Breaching the Bay of Bengal: Early maritime exchanges between South India and Southeast Asia of the mid-1st c. BC to the mid-1st c. AD.

Bérénice Bellina

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Dr. HDR Bérénice Bellina

Introduction

Exchange in the southern Bay of Bengal (hereafter BoB) is many centuries old. However, evidence is unevenly distributed or traceable over the different periods and lead to a still rather blurred picture. At the turn of the second millennium AD, several inscriptions give us information on the links of South India with Thai-Malay Peninsula (hereafter "TMP") and Sumatra. Certain types of ceramics (red slipped ceramics of South Indian and Sri Lankan origin) and statues attest to the presence of merchant guilds such as at the TMP, Lobu Tua (9th c.) and Kota Cina (11th- 13th) (McKinnon 1996). Others record Chola incursions into the main ports of the Straits of Melaka under the Malay trade consortium Srivijaya (Wheatley 1961: 199-200). These raids have been interpreted as the Tamil kingdom's desire to facilitate the enterprises of Tamil merchant guilds in the region and to usurp control of the northern end of Srivijaya's trade network (Guy 2011). South Indian merchant guilds are known to have been vigorously active agents for trade with Southeast Asia (hereafter SEA) and China (Kulke, Kesavapany, et Sakhuja 2009). Tamil guilds also ventured in the hinterland, like in the Batak area in North–East Sumatra to exploit resources (gold and camphor). There, ethnographic and linguistic evidence attest that they conducted those activities in symbiosis with local people (McKinnon 1996).

Further back in time, during the early first millennium AD, written documents are sparser and largely rely on Western sources, and more especially Roman. Researchers have argued that when trade with Rome declined in the third and fourth century, South Asia (hereafter "SA"), and more especially South India, then turned to Southeast Asia, launching the period of sustained contacts. This period was traditionally called the "Indianised" period (Kulke et Rothermund 1998; Smith 1999), and its artistic and architectural remains have long been the exclusive focus of researchers. In contrast, little research has been done on industries in SEA during this period. Consequently, they are poorly defined and regional comparisons are inexistant. The first millennium AD trading port-city of Khlong Thom in Peninsular Thailand no doubt yielded South Asian and probably too South Indian ceramics, despite its being badly looted. From there comes the Tamil-Brahmi inscription left by a goldsmith named 'M. Perumpadan' on the touchstone dated to the 2nd century AD. This is the first written evidence for the presence of southern Indian craftsmen in SEA (Jacq-Hergoualc'h 2002: 87).

The preceding period, i.e., the first millennium BC and the first centuries AD, has long been considered of little significance in terms of economic and cultural exchange. The few Indian imports were merely interpreted as the result of intermittent and inconsequential contacts (Glover 1990). The latter included, the famous "Indo-Pacific glass beads", rouletted ware and other types identified at Arikamedu found distributed in disturbed contexts, often burials in Sumatra, Bali and Vietnam. The increase in excavations of sites, cemeteries, and ports (in SEA), dating to the last centuries BC and early centuries AD, and the use of a wider range of analytical tools now provide a greater amount of

exchange evidence. They include imports recorded from more secure contexts but also other more discrete evidence of exchange from different disciplines. They provide a different perspective on the exchange between South Asia and SEA in the early historical period and on the place of South India.

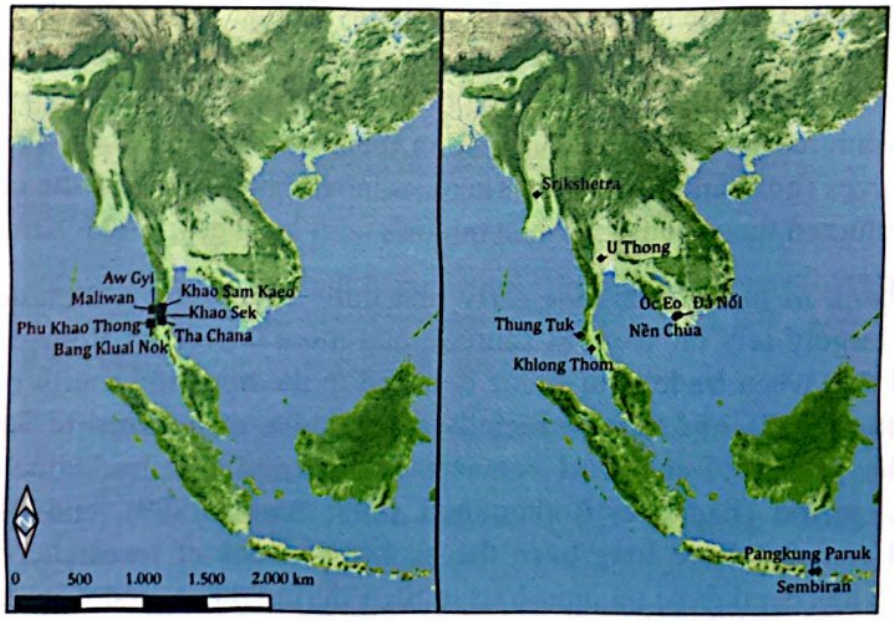
This preliminary study lists evidence of exchange networks during four phases.

1-1500 BC-500 BC: The prehistoric phase is the least investigated period. Only tenuous evidence is reported, mostly coming from archaeobotany and linguistics.

2-500 BC-200 BC: Connexions with South Asia and only few with South India, are now evident.

3-200 BC- 300 AD: There is an array of robust evidence coming from multiple sources.

4- mid-first mill. AD: This is when connexions between the two regions are well attested by influences in the politico-religious fields. However, evidence from industries and organic remain are more discreet because less studied as scholars rely on texts, architecture, and statuary.



Map 1. Distribution map of mid-late 1st mill. BC sites (left) and mid-1st mill. AD sites (right)

Proof for exchanges with South India become particularly apparent around the 3rd-2nd centuries BC. They consist of:

1. Direct and indirect evidence of the presence of South Indian merchants and craftsmen:

- materials likely brought by South Indian individuals for their living, such as specific crops (mung beans, pigeon peas, etc.) and possibly some artefacts such as some pottery vessels and coins.

- artefacts locally made by South Asian and eventually South Indian craftsmen either for their own community or as products made to order for local communities.

- palaeogenetic analyses revealing their presence or their mixing with local groups.

2. Evidence of network connections in the form of imported raw materials highlighted by compositional analyses of raw materials such as glass, metal, and stone.

In the final part of this paper, issues revolving around production networks, South Asian artisans, their possible association with trading organisations, and the political conditions that made it possible to maintain their networks are tackled. Integrating the various types of evidence and diversity of groups they may relate to draws a more complex picture of exchanges and of the groups involved. This various evidence of exchange perhaps begins to account for the plurality of groups that cosmopolitan societies embody. Finally, to conclude, few avenues to pursue the investigation of these privileged links between Southeast Asia and southern India are proposed.

I. Sequence of exchange based on archaeological evidence.

The idea that exchanges in the Bay of Bengal may date back to the prehistoric period is not new. Still tenuous clusters of evidence from linguistics and plant translocation suggest possible earlier links in the second and early first millennium BC. I will only refer very briefly to some of the more recent hypotheses, some of which are in the process of being published and most relevant to the southern BoB for this period, before discussing the period 5th c. BC-5th c. AD, which is the focus of this paper. Indeed, they could provide elements to better understand the proximity of certain groups on both sides of the BoB as early as the 5th-4th centuries BC.

1. Exchanges 1500 BC-500 BC = *still* very hypothetical and needing further investigation

In SEA, several migrations took place: those of the agricultural Austro-Asiatic speaking (hereafter AA) groups along the rivers but also, apparently, along the coasts, and those of the Austronesian-speaking (hereafter AN) groups in the South China Sea. As early as 1500 BC, exchange networks were active there, seemingly related to nautical innovations of AN groups in Taiwan, particularly outriggers (Blench 2022). These networks facilitated the circulation of groups of maritime merchant collectors not only towards the Pacific but also within the SEA, participating in the diffusion of materials and ideas.

Recently, based on linguistic data and some still tenuous archaeological remains consisting mostly of archaeobotanical and a few polished adzes and ceramic types (Gupta 2018), Rau and Sidwell proposed the hypothesis of a maritime expansion of the AA proto-Munda groups. These groups would have combined land and sea routes. The Isthmus of Kra is hypothesised to constitute a point of departure for these groups present in eastern India. Certainly, these groups are not attested in the southern BoB. So why refer to them?

Because linguists agree that these Munda groups have no tradition for maritime technologies and that they may have been assisted by knowledgeable navigator groups. In the SEA, these groups are the AN groups. Linguists Sidwell and Blench therefore consider the possible assistance of AN groups in crossing the BoB (Rau et Sidwell 2019; Sidwell 2022; Blench in press). Such partnership relationships between groups with different economic organisations are common in SEA. What would be the navigating populations in the region? Linguistic hypotheses indicate the antiquity of the Moken groups of sea nomads still present off the Kra Isthmus and in the Mergui archipelago (Benjamin, in press.).

This would agree with W. Mahdi's (2009) hypothesis, mostly based on linguistic evidence and plant translocation, that AN probably crossed the BoB during the 1st mill BC. He cites the adoption of an Austronesian-style boat design in South India (Hornell 1920). There is also linguistic evidence in the form of Austronesian word borrowings in Tamil as early as the 2nd century BC (Mahdi 2009).

I will not dwell on these hypothetical links, but the possibility of circulations of small groups of maritime traders-collectors such as sea nomads and AN groups specialising as intermediaries and collecting and distributing rare and sparse material resources should not be ruled out. The French Archaeological Mission in peninsular Thailand and Myanmar has identified traces of this as early as the middle of the first millennium BC associated with the first trading cities of TMP (Bellina, Favereau, and Dussubieux 2019).

It is assumed that metal trade was an important part of the Southeast Asian exchange at the turn of the first millennium BC (Wisseman Christie 1990). In SEA:

- three copper mining regions are known to have been exploited in prehistoric times and have received geochemical and technological study(Thomas Oliver Pryce et al. 2011; 2014; Cadet et al. 2022)

- Tin sources are concentrated along the TMP peninsula from Thailand to Bangka Island off Sumatra, and also extend north into Myanmar, Laos and southwest China (Schwartz et al. 1995).

There are documented links between the source in Laos and the tin rich Kra Isthmus from this period (Pryce et al. 2014; Pryce et al. 2023). The Southwest Silk Road which was active from the late 2nd millennium BC also involves India. Northern India but also parts of the network overlap the Maritime Silk Road and are thus relevant to southern India. The network is complex and massive, and all aspects of archeometallurgical research need further research in southern India.

It is known that southern India is short of tin and copper. It is likely that the exchange of metals, especially tin, was one of the motivations for trade in the BoB. The names given in Indian sources to localities in Southeast Asia reflect the interest in the mineral resources there. India has scattered sources of tin. This hypothesis had already been proposed by S. Srivinasan (Srinivasan 1998) and for more recent historical periods by A. Srisuchat (1991). Evidence of tin mining and the manufacture of high tin bronze ingots using nippled moulds/crucibles similar to some in India at Khao Sam Kaeo (hereafter KSK) supports an interest in the mid-first millennium BC (Murillo-Barroso et al. 2010; Pryce et al. 2017).

Archaeological evidence of exchanges between South India and the SEA is more tangible as early as 500 BC. Some evidence, particularly industrial evidence, reveals the familiarity of some groups in TMP with Indian industries and developments in India. They support the hypothesis of earlier links.

2. 500BC-200 BC: Isthmus, West Central Thailand, Vietnam, Philippines

During this period in SEA, proto states emerge as at Co Loa in northern Vietnam, Angkor Borei in Cambodia and in the form of city-states in the TMP peninsula.

A certain parallelism in societal developments can be seen with the transmission of ideas and concepts to the TMP, especially urban ones such as at KSK. As in South India, proto-urban ports slightly upstream of the river mouths emerge in the Isthmus of Kra in the TMP.

Around the South China Sea (hereafter SCS), groups from Thailand, coastal Vietnam and the Philippines who are engaged in long-distance exchanges share a range of exotic goods. Some come from the SCS, while others seem to come from SA. Many of these artefacts have the distinction of having been produced with South Asian techniques on the spot, as evidenced by the production evidence in the ports. The latter demonstrate a great deal of skill requiring a long apprenticeship, and the raw material is carefully selected. Some of these artefacts, such as beads, are also produced with imported South Asian materials. However, these techniques and sometimes these materials are associated with the style of the SCS. For these hybrid productions, first spotted for the semiprecious stone beads, I had proposed that they were made by South Asian artisans settled locally, perhaps working on commission for the trading elites of the Kra Isthmus ports (Bellina 2001; 2007). Excavations of workshop remains and analyses of other industries have led specialists in glass (Dussubieux et Bellina 2017), and ceramics (Bouvet 2017; Favereau et Bellina in press; Lefrancq, Favereau and Bellina in progress) to make similar hypothesis. It is these productions that use complex Indian techniques and sometimes South Asian materials that constitute evidence of the presence of craftsmen. The first ports of the Kra Isthmus, Thailand and Myanmar are the most concentrated.

From this time onwards, a hierarchy of sites and ports in the TMP can be observed. Depending on the specialisation and the place in the hierarchy, the type of goods found there varies. It is only in the first-tier ports acting as an international market such as KSK that Indian imports are found, perhaps carried by Indian merchants for their use. Second-tier ports such as Khao Sek (hereafter KK) do not supply imported goods but locally produce goods with South Asian techniques, which I interpret as the fact of the circulation of craftsmen within the confederation of merchant cities. Some hybrid productions (using South Asian techniques), such as bronze bowls with a high tin content and a central cone, hot-worked and quenched, are found in the burials of the surrounding groups in the Isthmus of Kra. They were probably produced in the ports. Evidently, evidence for this production is almost archaeologically invisible. The later would consist in an anvil and hammerstone somehow contaminated with bronze. These bowls would have been obtained in exchange for goods sought by these ports, such as agricultural products or forest. In the first category of ports, the workshops and their craftsmen relied on extensive supply networks linking Taiwan to the east and India to the west.

For this period, the exchange evidence consists of the following:

2.1. Imported artefacts and raw materials:

*artefacts: Only a few Indian Fine Grey Ware, such as rouletted ware are reported. It is likely those came with South Asian traders.

*South Asian raw materials:

Stones: Cornelian, most likely come from the Deccan. Analysis conducted on a few samples confirmed this origin (Carter and Dussubieux 2016). Some types of agate may have been imported from South Asia too but research is less advance as analyses cannot be carried out satisfactorily on these stones. Prof. H. Albert Gilg recently analysed some garnet excavated at Maliwan. Some may come from South India and Sri Lanka (pers. communication).

Glass: For this period, soda glass of type 3 (m-NA-l3) is dominant. This type of glass is comparable to that made in Kopia (Uttar Pradesh) (Kanungo et Brill 2009).

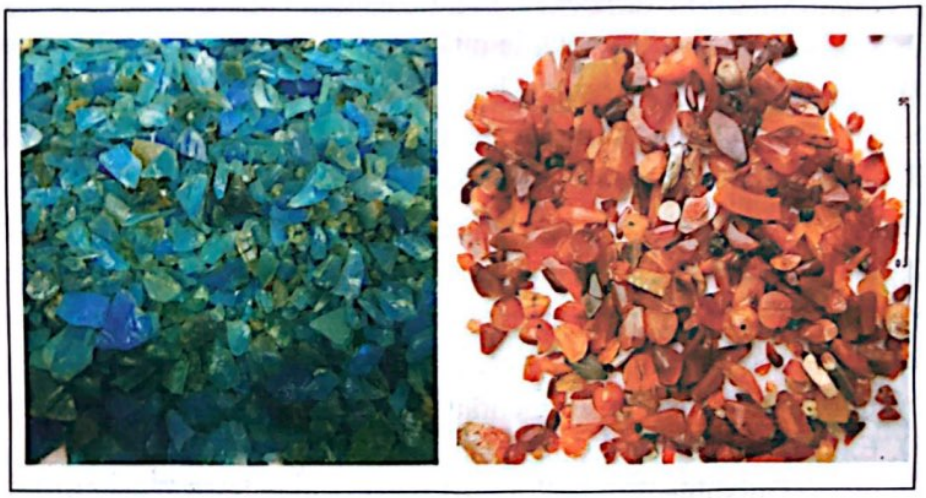


Figure 1. Glass flakes (left) and carnelian ornament production wastes (right) from Khao Sek (photos Bellina)

2.2. Locally produced objects with South Asian techniques– some of which can be referred to as hybrid.

-stone and glass ornaments were made in the late prehistoric SCS style (Bellina 2018a). Stone beads combine high-quality raw materials and very skilled techniques (knapping, polishing and perforation with a diamond-tipped drill) combined with the SCS Style. Similarly, lapidary glass beads and bracelets using soda type 3 glass were produced on the site with mature Indian techniques (Dussubieux et Bellina 2017). One of the specificities of this workshop is that it is built in pisé, a mixture of gravel and earth, an exogenous construction method. At Maliwan in southern Myanmar, a semi-precious stone and glass beads workshop was also excavated. Beads were made with South Asian techniques and raw materials, and the workshop was built with the same nonlocal method as in KSK. Both stones and glass ornaments were made in the same workshop at KSK, which was located along the river. It seems that at least during the early period, glass and stone ornaments industries were closely associated.

-High tin bronze artefacts: fragments of bowls with Indian-inspired design or knobbed vessels were found in different sites, mostly in ports but also in the near hinterland at Tham Phu Khao Thong (Bellina 2014a). Evidence for their production was found only at KSK for now. They consist of technical ceramics corresponding to crucibles to produce high-tin bronze alloys via the cassiterite cementation technique (TC 17), as well as nippled moulds to pour the resulting ingots (TC 16) (Pryce et al. 2017). KSK thus provides the earliest evidence for the exploitation of TMP tin resources, albeit on an

indirect basis. The shape of the KSK ingot moulds somewhat resembles crucibles found at Dariba, Rajasthan, and similar conical high-tin bronze ingots are known from Tilpi, West Bengal (Pryce et al. 2017).

-ceramics. It is possible that locally made ceramics with South Asian techniques, such as those using the wheel, were produced as early as this period (figure 2. Type 2). However, their great rarity, often disturbed contexts and 14C dating do not allow for precise dating. Nonetheless, they are found as soon as this early period.

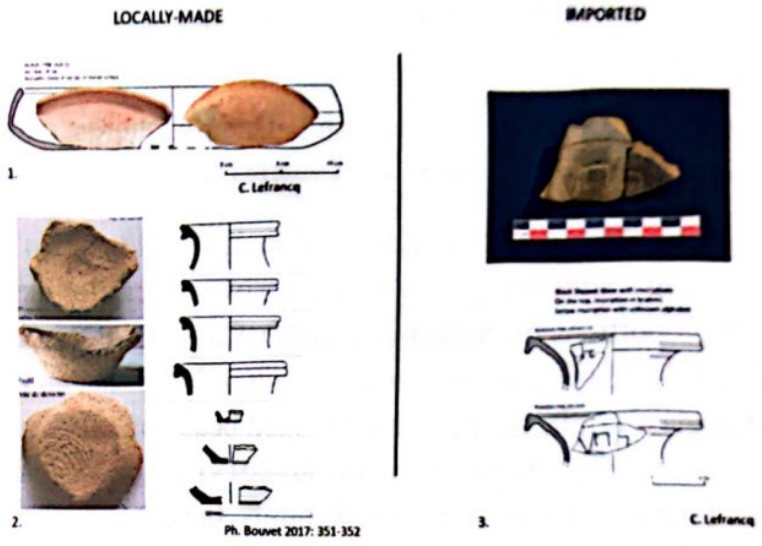


Figure 2. Ceramics: 1. Locally made ceramics imitating rouletted ware from KSK. 2. Locally made ceramics with Indian techniques et Indian morphologies from KSK. 3. Indian imported ceramics from Maliwan. Photos and drawing: Ph. Bouvet and C. Lefrancq.

3. 200 BC- 300 AD: Robust evidence from multiple sources

From the 2nd c. BC to the 3rd -4th c. AD or more, exchange clearly increased, and many more groups were involved. This period coincides with the insertion of Rome in the trade networks. Han Chinese as well as Mediterranean-inspired materials appear in the assemblage. This is the period when South Indian connections become prominent. The quantity of South Asian imports increases with clear South Indian connections (evidenced with glass, ceramics). They are found in a larger number of sites. During this later period, more ports emerged in the Isthmus of Kra, Phu Khao Thong and Bang Kluay Nok on the western coast in Thailand, two sites that seem related, and Aw Gyi in southern Myanmar. It is also the period when Island Southeast Asia (hereafter "ISEA") seems to enter the scene with Java and the Buni culture and Bali. The political and economic organisation in these regions remains to be investigated. Materials found there show connections with South Asia and probably South India such as at Sembiran in Bali and Pangkung Paruk. For ISEA, it is assumed that a search for copper and tin, of which they are deficient, has helped to stimulate their exchanges.

Angkor Borei in Cambodia is still active, and glass beads made with soda glass from southern India are reported there (Carter et al. 2021). Sites in the Isthmus of Kra also provide more evidence for close connections with South India, in particular PKT in Thailand and Aw Gyi in Southern Myanmar (Dussubieux et al. 2020).

3.1. Imports

*artefacts:

- ceramics: Regarding ceramics, more Indian Fine Grey ware comparable to those found in Arikamedu and Tissamahara were found in rather large quantity. They include Wheeler types 1 & 2, type 10 and type 18. In Bali, the site of Sembiran yielded 120 sherds of ceramic that Ardika and Bellwood compared to Arikamedu types (Ardika et al. 1997). In Java, the Buni context at Segaran IIA in levels dated of the last 1st BC-1st AD yielded Fine Grey Ware and rouletted Ware (Manguin and Indrajaya 2004; Lefrancq, Favereau, et Bellina in progress).

Phu Khao Thong yielded the famous Tamil-Brahmi sherds with the inscription "Tu ra o » or turavon _ 2nd CE. 2. « pu aa » – 4th AD (Bellina et al. 2012).

- glass beads: During this period, at KSK and in its satellite Khao Sek, drawn glass beads are imported from southern India. Glass shows two different situations. Arikamedu yielded equivalent proportions of potash and m-Na–Ca–Al glasses (Dussubieux 2001; Dussubieux et al. 2012). Aw Gyi at the extreme south of Myanmar and Phu Khao Thong in Thailand yielded glass artefacts, including finished beads but also tubes, glass chunks and melted bead clusters (Fig. 3b, c) (Bellina et al. 2018). Elemental analysis conducted on glass material found at these two sites exhibits high proportions of potash and m-Na–Ca–Al glass, like what was found at Arikamedu (Dussubieux et al. 2012; 2020). L. Dussubieux considers a possible transfer of technology between Arikamedu and Phu Khao Thong and Aw Gyi plausible (Borell and Dussubieux 2022: 499).

Another type of glass, soda type 1 (m-Na–Al 1), was manufactured in South India and Sri Lanka. In the first centuries AD, more m-Na–Al 1 glass beads indicate a higher intensity of trade with South India/Sri Lanka. It may signal the emergence of a new network with ramifications in peninsular Thailand and in the eastern part of Cambodia.

The combination of the potash/m-Na–Ca–Al glasses at Arikamedu, contrasting with the m-Na–Al 1 composition found at other contemporaneous South Indian sites, could indicate that different groups of people were involved in the manufacture of glass and glass beads in the southern part of India (Dussubieux 2021).

During this period, sites in Island SEA seem to enter the scene. The site of Pacung yielded a high-tin bronze bowl (Pryce et al. 2018). The same site also yielded Mediterranean glass (Calò et al. 2020).

Mediterranean-inspired intaglios: some are made in South Asia and some are Mediterranean imports. There was no direct interaction between the Mediterranean World and SEA during the AD early first centuries, and objects of Mediterranean origin predominantly arrived through and by South Asian intermediaries. The distribution of materials suggests that the most intense period for the arrival of Mediterranean imports to SEA was the late first century BC–AD first century, which is in parallel with the height of the Indo–Mediterranean trade (Hoppál, Bellina, et Dussubieux 2023).

The nature of imports and inspired objects in SEA is like what we can see in SA, particularly in the southern coastal parts of India. This area might have not only been directly involved in transferring Roman imports to Southeast Asia but also provided Indian-adapted models and sources of inspiration for some of the Southeast Asia-made Roman-inspired objects (Hoppál, Bellina, et Dussubieux 2023).

The most frequent imports consist of glass as the raw material (figure 3) and gold foil beads in Aw Gyi and Pangkung Paruk (Calò et al. 2015: 389; Calò et al. 2020: 5; Pryce et al. 2018) and Prohear Pryce et al. 2014).

Figure 3. Mediterranean glass from early sites (1-3 PKT),
4. AG, 5. Maliwan. After Borell et al. 2014.

Whilst amphorae are amongst the most common Roman material along with coins, they are rare in SEA. Two amphoras have been identified so far in SEA and they likely came through South India. One is a base, a surface finds identified at AG by Bellina and that R. Tomber identified as a Dressel 2-4 dating to the late first century BC and the early centuries AD. A handle from Khlong Thom is in display at the Andaman Cultural Center in Krabi, which was not identified as a fragment of amphora (Figure 4). Dr A. Marangou (Rennes 2 University) suggested that it may be a Dressel 2-4 type amphora from Italy dated to the first or second century CE (Bellina in press; Hoppál, Bellina, et Dussubieux 2023).

Figure 4. Amphorae. Top one from Maliwan; Bottom: Khlong Thom (photos Bellina)

* raw materials: Stones such as cornelian, agate probably kept coming largely from SA, and garnet from Sri Lanka and South Indian sources (Schmetzer et al. 2017).

* cultigens: When considering archaeobotanical evidence, mung beans and pigeon peas as well as horse gram are important. Those were domesticated in peninsular India, pigeon pea in Orissa, horse gram and mung bean in South and Noth-West India. From Southern India, all three spread to SEA, with the peninsula showing the first evidence (Castillo, Bellina, and Fuller 2016). D. Fuller believes finger millets spread from Africa through India, arriving in SEA from India early with an archaeological find in Phu Khao Thong dating to the 1st c BC (Castillo, Bellina, and Fuller 2016). PKT is the only site that provided finger millet in ancient SEA. It reached through India, perhaps South India.

3.2. Locally produced goods

Locally reproduced imitation of rouletted ware is found in cemeteries in Bali and Java in the Buni culture at Batujaya (1st BC-4th AD). There, ranked societies shared burial practices. Imported and local Indianised ware found in burials show that were valued (Manguin et Stark 2022). A few rare examples of imitations have been found in KSK (Lefrancq, Favereau and Bellina forthcoming). Locally produced ceramics with South Asia techniques in the Isthmus of Kra area are always represent a small proportion of the corpus (figure 2.) (Favereau and Bellina, in press; Lefrancq, Favereau and Bellina forthcoming). For whom these hybrid productions were intended is a complex question that is difficult to answer given the contexts and the poor conservation of the fragments found. Some involved a limited range of shapes and may have been associated with the specific needs of the South Asian communities settled there. Others may have been intended for Indian communities and other merchant communities sharing the same cultural references, perhaps Peranakan (mixed) groups (Favereau et Bellina in press).

3.3.3. Palaeogenetics

Sembiran is well known for the 120 pottery sherds of rouletted ware the excavators unearthed there and that they compared to those found at Arikamedu and on other sites in SA (Ardika and Bellwood 1991; Ardika et al. 1997). At Pacung, the layer that yielded many rouletted wares also contained a tooth that was subjected to AMS dating, stable carbon isotope and DNA analysis. Dated to 2050+/-40 BP, it was shown that it belonged to an individual consuming terrestrial food and of foreign origin; it was suggested that the individual may have come from Northeast India (Lansing et al. 2004).

4. Mid-first mill. AD

During this period, several sites in maritime and continental SEA yielded Sanskritinscriptions, statuary and Indianised temples. Settlements are large and complex, as evidenced at Oc Eo and Angkor Borei, both part of the Funan entity that conquered polities of the peninsula. Funan was both a maritime-oriented polity but had agrarian foundations. Oc Eo and Angkor Borei were at the heart of canals linking the Mekong Delta Centres, implying centralisation. They are interpreted as forming part a group of city-states sharing a culture and language with economic and religious affinities (Manguin et Stark 2022). The Indian religion was adopted as attested by statues and religious complexes: cults of Visnu by the 5th-6th and later of Siva.

Knowledge of the industries is more segmented. Fewer regional comparisons are made. Key SA artifacts found elsewhere in SEA, such as rouletted ware, are absent from the Funan sites as those ceramics date to an earlier period. However, influences are evident from the 2nd-3rd c. AD, as indicated by grooved roof tiles and perhaps orthogonal urban templates (Manguin et Stark 2022): 649). Indeed, this evidence, such as rouletted ware, is older. Perhaps there were Indian imports, but they may have not been identified since Indian ceramics of this later period is less well known. During this period, the material culture is most often inspired by India: kendi, lids with grip holes, etc.

4.1. Imports

There are still imports of raw materials such as stone (cornelian) and glass type m-nl-N 1 produced in Tamil Nadu. However, provenance analysis of stone for this period remains to be conducted.

The glass found at Angkor Borei and in Peninsular Thailand at Khlong Thom is associated with drawn beads but with glass found at South Indian sites such as Karaikadu. The presence of m-Na–Al type 1 glass beads led L. Dussubieux to see a connection between South Indian/Sri Lankan sites, particularly Karaikadu, Manikollai, and Giribawa, and these sites Khlong Thom in peninsular Thailand, Oc Eo and Angkor Borei. The reason why two networks of South Indian beads producers coexist needs to be further explored. Indeed, there seems to be one in Arikamedu and the other from other sites, such as Karaikadu (Dussubieux 2021).

4.2 Local craft

Roman-inspired materials were filtered through South Asia. Indeed, Mediterranean objects are mostly produced locally (Hoppál, Bellina, et Dussubieux 2023). Interestingly, they follow the South Indian canons, as in the case of coins with a suspension system. They are produced in Khlong Thom but according to a specific South Indian fashion. South India served as another source of inspiration via certain types of coin adaptations (figure 5). The practice of wearing genuine Roman coins and coin adaptations evoking Roman coin designs as pendants might have been imported from the southern regions of India to Southeast Asia (Borell, Bellina, et Chaisuwan 2014: 29-30). Such objects have exclusively been reported from Khlong Thom to date, and their design was known to be very popular in India, particularly in Andhra Pradesh state, where they were made of either metal or clay, greatly varying in terms of quality and accuracy. The style of the Khlong Thom tin pendants is closely related to the Indian ones, but the tin clearly suggests local manufacture, as well as the stone mould for casting recalling the same type of Tiberius' coins – also from Khlong Thom. These pendants might even be the results of activities of Indian craftsmen operating in SEA (Borell, Bellina, et Chaisuwan 2014: 109).

Figure 5. Stone mould and coins adaptations (1, 2, 4-6: KT; 3: Oc Eo).
Borell et al. 2014; Borella et al. 2017; Malleret 159-63)

4.3. Palaeogenetics:

The cemetery of Wat Komnou near Angkor Borei (Changmai et al. 2022) in Cambodia provided the first palaeogenetic evidence that South Asians and most likely South India admixed with local people in modern days in Cambodia during the Funan period.

II. organisation of groups of artisans and assumptions about the conditions favouring their work abroad.

South Asian imports have been discussed extensively as evidence of traders' connections and in terms of prestige and status markers for the South and Southeast Asian merchants class (Bellina 2001, 201; 2007; 2014b; Carter 2015; Carter et al. 2021). The accumulation of crafts using South Asian techniques but visibly intended for a variety of groups enriches the vision of exchange networks and place craftsmen in the forefront. There were fewer discussions about the circulation of craftsmen overseas and what were the economic and social implications. How were those organized? K. Rajan emphasized that the emergence of guilds by the 3rd c BC and that Tamil Brahmi inscriptions attest of well-organized trade (Rajan 2011; 2019). Excavations at Kodumanal yielded solid evidence for an inland settlement well connected to regionals networks and where many craft industries flourished (Rajan 2015). Southern India has a large concentration of vivid industries centres which products were aimed for export. Guilds played an important role in financial ventures. We know that in the later historical period, South Indian guilds settled in SEA. Can we imagine that some guilds could have supported these mobile artisans' endeavors? Alternatively, were there guilds that both crafted and produced? Members of guilds may have brought South Asian ceramics with them for them or as prestigious goods for foreign trading groups in ports. But what is often overlooked are the local productions these South Asian artisans made in foreign ports. These artisans produced goods for different groups and destinations. Some were perhaps made for members of the South Asian communities present in the region, either passing through or in diaspora. Others were maybe made to meet the political and economic strategies of local trading elites. Those include goods combining Indian craft system to the South China Sea style (ex: stone beads and some ceramics) and goods combining Indian craft system and style such as the Wheeled-coiled (Favereau et Bellina in press).

The implications are not the same in those two conditions.

In all cases, their productions correspond to goods reserved for a small number,

they are symbolically charged and exclusive goods. This is especially true since many techniques of these South Asian industries were never transferred to SEA, as if the artisans had deliberately preserved these techniques and thus their source of income. This is the case for glass production. As L. Dussubieux observes "only the technology to manufacture beads was transferred, the technology to produce the raw glass seems to have remained within South Asia as there is no evidence of a new recipe or variation of well-established recipes developed at Southeast Asian sites. This could well be the case for the potter's fast wheel, which is not attested in these early periods. The non-transmission of certain complex techniques raises several questions:

- that of the association of craftsmen with merchant groups for the supply of goods;

- the maintenance of links between communities of the same origin from one side of the Bay of Bengal to the other for the supply of materials that they worked on site but also to facilitate trade. Such behaviors are attested or assumed within merchant diasporas in historical periods (McKinnon 1996). In the case of bead makers, they would have kept their connection with South India/Sri Lanka to obtain the glass they worked. What was their organization and relations to merchants? Were they:

-Part of trading guilds?

-Autonomous and moving freely and then patronised by local trading elite?

-Part of a diaspora and working for the diaspora and local groups?

-A combination of all these hypotheses?

Another issue is that of the political conditions that made it possible to maintain these networks of craftsmen and merchants. Should we envisage these circulations of traders and artisans within the framework of alliances between partner trading cities (Bellina 2018b; 2018b)? The materials and craftsmen may have circulated within trading cities belonging to the same Isthmus of Kra confederation on the one hand and between this and allied trading cities in the south of the BoB on the other (Bellina 2018). One thinks of the supply of glass which indicates close links between Arikamedu-Aw Gyi -PKT (Dussubieux et al. 2020). Was there another later one linking Southern India, Khlong Thom in peninsular Thailand and Funan? Of course, this is only a working hypothesis.

Conclusion

In conclusion, evidence of exchanges between South India and Southeast Asia in the late prehistoric and early historic periods exists. They become increasingly apparent as the analysis progresses. The variety of evidence which not only include imports but also locally made object integrating different South Asian traits may reflect the variety of groups involved in trade, whether South Asian groups transiting there, local groups adopting South Asian cultural traits or multicultural/cosmopolitan trading communities. The variety of the evidence evoked in this paper may indeed echo the great diversity that cosmopolitanism encapsulates.

To pursue this research, three main avenues can be investigated.

1. Some ceramics show parallels possible Southeast Asian affinities. Those concern

the "curved and stamped ware" (Veeraswamy Selvakumar 2016). They have been found at several sites in South India, such as Kottapattnam (Rao 2001), Arikamedu (Ray 1986; Wheeler, Ghosh, et Krishna 1946): 49-51), and Alagankulam, in layers dating back to the last centuries BC (V. Selvakumar 2016). Visual comparisons (not techno studies) on photographs raise the possibilities of parallels between coarse impressed local ware at KSK and on a few other sites in the Isthmus of Kra such as Tha Chana and the "Carved Paddle impression" of AK, AL. These parallels raise the question of movements from SEA to SA, and the possible presence of small groups of Southeast Asian merchants on the Indian coast.

2. Tin exploitation and trade are an important issue to investigate further. Tin is abundant in the TMP and India is relatively short of tin. S. Srinivasan believed that there are some discrete sources in southern India, and that the producing place are not located yet (Srinivasan 1998). A. Srisuchat (Srisuchat 1996), based on the ingots found at Khlong Thom, suggested that bronze was exported to Tamil Nadu in great need of this metal. Pryce's lead isotope project analysed and compared high tin bronze bowls from SEA and SA (Thomas Oliver Pryce et al. 2014; Thomas Oliver Pryce et Bellina 2018). Some compositions match but the relations are yet to be explained and much more exhaustive sampling is necessary.

3. Refining the definition of the import and production sequence for glass and stone in the port centres is necessary. Glass provides a good example of sequences during which connexions shifted. However, as V. Selvakumar underlined, the sequence of production in the two neighbouring sites of Arikamedu and Karaikadu is slightly ambiguous. L. Dussubieux also points out that the location where production took place in Arikamedu is hazy (Dussubieux 2021). Characterising the type of production and the provenance of the raw materials that occurred over time in the different ports and production sites will be key to tracing connections elsewhere in SEA.As can be seen in the ports of KSK and KK, imports of raw materials and even finished products vary over time, revealing changes in networks. To characterise these networks, we would therefore need to define the production sequences technologically and compositionally on both sides of the BoB.

Acknowledgments: I wish to thank the Tamil Nadu State Department of Archaeology and Dr K. Rajan for inviting me to participate in the Padmasri Iravatham Mahadevan conference in March 2023. I also thank Dr Favereau and T.O. Pryce for reading a previous version of this article.

Bibliographic references

Ardika, I. Wayan, et Peter Bellwood. 1991. « Sembiran: The Beginnings of Indian Contact with Bali ». Antiquity 65 (247): 221-32. https://doi.org/10.1017/S0003598X00079679.

Ardika, I. Wayan, Peter Bellwood, I Made Sutaba, et Kade Citha Yuliati. 1997. « Sembiran and the First Indian Contacts with Bali: An Update ». Antiquity 71 (271): 193-95. https://doi.org/10.1017/S0003598X00084696.

Bellina, Bérénice. 2001. « Témoignages archéologiques d'échanges entre l'Inde et l'Asie du Sud-Est, mor phologie, morphométrie et techniques de fabrication des perles en agate et en cornaline (VIe siècle avant notre ère – VIe siècle de notre ère). » Paris: Sorbonne Nouvelle, Paris III.

———. 2007. Cultural Exchange between India and Southeast Asia: Production and Distribution of Hard Stone Ornaments (VI c. BC-VI c. AD). Collection « Référentiels ». France: Éditions de la Maison des sciences de l'homme ; Éditions Épistèmes.

———. 2014a. « Mission Archéologique Franco-Thaïe en péninsule Thaï-Malaise Programme 2011-2014 : « Évolution des populations de la péninsule Thaï-Malaise septentrionale et de leurs écosystèmes en relation avec les échanges hauturiers» Campagne 2014 ». Rapport pour la sous-commission des fouilles du Ministère des Affaires Etrangères. Paris: CNRS.

———. 2014b. « Maritime Silk Roads' Ornament Industries: Socio-Political Practices and Cultural Transfers in the South China Sea ». Cambridge Archaeological Journal 24 (03): 345-77. https://doi.org/10.1017/S0959774314000547.

———. 2018a. « Development of Maritime Trade Polities and Diffusion of the "South China Sea Sphere of Interaction Pan-Regional Culture": The Khao Sek Excavations and Industries' Studies Contribution ». Archaeological Research in Asia 13 (mars): 1-12. https://doi.org/10.1016/j.ara.2017.06.004.

———. 2018b. « The Elaboration of Political Models in Maritime Southeast Asia and of Pan-Regional Culture: Contribution from Khao Sek Stone Ornament Craft System Study ». Archaeological Research in Asia 13 (mars): 13-24. https://doi.org/10.1016/j.ara.2017.06.002.

———. in press. « Bay of Bengal early historical exchange based on data from peninsular Thailand-Myanmar (500 BC-200 CE) ». In India and the Indian Ocean History and Heritage: Multidimensional Perspectives, Selvakumar, V. Thanjavur.

Bellina, Bérénice, Aude Favereau, et Laure Dussubieux. 2019. « Southeast Asian Early Maritime Silk Road Trading Polities' Hinterland and the Sea-Nomads of the Isthmus of Kra ». Journal of Anthropological Archaeology 54 (juin): 102-20. https://doi.org/10.1016/j.jaa.2019.02.005.

Bellina, Bérénice, Praon Silapanth, Chaisuwan Boonyarit, Cholawit Thongcharoenchaikit, Jane Allen, Vincent Bernard, Brigitte Borell, et al. 2012. « The Development of Coastal Polities in the Upper Thai-Malay Peninsula ». In Before Siam: essays in art and archaeology, Revire Nicolas&Murphy, S., 69-89. Bangkok: River Books.

Bellina, Bérénice, Maung Sun Win, Kalayar Myat Myat Htwe, Htet Myat Thu, Cristina Castillo, Camille Colonna, Laure Dussubieux, et al. 2018. « Myanmar's Earliest Maritime Silk Road Port-Settlements Revealed ». Antiquity 92 (366): e6. https://doi.org/10.15184/aqy.2018.247.

Benjamin, Geoffrey. s. d. « Moken, Aslian and the Malay World: ancient connections ». In Cultural Continuity Within the Austronesian People of the Sea, Maxime Boutry&Jacques Ivanoff.

Blench, Roger. 2022. « Restructuring our Understanding of the South China Sea Interaction Sphere: Evidence from the Multiple Disciplines ». In Taiwan Maritime Landscapes from Neolithic to Early Modern Times, P. Calanca, Liu Yi-ch'ang and F. Muyard, 249-69. Études thématiques 34. Paris: Ecole française d'Extrême-Orient and the Institute of History and Philology, Academia Sinica.

———. in press. « The Munda Maritime Hypothesis ». Journal of the Southeast Asian Linguistics Society.

Borell, Brigitte, Bérénice Bellina, et Boonyarit Chaisuwan. 2014. « Contacts with the Mediterranean World in the Early Centuries CE ». In Before Siam was Born: New Insights on the Art and Archaeology of Pre-Modern Thailand and its Neighbouring Regions, N. Revire and S. Murphy (eds), 98-117. Bangkok: River Books.

Borell, Brigitte, et Laure Dussubieux. 2022. « Exceptional potash glass artifacts excavated at Tissmaharama ». Journal of glass studies, no 64: 33-35.

Bouvet, Phaedra. 2017. « Indian Fine Wares ». In Khao Sam Kaeo: an early port-city between the Indian Ocean and the South China Sea, Bellina, Bérénice, 283-343. Mémoires archéologiques 28. Paris: Ecole française d'Extrême-Orient.

Cadet, Mélissa, T. O. Pryce, Philippe Dillmann, Thongsa Sayavongkhamdy, Viengkeo Souksavatdy, Thonglith Luangkhoth, et Nigel Chang. 2022. « Technological Reconstruction of the Late Prehistoric Primary Copper Production of the Vilabouly Complex (Central Laos) ». Archaeological and Anthropological Sciences 14 (8): 141. https://doi.org/10.1007/s12520-022-01608-0.

Calò, Ambra, Peter Bellwood, James Lankton, Andreas Reinecke, Rochtri Agung Bawono, et Bagyo Prasetyo. 2020. « Trans-Asiatic Exchange of Glass, Gold and Bronze: Analysis of Finds from

the Late Prehistoric Pangkung Paruk Site, Bali ». Antiquity 94 (373): 110-26. https://doi.org/10.15184/aqy.2019.199.

Calò, Ambra, Bagyo Prasetyo, Peter Bellwood, James W. Lankton, Bernard Gratuze, Thomas Oliver Pryce, Andreas Reinecke, et al. 2015. « Sembiran and Pacung on the North Coast of Bali: A Strategic Crossroads for Early Trans-Asiatic Exchange ». Antiquity 89 (344): 378-96. https://doi.org/10.15184/aqy.2014.45.

Carter, Alison. 2015. « Beads, Exchange Networks and Emerging Complexity: A Case Study from Cambodia and Thailand (500 bce–ce 500) ». Cambridge Archaeological Journal 25 (4): 733-57.

Carter, Alison Kyra, et Laure Dussubieux. 2016. « Geologic provenience analysis of agate and carnelian beads using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS): A case study from Iron Age Cambodia and Thailand ». Journal of Archaeological Science: Reports 6 (avril): 321-31. https://doi.org/10.1016/j.jasrep.2016.02.025.

Carter, Alison Kyra, Laure Dussubieux, Miriam T. Stark, et H. Albert Gilg. 2021. « Angkor Borei and protohistorical trade networks: a view from the glass and stone bead assemblage ». Asian Perspectives 60 (1): 1-39.

Castillo, Cristina Cobo, Bérénice Bellina, et Dorian Q Fuller. 2016. « Rice, Beans and Trade Crops on the Early Maritime Silk Route in Southeast Asia ». Antiquity 90 (353): 1255-69. https://doi.org/10.15184/aqy.2016.175.

Changmai, Piya, Ron Pinhasi, Michael Pietrusewsky, Miriam T. Stark, Rona Michi Ikehara-Quebral, David Reich, et Pavel Flegontov. 2022. « Ancient DNA from Protohistoric Period Cambodia Indicates That South Asians Admixed with Local Populations as Early as 1st–3rd Centuries CE ». Scientific Reports 12 (1): 22507. https://doi.org/10.1038/s41598-022-26799-3.

Dussubieux, Laure. 2001. « L'Apport de l'ablation laser couplée à l'ICP-MS à l'étude du verre archéologique de l'Océan Indien. » Orléans: Université d'Orléans.

———. 2021. « Indian Glass in Southeast Asia ». In Ancient Glass of South Asia, édité par Alok Kumar Kanungo et Laure Dussubieux, 489-510. Singapore: Springer Singapore. https://doi.org/10.1007/978-981-16-3656-1_20.

Dussubieux, Laure, et Bérénice Bellina. 2017. « Glass from an Early Southeast Asian Producing and Trading Centre ». In Khao Sam Kaeo: an early port-city between the Indian Ocean and the South China Sea, Bellina, Bérénice, 549-85. Mémoires archéologiques 28. Paris: Ecole française d'Extrême-Orient.

Dussubieux, Laure, Bérénice Bellina, Win Hsan Oo, U Maung Sun Win, Htet Myet Tut, Kalayar Myat Myat Htwe, et Khinsandar Kyaw. 2020. « First Elemental Analysis of Glass from Southern Myanmar: Replacing the Region in the Early Maritime Silk Road ». Archaeological and Anthropological Sciences 12 (7): 139. https://doi.org/10.1007/s12520-020-01095-1.

Dussubieux, Laure, James Lankton, Bérénice Bellina, et Boonyarit Chaisuwan. 2012. « Early Glass Trade in South and Southeast Asia: New Insights from two Coastal Sites, Phu Khao Thong in Thailand and Arikamedu in South India ». In Crossing borders. Selected Papers from the 13th International Conference of the European Association of Southeast Asian Archaeologists, Volume 1, Mai Lin Tjoa-Bonatz, Andreas Reinecke and Dominik Bonatz, 307-28. Singapore: NUS Press.

Favereau, Aude, et Bérénice Bellina. in press. « Cultural dynamics in the early multi-ethnic ports of the Upper Thai-Malay Peninsula based on ceramic analysis ». In Ports, Networks, and Spheres: Singapore and the Evolution of the Asian Maritime Trading System, John Miksic. Singapore: NUS Press.

Glover, Ian. 1990. « Early Trade Between India and Southeast Asia - a Link in the Development of a World Trading System. (2nd Revised Ed.) ». University of Hull: Centre for Southeast Asian Studies.

Gupta, Sunil. 2018. « The Archaeological Record of Indian Ocean Engagements: Bay of Bengal (5000 Bc–500 Ad) ». In Online Only -- Archaeology, édité par Oxford Handbooks Editorial Board, 1re éd. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199935413.013.46.

Guy, John. 2011. « Tamil Merchants and the Hindu Buddhist Diaspora in Early Southeast Asia ». In Early Interactions between South and Southeast Asia: Reflections on Cross-Cultural Exchange, Pierre-Yves Manguin and A. Mani, 243-62. Singapore: Institute of Southeast Asian Studies ;

Manohar India.

Hoppál, Krisztina, Bérénice Bellina, et Laure Dussubieux. 2023. « Southeast Asia and the Mediterranean World at the Turn of the First Millennium: Networks, Commodities and Cultural Reception ». Cambridge Archaeological Journal, septembre, 1-24. https://doi.org/10.1017/S0959774323000264.

Hornell, J. 1920. « The origins and ethnological significance of Indian boat designs ». Memoirs of the Asiatic Society of Bengal VII (3): 139-256.

Jacq-Hergoualc'h, Michel, et Victoria Hobson. 2002. The Malay Peninsula: Crossroads of the Maritime Silk Road (100 BC-1300 AD). Handbook of Oriental Studies. Section 3, South-East Asia, Handbuch Der Orientalistik, v. 13 =. Leiden; Boston: Brill.

Kanungo, Alok Kumar, et Robert H. Brill. 2009. « Kopia, India's First Glassmaking Site: Dating and Chemical Analysis ». Journal of glass studies 51: 11-25.

Kulke, Hermann, K. Kesavapany, et Vijay Sakhuja, éd. 2009. « South Indian Merchant guilds in the Indian Ocean and Southeast Asia ». In Nagapattinam to Suvarnadwipa, 135-57. ISEAS Publishing. https://doi.org/10.1355/9789812309389-013.

Kulke, Hermann, et Dietmar Rothermund. 1998. A History of India. 3rd ed. London: Routledge.

Lansing, J.S., A.J. Redd, T. M. Karafet, J. Watkins, I.W. Ardika, S.P.K. Surata, J.S. Schoenfelder, M. Campbell, A.M. Merriwether, et M.F. Hammer. 2004. « An Indian Trader in Ancient Bali? » Antiquity 78 (300): 287-93. https://doi.org/10.1017/S0003598X00112955.

Lefrancq, Coline, Aude Favereau, et Bérénice Bellina. in progress. « Maritime Silk Road and early South and Southeast Asian cultural exchange from the ceramic perspective », in progress.

Mahdi, Waruno. 2009. « In search of an historical Sea-People Malay dialect with –aba- ». In Austronesian historical linguistics and culture history: a festschrift for Bob Blust, A. Adelaar and A. Pawley, 67-83. Pacific Linguistics.

Manguin, Pierre-Yves, et Agustijanto Indrajaya. 2004. « The Archaeology of Batujaya (West-Java, Indonesia) : An interim Report ». In Uncovering Southeast Asia's past: selected papers from the 10th International Conference of the European Association of Southeast Asian Archaeologists, the British Museum, London, 14th-17th September 2004,., E.A. Bacus, I.C. Glover&V.C. Pigott, 245-57. Singapore: NUS Press.

Manguin, Pierre-Yves, et Miriam T. Stark. 2022. « Mainland Southeast Asia's earliest kingdoms and the case of "Funan" ». In The Oxford Handbook of Early Southeast Asia, C.F.W. Higham and Nam C. Kim, 637-59. Oxford: Oxford University Press.

McKinnon, Edward, E. 1996. « Mediaeval Tamil Involvement in Northern Sumatra, C11-C14 (The Gold and Resin Trade). » Journal of the Malaysian Branch of the Royal Asiatic Society 69 (1): 85-99.

Murillo-Barroso, Mercedes, Thomas Oliver Pryce, Bérénice Bellina, et Marcos Martinón-Torres. 2010. « Khao Sam Kaeo – an Archaeometallurgical Crossroads for Trans-Asiatic Technological Traditions ». Journal of Archaeological Science 37 (7): 1761-72. https://doi.org/10.1016/j.jas.2010.01.036.

Pryce, T. O., A. Calo, B. Prasetyo, P. Bellwood, et S. O'Connor. 2018. « Copper-base Metallurgy in Metal-Age Bali: Evidence from Gilimanuk, Manikliyu, Pacung, Pangkung Paruk and Sembiran ». Archaeometry 60 (6): 1271-89. https://doi.org/10.1111/arcm.12384.

Pryce, Thomas Oliver, Sandrine Baron, Bérénice H.M. Bellina, Peter S. Bellwood, Nigel Chang, Pranab Chattopadhyay, Eusebio Dizon, et al. 2014. « More Questions than Answers: The Southeast Asian Lead Isotope Project 2009–2012 ». Journal of Archaeological Science 42 (février): 273-94. https://doi.org/10.1016/j.jas.2013.08.024.

Pryce, Thomas Oliver, et Bérénice Bellina. 2018. « High-Tin Bronze Bowls and Copper Drums: Non-Ferrous Archaeometallurgical Evidence for Khao Sek's Involvement and Role in Regional Exchange Systems ». Archaeological Research in Asia 13 (mars): 50-58. https://doi.org/10.1016/j.ara.2017.07.002.

Pryce, Thomas Oliver, Michael Brauns, Nigel Chang, Ernst Pernicka, A. Mark Pollard, Christopher Ramsey, Thilo Rehren, Viengkeo Souksavatdy, et Thongsa Sayavongkhamdy. 2011. « Isotopic and Technological Variation in Prehistoric Southeast Asian Primary Copper Production ». Journal of Archaeological Science 38 (12): 3309-22. https://doi.org/10.1016/j.jas.2011.07.016.

Pryce, Thomas Oliver, Mercedes Murillo-Barroso, Lynn Biggs, Marcos Martinon-Torres, et Bérénice

Bellina. 2017. « The Metallurgical Industries ». In Khao Sam Kaeo: an early port-city between the Indian Ocean and the South China Sea, Bellina, Bérénice, 501-46. Mémoires archéologiques 28. Paris: Ecole française d'Extrême-Orient.

Pryce, T.O., Simon Carrignon, Mélissa Cadet, Kay Thwe Oo, Saw Naing Oo, Thu Thu Win, Arkar Aye, et al. 2023. « A Partial Prehistory of the Southwest Silk Road: Archaeometallurgical Networks along the Sub-Himalayan Corridor ». Cambridge Archaeological Journal, juin, 1-40. https://doi.org/10.1017/S0959774323000185.

Rajan, K. 2011. « Emergence of Early Historical Trade in Peninsular India ». In Early Interactions between South and Southeast Asia, Reflections on Cross-Cultural Exchange, P.-Y. Manguin, A. Mani, G. Wade, 177-96. Singapore: Institute of Southeast Asian Studies.

Rajan, K. 2015. « Kodumanal: An Early Historic site in South India ». Man and Environment 40 (2): 65-79.
Rajan, K. 2019. Churning the Ocean. Maritime Trade of Early Historic Peninsular India. Manoo Pathippakan. Thanjavur.

Rao, K.P. 2001. « Early Trade and Contacts between South India and Southeast Asia (300 B.C.-A.D. 200) ». East and West 51 (3/4): 385-94.

Rau, Felix, et Paul Sidwell. 2019. « The Munda Maritime Hypothesis ». Journal of Southeast Asian Linguistics Society 12 (2): 35-57.

Ray, Himanshu Prabha. 1986. Monastery and guild: commerce under the Satavahanas. Oxford University Press. Delhi.

Schmetzer, Karl, H. Albert Gilg, Ulrich Schüssler, Jayshree Panjikar, Thomas Calligaro, et Patrick Périn. 2017. « The Linkage Between Garnets Found in India at the Arikamedu Archaeological Site and Their Source at the Garibpet Deposit ». The Journal of Gemmology 35 (7): 598-627. https://doi.org/10.15506/JoG.2017.35.7.598.

Schwartz, M.O., S.S. Rajah, A.K. Askury, P. Putthapiban, et S. Djaswadi. 1995. « The Southeast Asian Tin Belt ». Earth-Science Reviews 38 (2-4): 95-293. https://doi.org/10.1016/0012-8252(95)00004-T.

Selvakumar, V. 2016. « The Routes of Early Historic Tamil Nadu, South India ». In Ports of the ancient Indian Ocean, édité par Marie-Françoise Boussac, Jean-François Salles, et Jean-Baptiste Yon, 289-321. Delhi: Primus Books.

Selvakumar, Veeraswamy. 2016. « Indian Rouletted Ware and Associated Ceramics in the Early Historic Cultural Exchange Networks of the Indian Ocean ». Journal of Indian Ocean Archaeology 12: 64-92.

Sidwell, Paul. 2022. « Austroasiatic dispersal: the AA 3water-world" extended. Were the proto-Austroasiatics coastal migrants? » Journal of the Southeast Asian Linguistics Society Special Publication n°8: 56-72.

Smith, Monica. 1999. « "Indianization" from the Indian Point of View: Trade and Cultural Contacts with Southeast Asia in the Early First Millennium C.E. » Journal of the Economic and Social History of the Orient 42 (1): 1-26.

Srinivasan, Sharada. 1998. « The Use of Tin and Bronze in Prehistoric Southern Indian Metallurgy ». JOM 50 (7): 44-48. https://doi.org/10.1007/s11837-998-0194-9.

Srisuchat, Amarat. 1991. « Merchants, Merchandise, Markets: Archaeological Evidence in Thailand Concerning Maritime Trade Interaction Between Thailand and Other Countries before the 16th A.D. » Document 15 présenté à Integral study of the Silk Roads of dialogue, Bangkok, janvier 21.

———. 1996. Ancient Trades and Cultural Contacts in Southeast Asia. A. Srisuchat. Bangkok, Thailand: The Office of the National Culture Commission.

Wheatley, Paul. 1961. The Golden Khersonese: Studies in the Historical Geography of the Malay Peninsula before A.D. 1500. Kuala Lumpur: University of Malaya Press.

Wheeler, R.E.M, A. Ghosh, et Deva Krishna. 1946. « Arikamedu: An Indo-Roman Trading-Station on the East Coast of India ». Ancient India 2: 17-124.

Wisseman Christie, Jane. 1990. « Trade and State Formation in the Malay Peninsula and Sumatra, 300 BC - AD 700. » In The Southeast Asian Port and Polity: rise and demise, Kathirithamby-Wells, J., Villiers, J., 39-60. Singapore: Singapore University Press.

Recent Advances in Archaeological Investigations of South India

Proceedings

(2nd International Seminar in Commemoration of Padmasri Iravatham Mahadevan)

(2023 March 10-12)

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2024 Tiruvalluvar year 2054