

CHAPTER – 3

SCIENCE IN SANGAM LITERATURE AND
ARCHEOLOGICAL DISCOVERIES

[B.C.E. 3rd Cent To C.E 6th Cent]

Dr. J. SOUNDARARAJAN,

Assistant Professor,

Dept. of Ancient History & Archaeology,

University of Madras, Chepauk, Chennai – 600 005. India.

Mail. ID: jsrajan2013@gmail.com

Pukar (Kaveripoompattinam)

Pukār is the eternal city of history, literature and archaeology in Tamil country. According to the account presented in ‘Twin Tamil Epics’, the *Silappatikāram* and *Manimēkalai*, when the Festival to Indra, ‘Intiravinā’ immortalized in the epics was stopped the Goddess Manimekhalā (Tamil Manimēkalai) destroyed the city as per the standing order of Indra, King of Gods. The seven ‘Intiravikārams’, centers of Buddhist worship and ‘MālaiveGkumai-maIlaIvāI kōyil’ “temple of Indra” (Cilampu, Intiravi;āvūremmuttakātai, l. 173) are extolled in the epics (Jeyapriya 2004: 293)¹. It is said, around the 2nd century CE a Cōla king failed to celebrate the festival and the city was swept away in a *tsunami* and archaeologists say the old city is found wrecked in the sea away the coast of the city of present Pukār. We get a glamorous picture of the city in the ancient literature of the Tamils such as the *Pattinappalai*, *Silappatikāram* and *Manimēkalai*. Excepting the literary account found in the cited literatures, we do not have any perspective of the city of those times.

Literary Evidences:

The *Manimēkalai* presents a cosmological account of the *Cumukāmmukkōmmam* or *Cakkaravāḷakkōmmam* with a marble house inside, *Paḷḷikkarai* and sages and recluses taking shelter in that temple of the crematorium. It was fitted with a big flower garden, *malarvaIam* where MaGimēkalai went to fetch flowers for worship of the Buddha. It was from there that Goddess MaGimekhalā took MaGimēkalai by air (levitation, one among the *aCmamahāsiddhis*) to the MaGipallavam Island to get for her the much coveted *Pāttiram* (‘Pāttirampe__akātai’ of *MaGimēkalai*), the *akCayapātra* to feed the hungry multitude. It was dropped in a lake called Kōmuki/Gomukha by Aptuttirai (Son of the Cow), and was recovered by MaGimēkalai by which she fed the hungry in Kāñci. All these events are narrated in the Twin Epics. The *Pammilappalai* talks of the City of Pukār during the time of TirumāvaḷavaI, maybe earlier than the time of MaGimēkalai and presents a detailed pen-picture of the city (see below). My

question is whether the city of Pukār of those times could be redrawn with the help of literary and archaeological sources available². It should not be the abode of favorites and encourage nepotism. Let us now have a glimpse of how the glory of the ancient city of Pukār is told in literatures some 1800 years ago.

The salient features of the city are described in the ‘Intirvi;avūremmuttkātai’ of the *Cilappatikāram*. According to the MaGimēkalai there was a Square in the city that was guarded by the ‘Catukkapūtam’, which punished the immoral and that it wielded a noose (*pāśa*).

The Maruvūrppākkam consisted of various apartments for the different types of people to live in and engage in their professions: They are:

- Vēyāmāmam: courtyard of the Moon
- Viyankala irukkai: where markets were busy
- Mā7ikai imaEka7: palaces of the lords and aristocrats
- YavaIar irukkai: living quarters of the *yavanas*⁴
- Pulam peyar mākkal foreigners from various countries; maybe from China
- Nakara vīti: main street of the city where small sellers dealing with petty things move
- Kārukar irukkai: residence-cum-shops of dealers in silk, coral, pearls and gold
- Kūlakkamait teru: where people sell eatables
- Artisans: Several types of artisans working in bronze, iron, gold, tannery, painting, flower etc. are listed; those engaged in selling musical instruments are notified

The above facts would suggest the ‘Maruvūrppākkam’ was the chief market zone of the city where all types of people belonging to different nationalities could live together.

The ‘Pattinappākkam’ was the heart of the city that accommodated the temples and the King’s palace. The Main Street in which chariots fly were found here, called *tērvūti*. This was the main city part where those in royal service, the aristocrats and rich merchants lived. A catalogue such living quarters are described as follows:

- The royal palace, called *kōyil* where the king and his family resided
- Chariot moving main streets that move in four directions
- The bazaar in called *Pīmikaiiteru*
- The palaces of rich merchants, cf. *Mācāttāl*

- The *agrahāra* is called *ma_ aiyōr irukkai*, maybe round the temples
- The quarters of landlords and they are simply called *u;avar*
- Astrologers [*nā;ikaikkaGakkar*], dancing girls [*āmal kūttiyar*], prostitutes [*parattaiyar*]*, musicians, keepers of horses and elephants, poets and the learned.
- The Day Market was known as Nā7aEkāmi and the Night Market AllaEkāmi.
- The architectural edifices noted are ‘Ko_appantar’ (from Vajradeśa), ‘PammimaGapam’ (from Magadha), ‘TōraGavāyil’ (from Avanti) and ‘Kamaimukavāyil’.
- The temples for the following gods were present in the city: Śiva [*LiEga-Svayambhū - pi_avāyākkai pe_ iyōI*], the sixfaced MurukaI, the white complexioned Baladeva, the bluecoloured NemiyōI/Trivikrama (VicGu), Indra, A_avōr-pa77i, Pu_anilaik-kōmmam (for Sāsta or Sātavāhana), a temple for Kāma (Kā mavē7-kōmmam), a temple for the reclining VicGu (‘A_ituyilamarnta MaGivaGGaI-kōmmam’) and so on.
- These seem to be separate categories that came under concubines (e.g. Mātavi) and public women.

From the above account we get a picturesque account of the City of Pukār that existed 2000-1500 years ago. This description of the city may as well apply to Maturai, Vañci and Kāñci and they had no seashore. Descriptions of these cities appear in the ‘Twin Epics’ in the relevant contexts.

Ancient Tamil literary works such as the *pattinappalai*, *patirruppattu*, *narrinai Akananuru*, *purananuru*, *cilappatikaram* and *Manimekalai* present graphic accounts of the port-cities in the east and west coast of India. Many of these are defunct and no trace of their status as ports are found today. One among such flourishing port cities was kavirippumpattinam or [pum] pukar so eloquently described in the *pattinappalai*- and *cilappatikaram*. Today pukar known by its old name kavirip[pum] pattinam in nostalgic memory is no longer the ancient city. It is a small hamlet on the coast of the Bay of Bengal that lay in between puduceri and Nagapattinam. Nothing of the Cangam age is found here excepting some foundations of ancient brick buildings. Some recent memorials have been erected on the site, not befitting erstwhile grandeur and magnificence of the old city and these serve to broadcast the pretentious propaganda of political parties.

Literature on the other hand gives an excellent account of the temples that existed there and the flourishing port. The *cilappaikaram* reads as follows⁵:

Amarartarukkottam Velyanaikkottam
Pukarvellai nakartankottam pakalvayil
Uccikkilankottam urkkottam verkkottam
Vaccirakkottam Purampanaiyan valkottam
Nikkantakkottam nilakkottam ...

*Cutukattukkottam...*⁶

That is to say there were temples dedicated to the following gods and goddesses in the various parts of the city:

Amarartaru: kalpakavrksa “the wish fulfilling tree”

Velyanai : Airavata “white elephant the mount of indra”

Pukarvellainakar : “personified day the lord of the sky”, surya *Urkkottam* : “temple of the city” presiding deity of the city (*nagaradevata*), i.e.Campapati ⁷

Verkkottam : vel = *sakti*, a temple for *sakti* –*ayaudha*⁸

Vaccirakkottam : temple for *vajara*, the weapon of indra⁹

Purampanaiyan : God on the outskirts of the city, supposed to be *sasta* or *satavahana*¹⁰

Nikkantam : prakrit Nigranta, a Jain *palli* “temple” or “monastery”

Nila : Moon, temple for Candra

Kamavel : temple for kama or Manmathan

The above account would suggest there were temples for the personified vehicles of the major or minor gods, *gramadevatas* and *nagaradevatas*.

The *Cilappatikaram* in yet another context talks of the other temples that existed in the city of pukar. They are ¹¹

Piravayakkaiperiyon koyilum

Arumukaccevel anitikal koyilum

Nilameni Netiyon koyilum

Malaivenkutai mannavan koyilum ...

Aravor palliyum ...

In all these cases the word *koyil* stands for temples ¹². Elsewhere the *Cilappatikaram* employs the following words to denote a temple: *niyamam*, *nakaram*, *kottam*, *palli* and so on ¹³. In the above citation the gods noted are the following:

Piravayakkaipperiyon : the self born,*svayambhu*,Siva

Arumukaccevel : the six- faced Velan, Murukan or Arumukan

Nilameni Netiyon : “blue-coloured” the Tall one, Visnu

Malaivenkutai- mannavan : king of Rains, the white- banner holder indra

Aravorpalli : It *palli* of the *dharmas*,Buddhist

Besides, the celebration of the Festival in honour of Indra is described in great detail in the *Cilappatikaram* in its. *Itirvilarettakatai* and *Manimekalai* in 1.*Vilavaraikatai*.All these are

pointer of the fact that Pukar like Athens and Rome must have been a veritable metropolitan city and port of the ancient Colas. It is understood from the above account that the ancient city of Pukar accommodated temples for Siva, Visnu, Murukan, Indra, Gramadevata(sasta). Nagaradevata (Campapati), the Buddhists and Jains, Kamadeva, Surya, Candra and the personified *vajra*, Airavara, Kalpakavrksa and *sakti*.

Archaeological perspectives

Except the brick foundations of some edifices nothing solid in the form of images and temples have come out. Through excavation the ancient history of the city ***Pukar*** was brought to light by the **Archaeological Survey of India, Department of Ancient History & Archaeology of the University of Madras** under Prof.T.V.Mahalingam (***Excavations in the Lower kaviri Basin***) and **Tamil Nadu State Department of Archaeology**. They may be briefed in the following account¹⁴.

- A Wharf measuring 18-28 x 7.62 meter at Kilaiyur, dated 316+103 BCE.(dated according to c14 method).
- A water reservoir at vanagiri dated c.1-2nd century CE.
- A Buddhist *vihara* with five chambers each in eight feet square. A Buddha bronze statue of 5.5 cm height was also brought to light.
- A number of Roman coins and potteries of the early centuries of the CE.
- Since 1981 offshore explorations by diving into the sea were conducted.
- A brick wall and ring-wells discovered that belong to the period 2nd century BCE to 4th century CE.
- Discovery of stone masonry off the coast of vanagiri with the blocks varying in size 30 x 20 x 5 cm 65 x 40 x 10 and 60 x 35 x 10 cm. These were dated during 5th Century BCE to 4th Century CE
- During a seaward exploration conducted by the Geophysical Survey of India in 1997 they detected by in the sea a “U” Shaped structure, probably a Buddhist *caityagrha* and two additional structures. They also detected a palaeo-channel. These Findings led marine archaeologists to suggest the Pumpukar of the Cankam period extended 5 km seaward of the present sea shore.

Therefore, it has been suggested by archaeologists that the ancient city of Pukar has fallen a victim to a tsunami some 1500 years ago and what all we hear from literature is the only source of our knowledge of the port city of Cankam age Pukar. Unless underwater archaeological exploration is undertaken it is difficult to talk in solid historical terms of the nature of the city, its plan, the structures and the materials with which they were constructed.

Scholars (e.g. K.R .Srinivasan) affirm the ancient Tamils did not employ stone for building temples. So, most of these edifices must have been built of brick, wood and other perishable materials. What about secular buildings such as palaces and residences of nobles?

We may also keep track of the Asokan period pillars found in the outskirts of the city of Patna (ancient Pataliputra) and the massive rock-cut excavations of Buddhist *caityagrihas* and viharas at Bhaja, Bedsa and Karle; also Sanchi and the surrounding places. Something is missing somewhere in case of Tamilnadu. Much more organized and deep archaeological investigations are needed. We must note here that in the area called Herculaneum in Naples the ancient remains of the city (1st Century CE) were dug some 500 meters below the ground level.

Pukar was a port and so it is acceptable that it fell prey to an overflow of the sea. What about the inland cities of Maturai and Vanchi of which we hear in the *Maturaikkanci and patirrupattu*? Being an archaeologist, I am of the strong conviction that much more archaeological excavations have to be undertaken to unearth the ancient cities described in Cankam literature. I keep in mind the diligent work done by German and French archaeologists in discovering ancient Troy, Naples and Rome. If the Herculaneum and Pompeii in Naples could be brought to light that was submerged in volcanic ash¹⁵, why not we search for our ancient cities of Maturai, Vanchi and Karuvur 100-500 meters below the sea level? **Trade**

Contact Of Arikamedu

With Romans (Yavanas)

Before the death of the Roman king Augustus in 24 CE., a well organized sea-trade route was existed. For this many historical evidences are available now. Those Roman Ships, (Yavanar kalams) which came to the Malabar Coast of western India were also halted in the Coromandal coast for trade purpose. This view is confirmed by the discoveries of Roman coins and Roman country's archaeological artifacts which were obtained from the east & western coasts of India. Based on the artifacts from Arikamedu, it is understood that ancient, "Puducacae", (Puducherry) city people had a highly civilized and led a very good Tamil cultural life. They were also possessed the aesthetic sense in the field of paintings and sculptures¹⁶.

Literary Evidences

Through the Arikamedu port city, Romans did their inland trade with ancient traders of India and conducted off-shore marine trade with many other countries. The Roman trade contacts were recorded or referred in Indian literature and foreign accounts. Both the Indian literatures and foreigners accounts were inter-exchanged themselves. For example, Cankam Age literature is considered as a very special literature in south India. *Pattinappalai*, *Puranaanuru* and *Akanaanuru* (149 – 7-11), *Cilappatikāram*, *Manimēkalai* (19, 107 – 108) registered the history of *Kavirippumpattinam*. The Pukar trade with the Roman Empire, other Arab countries and eastern oriental countries were clearly listed and narrated in the contents of the Cankam age texts. The poetic verses in such Cankam texts refer the ancient maritime trade activities. Particularly Natrinai (58 : 5) mentions about, "Viram pattinam", port city. This place may be the Arikamedu, which was located in the eastern coast where the river Arikamedu merges with the Bay of Bengal Sea. (Estuary). The "Akham", poetic verses denote this place as, "Virai Mun Thurai Vaelirukku Sondhamanadhu". (The port city of Virai belonged to the Vaelir who

controlled the land in front of the sea)¹⁷. It also represents the presence of salt pans here and there during that time .

Sinam kezhu thanai veliyan
Irangu neer pangan kanal am
Perunthurai adupoera vaelir virai mun
thurai...(Akhnaanuru -149 – 7-11),

(Viram pattinam existed as a port and posses an oasis). From this it is understood that “Virai”, existed as a port city which was located on the coast. Virai refers to Viram pattinam. Thus, the present day Arikamedu was once a part of Virampattinam or Virai or the whole city of Virai. It also evidences that the Virai port city was flourished as a big port¹⁸.

Apart from this *Pattilappalai*, *Puranaanuru* (56, 17 – 20) poetic verses narrate the trade commodities which were brought in and brought out (import and export) via *Kavirippumpattinam*. What kinds of trade goods were imported via sea by the traders are mentioned particularly in the following verses, How these imported merchantile goods were exchanged with the other country’s goods were also well described in such poems.

e.g. Akhanaanuru: (7 – 10)

“Thalli Am Paeriyatru ven nurai kalanga
Vanar thantha vilai maan nankalam
Ponnoedu vandhu kariyoedu peyarum
Pariyoedu vanthu kariyoedu peyarnthiru Vazg kezhu musiri arpuzhai
valaisi”.

Archaeological Perspectives

The white foamed sea had the huge fine ships which exchanged gold for spices, horse for spices at the ports of Musiri¹⁹. In addition, it also described the coastal sea city on the banks of river cauvery and its town planning. Particularly Romans, Greeks, Arab and Chinese traders came and stayed (Yavanar Irukkai – a settlement place of Yavanas) in their owned settlement area. Thus, traders from other countries had a trade link with ancient India’s ports.

- e.g. 1. Masuli pattinam (Andhra pradesh)
 2. Kalingam (Orissa)
 3. Marakanam (pudhucherry)
 4. Puducae (puducherry)

All the above said ancient ports were mentioned in Ancient India 1960 – 1965 – 69)²⁰.

Amphoerae jar used by Greeks and Romans²¹. The rouletted (English name) and Aritine potteries were discovered from this Arikamedu port city²². In addition to the exploration in this Arikamedu port city ,excavations were carried out by the following persons:

- (1) French expert Mr. J.M. Casal

(2) R.E. Martimer Wheeler

(3) K.V. Raman, University of Madras and Pennsylvania University Professor Ms. Vimala Begley (joint venture by the two educational institutions collaboration)

All of them confirmed the presence of the above said potteries resembles those excavation findings. By this we can understand the used potteries of Greeks and Romans. Their spread in India (our country), evidenced the trade contacts between these countries. They are considered as an unshakable historical vestiges. More over the potsherds bearing the script namely Kannan and Saathan palaeographically that these inscribed shreds were belonged to 1st century CE.

It should be mentioned that the Roman Pottery Aritine was manufactured at ARIZZO, a place in Italy during the early century of Christian era 1st Century CE. It was not manufactured previously or after that period, where ever they are found in the world clearly shows their spread and presence, which confirmed the trade contacts of Romans and other countries. By this, if more Aritinepotsherds and other such objects found in the other parts excavations, discoveries can help us to do a comparative study of the Ancient merchantice, trade contacts can be made analysed. (In case, the occurrence of more evidences from different perth of the world also had a comparative outlook). Literaries by Ptolemy, Greek Scholor, *Pura Nanuru*, Aka Nanuruetc., Periplus, Maris, Etrithriyan, Malaengal, Mylarba (1950 CE) reveals that many ancient port cities were existed in the ancient Tamil country particularly from Kanyakumari to Chennai. Some important cities are as follows:-

Kullaththurai, Eyirp Pattinam, Arikamedu, *Kavirippumpattinam*, Tondi, Marungai, Korkkai, Kumari. By this it is evidenced that the above said ports of ancient Tamil country did a busy trade with the western countries. The term, "Yavanar", is mentioned many times in ancient Tamil literatures (Cankam)²³ Romen coins were discovered from these port cities. In addition they were occurred in the following places: Arikamedu, Karaikkadu, Sengamedu, Kottaimedu, Azhagankulam, Vasavasamudram, Vellaamur Kodumanal, Kanjipuram, Poombuhar, Korkkai, Karur, Madurai, Pudukkottai, Velluur, Chennai, Mayilapore, Mambalam, Uraiyur, Paerur and Vijayamangalam.

Roman coins were found In Kerala, Vanji, Musiri, Thondi, Pattinam, Kottaiyam and Akki allure .Such coins were found in Andrapradesh, Nellore and Nangthaspar. In Karnataka, Chandravalli and Akkappalli are the places where the same was recovered. Certain Greek words were found in ancient Tamil literatures. Ancient barter system was in favor of ancient India. *Kavirippumpattinam* received many imported goods Via sea from different countries. In addition taxes and gold was also imported. Akil, Pearl and Thukil were exported. From Rome, silver and gold coins were exchanged for ornaments and other accessories. Because, Roman ladies were fond of such things from Tamil Nadu. Roman politicians were condemned their behavior. Even Tamil people wished to receive many things from Rome²⁴.

Among them Lady lamps (Paavai Vilakku), Time measuring instruments and foreign labourers were imported for the Tamil Country. Manimegali refers to, “Yavanar Thatchchar”. In the above said port cities, “Arikamedu” “*Kavirippumpattinam*”, existed as an important port. Arikamedu and *Kavirippumpattinam* excavation and research confirmed the the place as once flourished as port city. During the period between the early years of 1st Century CE. and the early phase of 2nd century CE. it had a busy trade contact with Romans. Dhakshina Taxila (Historic Relics from Arikamedu) “Pliny (77 CE) mentions,”Musiri”, as an important port city. In the later half of the 1st century CE. Tamil Country had” Contract market”, (Emoria Nomina) . This was mentioned in the book,”Periple De La Mer Erythree) (80 – 89 CE). More over the term, “Market” (Emoria) , was used by Mattil Paththoelemae in 150 CE.

In 24 CE. 120 cargo ships were sailed for trade journey at the same time, from ,”Myos Hormos”, port city. They crossed the Red sea and then reached India. Strabon, the Greek Historian gave this description .The artifacts from this site research provides special references on their own. Along with other potteries, Arezzo potsherds were also found. Previously found Augustus Emperor’s ring stone and the occurrence of Arezzo potsherds indicates the commercial trade contact between the western countries and coromandal coast during 1st century CE. From the Arikamedu and *Kavirippumpattinam* excavation vestiges, researchers formulated the following facts:

- * Augustus emperor consolidated the western European countries
- * The trade contact between India and Italy was expanded

Both these facts were inter related and happened at the same period of time²⁵. On the basis of geographical grounds, a city was existed in the coromandal coat and it had a trade contact with the western countries. More over the site where excavation research was carried was the same place which was mentioned and referred in Periplus and Ptolemy. i.e. Podukae²⁶. Roman period or middle first sub – division possessed the above said findings. Archaeologists and Historians used Proton magneto meter, Sonar magneto meter and Echo – sounder to study the Stratigraphy researches. By this the trade contact between Arikamedu and Rome are scientifically researched by them²⁷. With the help of the research works, new comers from other countries to India were studied well. During the 1st Century CE. To 6th Century CE.

ENDNOTES:

1. Jeyapriya Rajarajan, “A Note on Vaccirakkōmmam”, *East and West*, Rome 2004, Vol. 54: 1-4, pp. 291-302. This article presents a long list of the temples that existed in the principal cities of the Tamil country around the 5th century CE if this date for the *Cilappatikāram* is accepted. Ardent Tamil scholars stick to the date 2nd century CE or 2nd century BCE to 2nd century CE. For a forthcoming account see J. Soundararajan, *Vijayanagara-Nāyaka Temples: Art and Architecture*, Sharada Publishing House, Delhi 2013, pp. 6-10.
1. My teacher, Prof. Raju Kalidos asked me whether a New City on the model of the ‘Pammilappākkam’ and ‘Maruvūrppākkam’ with ‘Cakkaravā7akkōmmam’ could be rebuilt

on the site in memory of the Epics to bring the city to life again. It is possible if only the Government of Tamilnadu could lend ears to what archaeologists and historians say. Prof. Kalidos even suggests a “toll-free” or open market city could be created in Pukār where merchants from the east and west as in times of yore could come and sell their products or purchase Indian products “duty free”! If such a project materializes Pūmpukār may get an Air Port as we find in Khajurāho.

2. M. Raghunathan, *Six Long Poems from Sangam Tamil* (Madras 1978), pp. 63-64.
3. Yavanar are considered to be *mlecchas* by the commentators. They are the merchants from Greece and Rome. Some consider them Arabs.
5. For an excellent analysis of the ancient temples that existed in the cites of Pukar and Maturai, including Arrakam see Jeyapriya Rajarajan, A Note on Vaccikakkottam, East and west, Rome 2004. Vol.54:1-4. pp 291-302.
6. *Cilappatikaram*, 9: 9-20, 60.
7. It seems the city itself was known as Campavati. She was the protecting goddess of the city as was Maturapatti in Maturai.
8. It was typical attribute of Tamil Murukan.
9. Perhaps these were worshipped in their personified form.
10. He is supposed to mount a horse. The *kalittokai* v.82 notes *puranilaikkottam*. For a recent study of these temple types and lavish technical terms found in literature of the Cankam Age see R.K.K.Rajarajan, Rock-cut model shrines in Early Indian Art, Delhi 2012, Chap. 1. This work was the M. Phil thesis of the Tamil university of thanjavur where the present author did his doctorate.
11. *Cilappatikaram* 5: 170-173, 179.
12. Many a writer spells word *kovil* which is technically incorrect. *Vide*, Dr.R. venkatraman, *Intiyak kovil kattitakkalai Varalaru*, Madurai 1983. Kovil should be koyil and kattitakkalai should be kattatakkalai, Cf. Raju kalidos, *Encyclopedia of Hindu Iconography: Early Medieval, vol.I Visnu*, Delhi 2006, p. xxviii
13. Jeyapriya Rajarajan, *op .cit.*, p.295
14. In the *Manikalavalttuppatal* the *Cilappatikaram* invokes Candra and surya with the words: Tinkalaipporrutum tinkalaip porrut naviru porrutum naviri “sun” and tinkal “moon”
15. Natana kasinathan, *Tamils Heritage*, pp.65-89.
16. Albert C. Carpececi, *Pompeii 2000 years Ago and Today*, Viale Ariosto,
17. Villiyanur – Pulavar N. Vengadesan (1990) *Varalatril Arikamedu*, Thirumudi Pathippagam, Villiyanur. Page 12 – 25.
18. Begly .V. *Arikamedu Maru Thiranaivu*, Aejaea 87 (1983) Page 461 – 81.

19. Jouveau Dubreuil *Les ruins de Pondicherry*, 1941.
20. Begley V. and Richard Daniel De Puma eds. *Rome and India. The Ancient Sea Trade* (Madison, 1991).
21. Ancient India, Vol – 2, July – 1946, A.S.I. New Delhi – PP.
22. Amphorae jars were ancient European storage jars. They were used to store grains and liquid (Sprit and oil), particularly in Travel by Europeans. It is a kind of a jar. In the upper part two handles were present. It is a unique feature of this jar. The word, Amphorae”, is derived from a Greek word.
23. Rouletted plates were made by a well livigated clay. They will produce metal sounds when it was striken. It is an important feature of this kind of pottery. At the base, very fine paintings were painted in circles.
24. K.V.Zvelebil “*The Yavanas in old Tamil Literature*”, Charisteria Orientalia Prahai 1965.
25. Vimala Begley, “*New Investigation at the art of Arikamedu* “, in Journal of Roman Archaeology, Michigami, Vol. 6, 1993.
26. Auguste, *The Roman emperor’s name was written in Latin in a Roman coin*. He was born in 63 B.C at Rome. He was died at Nela in 14 CE.
27. R.E.M. Wheeler, “*Arikamedu* “- *Bulletin of ASI*, No. 2, July 1946, New Delhi.