

[Vicino Oriente XIX (2015), pp. 113-125]

INDIAN OCEAN TRADE: A REASSESSMENT OF THE POTTERY FINDS  
FROM A MULTIDISCIPLINARY POINT OF VIEW  
(3<sup>RD</sup> CENTURY BC-5<sup>TH</sup> CENTURY AD)

Serena Autiero - Princess Nourah bint Abdulrahman University, Riyadh\*

*Pottery is a key material of the ancient Indian Ocean trade network and its study provides an understanding of transcultural interactions. This study demonstrates that a reassessment from a multidisciplinary point of view offers new and original interpretations of known existing material. Even though we undeniably have a better comprehension of the Western material due to more advanced studies, these research results prove that it is necessary to dismiss the established Rome-centric perspective. In particular, a re-evaluation of the pottery finds in Western Indian Ocean countries strongly supports the idea that South Arabia and India played a primary role in international exchanges between the 3<sup>rd</sup> century BC and the 5<sup>th</sup> century AD.*

Keywords: Indian Ocean trade; transcultural transmission; South Arabia; India; pottery

In the 3<sup>rd</sup> century BC an important trade network arose in the Indian Ocean. Traders and sailors were the main characters in this scenario. Although these groups are usually only considered for their professional role, the reciprocal influence of their travels can be seen in the material culture and art of Roman Egypt, India and South Arabia. The trade routes crossing the Indian Ocean were important and active not only in the exchange of material goods, but also in connecting different cultures. Economic and trade relations allowed a country to open up beyond its borders, promoting a real cultural outflow.

The history of Indian Ocean trade dates back to at least the second half of the 3<sup>rd</sup> millennium BC when Mesopotamian ships called at the Harappan ports at the mouth of the Indus river (in present-day Pakistan). Subsequently this kind of international trade decreased due to political instability and economic recession. Even so, in the long period between the end of proto-historical trade and the Hellenistic period, Indian and Arab merchants learned how to exploit the monsoon. However we cannot know when they first crossed the Indian Ocean. Monsoon exploitation was a definite technical advantage for Arabs and Indians who – before Greek traders came on the scene – were for a period the only ones engaged in sea trade between the East and the West.<sup>1</sup> This sea route gave rise and new life to many harbours and port towns along the Indian Ocean shores, fostering a lively exchange network. The two ends of the Indian Ocean routes were India and Egypt; between them – at least at the beginning – Arabian ports played the role of *entrepôts* (fig. 1). Even Egypt, for most of the goods imported, was simply a middle passage to the Mediterranean routes.

All inquiries into Indian Ocean trade should be multidisciplinary; only a comparison of different sources of information can shed some light on the topic by combining the evidence and interpreting it in context. As is often the case in archaeology, and for this trade route, pottery is a good guide to understanding such a phenomenon. However, it is

---

\* This article is from the author's PhD thesis discussed at the Sapienza University of Rome, cf. Autiero 2012.

<sup>1</sup> Casson 1989, 11.

important to bear in mind that pottery alone cannot provide a complete view of the Indian Ocean network. Nevertheless, we can identify a shortlist of significant pottery types.

Along trade routes the primary use of pottery was as a container for foodstuff and other items for export, but sometimes it was a trade item in itself – as in the case of luxury ware – or it was transported as a personal belonging of merchants and sailors. The identification of non-fossil-type pottery and common ware is often problematic if we rely upon mere descriptions and visual clues. These pottery classes are quite similar throughout the world. This is why it is difficult to ascertain the provenience of many potsherds, especially when actual shapes cannot be identified, as in the case of body sherds. Only new technologies and mineralogical analysis will help scholars to clear up doubts surrounding the origin of pottery pieces and understand actual interactions. A re-evaluation of pottery findings from past excavations could generate a large amount of new data thanks to recent discoveries and studies that have changed our perception and given us new instruments with which to manage that material.

Scholars have traditionally devoted most of their attention to Roman pottery. The indisputable advantages of these studies are the long history of research in this field and the regularity of the classes and shapes of Roman pottery. This has held true since this field of studies originated.<sup>2</sup> The situation is completely different for Arab and Indian ware. The study of Indian pottery from the west coast and from the south is definitely underdeveloped. There is also a lack of comprehensive studies on South Arabian pottery.

In order to understand the actual importance of the Indian Ocean trade route for coastal sites suffice it to note that in Qani the majority of the pottery fragments found in the strata of the lower period (1<sup>st</sup> century BC-1<sup>st</sup> century AD) can be identified as imports from the Mediterranean, Arabian Gulf and Indian subcontinent regions.<sup>3</sup> Moreover, in the subsequent period most of the pottery was of foreign origin.<sup>4</sup>

Indian Ocean trade is more widely known from the Roman perspective. Roman trade in the period under discussion is evinced first of all in the widespread distribution of amphorae used mainly for transporting the three main exported items of the *romanitas*: wine, oil and *garum* (fig. 2). Recent studies confirm that amphorae from both the Western and Eastern Mediterranean and from the Red Sea area have been found in India.<sup>5</sup> It has been argued that Dressel 2-4 amphorae arrived in India from South Arabian ports and that they were often reused by South Arabians who refilled them with locally produced wine.<sup>6</sup> From the site of Qani 50% of the pottery assemblage is made up of sherds of Dressel 2-4 amphorae, and in Khor Rori 56.5% of the assemblage is storage vessels of various types.<sup>7</sup>

In addition to the findings of Roman amphorae in India, and considering that they were partly refilled with local products in South Arabia, we must also consider Arabian storage vessels – so far often unidentified – to obtain a clear picture of the direct export between the

---

<sup>2</sup> Wheeler *et al.* 1946.

<sup>3</sup> Sedov 2010, 372.

<sup>4</sup> Sedov 2010, 375.

<sup>5</sup> Tomber 2008, 42.

<sup>6</sup> Sedov 2007, 102.

<sup>7</sup> Sedov - Benvenuti 2002, 180.

two areas under analysis. Nowadays it is possible to gain a better understanding of sites under excavation, while some of the information from past excavations is lacking or lost. A key to further comprehending the actual bulk of trade interaction between India and South Arabia may lie in the pottery abandoned in the storerooms after excavations. A local South Arabian type of storage jar has also been identified. It is a high-footed storage jar with a porous fabric normally lined with bitumen or beeswax strongly suggesting its function as a container for liquid.<sup>8</sup>

As far as exports from the Persian Gulf area are concerned, they may have been carried in black and grey storage jars, the origin of which has not yet been conclusively ascertained. They may have been local in origin<sup>9</sup> or produced in India.<sup>10</sup> Moreover, some of the amphorae found in India, previously identified as Roman, have recently been revealed as Mesopotamian in origin; these so-called Torpedo jars were produced between the Parthian and Early Islamic periods and at least some of the vessels appear to have reached India (fig. 3).<sup>11</sup> Most vessels have a bitumen linen on the inner surface suggesting they were used, like their Roman counterparts, to transport liquids. Storage vessels from all over the Indian Ocean trade routes find cross comparisons in Egypt, India, Arabia, the Persian Gulf, and East Africa.

At present there are no accurate comparisons for Indian assemblages due to the initial state of research on South and Western Indian wares. Indian ceramic production, especially as far as storage vessels are concerned, is very simple in terms of both fabric and shapes, with close similarities all over the subcontinent. Moreover, this kind of production can easily be misunderstood for imports, and imported storage vessels can be misinterpreted as local products.

Tracking down the exchange of transport containers is not the only way to highlight interrelations between India and South Arabia. Pottery other than storage vessels was also transported and highlights this phenomenon. In this case it is more difficult to assert that it was exported as it may have been part of the personal belongings of traders and sailors or part of a ship's equipment, or even part of the daily wares used by settled foreigners. This category of pottery provides special potential for understanding interactions, but at present its recognition is unfortunately tentative.

The daily ware includes pottery with red fabric and pottery with grey/blackish fabric. Some types of fine ware have also been found along the Indian Ocean trade route; this label comprises all those items whose utilitarian purpose is combined with an aesthetic purpose and a particular production skill. This kind of ware has also been misinterpreted. A good example of this is Red Polished Ware (RPW) from South India: it was regarded as Italian Terra Sigillata, but until closer observation revealed its actual local origin. In Qani the presence of RPW increased from the 2<sup>nd</sup> century AD.<sup>12</sup> M.

---

<sup>8</sup> Tomber 2008, 50.

<sup>9</sup> Sedov 1996, 25.

<sup>10</sup> Salles 1984, 247.

<sup>11</sup> Tomber 2008, 39.

<sup>12</sup> Sedov 2010, 375.

Kervran<sup>13</sup> asserts that Indian RPW was also imported in the Persian Gulf area. It has also been attested in Siraf (Iran), Suhar (Oman) and Banbhore (Pakistan).<sup>14</sup> A large quantity of RPW has been recovered in Suhar, and associated with it a number of vessels made of medium-coarse blackish (grey-black) ware with a black polished slip of still unknown origin were also recovered at this site.<sup>15</sup> As a strong resemblance between the black potteries of the Persian Gulf from the 3<sup>rd</sup> century BC to the 1<sup>st</sup> century AD and the production of black ceramics in India has already been noted,<sup>16</sup> the presence in Suhar of what is surely Indian RPW together with a black pottery type confirms that their origin is one and the same.

A better understanding of pottery is hoped for to gain more information on the links between India and South Arabia. At the Khor Rori site archaeologists unearthed and identified many sherds of South Indian Black and Red Ware (BRW) and sherds of common ware whose shapes seem to be those of Indian *handi* (cooking pots) and *ghara* (jars).<sup>17</sup> Some sherds are probably from Coarse Red Ware cooking pots with the outer surface darkened by usage.

Focusing on South Arabia, a deep link with the Gulf Area/Mesopotamia is also suggested by the presence of green glazed ware (fig. 4).<sup>18</sup> The Persian Gulf can be considered as a parallel to the Red Sea; the lack of sources on this topic lessens its importance in international commerce if compared to the Egyptian over-documentation. Recent archaeological investigations are broadening our perception, revealing that South Arabia was not only a key location for Indo-Roman trade, but it was also a departing point for two parallel routes that lead northward to the mouth of the Red Sea and to Mesopotamia.

These indications allow us to suppose that an actual pottery *koinè* spread along the Indian Ocean trade route. Besides the common use of peculiar storage vessels, it is also a fact that common types of wares, such as Indian-style cooking pots (*handi*), were widespread from Arabia to Egypt and Iran, at coastal sites (fig. 5).<sup>19</sup> This is probably due, as already pointed out, to the phenomenon of exporting utilitarian items as the personal belongings of sailors and traders or as part of a ship's equipment. Transported items may have influenced local production, either for temporarily or permanently settled Indians and for the local people in touch with them. This fascinating hypothesis of the Indian import of kitchen ware and related technology all around the Indian Ocean trade route needs to be confirmed by further studies, but it is strongly suggested by the available data. Nevertheless, at least when they started making trading contacts and settling abroad, Indians brought pottery vessels from their homeland but later they may have managed to produce them according to their own pottery making traditions and techniques. With this

---

<sup>13</sup> Kervran 1996, 38.

<sup>14</sup> Whitehouse 1968-1974; Khan 1976, 11-12; cf. also Kervran 1996, 40.

<sup>15</sup> Kervran 1996, 40.

<sup>16</sup> Salles 1996, 297.

<sup>17</sup> Direct view of potsherd from Khor-Rori, found by the Italian Mission to Oman (IMTO), directed by Prof. A. Avanzini. Cf. Autiero 2012, 198.

<sup>18</sup> Sedov - Benvenuti 2002, 189.

<sup>19</sup> Sedov - Benvenuti 2002, 190.

hypothesis in mind, future studies can be better targeted to understand the actual extent of this kind of phenomenon. Further confirmation of such a hypothesis came from the Khor Rori site where no evidence of pottery kilns has been found.<sup>20</sup> Therefore the pottery supply should have reached the port settlement from elsewhere, either from the Hadrami homeland in the case of South Arabian settlers, or from a foreign country in the case of Indians.

In this shortlist of pottery types Rouletted Ware (RW) (fig. 6), an Indian fine pottery found also in Egypt, deserves a mention.<sup>21</sup> Some sherds from Qani which have not yet been conclusively identified could be RW.<sup>22</sup> V.D. Gogte<sup>23</sup> identified the Ganges Delta as the most likely source for this pottery type. This fact is significant for the history of Indian transoceanic trade if we consider the history of navigation. Depictions of ship types are particularly significant in this regard, pointing out how other information on the link between India and South Arabia comes from different sources. A graffito was recently found in Khor-Rori depicting a double-masted ship recalling the Satavahana ships featured on coins (2<sup>nd</sup>-3<sup>rd</sup> century AD; fig. 7).<sup>24</sup> Hence there can be little doubt that some of the Satavahana double-masted ships called at the maritime ports of South Arabia. It is interesting to note that this kind of transoceanic vessel also crossed the seas east of India. A double-masted ship is incised on a pottery sherd from Alangakulam (Tamil Nadu). The presence of a second mast can only be inferred from the position of the sole one visible on the poorly preserved sherd. This fragment has been dated to the 1<sup>st</sup>-2<sup>nd</sup> century AD.<sup>25</sup> Moreover a double-masted Satavahana ship has also been found on a seal from the Bengal Bay Area (Pargadas) dated to the 2<sup>nd</sup> century AD and kept in the National Museum of Kolkata.<sup>26</sup> These ships were not identical to each other, as they were built in different places, but the introduction of a second mast was surely due to the need for more speed in long-distance and transoceanic voyages.

South Arabian ports played a leading role in Indian Ocean trade in the pre-Roman age. The circumstances are mostly unknown or misunderstood due to the lack of data compared to the over-documentation of the classical world. Classical sources usually diminish the role of South Arabia in the Indian Ocean trade network, even if there is no doubt about its importance throughout the duration of these contacts. This is due to a strong Rome-centric preconception that afflicts the whole research strand. As a matter of fact, Indian Ocean trade is seen as part of an actual Roman Globalization centered on the province of Egypt. In this scenario South Arabian countries played a totally marginal role.<sup>27</sup>

The Periplus of the Erythrean Sea is the most important source for Indian Ocean trade in the period of the Roman Empire, nevertheless it has a lot of limits. This short handbook provides direct evidence of the sea trade carried out along the Indian Ocean routes just after

---

<sup>20</sup> Sedov - Benvenuti 2002, 195.

<sup>21</sup> Tomber 2008, 74.

<sup>22</sup> Sedov 2010, 372.

<sup>23</sup> Gogte 1997.

<sup>24</sup> Avanzini 2008, 616.

<sup>25</sup> Gaur - Sundaresh 2006, 126.

<sup>26</sup> Mukherjee 1990, 61.

<sup>27</sup> Sidebotham 1986; Begley - De Puma 1991.

the middle of the 1<sup>st</sup> century AD.<sup>28</sup> The limitations of the *Periplus* become apparent in view of the scant data it supplies about the ports of the Persian Gulf. This text does not do justice to the wealthy trade in the Persian Gulf, the extent of which is becoming evident thanks to many ongoing archaeological excavations. Of these, the investigations carried out recently at the site of Dibba (United Arab Emirates) provide new data on the role of the Persian Gulf ports in international trade.<sup>29</sup> Nevertheless, from a methodological point of view, the *Periplus* allows us to trace a pattern for this trade network. This is a very important opportunity that can help in the understanding of less documented historical periods or geographical areas.

South Arabian texts do not give much information about the lucrative international trade. However a small number of inscriptions evinces the presence of merchants from South Arabia involved in international trade. Some of these inscriptions are found in their homeland and others abroad.<sup>30</sup>

According to the *Periplus*, the South Arabian ports of Khor Rori<sup>31</sup> and Qani<sup>32</sup> traded with India.<sup>33</sup> New archaeological data corroborates this information. Archaeologists found some Indian potsherds and a Kushana coin of King Kanishka I in Qani.<sup>34</sup> Another Indian potsherd from Khor Rori also bears traces of a graffito. The palaeographical study suggests that it may be from Gujarat and the proposed date is the 4<sup>th</sup> century AD. The inscription, written in the Prakṛta language, possibly dates back to Satavahana rule in this area. This potsherd evinces the long history and the continuity of the link between the Barygaza area and South Arabia.<sup>35</sup>

The famous inscription from al-ʿUqlah (235 AD) bears further evidence of the presence of Indians in South Arabia. It counts Indians among those attending the annual coronation ritual.<sup>36</sup> More significant for trade matters are Indian graffiti on pottery sherds found in Qani and Khor Rori.<sup>37</sup> These inscriptions, dated to the 6<sup>th</sup>-early 7<sup>th</sup> century AD, even if later than the period under discussion, are very important for highlighting the link between India and South Arabia in a context of hard-to-identify export materials. Some fragmentary inscriptions in different Indian languages have also been found in Egypt<sup>38</sup> providing a

---

<sup>28</sup> On the date of the *Periplus of the Erythrean Sea (PME)*, see Casson 1989, 6.

<sup>29</sup> Jasim 2006, 214.

<sup>30</sup> South Arabian inscriptions discovered in Egypt are particularly interesting. Along the road linking the Nile city of Coptos to the port of Leukos Limen on the Red Sea, three Minean graffiti have been found (RES 3571; Ryckmans 1949, 56-57, n. 360-61). This caravan route crosses the Eastern Desert of Egypt. The location of the three graffiti – simply reporting three names – strongly suggests an implication with Red Sea trade, and the authors can only be merchants directly involved in it. Two more Minean inscriptions (RES 2771; 3022) found in Arabia refer unequivocally to Egypt, cf. Autiero 2012, 138-139.

<sup>31</sup> Avanzini 2008.

<sup>32</sup> Salles - Sedov 2010.

<sup>33</sup> Casson 1989.

<sup>34</sup> Sedov 1992, 126.

<sup>35</sup> Bukharin 2002, 40.

<sup>36</sup> Jamme 1963.

<sup>37</sup> Respectively Bukharin 2010 and Bukharin 2002.

<sup>38</sup> Salomon 1991, 731-735.

possible interpretative model for the South Arabian situation before the documented period. Egyptian epigraphic data suggests that during the early centuries of the Common Era there were both merchants temporarily in Egypt and well-integrated Indians settled there.

Along the Indian Ocean trade route goods travelled side by side with people and culture. Ongoing researches are redefining the independent role each played in international trade. At the same time, new studies will improve our knowledge of Indian ports; extensive digs could unearth unknown trade colonies and new materials providing information on the extent of the imports. A real synergy of different specializations is required to tackle this kind of research. Prior to all that, however, it is essential to be completely open-minded so that all preconceptions can be dismissed.

#### REFERENCES

- AUTIERO, S.  
2012 *I rapporti culturali e commerciali nell'Oceano Indiano Occidentale alla luce dei dati storici, letterari, epigrafici, numismatici, archeologici e storico-artistici (III sec. a.C. – V sec. d.C.)*, PhD Diss., Sapienza University of Rome, Rome 2012.
- AVANZINI, A. (ed.)  
2002 *Khor Rori Report 1 (1997-2000)*, Pisa 2002.  
2008 *A Port in Arabia between Rome and the Indian Ocean (3rd C. BC – 5th C. AD) – Khor Rori Report 2 (Arabia Antica 5)*, Rome 2008.
- BEGLEY, V. - DE PUMA, R. (eds.)  
1991 *Rome and India, the Ancient Sea Trade*, Wisconsin 1991.
- BUKHARIN, M.  
2002 An Indian Inscription from Sumhuram: A. AVANZINI - C. BENVENUTI - V. BUFFA - A. LOMBARDI - R. ORAZI - A.V. SEDOV (eds.), *Excavation and restoration of the complex of Khor Rori. Interim Report (October 2001- April 2002)* (Egitto e Vicino Oriente 25), Pisa 2002, pp. 39-40.  
2010 First Indian Inscription from South Arabia: J.-F. SALLES - A. SEDOV, *Qani'. Le Port antique du Ḥaḍramawt entre la Méditerranée, l'Afrique et l'Inde (Fouilles Rousses 1972, 1985-89, 1991, 1993-94)*, Turnhout (Brepols) 2010, pp. 399-401.
- CASSON, L.  
1989 *The Periplus Maris Erythraei: Text with introduction, translation and commentary*, Princeton 1989.
- GAUR, A.S. - SUNDARESH, S.  
2006 Onshore and Near Shore Explorations along the Southern Tamilnadu Coast: with a View to Locating Ancient Ports and Submerged Sites: F. CHETNA REDDY (eds.), *Mahasenasiri: Riches of Indian Archeological and Cultural Studies*, Delhi 2006, pp. 122-130.
- GOGTE, V.D.  
1997 The Chandrakhetugarh-Tamluk Region of Bengal: Source of the Early Historic Rouletted Ware from India and Southeast Asia: *Man and Environment* 22/1 (1997), pp. 69-85.
- JAMME, A.  
1963 *The Al-'Uqlah Texts (His Documentation sud-arabe 3)*, Washington 1963.
- JASIM, S.A.  
2006 Trade Centres and Commercial Routes in the Arabian Gulf: Post-Hellenistic Discoveries at Dibba, Sharjah, United Arab Emirates: *Arabian Archaeology and Epigraphy* 17 (2006), pp. 214-237.

## KERVAN, M.

- 1996 Indian Ceramics in Southern Iran and Eastern Arabia – Repertory, Classification and Chronology: J.-F. SALLES - H.P. RAY (eds.), *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean. Proceedings of the International Seminar Techno-Archaeological Perspectives of Seafaring in the Indian Ocean 4th Cent. B.C. - 15th Cent. A.D.*, New Delhi 1996, pp. 37-58.

## KHAN, F.A.

- 1976 *A Preliminary Report on the Recent Archaeological Excavations at Banbhore* (Department of Archaeology and Museums, Ministry of Education & Information, Government of Pakistan), Karachi 1976.

## MUKHERJEE, B.N.

- 1990 *Kharoshṭī and Kharoshṭī-Brāhmī Inscriptions in West Bengal (India)* (Indian Museum Bulletin XXV), Calcutta 1990.

## RYCKMANS, G.

- 1949 Inscriptions sud-arabes, 8e série: *Le Muséon* 62 (1949), pp. 55-124.

## SALLES, J.-F.

- 1984 Céramique de surface à Ed-Dour, Émirats Arabes Unis: R. BOUCHARLAT - J.-F. SALLES (eds.), *Arabie orientale, Mésopotamie et Iran méridional de l'âge du Fer au début de l'époque islamique* 8 (Mémoire 37), Paris 1984, pp. 241-270.
- 1996 Hellenistic Seafaring in the Indian Ocean: J.-F. SALLES, - H.P. RAY (eds.), *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean. Proceedings of the International Seminar Techno-Archaeological Perspectives of Seafaring in the Indian Ocean 4th Cent. B.C.-15th Cent. A.D.*, New Delhi 1996, pp. 293-309.

## SALLES, J.-F. - SEDOV, A.V.

- 2010 *Qani'. Le Port antique du Ḥaḍramawt entre la Méditerranée, l'Afrique et l'Inde (Fouilles Rousses 1972, 1985-89, 1991, 1993-94)*, Turnhout (Brepols) 2010.

## SALOMON, R.

- 1991 Epigraphic Remains of Indian Traders in Egypt: *Journal of the American Oriental Society* 3/4 (1991), pp. 731-736.

## SEDOV, A.V.

- 1992 New Archaeological and Epigraphical Material from Qana (South Arabia): *Arabian Archaeology and Epigraphy* 3 (1992), pp. 110-137.
- 1996 Qana' (Yeman) and the Indian Ocean: The Archaeological Evidence: J.-F. SALLES - H.P. RAY (eds.), *Tradition and Archaeology: Early Maritime Contacts in the Indian Ocean. Proceedings of the International Seminar Techno-Archaeological Perspectives of Seafaring in the Indian Ocean 4th Cent. B.C.-15th Cent. A.D.*, New Delhi 1996, pp. 11-35.
- 2007 The Port of Qana' and the Incense Trade: D. PEACOCK - D.F. WILLIAMS (eds.), *Food for the Gods: New Light on the Ancient Incense Trade*, Oxford 2007, pp. 71-111.
- 2010 Stratigraphy and Development of the Site. Preliminary Remarks: J.-F. SALLES - A.V. SEDOV (eds.), *Qani'. Le Port antique du Ḥaḍramawt entre la Méditerranée, l'Afrique et l'Inde (Fouilles Rousses 1972, 1985-89, 1991, 1993-94)*, Turnhout (Brepols) 2010, pp. 371-380.

## SEDOV, A.V. - BENVENUTI, C.

- 2002 The Pottery of Sumhuram: General Typology: A. AVANZINI (ed.), *Khor Rori Report 1 (1997-2000)*, Pisa 2002, pp. 177-248.

## SHAJAN, K.P. - TOMBER, R. - SELVAKUMAR, V. - CHERIAN, P.J.

- 2008 The External Connections of Early Historic Pattanam, India: The Ceramic Evidence: *Antiquity* 82 (2008), <http://www.antiquity.ac.uk/projgall/tomber>.



SIDEBOTHAM, S.E.

1986 *Roman Economic Policy in the Erytra Thalassa, 30 BC-AD 217* (Mnemosyne Supplements XCI), Leiden 1986.

TOMBER, R.

2008 *Indo-Roman Trade, from Pots to Pepper*, London 2008.

2010 Beyond Western India: The Evidence from Imported Amphorae: R. TOMBER - L. BLUE - S. ABRAHAM (eds.), *Migration, Trade and Peoples, Part 1: Indian Ocean Commerce and the Archaeology of Western India*, London 2010, pp. 42-57.

WHEELER, R.E.M. - GOSH, A. - DEVA, K.

1946 Arikamedu: An Indo-Roman Trading Station on the East Coast of India: *Ancient India 2* (1946), pp. 17-124.

WHITEHOUSE, D.

1968-1974 Excavations at Siraf. First-Sixth Interim Reports: *Iran 6-12* (1968-1974).

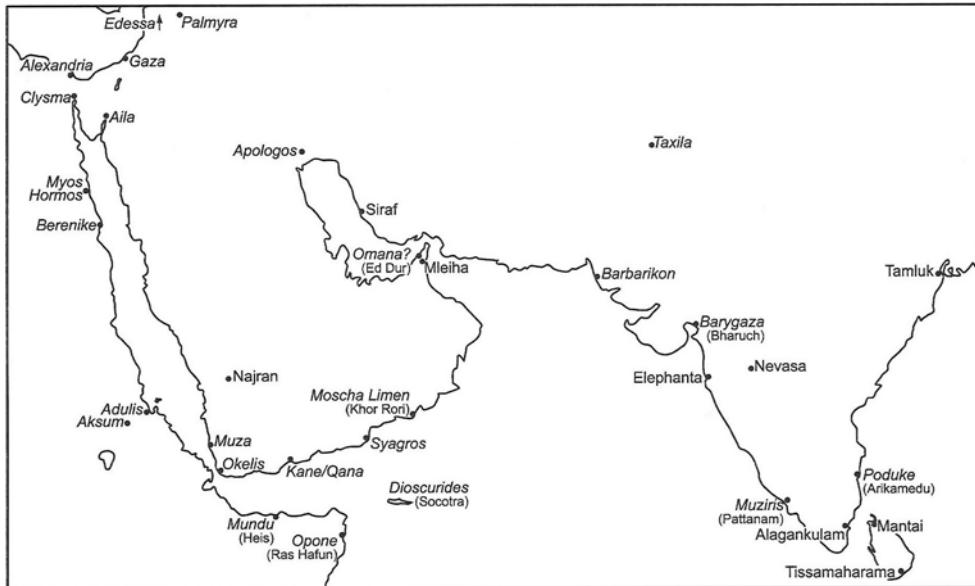


Fig. 1 - Map of the most important sites within the western Indian Ocean (after Tomber 2008, fig. 1).

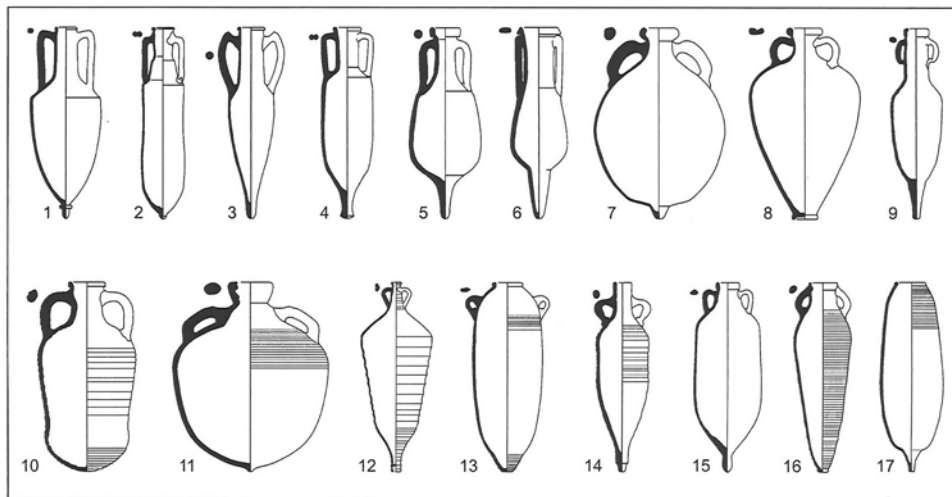


Fig. 2 - Amphora types found throughout the Mediterranean, and Indian Ocean. Early Roman: 1, Knidian; 2, Koan; 3, Rhodian; 4, Dressel 2-4; 5, Dressel 6 A; 6, Dressel 7-11, 38; 7, Dressel 20; 8, Gauloise 4; 9, Amphore Egyptienne 3. Late Roman: 10, LR1; 11, LR2; 12, LR4; 14, LR7; 15, Africano Grande; 16, Aqaba; Mesopotamian: 17, Torpedo jar (from the Early to the Late Roman period) (after Tomber 2008, fig. 3).

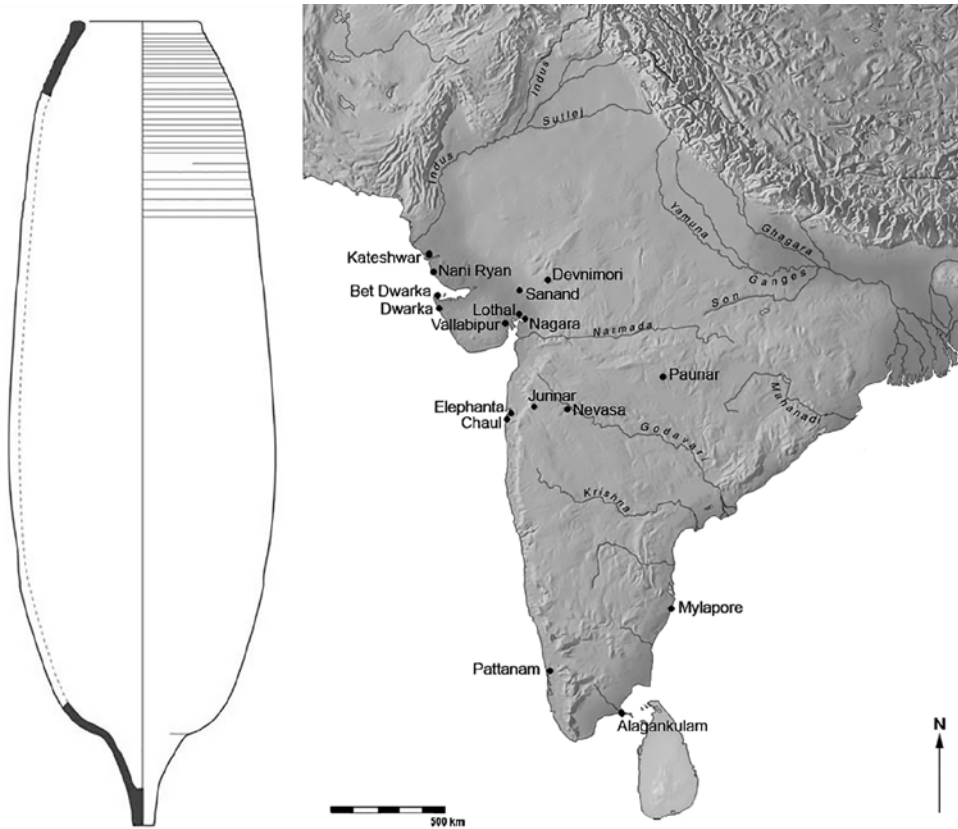


Fig. 3 - Torpedo jar (produced between the Parthian and Early Islamic periods) and distribution of this kind of storage vessel in India (after Tomber 2010, figs. 8-7).



Fig. 4 - A fragment of Parthian green glazed ware of Mesopotamian origin from Khor Rori (after Avanzini 2002, pl. 24.1).

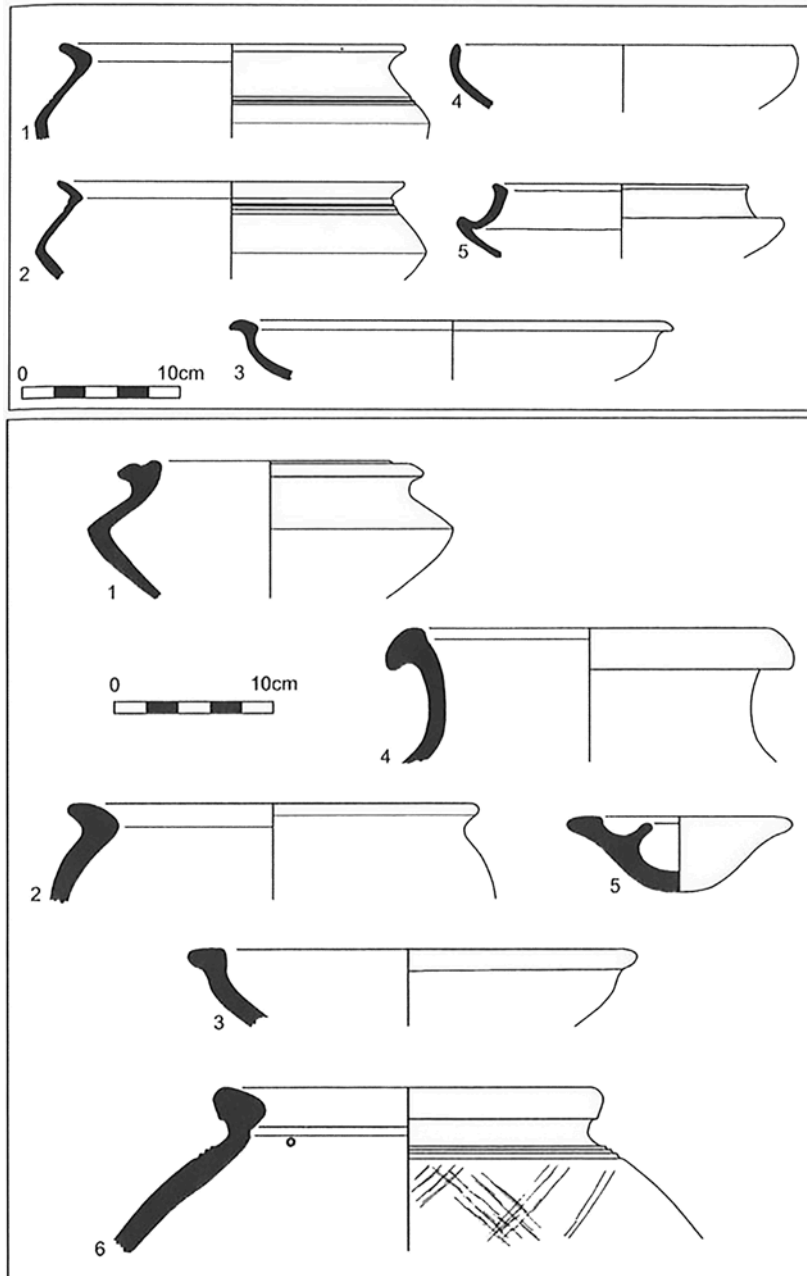


Fig. 5 - Indian common ware from Berenike and Myos Hormos, Egypt (after Tomber 2008, figs. 6-7).

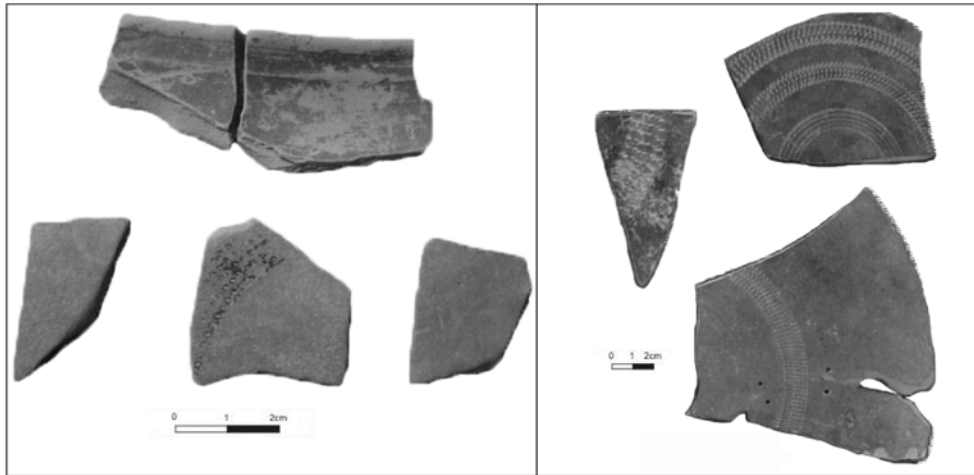


Fig. 6 - Rouletted Ware sherds (1<sup>st</sup> century BC-1<sup>st</sup> century AD) from Pattanam (left) and Arikamedu (right; reworking after Shajan *et al.* 2008, fig. 4).

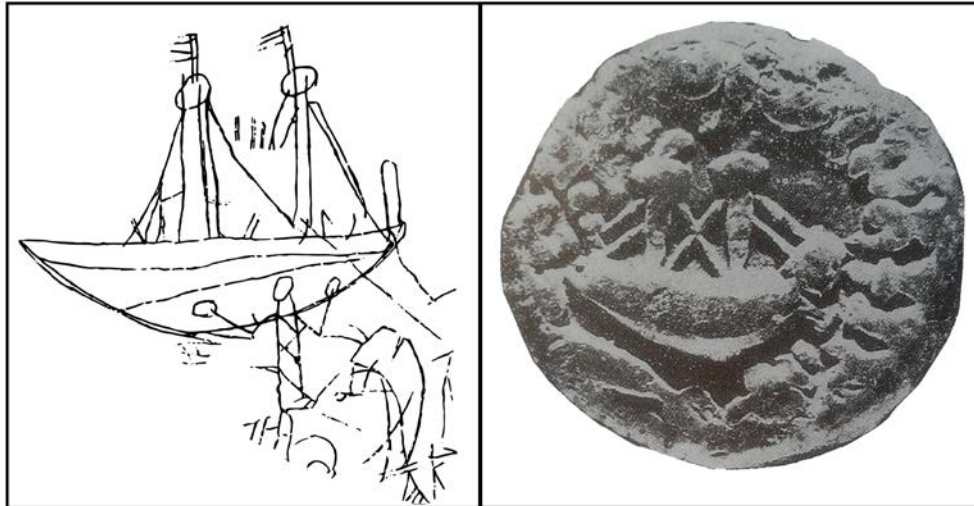


Fig. 7 - Double masted ship: graffito from Khor Rori and Indian coin of the 2<sup>nd</sup> century AD (not in scale; after Avanzini 2008, figs. 4-5, 616).