deeper or washed away, and if found, they are in fragments since cymbals are thin and smaller than gongs. Cymbals today are important musical instruments in many ensembles in Asia, but are not always found on all the islands. For instance, while cymbals are important in gong ensembles on Java and Bali and on the mainland, they are rarely used or not used at all on Borneo, Sulawesi, Mindanao, and Luzon.

### *Flat gongs*

The ninth-century Belitung shipwreck is identified as an Indian or Arab ship, establishing the early connections between the Middle East and Asia. By the tenth century, flat gongs, marked with Chinese characters that identified the trader or owner, appear in a shipwreck in Brunei. The date coincides with the period of the earliest documented Chinese settlement in Kota Cina on the northern tip of Sumatra and the earliest archaeological record in Singapore (McKinnon 1973; McKinnon and Lukman Sinar 1974). Flat gongs appear in a twelfth-century shipwreck in Pulau Buaya, near Riau, Sumatra, and a flat gong called *tongluo*, a Chinese term, in Muara Jambi, Sumatra, inscribed with the date 1231 on its rim. These three sites attest that gongs were known at least around Sumatra, the Thai–Malay Peninsula, Singapore, and Borneo, from the tenth to the thirteenth centuries. All three ships are identified as originating from south China, with destinations to the Philippines,

Borneo, Sumatra, and the Indian Ocean. In one of his last articles, however, Maceda proposed that flat gongs with narrow, straight rims in northern Luzon, Philippines, may have come from Vietnam (Maceda 2004:xxii–xxiii).<sup>20</sup> This type of flat gong is known today by various names. In central Vietnam, they are known as *chieng* (Condominas 1974), although the term *kangsa* (Sanskrit *kamsa*, “bell-metal”) is mentioned in Khmer inscriptions dating to the seventh century and Cham inscriptions from the ninth, tenth, and twelfth centuries.

A study on the trade between China and Vietnam during the Song dynasty (960–1279) refers to exchanges in musical instruments (Wong 1979). In 1157, Jiao Zhi, now part of Vietnam, sent to China two gold gongs, decorated with dragon motifs and weighing 120 taels,<sup>21</sup> and five sets of bronze decorative bells (Wong 1979: s.v. Song Hui Yao). In 1177, another mission sent three golden gongs weighing a total of 650 taels. In 1180, two other missions sent gongs: the first with five golden gongs weighing 250 taels; the second with five golden gongs weighing 250 taels and twenty silver gongs weighing 1,000 taels (ibid.:4–6). In exchange, China sent gifts to Jiao Zhi. These gongs were evidently flat gongs, rather than gongs with a central protrusion. However, there are no records as to whether these were sent to or traded with other countries in the area. Gongs and bells of this period were perhaps used in temples and court ceremonies rather than in the villages, where, during this period, a new and separate gong music culture might have been in its infancy. Terracota images of musicians playing a flat-surfaced instrument, either a gong or a round frame-drum, were found in Majapahit Java (Kunst 1968:fig. 65, 65a, 65b),<sup>22</sup> as well as in China. Flat gongs are today played only in highland northern Luzon, highland central Vietnam, south Bali, and in the many Chinese temples where dragon dance groups are active.

In sixteenth- and seventeenth-century northern Luzon, flat gongs were already known from Spanish accounts as *gangsa*. On the west coast of central Luzon, flat gongs called *palaye* were recorded in an early seventeenth-century Tagalog dictionary and in an early twentieth-century Pangasinan dictionary. Today flat gongs called *palayi* are played by the Ayta Negritos in Zambales and Bataan on Luzon. On Bali, flat gongs are called *bar* and *ber* (Sanskrit *bheri*, “drum”) and are played to accompany a temple trance dance called *baris cina* (Nicolas 2007:chap. 3; see also Nicolas in press).<sup>23</sup> Among the Kayan in east Kalimantan, three flat gongs (*mehbiang*) are played together as an ensemble and are part of the ritual paraphernalia for the dead (Maceda et al. 1979:4, 33).

In Manila, flat gongs (*luo*),<sup>24</sup> similar to the northern Luzon *gangsa*, are played for Chinese lion and dragon dances (*longsay*), together with pairs of cymbals and

20. Eleventh-century trade relations between Champa and Butuan has been established on the basis of ceramic finds (Burns and Brown 2003), and the route taken would have been via Luzon, where flat gongs are played today in the northern regions.

21. One tael weighed c. 36–40 g.

22. The playing technique of two hands beating on the flat surface of a round frame-drum bears some similarities to that used for the Kalinga flat gongs called *topayya* in northern Luzon.

23. Small ensembles with flat gongs are also known on Sumatra and Lombok.

24. In Chinese, various terms for flat gongs are known, including: *tongluo*, *t'ung po*, *sha-*

	<i>face diameter</i>	<i>base diameter</i>	<i>rim width</i>
<b>BOSSSED GONGS</b>			
Java Sea	27.0		
Rang Kwien	29.0	24.0	7.0
Sungai Lumut 1	14.0		
Sungai Lumut 2	17.6		4.2
Brunei 1	59.6		13.0
Brunei 2	38.0		8.0
<b>FLAT GONGS</b>			
Tanjung Simpang	41.0–43.0		
Pulau Buaya	27.0–29.5		4.5–6.0
Muara Jambi	45.0		7.0

**Table 2.** Measurements (in cm) of bossed and flat gongs found in various museums in Thailand, Sumatra, Java, Brunei, and Sabah. All measurements are from published sources.

a barrel drum.<sup>25</sup> These gongs are painted with their owners' names, similar to an ancient practice for Tanjung Simpang flat gongs. On the mainland, flat gongs are played by highland peoples in central Vietnam, west Malaysia, Thailand, Cambodia, Laos, Burma, and south China. In recent times, the spread has been due mainly to war, deforestation, and religious conversion. The instruments are known in this area using names from local languages of Austronesian and Austroasiatic origins, Sanskrit, and Chinese. In India, several terms for flat gongs and flat discs are known, such as *kansa*, *kansar*, *thali*, *tala*, and *cennalam* (Nicolas 2007:151–61).<sup>26</sup> What is equally significant is that for the variety of flat gongs used by eleven language groups in highland northern Luzon, the generic term is *gangsá*, derived from Sanskrit, but more than fifty terms are used for the individual names of each gong in musical ensembles in northern Luzon (Nicolas 2007:134–60; Nicolas in press).

In the archaeological records, flat gongs with narrow, straight rims vary in diameter (table 2). The Muara Jambi and Tanjung Simpang examples are large (45 and 41–43 cm), while the Pulau Buaya examples are medium sized at 27.0 to

---

*luo*, *luo*, *zheng*, *zhengmao*, and *jinzheng* (Thrasher 2000; Salmon 2003a).

25. Almost all lion and dragon dance groups in the Philippines today are composed of Filipino musicians and dancers, most of whom are not familiar with Chinese musical terms. These instruments are now called *tongtong* (flat gong), *tsangtsang* (cymbals), and *tambul* (barrel drum). In many respects, a pattern to the adaptation of Chinese musical practices to local traditions is thus apparent over time in this region. In Indonesia, the lion and dragon dances are known as *barongsai* and *barong*, and the recent celebrations of the 2009 Chinese New Year featured their performances in malls and town festivals. In some areas, Indonesians have also joined in to perform, as also happens in the Philippines. *Longsay* groups join Catholic feasts and processions of the Black Nazarene and the Santo Niño (Child Jesus) in Manila.

26. A flat gong from India called *tālī*, beaten on the rim, is shown on the cover picture of *South Asia: The Indian Subcontinent* (Arnold 2000).

	<i>face diameter</i>	<i>base diameter</i>	<i>rim width</i>	<i>boss width</i>	<i>boss height</i>
Butuan*	54.0	11.7			
near Butuan†	33.5	30.5	5.8	10.0	2.4
Pandanan 1	57.0	14.0	12.5	2.0	
Pandanan 2	53.0	42.0	12.0	12.0	2.0
Pandanan 3	50.0	38.0	12.5	10.5	3.0
Pandanan 4	38.0	30.0	7.5	8.0	2.0
Pandanan 5	37.5	30.0	7.2	8.0	2.2
Pandanan 6	37.0	29.5	7.0	7.5	2.0
Lena Shoal 2595	54.5	43.4	14.4		
Lena Shoal 1124	38.2	29.5	7.0		
Lena Shoal 2594	37.2	29.7	6.7		
Lena Shoal 2550	36.7	28.5	6.0		
Royal Captain 1	31.5	28.8	5.0	7.5	2.0
Royal Captain 2	31.0	30.0	5.8	8.0	2.0
Royal Captain 3	31.0	28.0	6.0	7.5	2.0
Royal Captain 4	30.5	29.5	6.0–5.0	8.0	2.0
Royal Captain 5	30.0	27.2	5.8	8.0	2.0
Santa Cruz	31.0	28.5	5.5	8.0	
Tagbac (approx.)	30.0	6.0			
Intramuros	25.5	24.5	4.0	5.0	1.0

**Table 3.** Measurements (in cm) of bossed gongs found in shipwrecks and other sites in the Philippines. The gongs are stored in the National Museum of the Philippines and Butuan Provincial Museum. All measurements by Arsenio Nicolas, except \* by Linricon Absuelo and † by Wilfredo Ronquillo.

29.5 cm, quite similar to northern Luzon flat gongs, measuring between 27 and 37 cm (Goodway and Conklin 1987:2).<sup>27</sup> A set of smaller gongs may have diameters from 25 to 30 cm.

### *Bossed gongs*

No more flat gongs have been found yet in shipwrecks dated after the thirteenth century. Instead, bossed gongs appear in maritime archaeological records from the thirteenth to the seventeenth centuries.

Buried in deep alluvial sediments in northeastern Mindanao, the thirteenth-century Butuan boat with one bossed gong is evidence of Butuan's central position in trade during this period. The five boats found at the site and Butuan's extensive trade relations with China, Champa, Cambodia, Thailand, and the Middle East provide further support to this statement.

Four shipwrecks have Thailand as their port of origin, carrying bossed gongs from at least the thirteenth to the sixteenth centuries. The thirteenth-century Java

27. Northern Luzon flat gongs are graduated in size and played in an ensemble to produce melodic ostinatos.

Sea wreck identified as a Thai or an Indonesian ship carried bossed gongs. The thirteenth- to fourteenth-century Rang Kwien wreck, with a bossed gong and cymbal, was probably headed towards Indonesia. The fifteenth-century Phu Quoc shipwreck with fifty-one bossed gongs is identified as a Thai ship, heading towards Borneo and the Philippines. Finally, the sixteenth-century Sattahip shipwreck with bossed gongs came from Thailand. This period is contemporaneous with the Southern Song (1127–1279), Yuan dynasty (1280–1369), the Mongol invasions, and the Singasari-Majapahit period in the thirteenth century. This was also the time when the Thai established dominion over foreign territories, infringing on Pagan to the west, Angkor to the east, and the Thai–Malay Peninsula to the south (Hall 1999:216).<sup>28</sup>

A lone fifteenth-century shipwreck, the Pandanan ship with five bossed gongs, points to a trade of gongs between Borneo and the Philippines with links to the Thai–Malay Peninsula and Vietnam. The island of Palawan marks the frontier between the China Sea and the Sulu Sea, closed at the south by the island of Borneo.

In the fifteenth and sixteenth centuries, both the Lena Shoal and the Royal Captain Shoal shipwrecks originated from Zhejiang or Fujian, southern China, and provide evidence of a renewed trading activity after the Ming ban. These two shipwrecks carried bossed gongs and both were found along the western coast of Palawan Island. The fifteenth-century Lena Shoal shipwreck carried bossed gongs with narrow, turned-in rims and was headed towards Vietnam, Thailand, and the Philippines. The sixteenth-century Royal Captain Wreck 2 shipwreck carried small bossed gongs with narrow, straight rims, and was headed towards the Philippines and Borneo. Bossed gongs with a six-star pattern around the central boss found in this wreck are more common today on the mainland than on the islands of Indonesia and the Philippines; they are called *tan chieng*, as used in Fukien musical dramas. Ancient bronze drums in Vietnam and Indonesia (of Vietnamese origin) have solar ray designs on the centre of the tympanum (Bernet Kempers 1988:102, 115–18). In Mindanao, some *kulintang* sets (gongs-in-a-row) are decorated with ornate star patterns around the central boss, manufactured by means of the lost wax process (Maceda 1998:152, 174–75).

Another small, bossed gong with a narrow, straight rim was found in the shipwreck of the *San Jose* galleon that capsized in July 1694 off Tagbac Island, near Mindoro (Cuevas 1988). It is quite similar to those used today by the Hanunuo on that island, with a diameter of 30.5 cm and rim width of 5 cm (Conklin and Maceda 1955:10; Maceda 1998:125). One small, bossed gong with a narrow, straight rim was also found recently in Manila in the Spanish fort called Intramuros. It is similar to the bossed gongs called *tua luo* used in Chinese theatrical dramas (*kaw kha*) performed in Manila today.

---

28. Gosling (2004:14) notes that in prehistoric times, the Mun River in Thailand “appears to have provided transmission of [art] forms that originated as far away as the Philippines.”

### Bronze metallurgy and possible dating implications

A type of dating using metallurgical analysis of the composition of the bronze alloys to ascertain the metal content of Heger I bronze drums was devised by Hollmann and Spennemann (1985). It was observed that alloys with a high proportion of lead added to the copper and tin components have a wide distribution from Vietnam, the Thai–Malay Peninsula, and island Southeast Asia. Chronologically, it was also observed that the regional distribution and relative frequency shown for the different types of drums coincide with the accepted southward movement of drums or the drum-manufacturing tradition into Indonesia. Thus, there was a tendency for an increased lead content over time, from the oldest known drums in Yunnan, south China, to the later Indonesian examples (*ibid.*:94).

No similar study has been made for bossed gongs, but research conducted by Goodway and Conklin (1987) on flat gongs in highland northern Luzon provided some parallel results. The study employed metallurgical techniques to break down components by X-ray fluorescence for the analysis of major elements and optical omission spectroscopy for the analysis of minor and trace elements. The complex alloy showed major components of copper (59.3%–77.9%), tin (21.0%–24.5%), lead (0.10%–1.12%), and zinc (0.11%–0.30%). Fourteen minor and trace elements were detected (*ibid.*:6). The twenty-three samples came from Ifugao, northern Luzon (Goodway and Conklin 1987). Similar microstructures are found in Korea, Iran, India, and Thailand. The Thai samples from Ban Chiang and Non Nok Tha are dated from about 300 BCE to the mid-first millennium CE (*ibid.*:17–19). A very significant result was the presence of large amounts of trace elements and the absence of phosphorous, indicative of their ancient age, and that these were not fabricated from modern industrial materials or from scrap (*ibid.*:15). In India, this technology had two different uses. High-tin bronzes, brass, and high-lead alloys of copper tended to be used for utilitarian objects like vessels, ritual objects, coins, and charters, while leaded-tin bronzes were predominantly used for statuary (Srinivasan 1995:275, in Ray 2003:234, n. 12). High-tin bronze bowls in India and Thailand have similar componential parts to quenched high-tin bronze flat gongs in northern Luzon. Indeed, as Higham (1996) has concluded, early bronze manufacturing in Asia may have had several centres in India, Thailand, Vietnam, and China.

The Brunei shipwreck yielded two, well-preserved bossed gongs with wide, turned-in rims and a medium-height boss, with the bronze alloy made up of 84.29% copper and 15.71% tin. Bossed gongs manufactured in 1907 in Semarang, central Java, utilized a bronze alloy called *gangs*, consisting of ten parts copper (77%) to three parts tin (23%) (Jacobson and Hasselt 1975:132). In a series of articles, Huyser lists metallurgical analyses showing various proportions of copper and tin for gongs and various bronze objects. Gongs invariably have about 80% copper and 20% tin components (Huyser 1939:227). This proportion has been maintained up to the present day as reported in studies of gong-making in central Java by Quigley (1995). By the time flat gongs and bossed gongs appear in the Philippines and Indonesia, as well as in Vietnam among the peoples of the central Highlands,



the technology of manufacturing high-tin quenched bronze was already known in India (Srinivasan 1994, 1998; Srinivasan and Glover 1995), Thailand, Borneo, Java, and China (Champion 1869).<sup>29</sup>

### Some conclusions

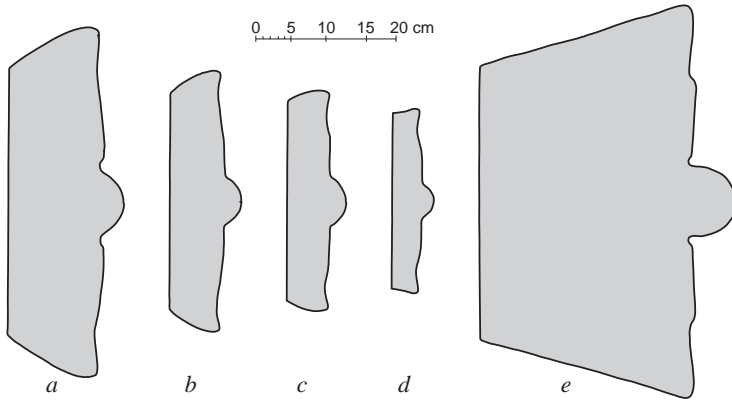
The transport of gongs, flat or bossed, continued on after the seventeenth century; twentieth-century ethnographic studies document a continuity of trade and exchange along a number of these routes, thereby confirming the use of bronze for highly valued musical instruments, such as bronze drums, as early as the Bronze Age, and contrasting with an older music which made use of bamboo, wood, and other natural materials. The diverse types of gongs found in these shipwrecks and at other sites attest to the variety of gong-music playing as early as the tenth century. Flat gongs are illustrated in the temples in Amaravati (seventh century) and Hoysala in India (twelfth to thirteenth centuries), and in Baphuon (eleventh century) and Angkor in Cambodia (eleventh to thirteenth centuries). Gongs, however, are not carved on the reliefs of the ninth-century Borobudur and Prambanan temples on Java, but they are found much later in the bas-reliefs of the temples of Kediri (early thirteenth century), Panataran, Ngrimbi, and Kedaton in east Java (fourteenth century), and Sukuh in Central Java (fifteenth century). The fourteenth-century Javanese panegyric poem *Nagarakertagama* mentions the term “gong,” but this term is not known in Old Javanese and Old Balinese inscriptions dated to the eighth to fifteenth centuries (Kunst 1968:65–66; Nicolas 2007:chap. 2; see also Nicolas in press).

The measurements of gongs in shipwrecks (table 3) give a general idea of the various sizes and profiles of these gongs. Bossed gongs with low bosses and narrow, straight rims are found in the Royal Captain Shoal, Tagbac, and Intramuros sites; however, the majority are bossed gongs with low bosses and narrow, turned-in rims found in the other eleven sites.

The Pandanan gongs are very similar to the *sanang* of the Pa’lawan people on Palawan Island; such gongs are used today for music making and ritual offerings. These bossed gongs are flat faced, with no concentric rings (Maceda 1998:129). Smaller bossed gongs with narrow, straight rims, similar to the Royal Captain gongs, but without the six-point star designs, are more common today in Mindoro (Hanunuo *agung*), Mindanao (Tiruray and Manobo *agung*) (ibid.:125, 128, 135), and in villages on Java (*bende*). These ensembles play music where one person beats one gong, with five or six players in total producing melodic drones or ostinatos (Maceda 1974). Such a style of playing is also used with flat gongs in highland northern Luzon. Flat gongs and bossed gongs played in unison—but which are tuned and which do not play melodies—are used today in Yunnan, south China, in highland central Vietnam, and in central Thailand (*khong*). In Manila, a set of ten

29. Barnard (1961) reported bronze mirrors from the Han period with a high tin component of 22%–31% tin, as quoted in Rajpitak and Seeley (1979:28).





**Figure 11.** (a–b) Pandanan shipwreck gongs; (c) Royal Captain gong; (d) Intramuros gong; (e) *agung/egung* (Mindanao/Borneo) (sketches: Eduardo Bersamira).

to thirty flat gongs (*lam luo*) is played with bossed gongs and drums in Chinese funeral processions (*koh pua che*), similar to practices in Singapore.

The bigger gongs of about 54–60 cm in diameter in the Butuan, Pandanan, Brunei, and Lena Shoal sites are particularly significant in the context of contemporary music practices. Gongs with low bosses, diameters of about 60 cm, and wide, turned-in rim widths of 15 cm are rare in Mindanao and Borneo today. What is common is the contemporary *agung*-type of instrument, with a high boss of 7 cm, about 30–50 cm in diameter, and a 20–30 cm turned-in rim width (figure 11e) (Nicolas 1977). No *agung*-type gong has been found in these shipwrecks so far, suggesting that there were different type of gongs circulating between Mindanao, Palawan, and Borneo.<sup>30</sup> Moreover, the term *agung* is known in at least twenty language groups in southern Philippines, with about fifty or more other individual names for other gongs of the same type (Yraola, in Maceda 1998:108, 330).

Three types of bossed gongs have not yet been found in shipwrecks. The Mindanao *gandingan*, a big bossed gong with low boss and narrow, straight rim, and the Mindanao-Borneo *agung* type, of high boss and wide turned-in rim, are also not found on Java or Bali. Additionally, large gongs on Java and Bali called *gong agung*, of up to a metre in diameter, with low bosses and wide turned-in rims, are today played in the courts and large temples, but have not been found in any shipwreck.<sup>31</sup>

30. These were probably transported in small inter-island boats and vessels, rather than big, long-distance trading vessels. Illustrations of bossed gongs being played on ships are found on wooden boards, bamboo tubes, and ceremonial cloths in Kalimantan, Borneo, having associations with the final journey of the dead (Bernet Kempers 1988:143–63, 544–45).

31. Of the several gongs in Kunst (1968:66, fig. 58), one on the reliefs of Panataran temple (fourteenth century) in east Java is quite large and its diameter size is similar to the contemporary *gong ageng* on Java and Bali, but this gong appears to be flat, rather than bossed. Kunst (1968) referred to Tang dynasty annals (618–906) that recorded gongs, drums, and conch-shells accompanying the Buddhist ruler of Poli riding an elephant. Poli has been identified as Aceh on Sumatra or as Bali, two big islands where similar but diverse and com-

Gongs called *agung* (spelled *aghon*) in chronicler Antonio de Pigafetta's 1521 account may have come from Borneo, but were borne by Chinese ships, although Pigafetta recorded that these were made in "Signio Magno" or China. The ensemble consisted of one big *aghon* played with a pair of these gongs, a drum, and a pair of cymbals (Pigafetta, in Blair and Robertson 1903–7:vol. 33, 149–50). These gongs might be similar to contemporary *agung* or *egung* on Mindanao and Borneo. Gong and drum ensembles are common in this area; however, cymbals are not used in present-day gong ensembles in the Philippines, Borneo, and Sulawesi, but are very important in ensembles in Burma, Thailand, Laos, Cambodia, Vietnam, West Malaysia, Java, Bali, and Lombok.

A seventeenth-century Spanish account mentions the *culintangan* (small bossed gongs-in-a-row), played together with *gumbao* (drum; known today as *gimbal*) and an *aghon* on Mindanao, accompanying trance ceremonies (Combes, in Blair and Robertson 1903–7:vol. 40, 134–36). If the gong fragments from Sungai Lumut, Brunei, are of the *culintangan* type, then this type of gong was already known by the fourteenth century on Mindanao and Borneo. Finally, the term *mongmongan* (bossed gongs) was known in central Luzon from seventeenth- and eighteenth-century Spanish dictionaries; *mong* is a more widespread term for gong in mainland and island Southeast Asia today.

From colonial Spanish accounts to a number of contemporary ethnographies, these gongs are said to have come from China, but such accounts do not qualify whether they were borne mainly in Chinese ships of recent voyaging or whether such stories may have come down as lore from oral histories. While there were indeed written records of gongs in early China and India, the rest of Asia did not produce written documents for such musical phenomena until much later. Gongs in China are of diverse shapes and profiles, and have various local names that are not known in Southeast Asia (Yuan and Mao 1986:314–16; Trasher 2000).<sup>32</sup> Despite the importance of Chinese trade in maritime Asia, the presence of Chinese temples, and the documented musical activities of Chinese communities, very few musical terms of Chinese origin can be found in Southeast Asia; this contrasts with the spread of Sanskrit musical terms in Java, Bali, Cambodia, or Thailand (Nicolas 2007:chap. 3; Nicolas in press). Given the spread and distribution in this region, Maceda previously pointed out that gongs with bosses are of different sizes and shapes in Southeast Asia, and that their seat of manufacture would likely be in Southeast Asia, rather than in China (Maceda 1973:216). Today, gong manufacturing is known in northern Luzon, Mindanao, Borneo, Java, Bali, Burma, Laos, Thailand, West Malaysia, Vietnam, and China. One characteristic of these gongs is their high tin content ranging from 15% to 25%, with prehistoric precursors in India, Thailand, Vietnam, and China. Such an alloy might partly determine their survival in ocean saltwater, mud, and soil. Metallurgical analysis will further

---

plex gong musics are played today. In 1656 Van Goens wrote about gongs of various sizes and ensemble compositions being played in the courts of Mataram in central Java (Kunst 1949:115–16).

32. For a listing of gong terms and definitions in the Philippines, see Nicolas (1975) and Marialita Yraola (in Maceda 1998:310, 315–25).

explain why, for instance, flat gongs in the Tanjung Simpang wreck have survived since the tenth century (Nicolas 2007:75–77).

The appearance of gongs from at least the tenth century created a new music culture in Asia: a successor to the earlier movements of musical ideas from the ancient migrations of the Austronesian and Austroasiatic speakers, and the spread of bronze drums; and antedating the introduction of European music in the age of colonialism during the sixteenth century. Gongs subsequently created new aesthetics of sound and music composition, known on Java and Bali as the *gongan* structure, which became models for the more ancient bamboo and wooden musical ensembles (Nicolas 1988, 1994, 2008). Gongs and other bronze musical instruments have remained as the most visible and most sought-after musical instruments. Gongs have come down to us precisely because they have been better preserved than wood or bamboo instruments. Gongs also had a commercial value, not only in terms of the material they were made of, but ultimately because they acquired status and prestige in various historical contexts in Asia. There is thus no single centre to speak of for such instruments. In an area as diverse and complex as Asia, it is still quite difficult to trace which island became the first recipient of any given musical instrument. Early trade provided an impetus for the development of new musical ideas and for the intensification of musical activity in both court and temple centres and in mountain villages that are the repositories of ancient musical ideas in the region. Future archaeological, linguistic, genetic, and musical research will furnish more details on the movement of musical instruments and ideas in the context of long-term maritime musical exchange in Asia.

### Acknowledgements

I wish to thank the National Museum of the Philippines in Manila for giving me access to its archives and for allowing me to take photographs and measurements of gongs in its collection. Thanks particularly to Corazon Alvina, Eusebio Dizon, Wilfredo Ronquillo, Bobby Orillaneda, and Ligaya Lacsina. Shorter versions of this paper were read in early 2009 at the Archaeological Studies Program, University of the Philippines, and at the Oriental Ceramics Society of the Philippines. I wish to thank Marialita Yraola, Napoleon Mabaquiao, Bobby Orillaneda, Cynthia Ongpin Valdez, and Victor Paz for reading drafts of this paper.

### REFERENCES CITED

- Abinion, Orlando V.  
 1981 “The Recovery of the 12th Century Wooden Boats in the Philippines.” *Bulletin of the Australian Institute for Maritime Archaeology* 13/2: 1–2.
- Abu Ridho and E. Edwards McKinnon  
 1998 *The Pulau Buaya Wreck: Finds from the Song Period*. Ed. Sumarah Adhyatman. Ceramic Society of Indonesia monograph, 18. Jakarta: Ceramic Society of Indonesia.
- Arnold, Alison  
 2000 Ed. *South Asia: The Indian Subcontinent*. Garland Encyclopedia of World Music, 5. New York and London: Garland Publishing.

- Atkinson, Karen, Jeremy Green, Rosemary Harper, and Vidya Intakosi  
 1989 "Joint Thai-Australian Underwater Archaeological Project 1987–88 Part I: Archaeological Survey of Wreck Sites in the Gulf of Thailand 1987–88." *International Journal of Nautical Archaeology and Underwater Exploration* 18/4: 299–315.
- Barnard, Noel  
 1961 *Bronze Casting and Bronze Alloys in Ancient China*. Canberra: Australian National University.
- Bernet Kempers, August Johan  
 1988 *The Kettledrums of Southeast Asia: A Bronze Age World and Its Aftermath*. Modern Quaternary Research in Southeast Asia, 10. Brookfield, VT: A. A. Balkema.
- Beyer, H. Otley  
 1947 "Outline Review of Philippine Archaeology by Islands and Provinces." *Philippine Journal of Science* 77/3–4: 205–374.
- Blair, E. H., and J. A. Robertson  
 1903–7 Trans. and ed. *The Philippine Islands: 1493–1898*. 55 vols. Cleveland: Arthur H. Clark.
- Blake, Warren, and Michael Flecker  
 1994 "A Preliminary Survey of a Southeast–East Asian Wreck, Phu Quoc Island, Vietnam." *The International Journal of Nautical Archaeology* 23/2: 73–91.
- Brown, Roxanna M.  
 2003 "The Ming Gap and Shipwreck Ceramics in Southeast Asia." PhD dissertation, University of California, Los Angeles.
- Burns, Peter, and Roxanna M. Brown  
 2003 "Eleventh-century Cham-Philippine Foreign Affairs." In *Ancient Town of Hoi An*, 86–91. The National Committee for the International Symposium on the Ancient Town of Hoi An. Hanoi: Foreign Languages Publishing House.
- Cembrano, Margarita  
 1998 *Patterns of the Past: The Ethno-archaeology of Butuan*. Manila: National Museum of the Philippines.
- Champion, Paul  
 1869 *Fabrication of Gongs or Tom-toms at Un-Chong-Lan, Near Shanghai; Industries anciennes et modernes de l'empire chinois*. Paris. (English translation in Goodway and Conklin 1987:20–24)
- Christie, Jan Wisseman  
 1988 "Iron-working in Sarawak." In *Metal Working in Borneo: Essays on Iron- and Silver-working in Sarawak*, ed. J. W. Christie and V. T. King, 1–28. Occasional Papers, 15. Hull: University of Hull, Centre for Southeast Asian Studies.
- Chutiwongs, Nandana  
 1990 *Indonesian Bronzes in the Domela Nieuwenhuis Collection: A Catalogue Raisonné with Comprehensive Notes on Form and Function*. Amsterdam: Christies Amsterdam.
- Condominas, George  
 1974 *Musique Mnong Gar du Vietnam*. One 30 cm, 33 1/3 rpm disc. OCORA OCR 80. Paris: Collection du Musée de l'Homme.
- Conklin, Harold C., and Jose Maceda  
 1955 *Hanunuo Music from the Philippines*. One 30 cm, 33 1/3 rpm disc. Folkways Records FE 4466. New York: Folkways Records.

Cuevas, Maharlika A.

- 1988 *Report on Underwater Archaeological Activities at Tagbac Cove, Lubang Island: February 6–March 8, 1988*. Manila: National Museum of the Philippines.

Diem, Allison I.

- 1998 “The Significance of Pandanan Shipwreck Ceramics as Evidence of Fifteenth Century Trading Relations within Southeast Asia.” *Bulletin of the Oriental Ceramic Society of Hong Kong* 12: 28–36.

Dizon, Eusebio

- 1996 “Anatomy of a Shipwreck: Archaeology of the 15th Century Pandanan Shipwreck.” In *The Pearl Road: Tales of Treasure Ships*, ed. Christophe Loviny, 63–94. Makati, Philippines: Asia Type.

Flecker, Michael

- 2000 “The Bakau Wreck: An Early Example of Chinese Shipping in Southeast Asia.” *International Journal of Nautical Archaeology* 30/2: 221–30.
- 2001 “A Ninth-century AD Arab or Indian Shipwreck in Indonesia: First Evidence for Direct Trade with China.” *World Archaeology* 32/3: 335–54.
- 2002 *The Archaeological Excavation of the 10th Century Intan Shipwreck*. BAR International Series, 1047. Oxford: Archaeopress.

Francisco, Juan

- 1995 “Notes on the Sanskrit Terms in the Laguna Copper Plate Inscription.” In *Studies and Reflections in Asian Art, History and Archaeology: Essays in Honor of H. S. H. Prof. Subhadradis Diskul*, 297–309. Bangkok: Mahawitthayalai Sinlapakon.

Franke, Wolfgang, and Ch'en T'ieh-fan

- 1973 “A Chinese Tomb Inscription of AD 1264, Discovered Recently in Brunei: A Preliminary Report.” *Brunei Museum Journal* 3/1: 91–99.

Goddio, Franck

- 1988 *Discovery and Archaeological Excavation of a 16th Century Trading Vessel in the Philippines*. Lausanne, Switzerland: World Wide First.
- 2001 “La jonque de Lena et le vaisseau Royal Captain.” *Taoci (Annual Review of the Oriental Ceramic Society of France / La Société Française d'Étude de la Céramique Orientale)* 2: 11–20.

Goddio, Franck, Monique Crick, Peter Lam, Stacey Pierson, and Rosemary Scott

- 2002 *Lost at Sea: The Strange Route of the Lena Shoal Junk*. Trans. Josephine Bacon. London: Periplus.

Goddio, Franck, and Evelyne Jay

- 1988 *18th Century Relics of the Griffin Shipwreck: A Catalogue for the Special Exhibit, National Museum, Manila, Philippines, June 22, 1988 to July 31, 1988*. Lausanne, Switzerland: World Wide First.

Goodway, Martha, and Harold C. Conklin

- 1987 “Quenched High-tin Bronzes from the Philippines.” *Archaeomaterials* 2: 1–27.

Gosling, Betty

- 2004 *Origins of Thai Art*. Trumbull, CT: Weatherhill.

Green, Jeremy N.

- 1990 “Maritime Archaeology in Southeast and East Asia.” *Antiquity* 64: 347–63.

Guillot, Claude, Lukman Nurhakim, and Sonny Wibisono

- 1994 *Banten avant l'Islam: Étude archéologique de Banten Girang (Java-Indonésie), 932?–1526*. Paris: Presses de l'École française d'Extrême-Orient.

Hall, Kenneth

- 1999 "Economic History of Early Southeast Asia." In *The Cambridge History of Southeast Asia*. Vol. 1, pt. 1: From Early Times to c. 1500, chapter 4, ed. Nicholas Tarling, 183–275. Cambridge: Cambridge University Press.

Higham, Charles

- 1996 *The Bronze Age of Southeast Asia*. Cambridge: Cambridge University Press.

Hollmann, Dieter, and Dirk H. R. Spennemann

- 1985 "A Note on the Metallurgy of Southeast Asian Kettle-drums: Proportions of Lead and Tin and Implications for Chronology." *Indo-Pacific Prehistory Association Bulletin* 6: 89–97.

Howitz, Pensak Chagsuchinda

- 1977 "Two Ancient Shipwrecks in the Gulf of Thailand: A Report on Archeological Investigations." *Journal of the Siam Society* 65/2: 1–22.

Huyser, J. G.

- 1939 "Oud-Javaansche Koper-Legeeringen." *Culturel Indie* 1 (Juli): 227–31; 2 (Augustus): 257–60; 3 (September): 292–97.

Intakosi, V.

- 1983 "Rang Kwien and Samed Ngam Shipwrecks." *SPAFA Digest* 4/2 (Bangkok): 30–34.

Jacobson, E., and J. H. van Hasselt

- 1975 "The Manufacture of Gongs in Semarang." Trans. and intro. Andrew Toth. *Indonesia* 19: 127–72.

Junker, Laura

- 1999 *Raiding, Trading and Feasting: The Political Economy of Philippines Chiefdoms*. Honolulu: University of Hawaii Press.

Karim, Pg. Haji Osman

- 2001 "L'épave de Brunei et sa contribution a l'histoire maritime de Brunei." In *L'Hour* 2001: 19–27.

Kartakusuma, Richadiana Kadarisman

- 2008 "The Laguna Copperplate Inscription Dated 922 CE: The Portion of Juristic Charter (Sudhapatra) of the Bajau (Orang Laut) Maritime Communities." Paper read at the International Seminar on Sriwijaya Civilization: The Awakening of a Maritime Kingdom. Palembang, South Sumatra, Indonesia, 13–16 July 2008.

Kunst, Jaap

- 1949 *Music in Java: Its History, Its Theory and Its Technique*. 2 vols. The Hague; M. Nijhoff.
- 1968 *Hindu-Javanese Musical Instruments*. 2nd rev. and enlarged ed. The Hague: M. Nijhoff.

L'Hour, Michel

- 2001 Ed. *La mémoire engloutie de Brunei*. Paris: Editions Textuel.

L'Hour, Michel, and Jerzy Gawronski

- 2001 "Organisation de la cargaison: Procédés d'analyse et enseignements." In *L'Hour* 2001: 139–68.

Lim, Aurora Roxas

- 1987 *The Evidence of Ceramics as an Aid in Understanding the Patterns of Trade in the Philippines and Southeast Asia*. Asian Studies Monographs, 036. Bangkok: Institute of Asian Studies, Chulalongkorn University.

Locsin, Leandro, and Cecilia Locsin

- 1968 "Some Thoughts on the Pre-Ming Trade Potteries Found in the Philippines." In "A Report on the Archaeology of the Locsin-University San Carlos Excavations in Pila, Laguna, September 4, 1967–March 19, 1968," by Rosa C. P. Tenazas, 1–11. 43 pp.

Lunsingh Scheurleer, Pauline, and Marijke J. Klokke

- 1988 *Ancient Indonesian Bronzes: A Catalogue of the Exhibition in the Rijksmuseum Amsterdam with a General Introduction*. Leiden and New York: E. J. Brill.

Maceda, Jose

- 1973 "Music in the Philippines in the Nineteenth Century." In *Musikkulturen Asiens, Afrikas, und Oceaniens im 19. Jahrhundert*, ed. Robert Gunther, 215–32. Regensburg: Gustav Bosse Verlag.
- 1974 "Drone and Melody in Philippine Musical Instruments." In *Traditional Music and Drama of Southeast Asia*, ed. Mohd. Taib Osman, 246–73. Kuala Lumpur: Kementerian Pelajaran Malaysia.
- 1998 *Gongs and Bamboo: A Panorama of Philippine Musical Instruments*. Tables, maps, glossary, and photo layout by Marialita Tamanio Yraola. Quezon City: University of the Philippines.
- 2004 "Introduction." In *A Search in Asia for a New Theory of Music*, ed. Jose Buenconsejo, ix–xxv. Quezon City: UP Center for Ethnomusicology, College of Music, University of the Philippines.

Maceda, Jose, I Made Bandem, and Nicole Revel-MacDonald

- 1979 *Music of the Kenyah and Modang on East Kalimantan, Indonesia*. One 30 cm, 33 1/3 rpm disc, with booklet of annotations. Indonesian translation by Sunardi Wisnusubroto. Quezon City: UNESCO and University of the Philippines.

Machi Suhadi

- 1985 "Inscriptions from Muara Jambi." In *SPAFA Final Report, SEAMEO Project in Archaeology and Fine Arts: Consultative Workshop on Archaeological and Environmental Studies on Srivijaya, Jakarta, Padang, Prapat and Medan, Indonesia, September 16–30, 1985*, 262, app. 7f.

Malleret, Louis

- 1959 *Archéologie du delta du Mékong*. 4 vols. Paris: École Française d'Extrême-Orient.

Mathers, William M., et al.

- 1990 *The Archaeological Recovery of the Manila Galleon, Nuestra Señora de la Concepcion*. Maryland: Pacific Sea Resources.

Mathers, William M., and Michael Flecker

- 1997 *Archaeological Recovery of the Java Sea Wreck: Archaeological Report*. Maryland: Pacific Sea Resources.

Matussin bin Omar

- 1981 *Archaeological Excavations in Protohistoric Brunei*. Bandar Seri Begawan: Muzium Brunei.

McKinnon, E. Edwards

- 1973 "Kota Tjina: A Site with T'ang and Sung Period Associations." *Bijdragen tot de Taal-, Land- en Volkenkunde* 3/1: 47–52.
- 1984 "Kota Cina: Its Context and Meaning in the Trade of Southeast Asia in the Twelfth to Fourteenth Centuries." PhD dissertation, Cornell University.

McKinnon, E. Edwards, and T. Lukman Sinar

- 1974 "Kota China: Notes of Further Developments at Kota China." *Bijdragen tot de Taal-, Land- en Volkenkunde* 4/1: 63–86.



## Nicolas, Arsenio

- 1975 "Talasalitaan" [Glossary of musical terms]. *Musika Jurnal* 1: 137–54.
- 1977 *Ang mga kulintang sa Mindanao at Sulu* [The *kulintang* in Mindanao and Sulu]. Two 30 cm, 33 1/3 rpm discs with notes. Quezon City: University of the Philippines, Department of Music Research.
- 1988 "A Typology of Bamboo Musical Ensembles in Southwest Central Java." Paper read at the Symposium of the International Musicological Society, Melbourne, Australia.
- 1994 *Alat-alat muzik Melayu dan Orang Asli* [The musical instruments of the Malay and the Orang Asli]. Bangi: Universitas Kebangsaan Malaysia.
- 2007 "Musical Exchange in Early Southeast Asia: The Philippines and Indonesia, ca. 100 to 1600 CE." PhD dissertation, Cornell University.
- 2008 "Bamboo, Bronze Drums and Gongs: A Musical Exchange in Maritime Asia; Review Essay: *Gongs and Bamboo: A Panorama of Philippine Music Instruments*, by Jose Maceda (1998)." *Musika Jurnal* 4: 198–215.
- in press "Early Musical Exchange between India and Southeast Asia." In *Conference on Early Indian Influences in Southeast Asia: Reflections on Cross-cultural Movements, 21–23 November 2007*. Singapore: Institute of Southeast Asian Studies.

## Orillaneda, Bobby

- 2008a "The Santa Cruz, Zambales Shipwreck Ceramics: Understanding Southeast Asian Ceramic Trade during the Late 15th Century, CE." MA thesis, University of the Philippines, Diliman, Quezon City.
- 2008b "A View of a Late 15th Century Trading Vessel in the Philippines: The Sta. Cruz Shipwreck." *The Oriental Ceramic Society of the Philippines Newsletter* (August): 2–3.

## Perrin, Sharon

- 2000 *The Brunei Shipwreck*. Bandar Seri Begawan, Negara Brunei Darussalam: Elf Petroleum Petersen.

## Prishanchit, Sayan

- 1999 "Maritime Trade from the Fourteenth to the Seventeenth Centuries: Evidence from the Underwater Archaeological Sites in the Gulf of Siam." In *The Silk Roads: Highways of Culture and Commerce*, ed. Vadime Elisseeff, 189–98. Paris: UNESCO; New York: Berghahn Books.

## Quigley, Sam

- 1995 "Gong Smithing in Twentieth-century Surakarta." *Asian Art and Culture* 8/3: 12–31.

## Rajpitak, Warangkhan, and Nigel J. Seeley

- 1979 "The Bronze Bowls from Ban Don Ta Phet, Thailand: An Enigma of Prehistoric Metallurgy." *World Archaeology* 11/1: 26–31.

## Ray, Himanshu Prabha

- 2003 *The Archaeology of Seafaring in Ancient South Asia*. Cambridge: Cambridge University Press.

## Ronquillo, Wilfredo

- 1987 "The Butuan Archaeological Finds: Profound Implications for Philippine and Southeast Asian Prehistory." *Man and Culture in Oceania* 3: 71–78.
- 1989 "The Butuan Archaeological Finds: Profound Implications for Philippine and Southeast Asian Prehistory; Revised Version." In *Guangdong Ceramics from Butuan and Other Philippine Sites*, ed. Roxanna M. Brown, 61–69. Manila:



- Oriental Ceramics Society of the Philippines; Singapore: Oxford University Press.
- Salmon, Claudine
- 2003a "A Tentative Interpretation of the Chinese Inscription (1231) Engraved on a Bronze Gong Recovered in Muara Jambi (Central Sumatra)." *Archipel* 66: 91–112.
- 2003b "Diffusion et commercialisation de cloches chinoises en Asie du Sud-est." *Mirabilia Asiatica*, ed. J. M. Dos Santos Alves, Claude Guillot, and R. Ptak, vol. 1, 253–307. Weisbaden: Haarrsowitz Verlag and Lisbia Fundacao Oriente.
- Solheim, Wilhelm G.
- 1964 *The Archaeology of Central Philippines: A Critical Study of the Iron Age and Its Relationships*. Monographs of the National Institute of Science and Technology. Manila.
- Srinivasan, Sharada
- 1994 "High-tin Bronze Bowl Making in Kerala, South India, and Its Archaeological Implications." In *South Asian Archaeology 1993: Proceedings of the Twelfth International Conference of the European Association of South Asian Archeologists held in Helsinki University, 5–9 July 1993*, ed. Asko Parpola and Petteri Koskikallio, vol. 2, 695–706. Helsinki: Suomalainen Tiedekatemia.
- 1995 "The Enigma of the Panch-locha (Five Metal) Icons: Archaeometallurgical and Art Historical Investigations on South Indian Bronzes." PhD dissertation, Institute of Archaeology (London).
- 1998 "High Tin Bronze Working in India: The Bowl Makers of Kerala." In *Archaeometallurgy in India*, ed. Vibha Tripathi, 239–50. Delhi: Sharada Publishing House.
- Srinivasan, Sharada, and Ian Glover
- 1995 "Wrought and Quenched, and Cast High-tin Bronzes in Kerala State, India." *The Journal of the Historical Metallurgy Society* 19/2: 69–88.
- Tenazas, Rosa C. P.
- 1981 "Underwater Archaeological Investigation of the Rang Kwien Shipwreck." *SPAFA Digest* 2/2: 31–32.
- Thrasher, Alan R.
- 2000 *Chinese Musical Instruments*. New York: Oxford University Press.
- Wade, Geoffrey Philip
- 2003 *The Ming-shi Account of Champa*. Working Paper, 3. Singapore: Asia Research Institute.
- 2009 "An Early Age of Commerce in Southeast Asia, 900–1300 CE." *Journal of Southeast Asian Studies* 40/2: 221–65.
- Wong, Grace
- 1979 *A Comment on the Tributary Trade between China and Southeast Asia, and the Place of Porcelain in This Trade during the Song Dynasty in China*. Transactions of the Southeast Asian Ceramic Society, 7. Singapore: The Southeast Asian Ceramic Society. (Also published in: *Chinese Celadons and Other Related Wares in Southeast Asia* (Singapore: Singapore Asian Ceramic Society, 1979): 73–102)
- Yuan Bingchang and Mao Jizeng
- 1986 Ed. *Zhongguo shaoshu minzu yueqi zhi* [The musical instruments of ethnic minorities in China: A dictionary]. Beijing: Xinxijie Chubanshe.