Archaeological Investigation in and Around Melakarandai, Ettayapuram Taluk, Thoothukudi District, Tamil Nadu

Manikandan G.[1]

[1]. Pt. Deendayal Upadhyaya Institute of Archaeology, Knowledge Park - II, Greater Noida, Uttar Pradesh – 201 310, India (Email: manikandangtuti@gmail.com)

Received: 11 July 2020; Revised: 26 September 2020; Accepted: 03 November 2020
Heritage: Journal of Multidisciplinary Studies in Archaeology 8.2 (2020): 1059-1074

Abstract: *The present work details the cultural remnants in and around Melakarandai village. The major findings of the study are the identification of a habitation site and an iron production area in the study area. The chronology of the finding is not yet clear. At Keelakarandai, evidence for the late medieval cultural period was found which includes Jain sculptures and memorial stones.*

Keywords: Vaippar River, Iron Age, Early Historic Period, Smelting Area, Memorial Stone, Karandai, Tamil Nadu

Introduction

A number of archaeological research works have been carried out in Tamil Nadu before and after independence. Among these, several researches have focused on the southern part of Tamil Nadu (Caldwell 1877; Rea 1901, 1902-3, 1915; Zeuner & Allchin 1956; Gardener & Martingel 1990; Foote 1916; Selvakumar 2001, 2013) which helps to draw the outline of the cultural chronology of the region. The earliest cultural deposits are dated to Late Stone Age, which is popularly known as *Teri* sites, in the sand dune formations of the region (Zeuner and Allchin 1956). The area selected for the present study is located in the eastern coastal region (Figure 1) of Tamil Nadu. In the vicinity of the study area, various cultural materials like microliths, urn burials and a few habitational settlements are known and previously reported (Rajesh 2009; Selvakumar 2009; Manikandan 2016).

The Study Area

Melakarandai village is in Ettayapuram Taluk of Thoothukudi district, Tamil Nadu. It is surrounded by villages like Vembur and Alagapuri in the north, Keelakarandai in the east, Masarpatti in the west and Thappathi in the south. The area has many water bodies such as ponds and streams. The site of Melakaranthai (Rajesh 2017) is in the lower Vaippar River basin, where on 30 archaeological sites have been reported (Figure 2), belonging to the Microlithic till the Early Historical Period (Selvakumar 2008-09; Manikandan 2016; Rajesh 2018).

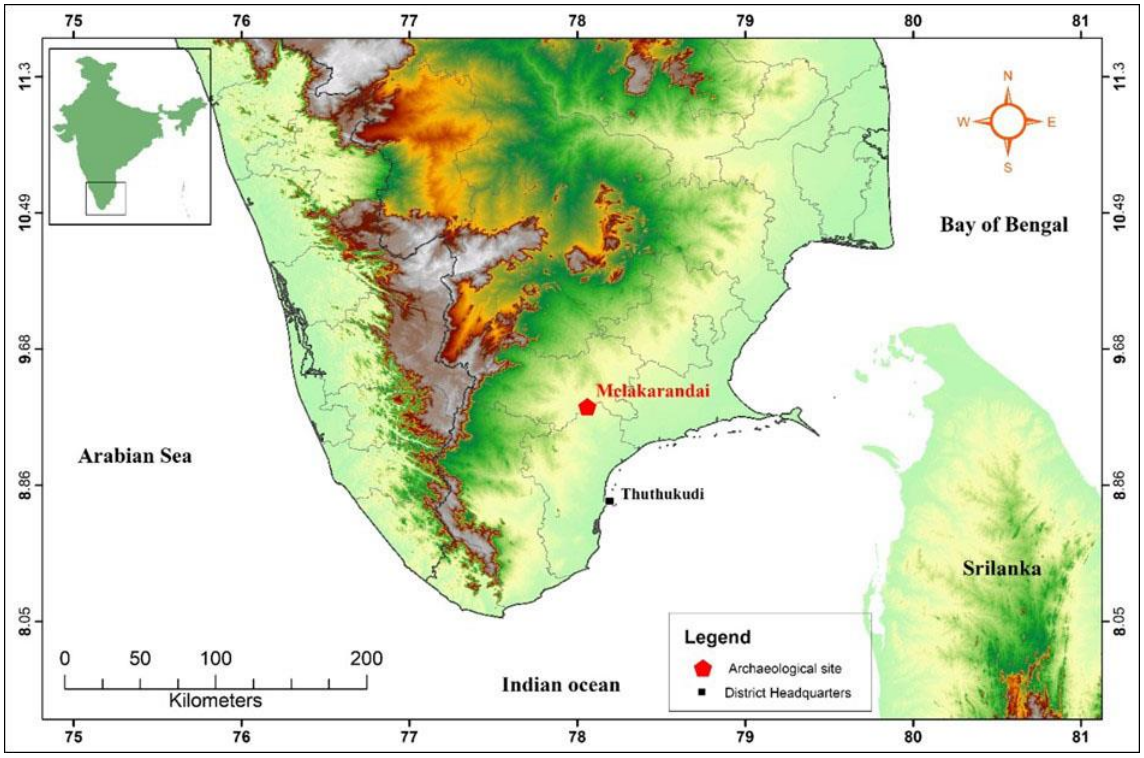

Figure 1 Study area (Courtesy: Manikandan 2020)

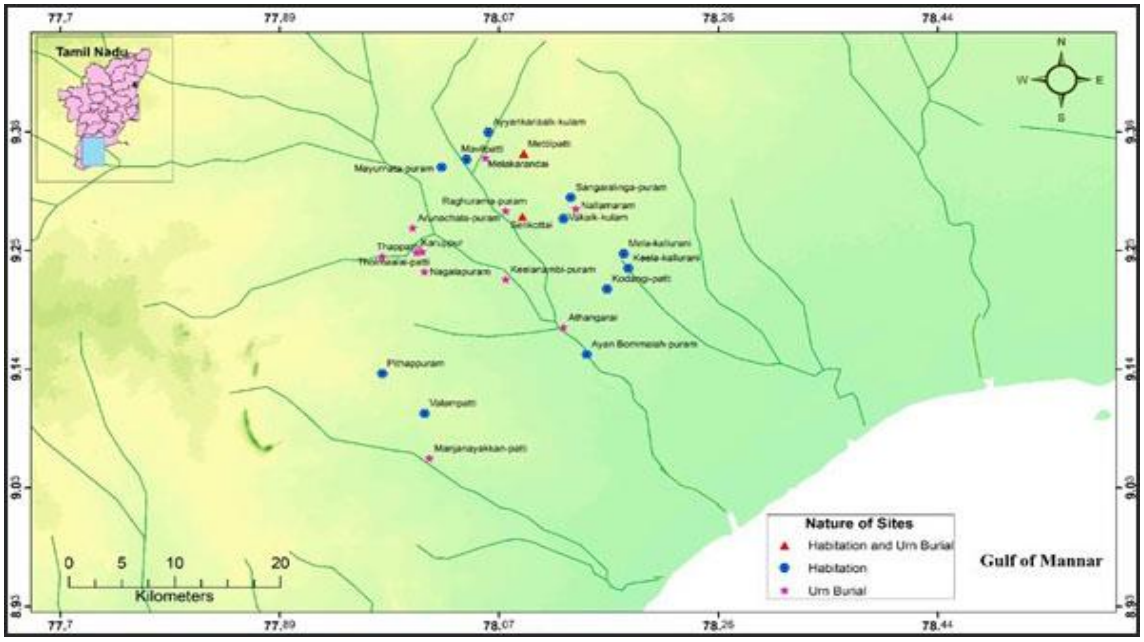

Figure 2: Previously Reported Archaeological Sites on Lower Vaippar River basin (Courtesy: Manikandan 2020)

Physiography

Geographically, Tamil Nadu can be divided into two parts: 1) Upland and South Sahyadri region, 2) The Eastern Coastal plains (Basa, Mohanty and Ota 2015). Thoothukudi district, physiographically, can be further divided into the Chittar Plain,

Kovilpatti Plain, Teri and Coastal zones (Gazetteer 1997). The Vaippar River is a seasonal water source; it originates in the Western Ghats and drains into the Gulf of Mannar (Gazetteer 1997), passing through Melakarandai. Chert is the predominant raw material in Kulattur (Ramachandran 1980:16-29), which might be the reason for the high frequency of chert artefacts from a number of sites in this region (Manikandan 2016). The present study area has a surface cover of black cotton soil, below which is the basement bedrock formation of gneiss rock (Figure 3). The climate presents high humidity and relatively lower to moderate temperatures throughout the year. Rainfall occurs mostly in the months of October, November and December (Survey report 2017).

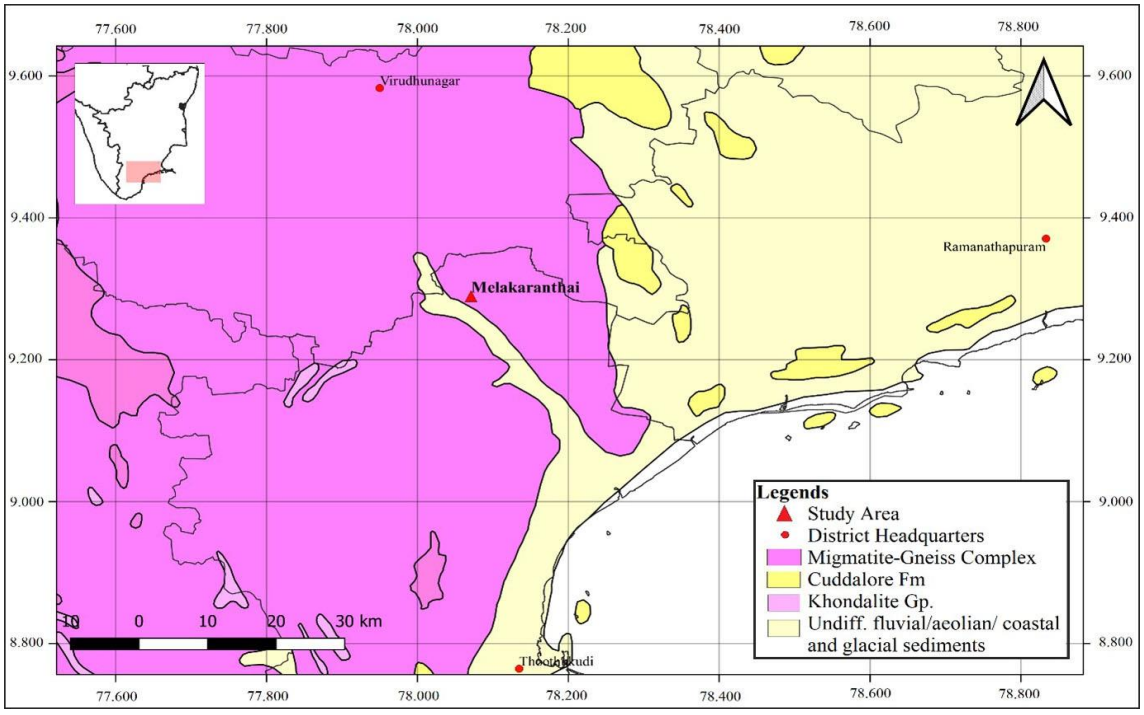

Figure 3: Geological formation (Manikandan 2021)

Archaeological Sites in the Lower Vaippar River Basin

V. Selvakumar (2012) reported several microlithic sites in southern Tamil Nadu. In the Vaippar river basin, several archaeological sites are reported wherein their earliest cultural evidence starts from the microlithic. Further, on the basis of field explorations, several other sites with microlithic evidence are reported (Rajan et al. 2009) however, unfortunately, their cultural sequences cannot be authenticated at present.

Tirutangal is a reported and excavated archaeological site (Balachandran 1994) which has revealed cultural evidences from the microlithic to the early historic period. Previously, the Vaippar river basin was explored by M. Rajesh and he observes that there is a spread of microlithic evidence over Ramanathapuram and Tirunelveli regions (Rajesh 2017). There are a few microlithic sites located close to Melakarandai, such as Mavilpatti, Irukkankudi Vembakottai and Sattur (Rajan et al. 2009) where chert

was employed to prepare stone tools. In this region, the microlithic cultural phase was succeeded by the iron age-early historic period, as noted from the cultural sequences reported from the site of Tirutangal. Similar sequences have been observed in the Gundar river basin (Selvakumar 2002).

In recent times, researchers have focused on Iron Age habitational settlements due to the lack of understanding of the lifestyles of the Iron Age period. Iron Age habitation and burial sites are reported at Mavilpatti, Mayurnatapuram, Mettipatti, Sengottai, Ayyampatti, Sangaralingapuram, Kulakattankurichy and Vakaikulam. There is evidence for the Tamil Brahmi script at Sengottai, a shell manufacturing site (Rajesh 2017), which shows the knowledge on writing in the region. Due to recent land alterations, habitational sites at Nallamaram, Raghuramapuram, M-Nagalapuram, Mutharpatti, Nenmeni, Athangarai, Manjanayakkanpatti, Thappathi and Tholmalaipatti could not be identified (Manikandan 2016, Rajesh 2017). Most of the burial sites identified in the present survey are found in a disturbed condition (Figure 4). However, the excavations at Adichanallur and Sivagalai revealed no surface indications for an urn burial.

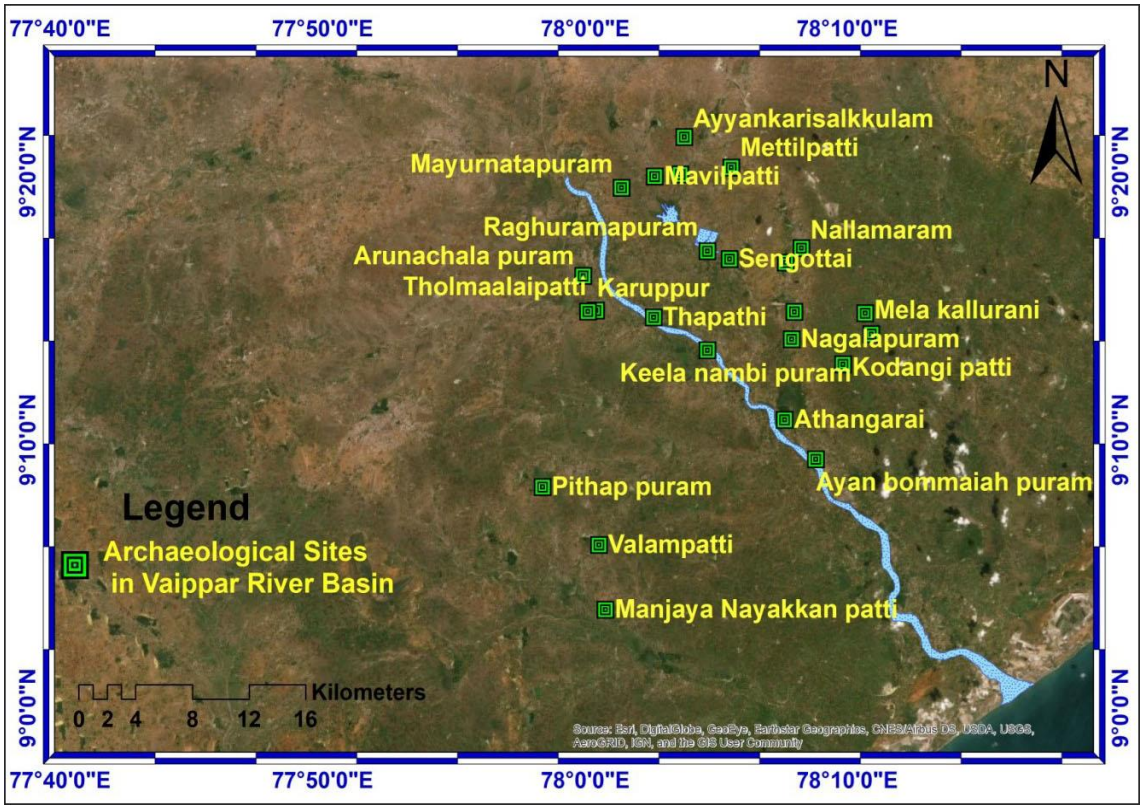

Figure 4: Reported sites around Melakarandai (Manikandan 2020)

Site Description

Mavilpatti (78° 02′.39′′ E; 9° 19′. 50′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by M. Rajesh (2009). A habitational mound was identified which is locally known as *Nattamkooru* (in Tamil, habitation). The area of

the site is 25 acres. Cultural evidence like Iron Age potsherds, iron slag, inscribed oil press, microlithic stone tools and hopscotch are noted. Multiple habitational complexes were identified at *Rettaikanmaythottam*.

Mettilpatti (78° 05′.34′′ E; 9° 20′. 10′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by M. Rajesh (2009). Urns and iron slag were found in the plot (*thottam*) of Srinivasan Ayyangar.

Rajapatti: It is located in Sattur taluka of Virudhunagar district. The site was identified by M. Rajesh (2017). The archaeological site is located near the *Sellaiyarammankoil*. The site covers an area of 5 acres. Blue and green glass bangle fragments are reported.

Raghuramapuram (78° 04′.39′′ E; 9° 19′. 03′′ N): It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by M. Rajesh (2009). It is an urn burial site locally known as *Sevakkadu* (land with red soil). Skeletal remains were reported from a disturbed urn.

Sangaralingapuram: It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by M. Rajesh (2009). This archaeological site is locally known as *kottaimedu*. The area of the site is 25 acres. It has Iron Age to Medieval period evidences. Iron slag and hopscotch are noted on the surface. This site was a shell bangle manufacturing center during the Early Historic period.

Kulakattankurichy: It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by M. Rajesh (2017). It is locally known as *Kottaikulam* (pond of a fort). A habitational settlement has been identified here. The area of the site is 25 acres. Iron slag and hopscotches have been identified.

Nallamaram (78° 08′.14′′ E; 9° 17′. 10′′ N): It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by M. Rajesh (2017). This is an Iron Age urn burial ground.

Ayyampatti (78° 00′.01′′ E; 9° 17′. 03′′ N): It is located in Sattur taluka of Virudhunagar district. The site was identified by M. Rajesh (2009). An Iron Age burial ground and habitation has been identified here.

Muditталai Nakalapuram (78° 02′.32′′ E; 9° 18′. 51′′ N): It is located in Sattur taluka of Virudhunagar district. The site was identified by M. Rajesh (2009). It presents an Iron Age urn burial, that was found along with iron objects.

Vakaikulam: It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by M. Rajesh (2017). It is a habitation site where Iron Age potsherds are found. White-painted black and red ware has been identified. Other pottery finds include black and red ware bowls, basins and plates.

Arunachalapuram (77° 59 55′.8′′ E; 9° 16 08′. 2′′ N): It is located in Sattur taluka of Virudhunagar district. The site was identified by Manikandan (2016). It is a habitation

and urn burial site, locally known as *Sevakkadu* (land with red soil). A terracotta animal horn was also found, although broken. It measures 4cm in length and 5 cm in breadth. Iron slag was also found.

Senkottai (78° 05′.30′′ E; 9° 16′. 45′′ N): It is located in Vilathikulam taluka of Thuthuudi district. The site was identified by M. Rajesh (2009). It is locally known as *Nattadumedu*. Burial and Habitational potsherds have identified at the site. One of the BRW shards contains the "ma" graffiti mark.

Muttarppatti (78° 02′.41′′ E; 9° 22′. 48′′ N): It is located in Sattur taluka of Virudhunagar district. The site was identified by M. Rajesh (2009). It is an urn burial site locally known as *Sevakkadu*. The size of the site is 5 acres.

Ayyankarisalulam (78° 03′.46′′ E; 9° 21′. 19′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by M. Rajesh (2009). A habitation mound of Early Historic and Early Medieval period has been identified at the site.

Mayurnatapuram (78° 01′.23′′ E; 9° 19′. 25′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by M. Rajesh (2009). A habitation mound of Early Historic and Early Medieval period has been identified here.

Nenmeni (78° 00′.41′′ E; 9° 19′. 21′′ N): It is located in Sattur taluka of Virudhunagar district. The site was identified by Vedachalam (Vedachalam et al. 2000). The ancient name of this village is *Nenmali*. An Iron Age urn was found at the site (Rajan et al. 2009; Rajesh 2017).

Athangarai (78° 07 36′. 1′′ E; 9° 10 45′. 6′′ N): It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by Manikandan (2016). Urn burials were found at a site, locally known as *Pannai Thottam*. The site is now a plain area because of cultivation. The black cotton soil here has an ashy coloured deposit. The findings include fragments of animal bones and possible iron elements.

Keelakallurani (78° 10 54′. 84′′ E; 9° 13 57′. 15′′ N): It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by Manikandan (2016). A habitational site, locally known as *Nathtathumedu*, is identified at here.

Keelanambipuram (77° 59 55′. 8′′ E; 9°16 08′. 2′′ N): It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by Manikandan (2016). It is an urn burial and habitation site, which is locally known as *Nattamkooru.* Surface collection has evidenced terracotta objects and iron slag. A terracotta taper was found in the habitation site which is 63 cm in length and 6.3cm in breadth. Interestingly, even at present, a pottery producing community is noted as living in this village.

Kodangipatti (78° 09 49′. 6′′ E; 9° 12 50′. 5′′ N): It is located in Vilathikulam taluka of Thuthukudi district. The site was identified by Manikandan (2016). A habitation site, which is locally known as *Bangarupatti*, was identified here.

Manjayanayakkanpatti (78° 00 46′. 1′′ E; 9° 03 40′. 7′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by Manikandan (2016). An urn burial site was identified at a site, which is locally known as *Pulavarthottam*. An iron axe was found along with the urn burial. A fossilized mammalian radius and pelvic element was found on the surface.

Pithapuram (77° 58 22′. 3′′ E; 9° 08 15′.0′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by Manikandan (2016). A habitation site is identified at a site, which is locally known as *Kottaimedu.* The findings include iron slag, a glass bangle fragment, a flake core, a terracotta object and a hopscotch. In the Vaippar river basin, several sites are noted as having stone tools but, unfortunately, none of the sites have given a context for such findings. Likewise, the stone tool (flake core) noted here is also without context.

Thappathi (78° 02 36′. 96′′ E; 9° 14 35′. 30′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by Manikandan (2016). Urn burials were exposed here during mining activity near the Vaippar River. Presently, none of the archaeological remains are visible on the surface, and the site requires further research.

Tholmalaipatti (78° 00 24′. 5′′ E; 9° 14 50. 5 N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by Manikandan (2016). Urn burials are found here, in an area locally known as *Sevakkadu*. However, this area is subject to several destructive activities carried out by the villagers. Further, two urns were brought from *sevakkadu* and are currently being used for water storage.

Valampatti (78° 00 31′. 0′′ E; 9° 06 05′. 9′′ N): It is located in Ettayapuram taluka of Thuthukudi district. The site was identified by Manikandan (2016). A habitation site was identified here, which is locally known as *Nattamkooru*. Cultural materials such as plain, decorated and painted potsherds, grinding stones, glass bangle fragments, slag and ring well fragments are collected from the site (Manikandan 2016).

Exploration and Findings from Melakarandai

Melakarandai (09°17′ 55′′ N; 78°03′ 37′′E): An archaeological site was reported in Melakarandai which is locally known as *Nattamkooru and Nattakidangu* (in Tamil, habitation). Urn burials and habitation remains were already previously noted (Rajesh 2009, Manikandan 2015). The total area of the site is about 25 acres. The entire site has been converted into agricultural land, with such agricultural activities being carried out since the year 2020. Only a small portion of the site, about 6.36 hectares, is still intact. The name of the village *'Karandai'* has an early origin. A term similar to '*Karandai*' has been employed in the Sangam literature, where a king brings a '*karandai*' flower while retrieving cattle (Subramaniyam 2013). Local people use this folk story, and have named their villages as Melakarandai and Keelakarandai.

Habitation Remains: Recently, research has focussed on identifying and locating Iron Age habitational sites in order to understand the socio-cultural and economical life of

the period. In that aspect, archaeologists have found several habitational sites which were contemporary to their burial grounds (Satyamurthy 2007). An excavation at Kodumanal resulted in the identifying a habitational-and-burial site and evidence of ancient industries (Rajan 2017).

Figure 5: Quern and Grinding stones (Manikandan 2019)

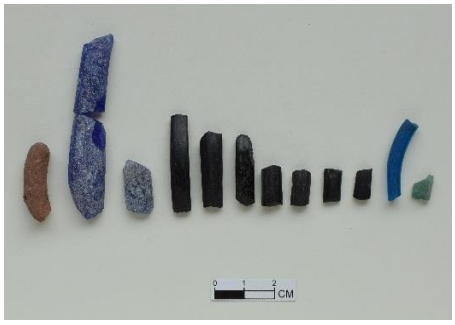

Figure 6: Bangle fragments

Figure 7: Hopscotches (Manikandan 2019)

Figure 8: Celt (Manikandan 2019)

Figure 9: Shell bangle with design

At Melakarandai, ancient habitation is evidenced by archaeological remains such as grinding stones and a quern (Figure 5), terracotta, glass and shell bangle fragments (Figure 6), hopscotches (Figure 7), a variety of red ware potsherds and a celt (Figure 8). Three grinding stones have been found. They are made on granite as well as gneiss rock, which is locally available. A terracotta bangle fragment was collected on the surface. Its thickness is 0.5 cm. Several glass bangle fragments, coloured black, green

and blue, were also collected. Previous explorations conducted by the author also noted black-coloured glass bangle fragments in the region (Manikandan 2016). Two shell bangle fragments have a zigzag pattern engraved on them (Figure 9).

In the study area, three chert flaked elements (Figure 10) were found. Unfortunately, no finished stone tool was identified. This may have been due to land levelling and agricultural activities that have affected the site. Quartz has been noticed in previous explorations in the Vaippar river basin (Rajesh 2017), Tamiraparani river basin (Zeuner 1956) and Gundar river basin (Selvakumar 2002).

Figure 10: Flake Cores (Manikandan 2019)

Figure 11: Disturbed Urns (Manikandan 2019)

At Melakarandai, burial remains have also been identified (Rajesh 2017). Urns were reported without any indications of burial. They are recovered from the southern part of the mound, where, at present, thorny bushes are seen. Here, due to several reasons, local people have dug up the soil. Two urns (Figure 11) were found here in a disturbed condition, at a distance of 150 cm. One of the urns is covered with a lid. The urns have a thumb mark on them, which suggests that they were probably hand made. They are coarse red wares, and are found along with a few red slipped ware shards.

Smelting Area: Smelting is the process of separating metal from ore by heating the ore until the metal within it turns liquid (David Mead 2013). In India, smelting activity has been noticed since the Harappan civilization, and continues until recent times. Iron smelting sites with secured dates available, such as Raja Nala-Ka-Tila, Malhar and Lahuradewa, dated to between 1800-1700 B.C.E, are identified in North India (Tewari 2003). In southern India, iron appeared for the first time in a megalithic context, which was the phase succeeding the Neolithic and microlithic cultural periods (Selvakumar 2002).

An iron smelting area was noticed in the present study area. It is located in northern corner (78˚04′ 6′′E; 09˚17′ 4′′ N) of the archaeological site. The presence of magnetite, iron pieces, iron ingots and slag suggest the identification of this space as a smelting area. Slag deposits are spread over the surface for about 1.41 hectares (Figure 12). Magnetite is not available locally, and it would have had to have been brought over from known deposits in Kanyakumari, Salem and Dharmapuri regions (Tripathi 2001). The iron slag presents an air bloomery structure (Figure 13).

Figure 12: Iron slag

Figure 13: Bloomer structure of slag

Figure 14: Naga Depiction

Figure 15: Shiva Temple

Sculptures of Later Period

At the archaeological site, two Medieval period temples have also been identified. These temples are locally known as *Madasamy* temple and *Oomathamman* temple. The

first sculpture, Sculpture no. 1, is the *Madasamy* sculpture, and is located close to the urn burial. The iconographical features are not clear but it is found in a seated posture and its head is missing. Along with this, a *Naga* sculpture is also found. Sculpture no. 2 is in the *Oomathamman* temple. This temple is located in northern side of the archaeological settlement. Here, three erected stones are found which do not have any depictions on them. Nearby, a snake stone, or *Soolakkal*, was found, which could have been a part of this temple complex (Figure 14).

In the village of Melakarandai, remains from Shiva temples, such as the Linga, an idol of Kartikeya and Nandi were found, and are interpreted to be of an abandoned nature (Figure 15).

Jainism spread into Tamil Nadu during the Medieval period, and related remains are reported from Kalugumalai, Korkai and Vanaramutti (Rajan et al. 2009) of Thoothukudi district. In Keelakarandai village, a Jain sculpture was found, which is locally known as *Oorkavalan*, which means 'a person who secures a village from its enemies'. This sculptural panel depicts the sitting Tirthankara with two attendants (Figure 16).

Figure 16: Jain Tirthankara

Memorial Stones in Keelakarandai

Hero stones, Sati stones and other memorial stones have their roots from the megalithic 'Menhir' (Rajan 2001), and such remains are reported from all over Tamil Nadu, varying in their space and time. A number of memorial stones are reported in the Chengam region of Tamil Nadu. The author has reported such finds from the sites of Thappathi, Masarpatti, Sakkilipatti and Tholmalaipatti (Manikandan 2020), which evidence memorial stones in the vicinity of Melakarandai village. Further, in this region, people from the *Kambalathu Naikkar*, *Arunthathiyar* and *Gounder* communities still continue the practice of erecting memorial stones. While most of the memorial stones do not have any images, a few of them do depict various figures and images (Figures 19 and 20). The height of these memorial stones is less than one meter.

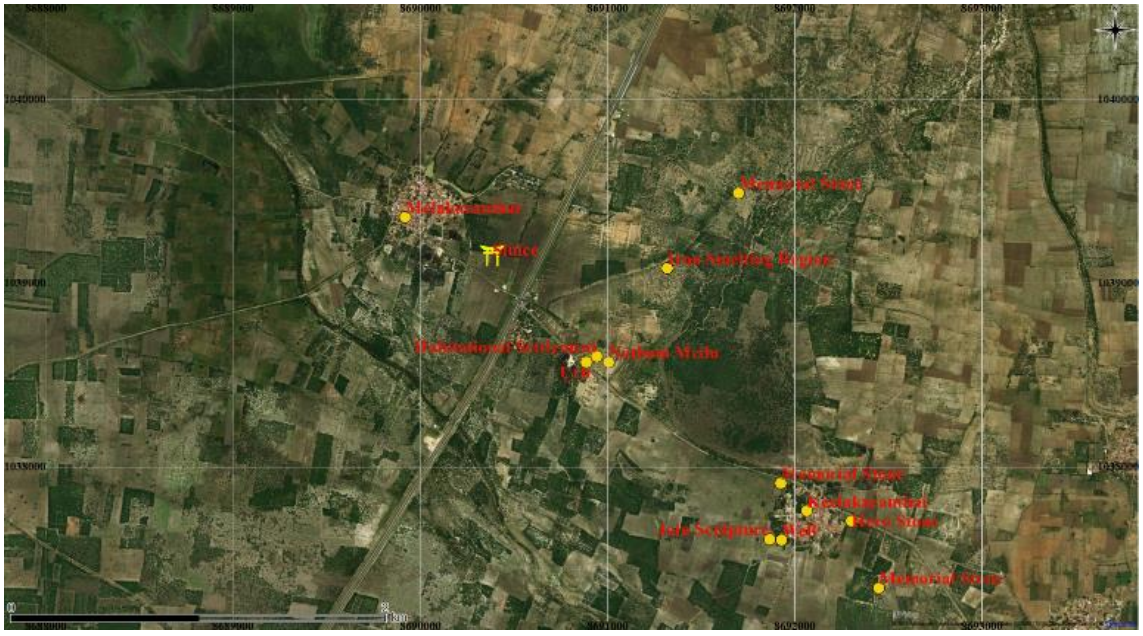

Figure 17: Map showing evidence of memorial stones (Manikandan 2019).

Figure 18: Memorial Stone

Figure 19: Sati Stone (Manikandan 2019)

At Keelakarandai, memorial stones have been identified at three localities (Figure 17). According to locals, they were erected by people of the *Kambalathu Naikkar* community

who worship a mother goddess called *Jakkammal*. At present, no one from this community is living in the village. People from this community used to visit and worship these memorial stones once in a year, on the day of Shivratri. On that day, the memorial stones would be decorated, and the people cooked and offered food to the deceased person(s).

Locality 1: It is located close to the primary school at Keelakarandai village. This place is locally known as *Pappanayakkar Thottam*. Here, six stones are found in a standing posture (Figure 18). According to locals, it was erected by people of the *Kambalathu Naikkar* community. Interestingly, none of the stones have any depictions of images or inscriptions on them.

a b c d

e f g h

Figure 20: Sati Stone (Manikandan 2019)

Locality 2: A *sati* stone was identified close to the church which is located at the eastern side of the village (Figure 19). A slightly ornamented hero and his consort are depicted seated in this image. While the hero holds a sword in his right hand, his wife is seen holding an unidentified object in both her hands.

Locality 3: *Sati* and memorial stones are identified at r*aamanna oorani*, which is located at the eastern side of the Keelakarandai village, in an area where present-day

cremations are conducted. Here, more than a hundred erected stones are identified, and a few of them have sculptural and/or inscription representations on them. Sculptural panels like single *sati* (Figure 20a-b), double *sati* (Figure 20c-f) and triple-*sati* (Figure 20g-h) panels are found, along with several other erected rectangular stones. Most of the images are found in a standing posture, with either a raised right hand or the anjali mudra.

Folk Stories on Tax Collection

According to locals, tax collection had happened during the Eattayapuram Nayakkar period. Tax collectors used to come and drink water in a well is located near the *Oorkavalan* temple in Keelakarandai village. That well is now abandoned.

Discussion and Conclusion

In terms of cultural history, it appears that this region was occupied from the Mesolithic times (Rajesh 2018). A few stone flakes, struck off chert, are found at Melakarantai, and this raw material is not locally available. It might have been brought over from the Kulathur region, approximately 60 km away from Melakarandai. People may have prepared stone tools at the site itself due to the presence of several stones which evidence flake and blade reduction marks. No evidence of the Neolithic period has been found in this area presently. Possible Iron Age-Early historic evidence is found with the presence of urn burials.

An iron smelting activity area was identified but, unfortunately, it has been disturbed by modern-day agricultural activities. The magnetite iron ore is not locally available, and it raises a question as to whether it might have brought from Salem, Dharmapuri or Kanyakumari region. The chronology of the iron smelting activity here is not clear. The Melakarandai site is surrounded by water sources in three directions, which could have been one of the reasons for settlement and occupation here. Future studies that focus on settlement patterns from a macro-regional perspective will be able to provide more information.

Here, an early depiction of the *naga* image is found, however, unfortunately, we do not find any related antiquities associated with it. At Melakarandai, Linga, Karthikeya and Nandi sculptures are scattered over the landscape, and this could indicate the presence of a Shiva temple(s) in ancient times. The Jain sculpture at Keelakarandai emphasizes the presence of Jainism here. On the basis of its sculptural representation, this Jain sculpture could belong to the Pandya period of the 10-14th century CE.

Memorial stones are also found at three localities. Some of them have the sculptural representation, while many of them do not. On the basis of the sculptural representations noted, they may possibly belong to the Nayaka period. Memorial stones of the Nayaka period are found in many parts of South India. Moreover, folk stories at Keelakarandai reveal about tax collection during the Nayakka period and may be associated with the Nayaka period memorial stones. Therefore, these evidence are relevant to the later history of the site.

Acknowledgements

The research was completed as part of the post graduate diploma course in Pt. Deendayal Upadhyaya Institute of Archaeology, Greater Noida, Utter Pradesh. The author thanks Dr. V. Selvakumar, Dr. V.N. Prabhakar and Dr. Ambily C.S. for their valuable comments for making this draft. I thank Pauldurai and Ajaykumar who helped me prepare the maps.

References

Basa. K. K., R. K. Mohanty. and S. B. Ota. (Eds.). 2015. *Megalithic Traditions in India: Archaeology and Ethnography*. (Ed.) Aryan Books International, New Delhi.

Caldwell, R. 1877a. Explorations at Korkai and Kayal. *Indian antiquary* 6:80-82.

Caldwell, R. 1877b. Excavations at Kayal. *Indian Antiquary* 6:82-83.

District Survey Report for Quartzite Thootukudi, 2017. Government of Tamil Nadu Department of Geology and Mining. Chennai.

Foote, R. B.1916. *Notes on Ages and Distribution: Indian prehistoric and protohistoric Antiquities*. Madras: Madras Government Museum.

Gardener, R. A. M. and H. Martingell. 1990. Microlithic sites and their Paleo environmental setting, Southeast India: A Re-evaluation. *Geo archaeology* 5, PP.1-3.

Manikandan. G. 2015. *Further Investigation of the Iron Age site at Melakaranthai, Tamil Nadu*. Presented Paper. Joint Annual Conference of IAS, ISPQS, and IHCS. Department of History, University of Hyderabad. Hyderabad.

Manikandan. G. 2016. *A Study of Urn burials from Ettayapuram and Vilathikulam region, Tamil Nadu*. Unpublished Dissertation. Deccan College Post-Graduate and Research Institute. Pune.

Manikandan. G. 2020. Newly Discovered Memorial Stones in Ettayapuram Taluka, Tamil Nadu. *The Archaeology of Burials: Examples from Indian Subcontinent, Volume*-II. S. V. Rajesh, G. S. Abhayan, A. Kumar and E. R. Elahi (eds.). 632-38. New Bharathiya Book Corporation, New Delhi.

Mead, D. 2013. Smelting, forging and smithing: a brief history of metallurgy for the lexicographer. *Sulang Language Data and Working Papers: Topics in Lexicography no.15: 1-19.*

Rajan, K. 2001. *South Indian Memorial Stones*. Manoo Pathippakam, Tanjore.

Rajan, K., R. Ramesh and J. S. Park. 2017. Recent evidence off Ultra Carbon Steel from Thelunganur, Tamil Nadu. *Man and Environment* XLII (2).

Rajan. K., V. P. Yathees Kumar. and S. Selvakumar. 2009. *Catalogue of Archaeological Sites in Tamil Nadu* Vol.2. Heritage India Trust, Thanjavur. pp. 462-471.

Rajesh, M. 2009. Explorations in the Vaippar Region and Arjuna river Basin. Tamil Nadu: A Preliminary Report. *Tamil Civilization* 23.

Rajesh, M. 2017. *Archaeology of Southern Tamil Nadu*. Unpublished Dissertation Department of Epigraphy and Archaeology, Tamil University. Tanjore.

Ramachandran, K. S. 1980. *Archaeology of South India-Tamil Nadu*. New Delhi: Sundeep Prakashan.

Rea, A. 1902-3. Prehistoric Antiquities in Tinnavelly. *Annual Report of the Archaeological Survey of India for the Year 1902-03*. Archaeological Survey of India. New Delhi.

Rea, A. 1915. *Catalogue of the Prehistoric Antiquities from Adichchanallur and Perumbair,* Madras: Government Press.

Satyamurthy, T. 2007. Adichchanallur: New Discoveries in the Light of Rea's Excavation. *Journal of Indian Ocean Archaeolog.y* 455-66.

Selvakumar, V. 2008-09. Then Tamil Nattil Puthiya Tholliyal Kandupidippukal, *Avanam (Tamil journal)* pp. 116.

Selvakumar. V. 2001. Microlithic Adaptation Patterns of the Mesolithic Hunter-Gathers of the Upper Gundar Basin, Tamil Nadu. *Report of post-doctoral Research Submitted to ICHR*. Pune: Deccan College.

Selvakumar. V. 2013. Prehistoric Sites in North-Central Tamil Nadu, South India. *Indian Journal of Physical Anthropology & Human Genetics.* Vol. 32. No.1, PP. 47.

Subramaniyam, S.V. 2013. *Tholkappiyamthelivurai* (Tamil). Manivasakar offset printers. Chennai. Pp: 378.

Tamil Nadu State Gazetteer 1- Thoothukudi District. 2007. Chennai: Gazetteers of India, Government of Tamil Nadu.

Tewari, R. 2003. The origin of iron working in India: new evidences from the Central Ganga plain and the Eastern Vindhyas. *Antiquity*, Vol. 77. No.297.

Tripathi, V. 2001. *The age of Iron in South Asia: Legacy and Tradition*. Aryan Books International, New Delhi.

Zeuner, F.E. and B. Allchin. 1956. The Microlithic sites of Tinnevelly district, Madras State. *Ancient India*.12, PP. 4-20.