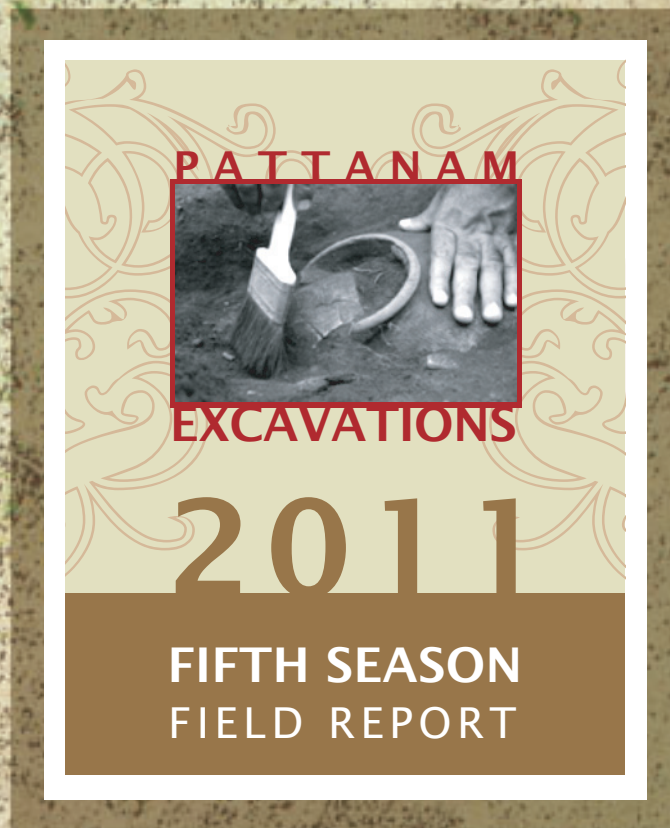


PATTANAM ARCHAEOLOGICAL RESEARCH



*Multi-disciplinary research with
cutting edge technological support*



Kerala Council for Historical Research
Trivandrum, Kerala, India



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Report of the Fifth Season Excavation at Pattanam

P. J. Cherian

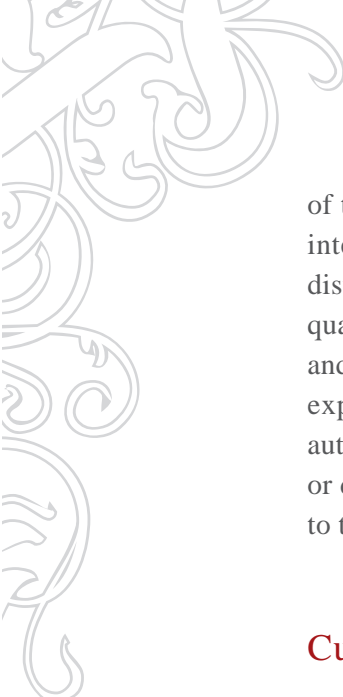
Evidence for urban life with multi-cultural characteristics
Roman and West Asian contacts predominate
Multi-disciplinary research with cutting edge technological support

The fifth season excavations at Pattanam (Ernakulam District, Kerala, India), adds yet another important chapter to the story of the brisk maritime contacts of the South West Coast of India with the Mesopotamian and Mediterranean regions. The substantial quantity of antiquities unearthed at Pattanam tells about a 2000-year-old urban culture with exogenous and indigenous characteristics. Interestingly, the dig did not unearth any structural remnants that match the magnitude of antiquities. This is a report of the multi-disciplinary excavation conducted as part of the Muziris Heritage Project by the Kerala Council for Historical Research (KCHR), in collaboration with the Archaeological Survey of India (ASI) and various institutes and universities inside and outside the nation.

The excavation lasted four months (Feb to May 2011) and ten trenches, including open trenches covering a total area of ca. 250 sq m were dug in three phases. (Phase I: Trenches 28, 29, 30, 31; Phase II: Trenches 32, 33 and Phase III: Trenches 34, 35, 36, 37). The open-trenches were of 10 x 10 m and 9 x 4.5 m dimensions. The excavation method was locus based and Harris Matrix was used to analyze the complex stratigraphic relationships.

One of the major objectives of the season was to study the overseas and regional trade networks that intersected at Pattanam. The exploration of spatial organization of this ancient port town (Muziris) was attempted by laying trenches in the northwestern sector 500 m away from the area where a wharf structure and a ca. 2000-year-old canoe were excavated earlier.

The open-trench method was adopted to ensure maximum exposure of structural features allied to the already known commercial, industrial and maritime contexts of the site. In this season, only a burned clay floor suggestive of prolonged burning activity as of furnace/kiln, two ring wells and a terracotta toilet feature were found - all at the lower levels of the Early Historic layer. The absence of major structures is an intriguing aspect



of this important port site, especially since the artifacts excavated demonstrate wealth and international connections demanding considerable built infrastructure. The intense disturbance of the site partially explains the highly fragmented artifacts, but the huge quantum of rubble; brickbats, iron nails and the roof tile pieces provide no clue as to how and why such disturbance happened. By virtue of its location, the site would have been exposed to coastal and riverine activities; geological opinion however is yet to authenticate any natural calamity or process that might have contributed to its disturbance or destruction. Further, the absence of primary structural contexts or aligned features point to the possibility of effective clearance attributable to later occupations.

Cultural Sequence

The stratigraphic layers and artefactual assemblages broadly validate with some question marks, the cultural sequence suggested in the previous seasons. The stratification of the 4m thick cultural deposit is explained below in the reverse chronological order i.e. in the order archaeological dig proceeds - from modern to ancient.

The upper stratum of about 1m.thickness, with a humus crest, represents the modern period (21st to 17th c CE). The next 2 to 2.5m. is the core stratum of Pattanam, representing the Post (?), Mid (?) and Early-Medieval (?) periods and the Early Historic period (16th c CE to 1st c BCE). Underneath the relatively undisturbed lower levels of Early Historic stratum is the 30 to 50 cm thick sandy layers representing the Early Historic - Iron Age transition (2nd c BCE to 4th c BCE) and Iron Age period (5th c BCE to 10th c BCE).

Stratigraphic differentiation of the medieval layers (16th c CE to 5th c CE) is difficult, primarily due to lack of artefactual evidence. Except for a few medieval roof tiles, no artifacts directly pertaining to this period were found. Natural calamities, commercial slumps or political instabilities could have dwindled the density of occupation or even led to long interludes of desertions during medieval period. If so, the probability is that, Pattanam is predominantly an Early Historic commercial site which gradually declined after the "glitter and glory" of the Muziris phase.

Major Finds

The voluminous quantity of antiquities unearthed at Pattanam is eloquent about a 2000-year-old polychromatic and polyphonic urban culture. In this season, the antiquity register has 4697 entries. (One entry may have multiple objects of the same kind, provided they are from the same locus, as the case of beads). The select list of finds discussed here does not imply any prioritizing per se. Pattanam continues to be the



paradise of antiquities and suggesting hierarchies prior to post-excavation analyses would be premature.

Beads : The bead assemblage consists of glass (5758 nos.), semi-precious stone (128) and terracotta (10) beads. The fascinating range of semi-precious stone beads includes beryl, carnelian, quartz, agate, amethyst, quartz crystal, chalcedony and onyx. Beryl beads are the largest group followed by carnelian beads. Pattanam seems to have had extensive lapidary workshops since a large quantity of raw material, chips and rough-outs were found across the trenches. Cameo blanks excavated ('sthaanika mudra') were more than in the previous seasons. Parts of stone moulds (4) probably used for making beads and rings are other interesting finds of the season. This season also produced other stone objects like broken saddle querns, pestles and work stones.

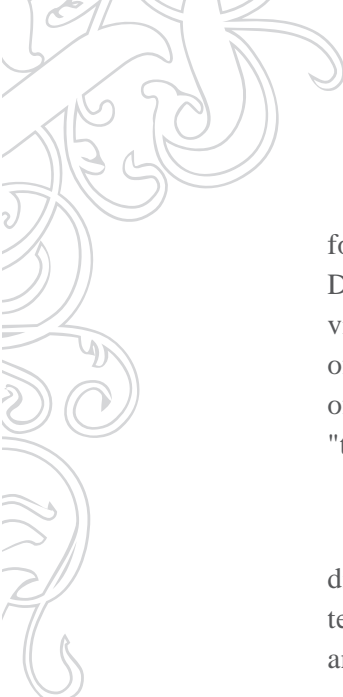
Metals : Another dominant antiquity assemblage is iron nails. 1805 nails were recovered this season. Most of them have thick rust and soil encrustations. Other metal objects include copper nails, lead scrolls and fragments of unidentified objects made of iron, copper and lead. A gold ring and minute bits of gold were also recovered. Intense metallurgical activities are indicated by the presence of crucibles and substantial quantity of iron slag. A crucible with a stirrer was another remarkable find.

Glass : 400 glass fragments were recovered and this is so far the largest number reported from Pattanam. Along with the fragments of pillared Roman bowls, this season produced fragments of beautifully painted glass and a few of mosaic variety. This season also produced black and white moulded glass gaming counters, used for board games. Finger ring stones or pendants made of glass were excavated this season for the first time.

Coins : Of the twenty two copper coins excavated, nine are early Chera coins with the typical symbols of elephant, bow and arrow. Interestingly, in all the five seasons, Roman coins were marking their presence at Pattanam with striking absence.

Pottery : Pottery assemblage is broadly classified into local pottery and special ceramics.

The local pottery sherds amounted to nearly 9 lakh (894,085) which include body sherds (735,114), rim sherds (144,044), impressed/ grooved/ decorated (14,016), edge ground (534), perforated (92), graffiti (17), spout (8), handle (45), base (132) and organic impressed (83). The small and medium sized terracotta bowls from the Early Historic layers seem to be the dominant local pottery. Cooking vessels were few if one goes by the presence of soot particles on them. Dr V. Selvakumar (Tamil University) and Dr K. Krishnan (M.S. University) are studying different aspects of local pottery.




This season produced two sherds with post firing Brahmi letters. The five letters found on the rim of a local pot were deciphered as "a" "ma" "na" "tai"(?). According to Dr. Iravatham Mahadevan, "a ma na" meaning Jaina, is derived from Sanskrit Sramana via Prakrit Samana and Tamil Camana and the discovery is an evidence for the presence of Jainism on the west coast of India at least from the 2nd c CE. The stratigraphic context of the rim is in agreement with the above assumption. The second sherd was read as "ta" "ta". A few graffiti marked potsherds were also gathered from the pottery yard.

The terracotta objects of this season include lamps, spindle whorls, toy wheels, discs (with and without perforation), hopscotches, oven knobs and stoppers. Two terracotta objects of special interest are a vase base with moulded design of an animal and another with a swastika symbol.

The special ceramics include fine or distinct pottery- Indian or foreign and some unidentified types. The special ceramic assemblage comprises the Mediterranean (Roman) pottery- which includes amphora (2779) and terra sigillata (111), and the West Asian which includes torpedo jar sherds (1986) and Turquoise Glazed Pottery (861). The others in this category are Indian Rouletted Ware (3410), Pattanam Ware (186), Black and Red Ware (125), Chinese Ceramics (66) and a host of unidentified fine wares (37,650). The ceramic expert from British Museum, Dr. Roberta Tomber who was with the team for three weeks, analysed the Mediterranean assemblage of the 2010 and 2011 seasons. According to her, "The large quantities of amphorae, particularly intact from the 2011 excavations, reinforce the picture previously obtained, of a peak of Roman contact during the later first century BCE and first century CE, although some sherds continue into at least the second century CE. The only Late Roman (fifth/sixth) transport amphora so far identified at Pattanam, the Aqaba (ancient Aila) amphora also occurred."

Dr. Tomber adds, "The broad range of Mediterranean amphora sources, particularly South Italy, had already been recorded in the earlier seasons. New to the 2010 assemblage is the flat-bottomed Gaulish (French) wine amphora represented by a grooved handle and a number of body sherds. The handle can belong to a number of different rim variants, the earliest of which may date from c. 40 BCE, but the majority and the most widely exported shapes date between CE 50 and the end of the third century."

This season produced 111 sherds of Italian terra sigillata including some diagnostic types such as rim, base and stamped sherds. One base had a stamp of three letters 'VIL' probably part of a potter's mark; a three lettered stamp mark 'CAH' was found in the Alagankulam excavations. Though the 122 terra sigillata sherds recovered in the last five seasons may not look impressive when compared to the ca. 6000 amphorae sherds, they are the largest quantity of terra sigillata ever recovered from an Indian port site. Two other Indian sites, both on the Tamil Nadu Coast, had produced terra sigillata; Alagankulam (3 sherds) and Arikamedu (88).



Dr. Tomber says "The terra sigillata ware belongs to the finer spectrum of Roman pottery and was originally covered in a glossy red surface produced from fine clay (slip) and used at the table for the serving and consumption of food. Therefore, it serves a different function than the numerous Roman amphorae that were used for the long-distance transport of foodstuffs. Two main sigillata shapes are present, large shallow platters and small cups for drinking. Further study of the Pattanam sherds will provide details on the forms, their date and where they came from, but generally speaking they appear to belong mostly to the late first century BCE and the early first century CE."

The West Asian ceramic expert Dr. Derek Kennet of the Durham University, UK is studying the assemblage of buff, blue and green glazed Parthian/Sassanian ceramics (Turquoise Glazed Pottery) and torpedo jar sherds. The nature of distribution of torpedo jar fragments and their occurrence in large quantity this season suggests the strong commercial links of Pattanam with the West Asian region probably even before and beyond the Roman phase.

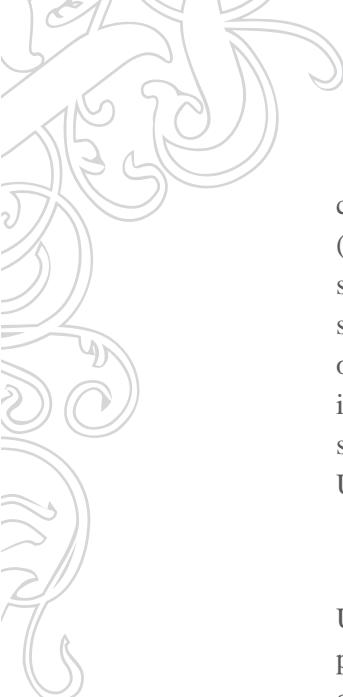
The Indian Rouletted Ware (IRW) with a record number this season will help to understand the Indian Ocean trade dynamics, which contributed to the development of long distance maritime trade. The occurrence of IRW at the lowest layers of occupation is a pointer to the probable Buddhist and Jain commercial links of Pattanam. The study of IRW assemblage by Dr. Peter Magee of Bryn Mawr College, USA, can give insights into the urban character of peninsular India and its role in long distance trade in the Early Historic period.

Archaeo-botanical research

The University of Oxford conducted the second season of archaeo-botanical research in the 2011 season. Mr. Andrew Blair (Durham University) collected samples from the sediments of each locus employing flotation and wet sieving methods. A total of 176 sediment samples and five wet samples were collected. Dr. Nicole Boivin, Principal Investigator, Sea Link Project (Oxford University) and Dr. Dorian Fuller (UCL, UK) would study these samples at the laboratories of the Oxford University.

Geo-archaeological and geo-physical research

Two researchers from the collaborating Universities of Oxford and Southampton, UK, carried out geo-morphological and geo-physical surveys during the season. As part of the geo-archaeological research, Ms. Anna M. Kotarba-Morley (Oxford University) conducted auguring and geo-morphological surveys to generate geo-archaeological data from the site. This study, designed to complement the archaeological excavations is



crucial in the revisualisation of the ancient landscape and seascape of the Pattanam (Muziris) port site. The survey also aims comparative study of other contemporary port sites in the Red Sea and Indian Ocean rims. The study is expected to aid the generation of scientific data to re-imagine the ancient ports, their infrastructure, capacity and logistics of harbour usages. The data collection was successfully completed and the second stage involves the analysis of geo-sediments; by particle size, magnetic susceptibility and sediment chemistry at the Research Laboratory for Archaeology, History and Art at the University of Oxford.

The geophysical studies conducted by Ms. Carmen Obied, (Southampton University) consisted of magnetometric survey of select areas of the Pattanam site. The primary aim was to identify sub-surface features such as brick walls, hearths, kilns and dumps in order to map the ancient maritime landscape of Pattanam. Magnetometry is highly effective in archaeology since it can detect human processes and interventions that affect the magnetic properties of the soil. The magnetometric surveys have greater significance in Pattanam since they are particularly effective in waterlogged areas. At Pattanam, besides the water logged areas, the locations with possible sub-surface features were scanned using a dual sensor fluxgate gradiometer. The data will be processed at the Digital Archaeology Computing Laboratory at the University of Southampton and contextualized on the topographic survey maps of the Pattanam area. If the Pattanam survey generates positive results, it could become a standard practice for locating potential archaeological spots elsewhere in India.

Anthropocene research

A team of researchers, led by Dr. T. N. Prakash, Centre for Earth Science Studies (CESS), Trivandrum, collected soil samples from the trenches for tracking the anthropocene context of Pattanam. Sediment samples collected at 10cm intervals from the trench baulks will help to locate the anthropocene boundaries. This is also part of a national project by the IISc Bangalore, to study the anthropocene horizon of different parts of the country. Thanks are due to the Director, CESS, for making available Total Station Survey equipments for field studies at Pattanam.

Digital database

The sheer quantity and variety of material data, multi-disciplinary data fields, excavation reports, laboratory reports, photo/video and drawing documentations, confirmatory and speculative data, comparative data from other sites and a host of other information fields have exposed the limitations of the traditional registries and modes of documentation in archaeology research. Therefore, this season, an effort was made to

develop a digital solution to store and manage the archaeological data. Thanks to the voluntary support of IT consultants Mr. Deepak P. (IBM, Bangalore) and Mr. Salil G. K. (Bangalore), the first phase of digital solution could be successfully completed. Presently, under their guidance, two KCHR interns, Mr. Paul Thomas and Mr. Nevil Joe Baby (Model Engineering College, Cochin) are working to develop an application to automate Harris Matrix based recordings during excavations.

Green Archaeology

As part of the community archaeology initiative and heritage management concerns, the team promoted the use of bicycles in the village. The bicycles donated to the green archaeology by the KCHR well-wishers and Pattanam friends (see appended list) were gifted to the Pattanam villagers to promote the cause of the eco-friendly Muziris Heritage zone. This ongoing initiative hopes to convert Pattanam into a village of bicyclers proudly guarding the environment of a potential world heritage site. Please feel free to donate a bicycle to green archaeology if you are yet to. (kchrtvm@gmail.com)

Loss of a loyal hand

Kesavan, one of the local workers assisting the Pattanam excavations, died of heart attack on the early hours of May 7th. He was with the team ever since the Pattanam excavations began in 2007. He remained with the team though he had better remunerative opportunities elsewhere. He was one of the disciplined and dignified members of the Pattanam team. Kesavan's death has orphaned his children, Ashitha, 12, and Ashith, 6 and his wife, Saraswathi. Like other dalit families in his neighborhood, Kesavan's family too had no insurance or social security. Kesavan Family Fund initiated by KCHR is receiving support from far and near (list of donors appended). If you are yet to donate, you are welcome. (kchrtvm@gmail.com)

Inter University Centre for Material Culture Studies

On March 28th 2011 Hon. Minister, Jos Thettayil inaugurated the Inter University Centre for Material Culture Studies at Sree Sanakaracharya University, Kalady in a meeting presided by Dr J Prasad, Vice Chancellor, Sree Sanakaracharya University. The keynote address was delivered by Dr. P. J. Cherian, Director, KCHR. The Centre, a joint venture by the University and the KCHR would be a multi and inter disciplinary centre for archaeology, archaeo-sciences, heritage management and museum studies. The Centre would transform the academic impact of Pattanam research into opportunities for advanced studies in material culture.

Yoga Sessions

In archaeological excavations, team work and multi-tasking are more the norm than exception. It involves disciplined labour, coordination, documentation, conservation, storing etc, all to be done with care and precision. Lacking team culture and dedication could be disastrous. The yoga sessions helped the team to focus and work in harmony. Working days began at 6 am with a yoga session that lasted 45 minutes. Our sincere thanks are due to Brig. (Rtd) T Radhakrishnan who equipped us physically and mentally for the demanding tasks of the long day.

Research Team

P. J. Cherian (KCHR) - the Director, Co-directors - Dr. M. Nambirajan (ASI), Dr. K. P. Shajan (KCHR), Dr. V. Selvakumar (Tamil Univ.) and Dr. K. Rajan (Univ. of Pondicherry). Ceramic expert - Dr Roberta Tomber, (British Museum), Antiquity Registrar - Dr. Preeta Nayar (KCHR), Field work and documentation supervisors - Madhavi K. (Mar Thoma College, Perumbavur), and Dineesh Krishnan (KCHR). Trench supervisors - Sarath Chandra Babu (KCHR), Ajesh Krishnan (ASI), Vijimol P. K. (KCHR), Jaseera Majeed (KCHR), Andrew Blair (Durham Uni), Remya K. (KCHR), K. P. Rajesh (KCHR) and Rajeswari (Tamil Uni.). Pottery yard researchers - Vasudevan K. (KCHR), Metilda M. (Tamil Uni.), Kalaiselvi J. (Tamil Uni.), M. Valentina (Tamil Uni.) and Rejitha Santhosh. Archaeo-botanical research- Andrew Blair (Durham University) Bandari Saidulu (KCHR) and Barandaman (Tamil Uni). Visual documentation research - Prasanth Mohan, Survey and trench layout - L. R. Rakes (ASI). Section drawings by Bandari Saidulu (KCHR), Geo-archaeological survey - Anna Morley Kotarba (Oxford Uni.), Geo-physical survey - Carmen Obied (Southampton Uni.). Digital database research - P. Deepak, (IBM, Bangalore) and G. K. Salil (Bangalore). KCHR staff - T P Sivanandan, Sunanda Nair, Dineesh Krishnan, K. P. Rajesh, Sreekumari B., Dileep Kumar B. and J. Santhosh shared multiple responsibilities of finance, co-ordination, accounting, storage, data entry, food and logistics. Students from various foreign and Indian Universities participated in the excavations as interns. Select number of school and college students were imparted training as part of the Field Archaeology School.



Green Archeology - List of donors

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Dr. Roberta Tomber, UK

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Shri. Ravishankar, Chennai	₹ 10,000.00
SBSS Trust, New Delhi	₹ 9,200.00
Ms. Thresy Vallikkapen, Norway	₹ 8,198.45
Prof. K. N. Panikkar, Chairman, KCHR	₹ 5,000.00
Ms. Narayani Harigovind, New Delhi	₹ 5,000.00
Prof. Periasamy N, Mumbai	₹ 5,000.00
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Dr. Derek Kennet, Durham University, UK	₹ 3,000.00
Dr. Kesavan Veluthat, DU, New Delhi	₹ 2,501.00
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A well-wisher	₹ 500.00
KCHR Director, Staff & Researchers	₹ 19,114.00
Co-workers of Kesavan	₹ 2,775.00

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ABSTRACT OF RESEARCH PAPERS

Conference of the International Association for Asian Heritage, Colombo, Sri Lanka

Pattanam research team attended the first conference of the International Association for Asian Heritage during the second week of April 2011 at Colombo, Sri Lanka and presented sixteen papers in a session on Pattanam excavations and Indian Ocean exchanges. The team also undertook study tours to some important archaeological sites of Sri Lanka.

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- 12.** Geo-archaeology of central Kerala coast and the site formation at Pattanam (Muziris), Shajan K P et al.
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The maritime spice route that linked peninsular India with West Asia, Red Sea and Mediterranean rims; new archaeological evidence from Pattanam (Muziris)

P.J. Cherian# , K.P. Shajan# , V. Selvakumar+ , M. Nambirajan^ , K. Rajan* , Preeta Nayar#

Kerala Council for Historical Research + Tamil University, ^ Archaeological Survey of India, Thrissur Circle , * Pondicherry University

The paper attempts

- a) To discuss the evidence on the Early Historic exchanges between India and the Mediterranean world, with Muziris and Berenike ports as reference points.
- b) To interrogate some of the existing perspectives on the Indian Ocean exchanges, sources and to generate new questions.
- c) To situate Indian Ocean exchanges and local/regional trade networks, prior to and after the Roman peak phase at Pattanam, in the light of the new archaeological evidence.

Indian Ocean Exchanges and the Greek – Latin Sources, Restricted accessibility to sources and the unavailability of alternative sources led to the domination of Euro-centric perspective on Indian Ocean exchanges.

The story of the ‘discovery’ of monsoon winds in 45 AD attributed to Hippalus (in some sources 47 AD) demands critical interrogation. The paper attempts to argue that the ‘discovery’ was a possible construct – to register the flourish of Roman trade. Consequently, the multiple stake holders and their contributions to the existed maritime knowledge that facilitated the mid-ocean routes were dismissed or sidelined. The Hippalus story could have later become a myth for the legitimation of the imperial/dominant processes. The context that makes the Greek- Roman sources vociferous on the Hippalus discovery of Monsoon winds needs to be looked at afresh.

Major trade goods transacted between Berenike on the Red Sea Coast and Pattanam identified as Muziris on South West Coast of India. Items exported from Berenike were frankincense, myrrh, ivory, tortoise shells, cassia, cloth, aloe, robes, cloaks, flint glass, myrrhine (travertine), coral, copper, sheets of soft copper, tin, gold, olive oil and wine. They were procured from Mediterranean region and Africa.

Items exported from India included Malabar spices like black pepper, cardamom, costus, bellium, lykion, nard, malabathrom etc. luxury items like pearls, gems, glass and semiprecious-stone beads, cameo blanks, textiles and forest goods like teak, ivory, medicinal herbs and tortoise shells etc.

Black pepper, which was the high profile commodity, has been unearthed in substantial quantity from Berenike. In 1999, 7.55 kg of black pepper corn was found buried in the courtyard floor /storeroom of the 1st century AD Serapis temple trench at the Berenike site. All excavation seasons have produced pepper in varying quantities.

Coconut husks were found in the early Roman layers of Berenika site. In all probability coconut could have been a dietary item in the mid ocean trade routes. Other food items with Malabar Coast links found at Berenike were *moong* beans (golden / green gram), *amla* or Indian gooseberry and sesame seeds.

Indian ceramics like fine tableware, coarse kitchenware, large storage and shipment jars etc. were also found in large quantity at Berenike (Begley and Tomber 1999). Presence of Indian pottery sherds in the Berenike - Coptos route implies that Indians could have travelled to Alexandria along with trade goods.

Though cotton textiles were recovered at Berenike and Myos Hormos there is no clue to their provenance. A large number of ostraca - pottery sherds used as scribbling pads-with Brahmi scripts were found at Berenike. The deciphered ostraca had scribbles mostly related to accounts and water distribution. The inscriptions in Tamil Brahmi and Prakrit emphasise the Indian presence at Berenike. They were mostly names, probably of lucrative traders.

Teak was another important Malabar product found in large quantities at Berenike pointing to the intensity of Malabar connection. Teak logs had holes and nails indicative of probable use in ship making or repair and multiple reuses. Another South Indian item recovered from Berenike was sandal wood.

Bamboo matting similar to those used in the Malabar Coast was found in both early and late Roman layers. One conspicuous absence at Berenike is that of South Indian coins.

Pattanam Finds and Features- Pattanam located in the Periyar Delta 25 km north of Cochin. The word Pattanam has ancient origins and means port city, presently a land locked rural hamlet. Water bodies surround Pattanam and geological studies have identified paleo channels crisscrossing the area.

The following features of Pattanam site would be discussed :- a, Maritime b, Urban c, Commercial – artifacts of external and regional links and d, Industrial

Excavation in the densely populated Pattanam site: challenges and responses

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The Pattanam site represents one of the major archaeological discoveries of the past several decades and vouches for the unparalleled role of Malabar Coast in early Indian Ocean trade. Pattanam seems to be an integral part of the legendary port of Muziris, the ever-elusive ancient port site on the South Western Coast of India. The multi-cultural character of the site pronounces its potential to be a world heritage site.

This paper discusses the challenges involved in undertaking archaeological research in a thickly populated site as well as in a socio-academic context where there were hardly any excavations worth referring to in the recent past.

Digging at Pattanam was a huge challenge since the village – especially the archaeologically potential area- is a densely populated one. Most residents are either small-scale landowners with little land to spare or are unwilling to lease out their land for excavation. They had a fear that there would be forceful eviction especially if the excavations brought out anything archaeologically significant.

This fear originated and perpetuated since the colonial times was instrumental for the effective destruction of the archaeological sites in the state. This fear like the phantom pain is hard to overcome. All social groups seem to have contributed to this ‘fear’ which indirectly ensured the doom of the archaeological wealth.

The KCHR had to develop some strategies to alleviate this fear of the ‘forceful takeover by government’. House visits and one to one interactions by excavation team members, circulation of signed letters from the KCHR and excavation officials, efforts of mediation through local self government leaders, revenue officials, interventions of the legislative assembly member and a cabinet minister etc were some of them.

Offer of a respectable rent for excavation, compensation for agricultural damages and the offer of market price for gold or costly metals excavated, refilling of excavation pits etc were the commitments made. The Ancient Monuments and Archaeological Sites and Remains Act of 1958, a law aimed to preserve monuments of national importance, provides for compensation to the lands acquired or used for excavation. Section 27 of the Act says: “Any owner or occupier of land who has sustained any loss or damage or any diminution of profits from the land by reason of any entry on, or excavations in, such land or the exercise of any other power conferred by this Act shall be paid compensation by the Central Government for such loss, damage or diminution of profits.”

Another policy was to purchase land at a liberal rate fixed by the revenue department. Unfortunately, even those who were half-heartedly willing to sell their land, found the ‘liberal price’ not so liberal.

This paper further discusses the people centred heritage conservation efforts at Pattanam. Large-scale horticulture—with the participation of the local women power is being proposed. Besides the eco sensitive preservation of the site, this may ensure a means of subsistence for the villagers. The recently launched ‘Green Archaeology’ initiative hopes to convert Pattanam into a village of bicycle users, with the objective of making it an eco-friendly and heritage-friendly site. Green Archaeology hopes to provide the villagers free bicycles gifted by friends and well-wishers, on a need come merit basis. These initiatives can make the people of Pattanam stakeholders and guardians of the site rather than feeling the threat of forceful eviction.

Digital documentation of Excavation Data : Pattanam Archaeological Research

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Extended Abstract

Archeological Research is often found to be heavy on reasoning prowess and could be significantly aided by data intensive analyses. Excavations provide archeological researchers with material objects and features that serve to imagine and reconstruct the past. When such hypotheses are put together to draw up the life and times of our ancestors, disagreements between various hypotheses often arise; upon such circumstances, researchers need to go back to the evidences to critically examine and refine their positions. Consider the case of discovery of some remains of a structure that seems to have characteristics of either a ship or a farmhouse. The absence of any evidence of a water body in the premises could be used to weaken the hypothesis that the remains were those of a ship and strengthen the farmhouse assumption. Digitized documentation of the remains could help speed up this such hypothesis framing and decision making. A decision support system to enable and ease such research should hence be able to provide real-time data dicing capabilities and provide insightful analyses of various subsets of data chosen (according the users' interests). Coming back to our example, based on the knowledge that pebble like round stones are found close to water bodies, the researcher should be able to query the database to find the number of such artifacts that were found close to the remains in question. If the number of such pebbles (or round stones) are found to be not as abundant as expected close to a water body, the researcher could focus more on the farmhouse hypothesis. In this paper, we focus on our experiences towards building a digital database of archeological findings that would aid such analysis. The assemblage of artifacts which are often too fragmentary and disconnected, demands corroborations and permutation combination analysis which could be achieved through a well conceived digital data base. It can contribute towards scientific sketching of the lost past.

Documenting archeological data digitally is often a challenging task. This is so due to various factors such as heterogeneity of data types, possibilities of

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error in data entry and due to the nature of incremental build up of artifact metadata. Often data is recorded in Microsoft Excel spreadsheets. Instead, in the 2011 Season of Pattanam Excavations, we switched to a software that is custom-built for data entry. We now outline our considerations in moving towards such a method (contrasting it with conventional Excel spreadsheet style data entry).

Error Free Data Entry: Consider two trenches *1* and *2* that have *2* and *3* loci respectively. However, an artifact could be mistakenly labeled as belonging to *locus:3 in trench:1* (whereas trench *1* is known to have only *2* loci). Such errors are less likely to be detected by the data entry operator who has limited knowledge about the excavation trenches. These errors, obviously, could easily propagate to the Excel sheet too; due to the absence of any sophisticated error checking mechanism. However, in the custom built software that we have developed, there are provisions to incorporate such domain knowledge about trenches and loci; such knowledge is used by the software to disallow entry of such erroneous data.

Canonicalization: The same artifact may be casually referred to, by different names. As an example, *broken glass bead* and *broken bead of glass* could be used interchangeably. Canonicalization is important so that artifacts that are referred to by either of these entities are identified to be the same, this is obviously important while performing deep analysis on the data. In our software, we include a dictionary (presented as a droplist) of canonical artifact type names with provisions to choose from among them during data entry; this decreases the likelihood of minor variations in type names from passing off as different types. It may be noted that such dictionary based selection of artifact types cannot be incorporated in Excel.

Parallelization of Data Entry: The software solution for data entry is web-based and can be accessed by any server on the network. In large excavation sites, this aids parallelization of the data entry process enabling multiple users to enter the data from different terminals at the same time.

Easy Updating: When an artifact such as a bangle is found, some details are recorded in the *Tally Sheet* that is filled up at the excavation site on a day to day basis. However, certain finer details (e.g., width of the bangle, diameter etc) are recorded only at a later time since such measurements are taken within facilities that have equipment to record accurate measurements. In an Excel based data entry system, when more details including laboratory/expert analyses are available at a later date, the corresponding record has to be found from among the many records available and then updated. This is cumbersome and error prone and could be easily avoided in a software solution that allows for efficient search. We enable such functionality by providing multiple ways to search through artifact records and drill down to the one in question, making the updating easy and almost error free.

Seamless Linkage of Heterogeneous Data Sources: Artifacts, in addition to being described by their various attributes such as type, shape and color, often have an accompanying photograph and/or an illustration. In a software solution, we provide with functionality to view all attributes pertaining to

an artifact together, in a single page. Such linking with data sources such as photograph files is obviously beyond the scope of a spreadsheet software such as Excel.

In this paper, we describe how the aforementioned features have been enabled in our software, with illustrative screenshots that describe functionalities of interest. We also cover our experiences in building such a software with the hope that it would contribute towards compiling a set of replicable models for digital documentation of archeological data.

The Industrial Context of Pattanam and Trench PT XVI, 2010 Season

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Pattanam site today is widely recognized as one of the major archaeological sites in South Asia. The site poses number of challenges in understanding the complexities of life in an ancient port site, generally agreed to be the legendary port of *Muziris*. This paper attempts to introduce Pattanam through the experiences of digging trench XVI (N 10⁰ 09' 24.4" E 076⁰ 12' 32.7") in the 2010 season. The locus based excavation methodology attempts to make sense of human activity in each locus and Harris matrix helps to establish the relationships among loci as well as refine the cultural sequence.

The site seems to have been active from 1000BC to 1000 AD of which except in the Iron Age period the commercial character was an integral part of it. This paper poses the question what was the industrial character of the site as well as its role in making the port site an epicenter of trade in the early historic period. This paper proposes to discuss the important finds in relation to its possible industrial activity. The major activities suggested are brick and tile manufacturing, lapidary workshop and metal working. The paper will discuss the kiln or furnace context excavated in the trench PT XVI.

The major feature from this trench was the remains of kiln like feature or the structure found in the north eastern corner of the trench. This could be a furnace or an area that could have been used for continuous firing activity. It was constructed with clay and by the later activity it was burned for industrial purposes. It had two features; the vertically aligned portion, which was in primary context and a rammed brick or mud like feature, which was in secondary context, probably for strengthening the vertical area. None of the finds from the locus or nearby loci was helpful in identifying its function. However, from the burned clay context we can assume that this area could have been used for some kind of regular burning activity with high degree of firing. This can be a pointer to the possibility of the manufacturing activity at the site for a long time. For the last five seasons, Pattanam produces the wastages, debitage, flakes, etc of different semi precious stones, glass, terracotta crucibles and various context of ashy patches and charred soil, the concentration of charcoal etc. These evidences seem to have shown the possibility of the industrial activities in the site. Interestingly, all these evidences were, unearthed in the early historic contexts.

Architectural features of Pattanam site with special reference to terracotta roof tiles

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One of the fascinating features of Pattanam archaeological site is its architectural remains. This paper attempts to discuss the terracotta roof tiles of Pattanam in the backdrop of its architectural features.

Pattanam has a four-meter thick cultural deposit with habitation evidence for about three thousand years BP. The sediment debris layers give the impression that the site was more or less in continuous use and therefore considerably destroyed. Very few artifacts are recovered from the primary context, the possible exceptions being the architectural remains.

The architectural features at Pattanam are either residential or commercial in character. The paper will discuss various aspects of the architecture and more specifically would contextualize the terracotta roof tiles. The roof tiles and probably iron nails are the two important evidence categories for understanding the nature of superstructure of the architectural remains. The rest of the building materials being made of perishable items could have been lost forever.

The paper would discuss the three types of tiles, namely, Early Historic triple grooved tiles, medieval tiles (*kambod/koorayod* in Malayalam) and ridge tiles and their contexts. A corner tile with an animal face (?) was a unique find.

Archaeological features of Pattanam with special reference to Trench PT10 XIX, 2010 season

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Pattanam is a multicultural site situated on the west coast of South India. A hamlet within Vadakkekara village in Chittatukara Panchayat, it lies 1.5 km northwest of North Paravur in Ernakulam District of Kerala ($76^{\circ}10'$ E, $10^{\circ}10'$ N), near the southern edge of the Periyar delta.

This paper attempts to highlight the importance of archaeological features of Pattanam site with special reference to those from Trench PT10 XIX, 2010 season. The artefacts and features were uncovered employing locus based methodology which differentiated activity areas on the basis of difference in sediments and their contents.

Trench PT10 XIX (7 m NS and 4 m WE) was laid on the south-western portion of the plot of Mrs. Valsala Kumari (Survey No: 222/9 A 1), locally known as Padamadathil. This trench located in close proximity of a temple water tank/pond on its south was characterised by its highly disturbed nature.

Understanding disturbed contexts is as important as undisturbed contexts in throwing light on the complete history of a site and it is in this context that Trench PT10 XIX assumes importance because of its variety and intensity of disturbance. Pits were the major feature of disturbance followed by dumps. Pits could be observed from modern layers to medieval layers, sometimes cutting into early historic layers. They could be attributed to different activities - from removal of tree stumps and garbage disposal to water storage for industrial/agricultural purposes and even treasure hunting. Antiquities, ceramics and architectural debris of various periods are often found mixed up which underline the severity of disturbance.

While water storage areas were characterised by sandy gravel patches running across the trench on the eastern and western sides, the two major dumping areas were indicated by dark patches of clayey sediment on the northeast and on the southeast of the trench. Brickbats, potsherds of local and foreign origin (with soot indicating periodic burning) and artefacts of different nature were observed in the latter. Abandonment of either an activity or its location was also indicated from the large number of complete micro beads and frankincense from these dumping areas. Similar features appearing in the adjacent PT10 XVIII makes this area of the site interesting.

The intensity and nature of these disturbances pose interesting questions as to the various activities at the site and also their relationship with each other. The findings from Trench PT10 XIX clearly reflect the urban nature of the Pattanam site and its overseas trade relations through its artefacts. The evidence from Pattanam points to a continuous occupation of the site from Iron Age to the Modern times with yet to be confirmed gaps

or desertion of the site. Pits, dumps and their associated finds from this trench assume importance in this background as they could be reflections of the intense and continuous (?) utilisation of land, right from Iron Age and thus become an important source to understand the land use pattern at the site of Pattanam.

Pattanam (Muziris?) excavations - A port town on the Malabar Coast; A few observations

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The Pattanam excavations undertaken from 2007 by KCHR in collaboration with the Archaeological Survey of India are important in the early history of South India and the East –West exchanges in the Indian Ocean rim. The excavations at Pattanam yielded a wide variety of archaeological evidence for maritime trade contacts. Until the discovery of the site, the role of the Malabar Coast in the Early Historic trade network was understood only on the basis of detailed references in the Sangam Literature, Periplus, works of Pliny (Natural History), Ptolemy (Geographia)) etc and a few Roman coin-hoards found in Kerala. While several Indo-Roman sites have been investigated on the East Coast, the researches done in Malabar Coast did not yield any significant results.

Pattanam is a small village located in Chittatukara Panchayat – Vadakkekara village, lying between Kodungallur and North Paravur in the Periyar delta, about 25 km north of Ernakulam/Kochi. The Arabian Sea is about 4 km west of the site. Since 19th century onwards, the Muziris has been considered as located somewhere near Kodungallur or Cranganur. The scholars like Anujan Achchan, K.V.Raman etc. conducted investigations in the area. Shajan in 1998 located the Pattanam site, which is under excavation. Subsequently, the site was investigated by a group of researchers and a hypothesis, that it could be the location of ancient Muziris, was put forth. Since 2006 the site is being subjected to excavations.

An early phase of 'urbanization' is evident from the burnt bricks, clay floors, triple grooved roof tiles, storage jars, ring well and fine pottery. Mainly it is pottery that indicates foreign contacts. The wharf gives further clue to the maritime association of the site. Apart from these features, its urban and maritime characteristics are also significant and are discussed in this presentation.

The enormous amount of artifacts recovered from excavations, unique features of the site and the location significance in relation to the palaeo coastline and water bodies suggest that Pattanam could have been part of the ancient port of Muziris. Still there are certain questions which require convincing answers. More research and evidences are necessary to understand the context of this early historic settlement and before anything could be said of this site being Muziris.

Photographing built monuments & excavation data; An experience sharing in heritage conservation

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The paper would discuss the role of photography in documenting architectural and archaeological resources. It hopes to explain how photographic documentation can be a helping tool in heritage conservation.

The springboard of this enquiry is the authors' experience in the photographic documentation of built heritages and real-time documentation of the fifth season Pattanam excavation data and activities. The presentation hopes to take you along the authors' experience-trail in order to discuss the new trends and techniques in photography. It also hopes to share some of the techniques that can be adopted in documenting built monuments and excavation contexts.

Visual documentation of excavation data and activities poses a unique set of challenges, which requires imaginative and systematic methods. The paper hopes to discuss the visual documentation methods followed at Pattanam and the integration of photographic data into the digital database of Pattanam archaeological research. Besides locus based photographic documentation of antiquity and special pottery the daily documentation routines include locus photography, feature photography, activity photos, documenting visits, discussions etc. The paper would address the problems of real-time documentation during excavations and the possibilities of betterment.

Bead assemblage from Pattanam Archaeological site, Kerala, India

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Beads, made of glass and stone, are small and beautiful objects with perforations. They are one of the oldest human art forms used as personal adornment, talisman, trade item, symbols and for rituals. The antiquity of bead making can be traced to 82,000 years B.P. as evidenced by the discovery of beads of Nassarius marine shell origin found in the cave at Taforalt in Morocco. The earliest excavated beads happened to be made of organic materials like bone, teeth, ivory, conch shell, ostrich egg shell, pearl and amber. Hard stones had been in vogue around 10000 B.P as vouched by Egyptian civilization.

Bead making in India dates back to the Upper Paleolithic period. Beads made out of semiprecious stones seem to be a common feature in Indus sites. Glass beads started appearing in 6th century BCE. In the Indian sub continent they had become an object of common occurrence since the Early Historic period.

The presence of beads in Iron Age (Megalithic) burial contexts has been reported in peninsular India and Kerala. In the Kerala region none was from habitation or commercial contexts, an archaeological puzzle for long. Excavations conducted at Pattanam during the last five seasons since 2007 have brought out a unique assemblage of beads distributed across the five cultural layers of Pattanam. Beads from Pattanam are mostly made of semi precious stones and glass. Stone beads are mainly of carnelian, chalcedony, agate, amethyst, beryl, garnet and quartz. The transparent, translucent and opaque glass beads are in almost all known shapes and colors. Though the glass beads were recovered in huge quantity the manufacturing wastes are almost nil where as stone bead debitage could be found in large quantity at the site. The paper would attempt to quantify the data in this regard.

Pattanam being identified as an integral part of the legendary port of Muziris, the paper would try to explore the purpose of bead making at the site.

Early Historic hinterland trade in the Tamil Nadu - Kerala region – in the backdrop of the recent excavations at Thandikudi, Porunthal and Pattanam

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The early historic period of peninsular India witnessed proliferation of literary, industrial, trade and commercial activities. The recent archaeological explorations and excavations conducted in Tamil Nadu and Kerala (the ancient Tamilakam) yielded considerable fresh data to understand such activities. The fresh investigations conducted in Amaravathi, Noyyal and Bhavani river valleys in Coimbatore region of Tamil Nadu, the ancient Chera country, met with numerous settlements. These habitation-cum-burial sites were in existence since Iron Age and some of the sites could have transformed as trade centres, industrial centres, port cities, capital cities, etc., during Early Historic times. The location of various trade centres on the trade routes clearly points to this possibility. The semi precious stone bead making industrial centre at Kodumanal, glass bead making centre at Porunthal and Iron and steel workshops at Nichchampalyam were all located close to resource yielding zones. Several sites like Elvamalai and Vempathi in Bhavani river valley; Perur, Vellalur, Sulur, Kaniyampundi and Kodumanal in Noyyal valley and Porunthal, Ravimangalam, Ambilikai, Puliymarattukottai, Kundadam, Kudimangalam, Nedunkur, Karattupalaym and Karur in Amaravathi valley are some of the important archaeological sites that had a greater bearing on the early historic society. Though, many of the sites have not excavated but the landscape of the sites and the surface findings suggests that these sites have close similarities with the excavated ones. The availability of industrial resources like semi-precious stones, iron ores and natural bio-products like pepper, cardamom, ivory, medicinal plants, etc. augmented the trade activities. The western bound trade goods through well established port like Pattanam (Muziris) were, in fact, procured in hinterland trade centres. The enormous demand for oriental goods was adequately met with the resources generated in hinterland production centres. The recent excavations conducted at Thandikudi, Porunthal and Pattanam shed much light on this aspect. The paper would further discuss the emergence of trade routes, trade centres or port cities in the peninsular India.

Pattanam excavations and the advantages of employing Harris Matrix in understanding pits

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Pattanam (N 10 09' 24.1", E 076 12' 32.9") is the first multi-cultural site on the Malabar Coast to yield a plethora of archaeological evidence on the ancient Indian Ocean exchanges, especially on the Roman and the West Asian contacts. The excavations have thrown light on the Iron Age, early historic, early medieval and modern cultural periods. The site mainly exposed sediment and debris layers, pits, and architectural remains. This paper attempts to discuss how Harris matrix method employed in excavations helps in the better understanding of the pits as perceived from the Pattanam experience.

All trenches at Pattanam had pits in one or more layers and naturally yielded artifacts belonging to different cultural periods. The pits are important indicators for the nature of disturbance and researchers approached them mostly for the artifacts in them. Pattanam method of studying pits helped in tracing certain patterns.

This paper will focus on the trench PT10XVII of the fourth season (2010), which unearthed pits in all layers. Mainly three types of pits were found at Pattanam, modern pits, which start at the surface (humus) and ends within the modern layer, medieval pits starting from the modern layers and ending in the medieval layer or sometimes extending beyond it to the early historic layer. Thirdly, the pits originating at the early historic layer either ending in the same layer or cutting through the Iron Age and natural layers.

Pits are complex phenomena and employment of locus based methodology and the Harris-matrix, can help better understanding of their contexts and relationship with other pits. The Harris-matrix system primarily helps to identify the relationship between stratigraphic layers and various loci. Each locus is attempted to be understood in terms of its early, contemporary and later relationship with other loci. A vertical view of Harris matrix chart gives clear picture of how one pit cuts through different layers. If horizontally conceived, it can also illustrate the spatial relationship among various loci. The artifacts recovered from the pits can be attempted to be linked with the relevant loci contexts in the trench. This might help in the distribution analysis and quantification of artifacts. It can give indications on the intensity of disturbance of the site as well. The paper hopes to critically assess the benefits of the locus method and the Harris matrix in a disturbed like Pattanam.

Geo-archaeology of Central Kerala coast and the site formation at Pattanam (Muziris)

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Kerala coast is predominantly an emergent coast, mostly covering with sediments of recent geological origin. Geomorphological evolution of the coast has an important bearing on the settlement history of the area. In this context, it is important to unravel the palaeo-geographical events, like various transgression – regression episodes, formation and stabilization of ancient beach ridges and inland sand dunes and the shifting of the river courses in the area. The coastal landforms are beach ridges, swales and inland sand dunes, intermittently traversed by fluvial and estuarine bodies and floodplain deposits, bordering by the laterite monadnocks to the east. The near coastal features are considered to have evolved during the mid to late Holocene period when the sea level was more or less stabilized and fluxuated close to its present level.

The presence of numerous urn burials of megalithic nature in the interior beach ridges and sand dunes points to the stabilization of the ridges by late Holocene time. Radiocarbon and ceramic studies have fixed the chronology of the coastal site of Pattanam, as one of the most ancient port sites in south India, spanning from 1000 BC. Sedimentological studies of the sandy sediments underlying the cultural strata points to the alternating nature of ancient beach ridges and coastal sand dunes while it was inhabited. The sediment column does not possess evidence of any natural catastrophic events and it is postulated that Pattanam was abandoned in Early Medieval period due to unknown reasons. Petrographical studies of rock samples from the site indicate significant presence of volcanic rocks like Basalt of unknown provenance, probably brought to the site as ballast stones. Geo-archaeology of the coastal areas and the site formation process in relation to the Iron Age and Early Historic layers of Pattanam is discussed here in the light of mid to late Holocene geological and geo-morphological changes happened on the SW coast of India.

Terracotta objects from Pattanam excavations with special reference to spindle-whorls, hop scotches, wheels/discs and lamps

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Pattanam archaeological site can claim uniqueness owing to its huge quantity of potsherds from early historic cultural layers. The 650 square meter area excavated in the last four seasons (from 2007 to 2010) has produced three million body sherds and around two hundred thousand diagnostic sherds.

This paper would discuss four types of terracotta objects -spindle whorls, hop scotches, wheels/discs and lamps and their possible functional context in the ancient port town of Muziris.

In archaeological research, often the artifacts are unilaterally associated with certain activities or life contexts of the male dominated society. Some of the artifacts from Pattanam provide an opportunity to visualize children and women at Pattanam

Spindle whorls used in cloth weaving is indicative of handloom industry and going by the present weaving traditions at Pattanam, probably women might have played a significant role in weaving in the early historic period as well.

Terracotta pieces known as hopscotch made mostly from broken pottery are round in shape. Children have universally used them for the playground game which is also called hopscotch. The other possibility suggested by archaeology researchers is that such objects could have been used as weights.

Terracotta discs/wheels as toys are usual occurrence in habitation contexts and at Pattanam most of the discs seem to have been made out of used pottery and probably they were also used as wheels.

Terracotta lamps have a significant place in both commercial and residential contexts. There were possibly many varieties of them in use at Pattanam. This paper would discuss two types that might have been used for ritualistic or household purposes.

This paper discusses the nature and function of these terracotta objects from the Early historic to the modern period at Pattanam.

Local pottery from Pattanam, Kerala: A report of the 2007 excavations

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Pattanam is an archaeological site located in the Periyar delta of Kerala. This site has evidence for occupation from the Iron Age to the Late Medieval period spanning several hundreds of years. The most important cultural period represented at the site is the Early Historic, when the Indian Ocean trade and exchange were very active in the southern part of India. Until the discovery of this site, the port of ancient Muziris was considered to be at Kodungallur. The identification of the site through the initial surveys of K.P.Shajan and later joint work by the authors (Shajan et al 2004, Selvakumar et al. 2005) highlighted then importance of the site. The excavations conducted at the site by KCHR from 2007 have brought out very important finds from the site (Cherian et al. 2007, 2008, 2009).

The local pottery forms the most abundantly represented material at this site. Several thousands of ceramic sherds were found in the 2007 excavations. They exhibit the various aspects of the socio-cultural life of the resident at the site of Pattanam. The local pottery included containers for day to day use, industrial purpose, architectural materials such as bricks, tiles and ring wells. This paper focuses on the local pottery unearthed from the 2007 season's excavations at Pattanam.

Pottery as a means to study the daily life at Pattanam-an analysis of the decorated pottery

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One of the biggest challenges faced by the researchers at Pattanam excavations is the documentation and classification of the huge quantity of pottery unearthed there.

This paper attempts to discuss the method of pottery documentation and try to contextualise pottery in the daily life at Pattanam. More specifically it would discuss the nature of decorated pottery of Pattanam.

Since the excavation followed the locus based methodology, the sorting too was done accordingly. The biggest challenge of the pottery yard was to classify locus based sherds which numbered in thousands. The four seasons of excavations have produced 3 million body sherds, and 200 thousand rims and decorated sherds. The existing practice of pottery documentation does not consider the local body sherds as an important source of evidence and they are neither documented systematically nor stored for studies. At Pattanam they are systematically documented and preserved.

This paper would discuss the documentation method of local pottery followed at Pattanam. During digging, the trench supervisors sort the pottery into two categories - fine-ware or distinct fabric and coarse-ware or local pottery. The local pottery assemblage would be further classified into three groups, namely, Rim sherds, Body sherds, and those with Decorated, Impressed or Grooved features. Other categories of pottery of special interest to the researcher are those with distinct fabric features and those with graffiti. All these categories are separately weighed, numbered and registered.

The chronology of decorated pottery may be assumed as Early Historic period, since the majority of decorated sherds were from the depth ranging between 200-300 cms. Different techniques were adopted for making the motifs, which can be divided into three - appliqué, incision and stamping. Some decorations were made by using a single technique and some by the combination of all the three. The most common methods used were incision and appliqué, while the stamping method was rare. Some designs are similar to those excavated at Arikamedu site near Pondicherry and a few others have close resemblance to Iron Age pottery.

Bowls seems to be the largest category of pottery found in Pattanam. They might have been inevitable in routine daily life. Such categories of pottery are devoid of decorations. Therefore, it may be logically assumed that the decorated pottery served other social requirements in ritualistic or ceremonial contexts.

Eco-facts of Pattanam archaeological site with special reference to Trench XVIII- 2010 season

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Since culture cannot be understood independent of environment, eco-facts are crucial to any archaeological site. Unfortunately, the survival of eco-facts in archaeological contexts in tropical countries is a rare occurrence. Though located in a tropical coastal region, the Pattanam site especially its water logged contexts are rich in organic materials.

This paper attempts to discuss the nature of eco-facts recovered at Pattanam, more specifically those from trench XVIII of the fourth season (2010).

The water logged contexts of 2007 season produced a plethora of botanical samples which included a wooden canoe made of *Anjili* (*Artocarpus hirsutus*), bollards made of teak wood (*Tectona grandis*) and many other remains such as pepper, cardamom, rice, coconut shell, mango seed, and frankincense.

The recovery of eco-facts at Pattanam was through locus based excavation and flotation methods. The faunal remains recovered included highly fragmented and decayed human bones and four teeth. The botanical remains included charcoal, seeds, cereals, leaves and barks. This paper would focus on the botanical remains of the trench PT XVIII.

An interesting feature of the trench PT XVIII was a feature with 18 wooden pegs of circa 15 to 30 cm length, arranged elliptically in 20 cm intervals at a depth of 4 meter. These wooden pegs were sharpened at one end and the elliptical area where they were pegged had inner and outer layers of thick leaf packing. The activity related to this context could not be identified since no other collaborative evidence was available.

At 4 m depth, this trench produced evidences of peat formation. The peat is a spongy layer of botanical remains deposited over a long period. Going by the inferences of the cultural layers, the peat formation from the Pattanam site appears to be more than 3000 years old since it was found below the Iron Age layers. One interesting feature was the presence of fragments of frankincense in the peat.


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