THE STUDY OF CARGOES FROM TANJUNG SIMPANG MENGAYAU WRECK AND JADE DRAGON WRECK, KUDAT, SABAH

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THE STUDY OF CARGOES FROM TANJUNG SIMPANG MENGAYAU WRECK AND JADE DRAGON WRECK, KUDAT, SABAH

by

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KAJIAN KARGO DARI TAPAK KAPAL KARAM TANJUNG SIMPANG MENGAYAU DAN KAPAL KARAM JADE DRAGON, KUDAT, SABAH

ABSTRAK

Tesis ini membincangkan tentang analisis dan klasifikasi artifak kargo yang ditemui daripada dua tapak kapal karam di Kudat, Sabah, Malaysia. Berdasarkan analisis stailistik pada seramik setiap kapal, ia berkemungkinan bertarikh sekitar abad ke-10 M hingga ke-13 M. Kajian ini bertujuan untuk (1) menghasilkan inventori ke atas kedua-dua kargo, (2) menghasilkan satu sistem pengelasan menggunakan kaedah analisis saintifik dan analisis morfologi, dan (3) menentukan pentarikhan dan tempat asal datangnya isi kargo tersebut. Tapak kapal karam pertama yang dikenali sebagai Tanjung Simpang Mengayau (TSM) Wreck dipercayai karam semasa dalam pelayaran dari China ke Borneo atau/dan Sumatera pada Dinasti Song Utara (960-1127 M), manakala kapal karam kedua, Jade Dragon Wreck (JDW) bertarikh pada Dinasti Song Selatan (1127-1279 M) kerana membawa barangan yang sama ditemui di Sumatera. Antara isi kargo ialah tembikar tanah, tembikar batu, porselin dan barangan logam seperti cermin cakera dan perhiasan dinding. Tapak kedua juga membawa artifak litik yang mana tidak terdapat pada tapak kapal pertama. Jumlah keseluruhan seramik yang dianalisis ialah 2,590 yang diperolehi dari koleksi Jabatan Muzium Negeri Sabah dan pengumpul barang antik di Sabah. Analisis sampel seramik menggunakan gabungan ciri-ciri morfologi seperti bentuk, warna dan hiasan dikenal pasti dan diklasifikasikan sebanyak 11 jenis seramik iaitu mangkuk, balang, pinggan, ewer, kendi, botol, bertutup. kotak, besen, teko, pasu dan penutup. Sembilan kumpulan warna glais dan hiasan/motif kelopak teratai, pokok teratai dan awan pada bahagian dalam mangkuk

dan piring, manakala motif garisan menegak yang dibentuk oleh sikat buluh merupakan hiasan luar badan yang popular. Bagi logam pula, terdapat sebanyak 234 objek logam lengkap dan 677 yang tidak lengkap daripada TSM diperolehi dari Jabatan Muzium Negeri Sabah dan pengumpul barang antik, manakala JDW hanya mempunyai dua objek logam lengkap dan semuanya diperolehi dari koleksi JabataPn Muzium Negeri Sabah. Sama seperti klasifikasi seramik, logam dikelaskan mengikut (1) Fabrik; gangsa atau loyang, (2) Jenis; gong, cermin, keris atau syiling, (3) Warna; kuning keemasan atau kuning lebih gelap, (4) Motif & Hiasan; fauna, semula jadi dan haiwan mitos serta aksara Cina, dan (5) Masa; iaitu Dinasti Song utara atau selatan. Tiga impak dalam kajian adalah (1) ianya dapat menyediakan kaedah pengelasan artifak dari tapak kapal karam yang sistematik secara terperinci dan pantas dengan megambil keseluruhan data sama ada morfologi, sifat fizikal dan komposisi kimia, (2) melihat jalinan budaya Cina dalam masyarakat tempatan sejak berabad berlandaskan ekonomi, dan akhir sekali (3) ianya telah mendedahkan kepentingan perairan Sabah dalam kajian arkeologi maritim semasa era pelayaran seperti pertukaran ilmu teknologi (pembuatan gong), kebudayaan tempayan pengebumian, tempat perlindungan dan pelabuhan sementara kepada kapal yang menyusuri pantai barat Borneo. Kesemua bukti ini menunjukkan bahawa Sabah terlibat secara langsung dalam perkembangan maritim dan asimilasi budaya sejak era perdagangan maritim di Asia Tenggara.

THE STUDY OF CARGOES FROM TANJUNG SIMPANG MENGAYAU WRECK AND JADE DRAGON WRECK, KUDAT, SABAH

ABSTRACT

This thesis discusses the analysis and classification of artefacts recovered from cargoes of two ancient shipwrecks in Kudat, Sabah, Malaysia. On the basis of stylistic analysis of the ceramics from each ship, these ceramics are presumably dated around 10th to 13th centuries CE. The objectives of this study are (1) to produce a documented data to evaluate cargoes from the two ships, (2) to classify the recovered artefacts using scientific analysis and morphological study and (3) to date and identify the provenance of the cargoes. The first shipwreck is known as Tanjung Simpang Mengayau Wreck (TSM) and is believed to have sunk on its way from China to Borneo and/or Sumatera during the Northern Song Dynasty (960-1127 CE), while the second shipwreck, Jade Dragon Wreck (JDW) is dated to the Southern Song Dynasty (1127-1279 CE) judging from the similar artefacts found in Sumatera. The cargoes consist of earthenware, stoneware, porcelain and metal objects such as mirror discs and wall ornaments. The latter site also carried lithic artefact, which assemblage is absent at the former site. Analysis and classification of the ceramic cargo included 2,590 samples from the Department of Sabah Museum's collection and private collectors in Sabah. The analysis of ceramic samples uses a combination of morphological characteristics such as form/shape, colour and decoration had identified and classified 11 main types of ceramics and nine glaze colour groups consisting of bowls, jars, plates, ewers, kendi, bottles, covered boxes, basins, teapots, vases and lids. Nine glaze colours and lotus petals, lotus tree and clouds, made using scraping or carving tools were found on the

inner body of the ceramics while vertical lines formed by a bamboo comb was a popular outer body decoration. As for the metal assemblage, the Department of Sabah State Museum's collection and private collectors included 234 complete and 677 incomplete metal objects from TSM, while JDW has only two complete metal objects, all from the Department of Sabah State Museum. Similar to the ceramics assemblage's classification, the metal assemblage classified was classified according to (1) Fabrics; bronze or brass, (2) Types; gong, mirror, dagger or coin, (3) Colours; golden yellow or darker yellow, (4) Motifs & Decorations; bossed, natural and mythical faunal or has Chinese characters, and (5) Period; northern or southern Song Dynasty. The impact is threefold; first, it determines Chinese cultural infusion into local community centuries ago, whilst second, it represents a two-way economic dependence of two polities, and third, it reveals Sabah waters' importance through maritime activities such as knowledge transfer (gong making), burial jar culture, facilitating ships with provision and shelter, as well as its significance as a main and peripheral route for ships travelling around Borneo west coast. All these evidence suggest that Sabah is one of the main players engaged in both maritime activities and cultural assimilation since the dawn of maritime commerce and trade age in Southeast Asia.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter encompasses the background of maritime archaeology in Sabah and the classification of recovered objects from the wreck sites, research scope, research aims posing questions and addressing the limitations of this research. In addition, it presents a schematic on the classification for artefacts collected from the two shipwrecks, namely the Tanjung Simpang Mengayau Wreck and Jade Dragon Wreck. These two shipwrecks sunk off the coast of Kudat in Sabah, Malaysia Borneo located at 500 meters away from each other (Figures 1.2 to Figure 1.3).

Figure 1.1: Map of the sites' location in Malaysia and Southeast Asia
Source: Franck (2012)

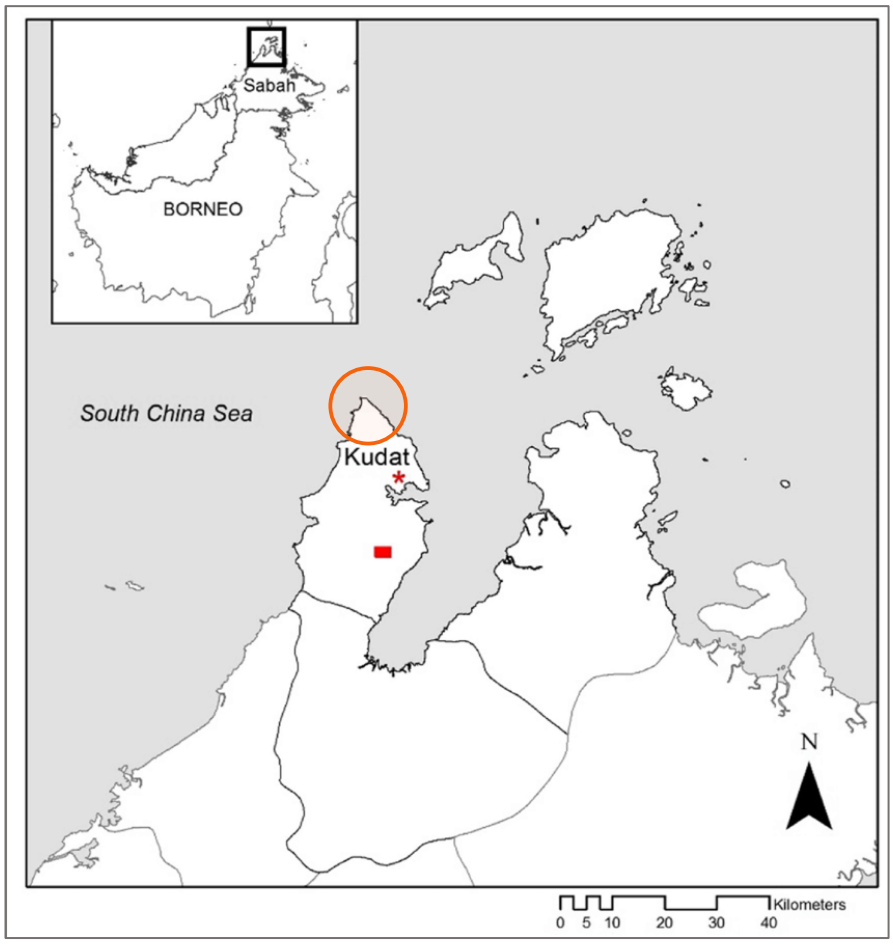

Figure 1.2: Map of the sites' location in Sabah
Source: Brown *et al*. (2018)

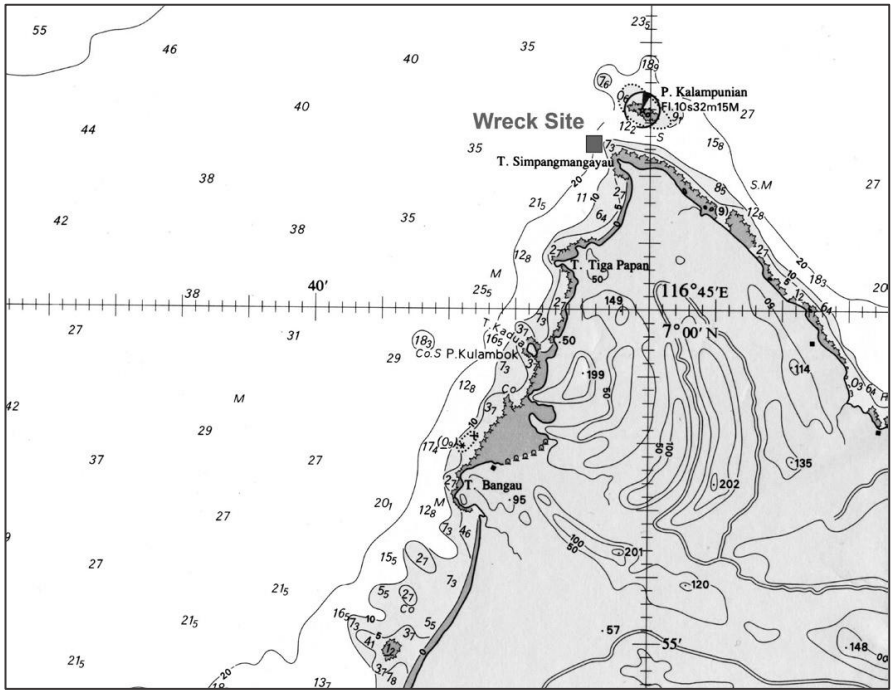

Figure 1.3: Map of the sites' location in Kudat
Source: Flecker (2012)

1.1.1 Maritime Archaeology in Southeast Asia

While trading and seafaring were flourishing around the globe, Southeast Asia was at its height in the emergence of thalassocracy kingdoms. Majapahit, Srivijaya were among the kingdoms known for maritime power in the south, so did Champa, Kedah Tua, and Langkasuka in the north, and Kutei and Po-ni in Borneo which were developed in phases; from domestic to regional and finally, imperial phase (Mukai, 2011; Kurz, 2014; Kurz, 2011). The most powerful and shifted only to expand regions was Srivijaya (Sriwijaya), today's` Palembang—a district in Sumatra, Indonesia. The main waterway is the Musi River, which stretches inland from the Sunda Sea in the east.

Figure 1.4: Map of the trade route and Srivijaya in 10th to 11th century
Source: Wan (2013)

At the height of maritime activity in Southeast Asia during the 13th century CE, Sabah waters facilitated the establishment of a significant and growing maritime networks that skirts its coastal areas along the northernmost to western regions of Sabah, down to Brunei Darussalam and lastly to Santubong in Sarawak, before diverging to the bustling international route of Indonesia (Yunos, 2011). At least three distinct networks emerged as a result of these maritime interactions; 1) the networks skirting Borneo polities; 2) the integral networks connecting areas around the South China Sea; and 3) the networks of direct exchanges between Southeast Asia and China (Tansen, 2014).

Malacca was under Srivijayan control before the 1500s; it superseded maritime power in the 15th century CE and later shifted international power centralising in Malacca. This new kingdom has become politically potent under the Sultanate reign and an economically important trading place, benefited by its strategic location at midpoint route that connects the eastern and western worlds.

The Hindu-Buddhism-influenced thalassocracy Srivijayan Empire assumed power and controlled the Malay Peninsula between the late seventh and 13th centuries CE, especially those along the Malacca Straits. Under the Srivijayan ruler, the Malay Peninsula had to revolutionise its trading network and become the archipelago's leading power. After the empire's collapse, Islam gradually spread through the region, and sultanate polities evolved. As a result, the Malacca Sultanate prospered as the first independent state and became a vital commercial centre.

On to the other side of the map, a kingdom mentioned in Zhu Fan Zhi by Zhao Rakuo (1127 CE– 1279 CE) as Po-li (an official writer and editor, Yao Silian 567–637 CE report) or Po-ni or Bo-ni (Muljana, 1981, 2006; Kurz, 2011; Kurz, 2014; Wan,

2013). The location is mid-west of today's Borneo; Brunei had seaborne trade occurred long-term and diplomatic connection between China-Borneo polities since the Tang Dynasty (618– 627 CE). We know from one of the most critical maritime sites after some artefacts were dredged out during the widening and deepening work on Limau Manis River in 2002. Ceramics, beads, stones, bronze bangles and jade among the finds (Osman, 2004). China-Boni trade is believed to exchange local products, world's finest quality camphor to the above items while objects like iron slag, crucibles, boat remnants, and coins showed that the settlers conducted maritime activities for the day-to-day business; fishing, shell collecting, metal smiting and trading (Yunos, 2011). Moreover, it was of a royal decree to send a political ambassador for a friendly visit, live and exchange tribute as a token of honouring this relationship. Finally, Boni harbours trading partners from South Asia, Arabian Peninsula, and Africa for much broader expansion.

The southeast of Borneo, Kutei (Kutai, Samarinda), part of Kalimantan, Indonesia on the other hand, developed into an active classical era's port with a prominent role of local trade with Europeans. This port had many trading activities with the western world than China. Hence, Boni had a long-term, successful, and sinewy grounding to China than Kutei. Another positive side of this involvement was the overall development in broader economic prospects and widened association in maritime history.

Despite research scarcity of Borneo's maritime history (Christie, 1988), it should, so far, have the evidence of trade from the shipwrecks, imported and exported commodities as figure factors of Brunei's thriving thalassocracy kingdom (Wan, 2013). Provided that Borneo is the third biggest island in the world and surrounded by three oceans, its self-sustaining agricultural economic resource was mutually growing

with the maritime port. Traditionally, indigenous tribes in Sabah are known as pearl divers because it was among precious commodities and pivotal for bead-wearing tradition during the sparking maritime age in the 10th to 13th centuries CE (Tarsat, 2018). Their settlements lined along with the coastal areas, providing direct contact with stopping by merchants.

As shipwrecks are essential to tracing the route used by merchants and explorers, concentrating on the ship itself— types of ship (trade or military), site formation (cause of wreck), manufacture style (country of origin), building materials (wood species), and the cargo (staked and labelled for trade) is arguably an important aspect in conjunction to classification. Texts, maps and diagrams of the process clarify the classification concept and correlate it into history.

Although no ship-making industry is yet known in ancient Borneo, extrapolation upon the number of shipwrecks and cargoes formed a trend showing that northern Borneo is a shipwrecks' 'hotspot'. Patterns grant us information on an actual trade route. Rather than relying solely on Chinese references, isolating similarities between local culture and the cargoes' artefacts would show another trend. From gong-making in Kudat to jar burial culture all over Sabah, shared culture is leaving a trail stressing the relevance of Borneo's past in the context of global history. Apart from that, by interpolating evidence orderly, the classification may lead to discoveries such as a whole, submerged town or resurface an ancient, buried city, and more importantly, it can rewrite the past altogether or ultimately, predict more maritime sites.

Merchants may have taken two significant routes to the Indonesian Archipelago. First, from China ports, the merchants will take an immediate turn to the right flank, down the Indo-China countries and Thailand, before going south along the

Malaysian Peninsular; while the second route was through the Philippines waters on the left, then back to the South China Sea along the Philippines' before reaching the tip of Borneo for protection on high sea turbulence (Wade, 2009; Miksic, 2018). Tip of Borneo is well-known to have a notorious, unapologetic sea and dangerous currents with occasional cyclone until today (Bala & Bee, 2009). However, once ships find their way to the nearest bay between Kalampunian and Tanjung Simpang Mengayau, which is usually calmer, they may shelter from the violent weather and replenish their ships. In this sense, the surrounding area emerged as a central player during the Age of Commerce in Southeast Asia (Wade, 2009).

Ancient shipwrecks in Borneo were salvaged, recorded and kept under museums' collections. While there are Chinese records on trade activity from China outward, including merchants and commodities to be exported to specific ports and traders, Borneo's record is virtually non-existent. Because not all recovery and salvage projects involved only government or local authorities, but also private companies, the artefacts at the museum's collection were the only ones allocated to them, which means not everything was recorded in detail. In this case, recording artefacts are substantially exigent since they are elements that transverse and encapsulate the actual time of historical wrecking, chronological sojourning, goods distribution, and direct involvement as trade currency. Distribution discoveries, marks trading and capillary routes, cultural adaptation and exchange, cross-cultural practice, or the plausible existence of other ancient kingdoms.

1.1.2 Shipwrecks and Cargoes in Sabah

Until 2017, eight shipwrecks had been identified as Chinese merchant vessels which sunk in Borneo waters and dated to the 10^{th} to 15^{th} century CE in which northern Song

Dynasties until Yuan Dynasty take place. During which, ceramics' crudeness gradual improvement to complexity showcasing separate dynasties between northern and southern Song Dynasties. These shipwrecks are Tanjung Tiga Papan (10th century CE), Canon Wreck (10th century CE), Coral Wreck (10th century CE), Kalampunian Wreck (10th century CE), Skulls Wreck (10th century CE), Tanjung Simpang Mengayau Wreck (10th to 13th century CE), Jade Dragon Wreck (10th to 13th centuries CE), and Brunei Shipwreck (15th century CE) (Sten *et. al*., 2006, Bee *et al*., 2003; Bee 2002, Bee *et al*. 2003; Bee *et al*. 2004a, Bee *et al*. 2004b, Bee *et al*., 2006, Ko, 2015; Azman, 2016).

Before 2010, understandably due to the underdeveloped study in maritime archaeology in Sabah, most studies covered the World War II fleet that exclusively focused on shipwrecks relevance for divers and tourist attraction. The recovered artefacts had been connected to one kiln site in China but not comprehensively compared to specific Chinese records.

Studies done by historians and archaeologists put Borneo as one of the early kingdoms in Southeast Asia, centring on annals and tribute records (*Zhu Fan Zhi*) and comparative studies artefacts found in Southeast Asia. Sadly, maritime-recovered artefacts permutation conforms to their variety vaguely. The selected few, usually the ones with significant characteristics sampled for the whole wreck, hence the name for the wrecks is usually derived from the prominent artefact itself. Moreover, they were restricted only to design and use-wear (Harrison, 1973), where trading routes is thinly described (Kurz, 2014; Harrison & Harrison, 1973; Flecker, 2011; Sjostrand, 2003).

1.1.3 General View on Ceramic

Individual ceramic pieces are formed from that mixture by hand or machine into the desired shape, a plate, bowl, teapot, charger, or any other type of ceramic dinnerware. Each piece then undergoes a series of firings in which it is exposed to temperatures well above 1,000 degrees Celsius in a specialised oven called a kiln. That exposure to heat causes the clay to undergo a physical transformation that makes it rigid and durable.

Each ceramic piece will likely receive a glaze coating before or between firings depending on the desired results. Because many types of clay remain naturally porous even after firing, coating seal the surface to prevent it from absorbing moisture from food and drinks. Manufacturers use a transparent glaze if they want the natural colour of the fired clay to show through. Glazes often turn opaque when fired and chosen for the decorative coloured finish, and they give the final dinnerware.

Many ceramic types are fired to temperatures high enough and held long enough for the clay to become partially or fully vitrified. Vitrification is a process which brings the ceramic to its melting point. At that temperature, the clay and minerals fuse and form a crystalline structure. The term is derived from the Latin word "vitreum" which means glass because it produces glass-like clay properties. The transformation dramatically strengthens the material and makes it much less porous than non-vitrified ceramics, sometimes so much that manufacturers choose to forgo glazing ceramic pieces that have been fully vitrified. (https://www.katom.com/cat/dinnerware/porcelain-vs-stoneware-vs-china.html)

The earliest art evidence from ancient China depicts crude pottery and geometric designs decorated in Mesolithic sites in northern China and the Guangdong-

Guangxi regions circa 1600 BCE (Sullivan *et al*., 2014). The Song Dynasty, viewed as the golden age of Chinese ceramic art, witnessed the country in two halves: the northern half, which enjoyed a relatively high degree of tranquillity, and a Southern zone beset by invasion upheaval. Despite this, most art historians agree that pottery reached its zenith during the Song period. More subtle than its predecessors or successors, Song pottery was characterised by flowing monochrome glazes and a depth of colour that moves the viewer to touch and contemplate. In terms of their technical prowess, innovation, and aesthetic sensitivity to glaze and shape, Song potters stand above all others in their ceramic art quality. Here is an overview of the most notable examples of Song ceramic ware found from the sites.

First, the Ding ware is one of the most famous and refined Song Dynasty white stoneware made in the Ding kilns of Hebei Province, southwestern Beijing. This ware has high-fired, grey-coloured clay, overlaid with ivory-white slips and transparent glazes—some vessels decorated with hand-incised patterns as well as intricate pressed motifs. The vessels in this category are ewers and covered boxes. Secondly, the Northern celadon ware denotes a prevalent form of high-fired stoneware made in kilns and Shanxi province. It comprised a thin grey-coloured ware decorated with impressive or hand-carved designs (featuring flowers, waves, fish, dragons, clouds) and overlaid with a translucent olive-green glaze. Most celadons are bowls and plates. The third category of ceramic is also greenware, the Longquan celadon, which is reputedly the most sophisticated porcelain celadon of the Song Dynasty made in the Southern province of Zhejiang. This category, in particular, is a sizable item found in the Jade Dragon Wreck. Lastly is the Tz'u-chou pottery. Tz'u-chou ceramic ware encompasses sturdy stoneware made in Honan, Shanxi, and Shandong provinces in

Northern China during the Song and Ming dynasties (960 CE-1644 CE) (http://www.visual-arts-cork.com/east-asian-art/chinese-pottery.htm#sui).

1.1.4 General View on Gong

Gongs had been traded to either Borneo or the Philippines (Nicolas, 2009). It is a sonorous, percussive musical instrument of Chinese origin and manufacture, made in a broad, thin disk with a deep rim that has spread to Southeast Asia - a type of flat bell (Kartomi, 1990; Nicolas, 2009). Blench (2006) defined a gong as a circular bronze percussion instrument with indefinite pitch, usually with a deep rim and with or without boss. The earliest known gong, *Luo*, was from the Han Dynasty dating back to 206 BCE - 220 BCE excavated at the Luobuwan site in Guangxi Province, southwestern China (Blench, 2017). Through Blade's classification, the types of gong manufacture in Burma, China, Annam and Java have at least seven types of *kempul*, *bende*, *beri*, *kenon*, *kempayan* and *ketuk* (Blench, 1992). Tabuli strikes them as a beater to produce sounds. Therefore, a heavier bossed-type gong will need a heavier mallet (beater). He also specified four steps in manufacturing gong in ancient and modern manufacturing techniques. Paiste's family, since 1902, used modern techniques producing gongs with consistent tunes. After 110 years, Paiste's family reputation remains a prominent European gong manufacturer and supplier worldwide, with an approximately consistent elemental composition.

Culturally, Asian families believe that gong can attract wealth and serve as a status symbol. Certain ceremonies such as rites, a gong used to evoke ghosts and the banning of demons. Moreover, touching a gong brought fortune and strength to the weaker person (Blade, 1992). As a musical instrument, the gong accompanied celebrations and funeral ceremonies, songs and theatre. In Asian high culture or private

concerts at residences, gongs are celebrated as an orchestral instrument (Nicolas, 2009).

Borneo's commodity fulfils consumers' needs and demands with the finest and high-quality local forest revenues (Wade, 2009), thus requiring high-quality products. Nevertheless, this is not always fulfilling as the bronze gongs production quality is commonly proven inversely proportional to marketplace demands. In 2006, a study of bronze gongs by Blench (2009) interpreted gongs valuable contribution that settlements emerged from musical instruments marketed by Chinese merchants to get supplies due to countless naval expeditions and diplomatic missions. Therefore, such an emergence of cities would address here as supply ports.

Promulgated via Webmaster's Third New International Dictionary, 1976 edition, musical instrument term defined as implements used to produce music, mainly as distinguished from human voice (Kartomi, 1990). Accordingly, their tuning/sonority varies during the production details such as thickness, size, and material used. In Kartomi's book on Concepts and Classifications of Musical Instrument (1990), she describes many classifications according to society, including the two schemes of modern Chinese classifications; the musical instrument is a mode of sound excitation other is morphological. However, during the Song Dynasty, the gong was not characterised since Tanjung Simpang Mengayau Wreck gongs' morphology is consistent and would drive hypothesis from the sound produced.

The superiority of percussive musical instruments lies in their functionality and physical appearance. Martin and Kim from M.I.T. Media Lab Machine Listening Group in 1998 applied a pattern-recognition approach to classifying musical instruments. Their study demonstrates that the gong capability to produce different

tones hinges on the multi-elements it contains during the manufacturing process (Martin & Kim, 1998).

Bronze is an alloy made up mostly of copper (Cu) and tin (Sn), while gong is the oldest and most important percussive musical instrument, which term was coined by Javanese, but it is also known as tam-tam throughout Southeast Asia (Blade, 1992). According to Nicolas (2009), flat gongs from south China tuned and did not play melodies similar to some countries, including Yunnan, highland central Vietnam and central Thailand. There must be a particular reason for a musical instrument not to be played as one. Many ethnics in Southeast Asian countries, especially people who honoured ancient artefacts and indigenous people, use gongs as ornamental objects collection rather than functional instruments.

Another method to distinguish between superior musical instruments is the metals' content using chemical characterisation as a percussion musical instrument. Copper (Cu), for instance, will affect the colour and lead (Pb) adds durability and weight to it. Thus, one characterisation of musical instrument exclusivity is by comparing frequencies it emits played at a specific note (pitch) with all instruments with another percussion family. They produce equally the same note; therefore, they are grouped with the same musical instrument family (Kartomi, 1990).

Historically, before the currency was in open-market use, the barter system was first introduced to trade commodity and currency (Blench, 2006). In fact, during the maritime trade boom, the currency was one of the significant external changes that historically proven the commerce have taken place in rapid movements apart from other changes throughout the region (Wade, 2009). Other characteristics would be the currency's physical state, where the currency frequently has the non-destructive

capacity with heavyweight and abundance of the amount. These strongly suggest that the above characteristics explained their elemental compositions is functional for currency.

The elemental composition reflects on the quality (Blade, 1992). Elemental trend reassures massive production's quality as it is similar to a formulated composition before. The similarity marked a standard for the desired quality. Moreover, its durability and resistance to perpetual exposure to seawater might reveal the additive agent. Blade stated that gong's metal composition adjusted according to consumer demand by and more extensive. The more demand for it, the lack of quality it became. A high-quality gong contains more silver (Ag) metal and a lighter colour but will cost five times more than a regular gong. Simultaneously, the presence of iron (Fe) will give a brownish colour to the lower quality gongs. Few families with the gongs in Southeast Asian countries would be noted as a highly privileged family. In Borneo, exclusive gongs manufacturing was well-known by an ethnic group known as Iranun in Tempasuk, Kudat, Sabah (Pugh-Kitingan, 2010). Blade (1992) discussed that traditional processes are pouring, hammering, smoothing, tuning, polishing, and ornamenting. Modern-day production of gongs by Paiste used to mould in the process, where a rolled metal sheet was a cut-out in a circular disc form before pressing the sides to upturn into a plate.

1.2 Research Issues and Problems

The first issue arises due to the aftermath of the recovery project. Following recovery, all the way to the warehouse treatment, damage assessment and then curation are fundamental stages in keeping data unchanged and reliable. These data are assets identification of provenance and dating and later enable study on determining

destination, trade routes, distribution, and ethnic buyers ~~in~~ early Sabah's maritime history. It is also useful for 3.7 study. Immediately, a suitable approach for data collection sets objectivity and comparability clear within and between assemblages at once; for example, a computer protocol performs a modular comparison of clustering artefacts in line with criteria of interest. It is required to have an expandable and flexible, more streamlined taxonomic classification for scientific investigation because ultimately, the data produced would support the objective and significantly improve managerial and curatorial aspects, if not archaeological studies in the future (Lefrancq *et al*., 2019). All three issues discussed above conclude that this study is a necessity for further study.

The second issue is as artefacts contain knowledge of the past; it is desirable to amplify ways to preserve them once discovered. Excavated or not, artefacts are sensitive objects, eternally subjected to threats. Although in situ recovery with measurable precautions is taken for no harm done, they would, at the minimum, open to natural damage of oceanic activity and human interaction, loss of original glaze colour, the evading crustacean organisms, or worse, looting. Should we choose to excavate, a significant drawback for non-in situ recovery is the loss of elements naturally preserved in submerged conditions, i.e., original colour, vessels content, degradation, or else. Even after excavation, another level of threat is possible. If a proper recording is unintentionally dismissed during handling, typically due to time constraints and space on the boat, some substantial links would be missing; the total amount of complete or shards, the form of assemblages, their unique designs, among others, will quickly be disappeared and left only what comparable to a massive lump of chaos. Unfortunately, these are irreversible threats; hence, performing concession before all information has been gathered is unadvisable.

Some comparable characteristics manifested in different aspects such as materials, shapes, decorations and colours. For instance, decorations placement could be similar to the outer body and the inner body of U-bowls unique to their sites. Another example is maybe a colour might consistently or rather almost exclusively be found in jars and no other class. Thus inquired the best system to classify the cargoes. A structured classification system become a must for more complex inquiry in this case, perhaps by using scientific analysis and morphological study according to fabric materials, types and forms, decorative techniques, glaze colours and their component, fire and kilns site, as well as motifs and symbols will be able to serve its purpose (Rice, 2015).

The third issue to address is the threat imposed unto artefacts for their commercial value. Once a site is exposed, either by chance or intentionally, the potential damage caused by looting would be serious (Flecker, 2017). Through academic and archaeology lenses, unexamined artefact is canonically at risk of losing its valuable data. Speedy examination enables a sizeable data collection in-situ with minimum removal of anything (Beck & Jones, 1989; Karasik & Uzi, 2011).

Bearing encapsulated history, artefacts require a proper approach upon discovery until reporting preferably academic because of the depth and extensive nature of academia before it ends up as one of the novelty items in antique shop. Although this approach takes longer time almost likened as deferment to concession process to involving parties, antiquity era shows an exemplary loss of information we shall not repeat; at least not intentionally (Flecker, 2017). Keeping antiques ‘safe’ in guarded personal collection on the other hand, not only may devalue their worth but also greatly reduce the past into an elusive idea. For example, in metalware, while the absolute dating could help trace the production date, oxidation or simply mishandling

may cause serious damage on its patina. Crust, rust, discolouration, or degradation slowly but surely had surface etching, motifs or other kind of decorations disappear. As in supplementing and improving antiquity practice, because in the past antiquity not just preserved the objects but also pioneering the appreciation of ancient objects which is not too different to modern society's value today but rather improving the practice to be more systematic towards the demanding inquiry of our connection in the past (Oldham, 2015; Palincas, 2005; Read, 1989).

Oftentimes diversity of goods brought by Chinese merchants are not just responsible for bringing forth trading activity but also richness into local culture and lifestyle. However, more in-depth work is needed to substantiate their existence as an integration to local history. Taxonomic classification is exploitable to provide objective and explicit proof answering the pervasive questions such as provenance and metal or ceramic culture; a different set of systematic classification helps present fresh perspectives yet replicable according to aspects of interest. Therefore, a question emerged on imported goods in term of quality, quantity and popularity in accordance with social hierarchy as demands opportune supply (Brown, 2009; Hall, 1986, 2006, 2010; Kolpakov, 1993), thus making a systematic inventory and extensive register suffice to create useable database for this endeavour.

1.3 Research Questions and Aims

Three-fold questions arise probing for answers to the above problems. As a start, first question represents an interdisciplinary collaboration of maritime archaeology and chemistry in characteristics, provenance, and intended market, in the form of tabulated data, graphs, tables, or another arrangements. Compilations are helpful because of arbitrary or meaningful patterns that indicate a correlation between site-artefact, sociocultural assimilation of China-Borneo, and past-present history; for example,

particular design and abundant might be the most essential critical marketable and favourable goods among the buyers. Investigating the cargoes also offers a better understanding of the physical attributes such as type, form and colour produced massively and widely traded at the ships' demise. Following the analysis, these artefacts variation underpins and breaks the classification system into components to describe the Chinese manufacture of trade goods, ceramics and metallic ornaments, and, more importantly, the development of maritime polities and economy in Southeast Asia.

Two significant assemblages are ceramics and metals kept at the Sabah State Museum. After treatment, they are either curated in the exhibition room or left untouched for safekeeping in the conservatory building. Each has a calling number and is weighed, measured, photographed and recorded, whether it is incomplete or a fragment. The ceramics were analysed for their fabrication techniques, types and forms of vessels, decorative techniques, glazes additives and colours, kilns site, as well as the designs; motifs, symbols, carvings, patterns, incisions, impressing/stamping/embossing, sgraffito, and combing. While metal objects also underwent the same process, they are profiled according to manufacturing techniques, decorations, colours, functionality, and designs, punctures or drawing.

Since classification is not an unfamiliar practice throughout archaeology, artefacts classification has produced a great variety of systems, all of which are unique to their site. Pottery classification, especially for ancient Chinese pottery, started quite early, primarily due to its popularity in the West, which scholars observed from the 19th to 20th century (Bahr, 1908; Bahr, 1916; Hodgson, 1907). In light of answering this issue, their attempts were fixated primarily on essay format without proposing a hierarchy tree illustrating the branches growing according to the unique characteristic

of artefacts (ceramics), in-depth use-wear functionality or the connection with other groups of cultural objects. Similarly, a presentable system should execute these characteristics and enable cross-examination for all ensembles grouping before being interpreted into meaningful data. All the more important point is that the system should stand out at procuring a replicable, easily expandable and has inferable outcomes while at the same time figuring out relevant data for future studies.

The collected data serves both physical and chemical components, requiring guided pathways while handling the artefacts upon discovery. In return, a fast and organised curation in museology is expected to gain ease from this system. Hence, guidelines are derived, with carefully designed labels and retraceable calling numbers and photographs. Next, brittle artefacts (those are potentially would break off) are labelled and secured in plastic bags to avoid replicable shards. The execution of this strategy should be done as soon as possible after artefacts were hauled and treated on board.

Third, one of the main concerns is to secure invaluable knowledge from artefacts from of the ships' cargo from being lost. These includes the ones recovered, looted, sold or kept away as finder's keeper. They harboured tons of Chinese artefacts both complete and shards. To leave the sites at their natural state may bring about multiple threats from all sides and harming the tangible resource of our cultural understanding of distant past. One such account was discussed by Flecker (2017) in his paper on legislation of Southeast Asian's underwater cultural heritage and another case happened to the site in 1990s reported by Sjostrand and others in their 2006 book on "Mysteries of Malaysian Shipwrecks". As an act to rescue and curb the crime against local culture and history, all information regarding the site shall be recorded. An inventory covering as much criteria as possible is sufficient to form a database; a

recallable, measurable and reliable inventory system. It should include records on dimension, colour, design, weight, frequency, as well as the material they were made of, elemental and metal compositions, hardness (wherever applicable) and ultimately their photographic documentation. It should also be noted in manual form to tally the colour with pictures because of the digital colour difference across electronic devices.

Moreover, since collected artefacts could only yield so much without interpretation, notwithstanding, the need for such action is in order. Raw data indeed is unprocessed, short-sighted information. Let us assume each cargo carries a set of artefacts, say, ceramics. Inquiry ensuing on similarities, origins, era, purpose and even kiln sites would have the answer be readily available after interpretation because each datum is related in one way or another either within its own or other groups. While Chinese ceramics are notably known for their quality, the quality reflects itself in ranges.

More insights into Sabah-China maritime trade to the extent of documentation would help grasp international connection and develop a historical timeline during maritime trade with ancient China. Indeed, the Borneo coasts, including Sabah's, have been vital in human evolution and local society as a whole (Miksic & Goh, 2018; Tansen, 2003, 2006, 2014; Kurz, 2014; Arnold, 1988). Therefore, the following are the main aims for this research:

i. To date and identify the provenance of the cargoes as well as to determine the destination, maritime trade routes, distribution, and potential buyer in early Sabah’s maritime history.
ii. To classify the recovered artefacts using scientific analysis and morphological study according to fabric’s materials, types and forms, decorative techniques,

glaze colours and their component, fire and kilns site, as well as motifs and symbols.

iii. To produce a complete register of artefacts from two cargoes from Tanjung Simpang Mengayau Wreck and Jade Dragon Wreck, Kudat, Sabah.

This study's in-depth synthesis would bring forth knowledge of the region during the initial contact of Sabah to the world, presenting the evolution of complex societies in Southeast Asia beginning around 960 CE to the late 10th century CE period. In Kudat, shipwrecks mainly show Sabah influence on early water transportation towards Brunei, Sarawak and Sumatra. Other than tracking production in a chronological order, this research anticipates finding Chinese records typically from annals and royal records in which, studies on Chinese dynasties often depends on; presently establishing strong association since most ships, especially the ones carrying a fully stocked cargo, may record goods with the intended destination.

Secondly, this research aims to design a way to showcase artefact analyses of recovered shipwrecks from Kudat, Sabah. The analysis will show popular trade goods, quality, the sellers and buyers, and other cultural and economic information necessary for Sabah maritime history. Cargo and the age of the ships dated to the early Age of Commerce, together with the existence of settlements along western Borneo are all evidence to Sabah maritime history and chart Sabah on the trade route map. Maritime artefacts occupy many different roles while integrating data to the past as they encapsulate time. Thus, by assessing these shipwrecks and their cargoes, they could indicate trade routes taken by Chinese merchants and predict more ancient wreck sites.

Lastly, it also represents an interdisciplinary collaboration of maritime archaeology and chemistry in characteristics, provenance, and intended market, in the

form of tabulated data, graphs, tables, or another arrangements. Compilations are helpful because of arbitrary or meaningful patterns that indicate a correlation between site-artefact, sociocultural assimilation of China-Borneo, and past-present history; for example, particular design and abundant might be the most essential critical marketable and favourable goods among the buyers. Investigating the cargoes also offers a better understanding of the physical attributes such as type, form and colour produced massively and widely traded at the ships' demise. Following the analysis, these artefacts variation underpins and breaks the classification system into components to describe the Chinese manufacture of trade goods, ceramics and metallic ornaments, and, more importantly, the development of maritime polities and economy in Southeast Asia.

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Since classification is not an unfamiliar practice throughout archaeology, artefacts classification has produced a great variety of systems, all of which are unique to their site. Pottery classification, especially for ancient Chinese pottery, started quite early, primarily due to its popularity in the West, which scholars observed from the

19th to 20th century (Bahr, 1908; Bahr, 1916; Hodgson, 1907). In light of answering this issue, their attempts were fixated primarily on essay format without proposing a hierarchy tree illustrating the branches growing according to the unique characteristic of artefacts (ceramics), in-depth use-wear functionality or the connection with other groups of cultural objects. Similarly, a presentable system should execute these characteristics and enable cross-examination for all ensembles grouping before being interpreted into meaningful data. All the more important point is that the system should stand out at procuring a replicable, easily expandable and has inferable outcomes while at the same time figuring out relevant data for future studies.

The collected data serves both physical and chemical components, requiring guided pathways while handling the artefacts upon discovery. In return, a fast and organised curation in museology is expected to gain ease from this system. Hence, guidelines are derived, with carefully designed labels and retraceable calling numbers and photographs. Next, brittle artefacts (those are potentially would break off) are labelled and secured in plastic bags to avoid replicable shards. The execution of this strategy should be done as soon as possible after artefacts were hauled and treated on board.

1.4 Methodology

This section provides a brief discussion of the methodology used and will be discussed in tandem to research aims accordingly which in short, (1) artefact in Sabah maritime archaeology context, (2) classification process and (3) registration of collection. A more detailed discussion on the research methodology is given in Chapter 3.

The discovery of these cargoes is significant to Sabah's maritime archaeology. From the state formation to the colonial age until today, Sabah culture has always been

formed by activities in the past. Most significantly made by the interaction with outside world. In this case, trade network was the main components for this interaction. Trade and using maritime power brought cultural formation (Orillaneda, 2014), cross-cultural exchange (Zakharov *et al.*, 2014), state formation (Zakharov, 2019; Hall, 1985), religious transmission (Cœdès, 1918, 1964, 1975; Nilakanta Sastri, 1955) and economic establishment (Wheatley, 1961). These penetration and acceptance of culture often impacted fundamentally on the cultural assimilation which further commercial and network improvement in Sabah as the presence of littoral settlement along west coast of today Sabah that could developed from this maritime legacy.

The archaeological classification system is a method that combines the data collection and compilation processes by group, size, fabric material/elemental composition, morphology, time frame and hardness of ceramics, rocks, and metal artefacts that have been used or altered by humans from archaeological records (Orillaneda, 2012; Craig, 2013; Choy, 2014). Therefore, based on the archaeological classification method, this study used comparative methods in classifying ceramics according to morphological characteristics, including type, shape/form, design and decoration.

Each class is then segmented into smaller components named sub-classes (Figure 1). Sub-classes are formed in parameters of significant differences. Throughout the analysis, sub-classes were subsequently adjusted according to a certain extent of characteristics; colours conveyed from Munsell Chart (Jan, 1970), shapes (plates, bowls and jars), design (body and rim), and decorative patterns (floral, faunal, inscriptions, and *appliquè* motifs). A decorative pattern known as style is also not considered as style emphasises utilitarian value rather than aesthetic value. Moreover, it is also should be discussed in-depth on the multitude of patterns. Thus, this