

Stone anchors along the coast of Chilika Lake: New light on the maritime activities of Orissa, India

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Since the beginning of maritime archaeological studies, several types of stone anchors have been either retrieved or located along the coast of India. These stone anchors show their evolution to the development and have contributed immensely towards the growth of maritime trade. With increase in the carrying capacity of ships, changes made in their sizes and construction patterns, subsequently, the size and shape of the anchors also got modified. On the basis of anchor findings, an attempt has been made to trace the economic and cultural relationships among people of different regions. Maritime archaeological explorations have been carried out along the Chilika coast, Orissa to locate the remains of the maritime activities. Onshore explorations have yielded stone anchors along with hero stones at Kanas, pottery, coins and structures at Manikapatna and Palur, and navigational traditions were observed around the villages of Chilika Lake. These anchors are different from other anchors reported from various parts of India. Kanas is the first instance where stone anchors have been found along with hero stones. This communication deals with stone anchors of Kanas and their role in the maritime activities of Chilika Lake region.

Keywords: Chilika Lake, maritime activities, ports, stone anchor.

A SYSTEMATIC onshore survey conducted in and around Manikapatna, Palur and adjoining regions of Chilika Lake, Orissa (Figure 1) revealed archaeological remains such as stone anchors and hero stones. Geological evidences indicate that Chilika Lake was part of the Bay of Bengal during the later stages of the Pleistocene period¹. Chilika Lake is the biggest water lagoon in India as well as Asia. It is a shallow brackish-water inshore lake, connected to the Bay of Bengal through a narrow mouth. It is about 64 km long in the north-south direction and 13.5 km wide in the east-west direction. Chilika Lake is bordered between the sea and mountains. Formation of a barrier spit near Palur due to littoral drift and creation of a sand bar along the eastern shore have transformed the lake gradually to a shallow lagoon. Presently, the sea is connected with the lake near Satapada through a number of shoals, sand spits, sand bars, openings of shallow depth and a narrow channel. The presence of these features considerably reduces tidal flow in and out of the lake. In

the past, discharge of sediment by the tributaries of River Mahanadi made the lake shallower and subsequently the lake was separated from the sea after the formation of the spit². The lake is continuously becoming shallow; sandbanks and a number of islands are visible just above the surface because of the discharge of silt and sediment by the rivers Daya, Bhargavi, Makra and Nuna. Some of the rivers are tributaries of the Mahanadi and others are streams joining the lake. Water level in the lake fluctuates seasonally and during high and low tides. Similarly, maximum area of the lake experiences submergence and emergence every year.

It is not known since when the lake was used for maritime activities. But the finding of shark teeth during excavations at Golbai has indicated that people probably ventured into the lake since the Neolithic and Chalcolithic period (2100–1100 BC), if not earlier³. In the later period, Ptolemy (AD 150), the Greek geographer, had referred to Palur as the port 'Paloura', which was an important port of Kalinga, located close to the 'point of departure' (apheterion) for ships bound for Khryse⁴. That 'point of departure' was situated outside of the southern tip of the lake at Kantiagarh, from where ships bound for different parts of Southeast Asia were to sail directly. Similarly, Hiuen Tsang (7th century AD), the Chinese pilgrim, visited Orissa in AD 638 and referred to Che-li-talo-Ching as a flourishing port⁵. This port was also located at 'Chhatragarh' on the banks of Chilika Lake⁶. Further, the *Brahmanda Purana*, a 10th century AD text, mentions that the Chilika Lake itself was an important centre of trade and commerce, and a number of ships were sheltered in the lake. Ships used to set sail to Java, Malaya and Ceylon from Chilika⁷. This suggests that the lake was deep and connected with the sea through a wide-opening mouth, which provided easy berthing for the sea-going ships bound to the Southeast Asian countries⁸.

In the past, monolithic stone pillars on the shore of the lake with a lamp on the top were used as lighthouses for seafarers. Such a monolithic stone pillar, 2 m high, has been observed on the hilltop at Raghunathpur, near Podaghar (Figure 2). A similar type of pillar is also seen on the hill of Palur. These hillocks on the shore of Chilika were also referred to as 'deepa-adia pahad' (Hill of Light). Another hill on the southern side of Gourangapatana also served as a lighthouse, locally known as 'deepa dandi'. Stone alignments at the foothills of Ghantasila and Nandighar near Rambha on the bank of the lake might have acted as breakwaters. Chilika separates these stone alignments from each other through a narrow land mass over about 700–800 m. The length of both the breakwaters is 650–675 m; the height could be about 9 m and water depth 1 m. The backwaters and presence of hills indicate that ships were anchored in this sheltered area during the southwest and northeast monsoons, storms and cyclones.

The excavation findings of Manikapatna comprise of Indian rouletted ware, knobbed ware, kaolin ware, red

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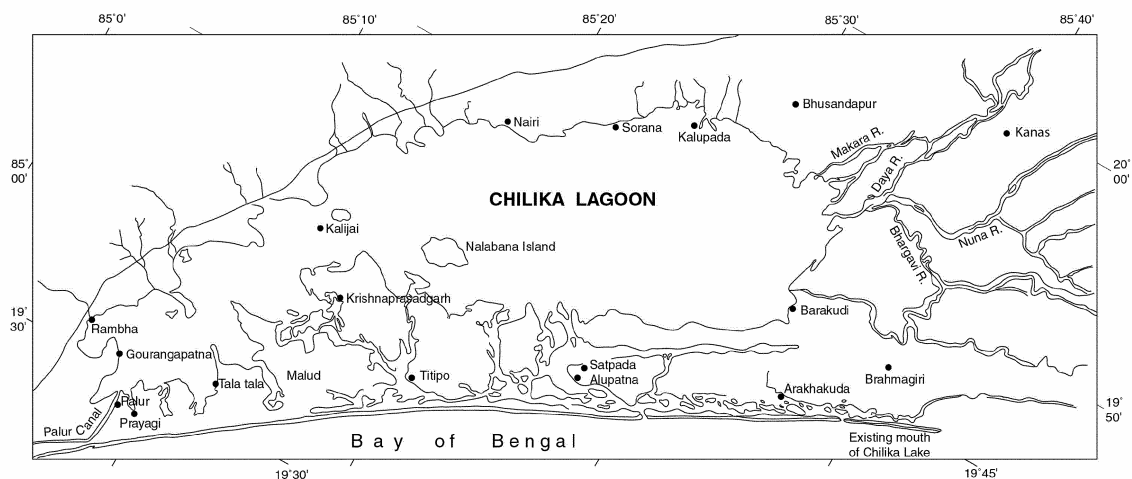


Figure 1. Map showing Chilika Lake and other sites.



Figure 2. Monolithic stone pillar lighthouse on the bank of Chilika Lake.



Figure 3. Terracotta ringwells noticed at Manikapatna on the bank of Chilika Lake.

glazed ware, stamped ware, amphora sherds, a Kharosthi inscription on a potsherd, Puri–Kushana coins and Ceylonese coin, which belong to the early historical period. The upper levels of the excavations yielded a large quantity of Chinese celadon and porcelain ware sherds, egg-white Arabic glazed ware, black ware, red ware, etc. These findings show that Manikapatna had maritime interactions with Sri Lanka, China and other countries⁹. The recent explorations at Manikapatna have brought to light terracotta ringwells on the shore of Chilika, which submerge during high tide and are exposed during low tide (Figure 3). Besides, black and red ware similar to those found at Sisupalgarh near Bhubaneswar were also collected. The other pottery remains are glazed ware, red ware and red glazed ware. Coastal explorations at Palur and the adjoining areas provided fine red ware with flaring rim and grey ware bowls and local imitation of Northern Black Polished (NBP) ware. These sherds were scattered

over a large area and are datable to the early historic to medieval period. Local information reveals that similar kind of pottery was found while digging for various purposes in the surrounding regions of Palur¹⁰.

Ships at Chilika Lake used large and heavy stone anchors tied with a rope. This has been confirmed in the contemporary writings (e.g. 'Chilika Yatra' by Chintamani Mohanty), where it has been mentioned that ships carried stones tied with a rope and these were lowered during storms and cyclones. These stones were used as anchors (langhars). In later periods, iron anchors were used both



Figure 4. *a*, Stone anchors found during explorations at Kanas (scale: 25 cm with 5 cm division). *b*, Hero stone found along with stone anchors at Kanas.

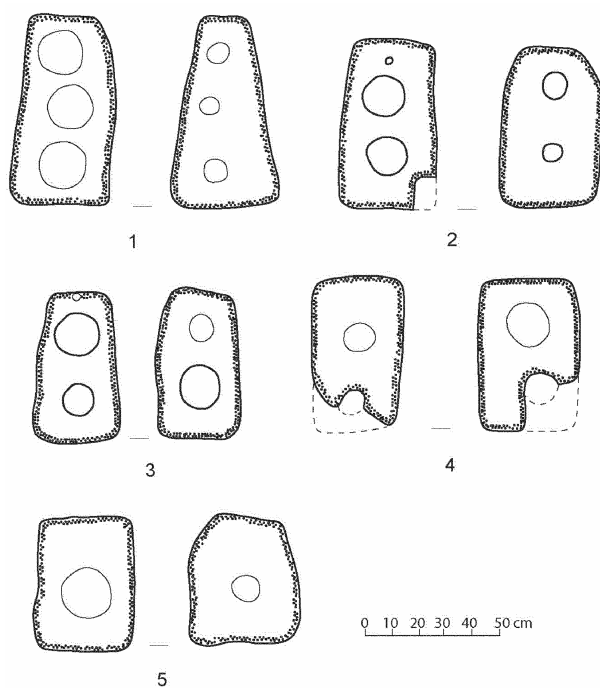


Figure 5. Stone anchors from Kanas.

in the front and back of the ships for anchoring in northern Orissa; anchors at the back were known as 'latadi'¹¹. Similarly, one can find even today stone pillars (pathara khunti) in Belantara village in the adjoining area of Chilika Lake, which were identical to stone anchors used in ancient times¹². However, the sizes and shapes of these stone pillars are not provided.

While undertaking coastal explorations to locate the remains of maritime activities of Chilika Lake and adjoining regions, some perforated stones were found along with a number of hero stones at Kanas, an ancient river port site. Kanas is situated close to Chilika Lake in Puri District (Figure 1) and at a distance of about half a kilometre from River Nuna, which flows into the Chilika Lake. Earlier, Nuna was flowing close to Kanas. The other

anchors which flow near Kanas are Daya and Bhargavi; they also join the lake after flowing over a short distance. During explorations, stone anchors (Figure 4 *a*) as well as hero stones were found, which were collected earlier in knee-deep water in a field. It is assumed that the hero stones (Figure 4 *b*) were erected in remembrance of heroes who had lost their lives in naval battles. Though it is not accurately known when the naval battle was fought, on the basis of features on the hero stones, it could be dated between the 7th and 9th century AD.

The explorations yielded five stone anchors from Kanas. One is broken and the remaining four are trapezoidal in shape (Figure 5). One anchor has three holes, three anchors have two holes and the other anchor has only one hole. All the anchors are efficiently made, but their surfaces are irregular. The dimensions of each anchor are given in Table 1. The first stone anchor is the longest one having three holes in a vertical line. The holes on one side of the anchor have been tapered and the other side is untapered. Chisel marks are visible on the backside. The second anchor has two holes. The lower hole is tapered whereas the upper hole is untapered. A small hole is present on the upper portion of the upper hole. It appears that it has not been made deliberately. Similarly, an L-shaped chip has been chopped-off from this anchor, but its purpose is unclear. The third anchor has two holes and none of them is tapered. The upper hole is wider and bigger than the lower hole. Even this anchor has a small hole at the upper portion of the upper hole. The fourth anchor has also two holes; however, its lower hole is broken either due to frequent use or because of some other reason. Both the holes of the anchor taper and have two cut marks on the upper side. The fifth anchor has only one hole, which is tapered. Chisel marks are visible on its surface and the edges are not sharp. All these anchors are made of red sandstone. The red sandstone of Orissa region is prone to erosion and it is not hard, unlike other rocks. Hence holes of the anchors are either tapered or broken. All the anchors are dressed properly and are either trapezoidal or square in shape. Their surfaces are uneven and weathered. From their typology, it appears that these stone an-

Table 1. Measurements of anchors from Kanas

Raw material	No. of holes	Length (cm)	Width, max and min (cm)	Thickness (cm)	Size of holes on front side (cm)	Size of holes on back side (cm)
Sandstone	3	72	37 × 24	17	19, 18, 18	8, 7, 6
Sandstone	2	61	35 × 32	20	17, 16	9, 6
Sandstone	2	55	30 × 25	17	19, 12	18, 7
Sandstone	2	57	39 × 36	18	16, 15	12, 8
Sandstone	1	47	37 × 35	15	21	10

**Figure 6.** Depiction of a man worshipping the phallic (symbol of Lord Siva) on a hero stone.

chors were developed for marshy and muddy river mouth and lakebed. Wooden posts or bamboos were inserted in the holes because these anchors were kept permanently under water. Hence ropes were not used for lowering and lifting the anchors, and no rope marks are also seen on them. The stone anchor with one hole was probably used for small boats. Some of the stone anchors have been converted into hero stones. However, the shape and effectiveness of the anchors can be taken into account in relation to the environment and nature of the lakebed. The reason for finding hero stones along with anchors could be that some naval battles were fought in the region, and hero stones were erected in memory of the dead. The making of hero stones from anchors is the indication of alternative use.

It is complex to date these anchors in the absence of datable evidences. The only source to date the anchors is to date the hero stones and the naval battles fought around the lake. The stone anchors are associated with hero stones and these hero stones are associated with the naval war fought in the past. The approximate period of the naval battle can lead to the date of these anchors. Frequent battles have been fought along the coast of Orissa during the 7th century AD and the hero stones might have belonged to that period. There is a reference in an Oriya text called *Paika Kheda*, implying training of soldiers, wherein there is a chapter dealing with naval wars. Similarly, there is a place called 'Nausena', meaning the naval force, located

close to Chilika Lake⁶. From the above sources, it appears that the rulers of Orissa in the past might have maintained a naval force. The historical records state that the Gauda king Sasanka (AD 619–620) attacked and defeated the king of Orissa in the early 7th century AD. Sasanka was a staunch Saivite (worshipper of Lord Siva) and on one hero stone we find the depiction of a human figure worshipping the phallic symbol of Lord Siva (Figure 6).

Land excavations at Kuntasi¹³ and Lothal¹⁴, and maritime archaeological explorations have revealed a variety of stone anchors from Goa¹⁵, Gujarat¹⁶, Kerala¹⁷, Lakshadweep, Maharashtra and Tamil Nadu¹⁸. These anchors have been classified on the basis of their shape, type and region. But the stone anchors of Kanas are different from other stone anchors found in India and other parts of the world. A number of stone anchors have been found from various parts of India, but none of them has been found from stratified layers nor associated with any datable antiquities, except at Bet Dwarka and Kannur. Under these circumstances, dating of stone anchors from India has been made on the basis of historical evidence and comparative studies. Similarly, stone anchors of Kanas have been dated on a comparative basis.

It has been observed that the anchors were made and used on the basis of availability of stone and depending on the shape and size of boats. Chilika lake has now become shallower due to deposit of silt. Hence flat-bottomed boats (nauka) made using clinker techniques, that are longer in shape now ply the lake¹⁹. The 'naukas' are extensively used for carrying cargo, ferry and fishing in Chilika Lake. Currently, these boats are anchored to the lake by tying them to poles (wooden posts) buried in the lakebed. Sometimes small stones were also used to anchor these boats. From the shape and size of the anchors at Kanas, it appears that the boats used these types of anchors. Ships that were engaged for overseas voyages used heavy stone anchors. It appears that these anchors were permanently kept in water along with the bamboo or post, and boats were tied to the bamboo on their return. When mariners shift their anchoring points, they carried the anchors and bamboos along with boats. As the depth of the lake is shallow and in the absence of waves and currents inside the lake the poles served as a rope. As a large amount of sediment was being deposited inside the lake, unless some support was provided at the base of the bamboos, they could not hold the boats. Hence, these anchors were placed below the bamboos.

The question arises as to why are there tapering holes on one side of the anchors. It could be due to the movement of the wooden poles inside the holes of the anchors. This cannot be ignored because the raw material is easy to erode. Or, local people might have used the anchors for some other purpose, which resulted in the tapering of the holes. The single-hole stone anchor is similar to the single-hole stone anchors found in Tiruchendur region, Tamil Nadu coast. Moreover, the single-hole stone anchor at Kanas differs in shape and size from the single-hole stone anchors which have been reported from Gujarat and Goa coasts.

The people of Orissa have been drawing inspiration from the lake. Literary and a number of local legends are associated with maritime activities of the lake. The ports and maritime activities of Orissa were well known that in the *Raghuvamsa*, Kalidasa has referred to the King of Kalinga (ancient Orissa) as 'Mahodadhipati', which means 'the Lord of the Ocean'²⁰. Similarly, the *Aryamanjusrimulka* (7th–8th century AD), a Mahayana Sanskrit text refers to the Bay of Bengal as 'Kalingodresu', i.e. 'the Kalinga Sea', as the ships of Kalinga dominated the Bay of Bengal²¹. Several battles have been fought in the coastal regions of Orissa between the 7th and 9th century AD, and on the basis of finding hero stones, these anchors have been dated to this period. In the absence of archaeological findings, namely pottery, coins, etc. and epigraphical evidence, the available historical accounts have been taken into consideration for dating the stone anchors of Kanas. Further, Hiuen Tsang had visited Orissa during the 7th century AD and at that time Chilika was a thriving port and these anchors were probably in use in the lake. From the finding of hero stones at Kanas, it could be assumed that the battle must have been fought close to Kanas. It appears that nearly about 1500 years ago, Chilika Lake as well as River Nuna were close to Kanas, but subsequently, Nuna shifted its course towards the east and the lake became shallower due to the deposit of silt from the rivers.

The stone anchors reported from other parts of India were used by seagoing vessels. However, the stone anchors found at Kanas were exclusively used by boats, plying in the lake. At Kanas, stone anchors and hero stones have been reported together. It appears that these anchors were permanently kept in water along with the bamboos. In the absence of waves and currents inside the lake, mariners could easily anchor their boats by deploying these anchors. After the introduction of iron anchors, stone anchors were discarded. Anchors with multiple holes indicate that a number of wooden poles were inserted to tie bigger boats or a number of boats were tied together with these wooden poles. However, even today mariners in the Chilika region use bamboos to anchor their boats and they tie a number of boats with one or two wooden poles. Further investigations would shed new light on the origin of these stone anchors.

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