

Maritime History of Andhra Pradesh and Prospects for Marine Archaeological Research

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Abstract

Archaeological, epigraphical, numismatic and other sources confirm that similar to ports in other coastal states of India, the ports of Andhra Pradesh had played a significant role in spreading Indian culture overseas to other countries. In course of time, both manmade and natural factors such as weak successors, poor economy, attack by neighbouring kingdoms, coastal erosion, sea level changes, tectonic activities, natural hazards, sedimentation and formation of sand bars and dunes in the navigational channels etc; caused the decline of ports and trade centres. Explorations have brought to limelight some remains of maritime activities, which are lying in hinterland and onshore regions. However, underwater remains so far have not been explored. Even some important shipwrecks of the later period await the spade of marine archaeologists. Based on the results of explorations there emerges a need for comprehensive marine archaeological (both onshore and offshore) explorations in Andhra Pradesh that can bring out evidences of maritime activities of bygone centuries.

Introduction

Andhra Pradesh located on the central part of the East Coast of India has about 600 km long coastline and a long maritime history. Andhra Pradesh with its navigable rivers, with convenient anchoring and landing facilities, served sailors for better oceanic trade through the ages. Various dynasties have ruled over different parts of Andhra Pradesh during different periods of bygone history. The geographical area of Andhra was frequently divided into different regions namely Asmaka, Mahishaka, Kalinga, Talinga and Andhra. During different periods of history, the people of Andhra established their contacts with other parts of India and also across the oceans. The expansion of Indian religions to the sea locked lands of the Southeast Asian countries and Far East was attested through archaeological findings, art objects, epigraphs and numismatic sources. Single mast ship motif punch marked coins, reported all along the Andhra coast belonging to the 4th and 3rd centuries BC, further embodies to this fact. The Bhattiprolu and Amaravati inscriptions furnish the names of the pre-Satavahana rulers and refer names of the organised bodies for industries and

trade revealing a growing economic activity in agriculture, mining and industries (Buhler 1984 and Chanda 1982). Major and minor ports came to limelight right from the early periods of history and continued till the modern period. The finding of Rouletted ware, Northern Black Polished ware, silver Punch marked coins, Roman coins, Kharosthi scripts, semi-precious stone beads, etc along the Bengal, Orissa, Andhra and Tamil Nadu coast indicate that a network of internal trade was existing about 2000 years ago and in this trade, ports played a vital role. Although, Pliny, Ptolemy, Periplus and Sanskrit, Prakrit and Telugu literature also mention the names of the ports that flourished from the early to medieval periods along Andhra coast. However, only some places like Dantapura, Kalingapatnam, Pithunda, Ghantasala, Amaravati, Motupalli, Masulipatnam and Kottapatnam (Fig. 1) have been identified with corroborating archaeological evidence as ports. Locations of some other ports also have been identified, whereas some ports mentioned in literature, cannot be identified today due to a lack of substantial evidence.

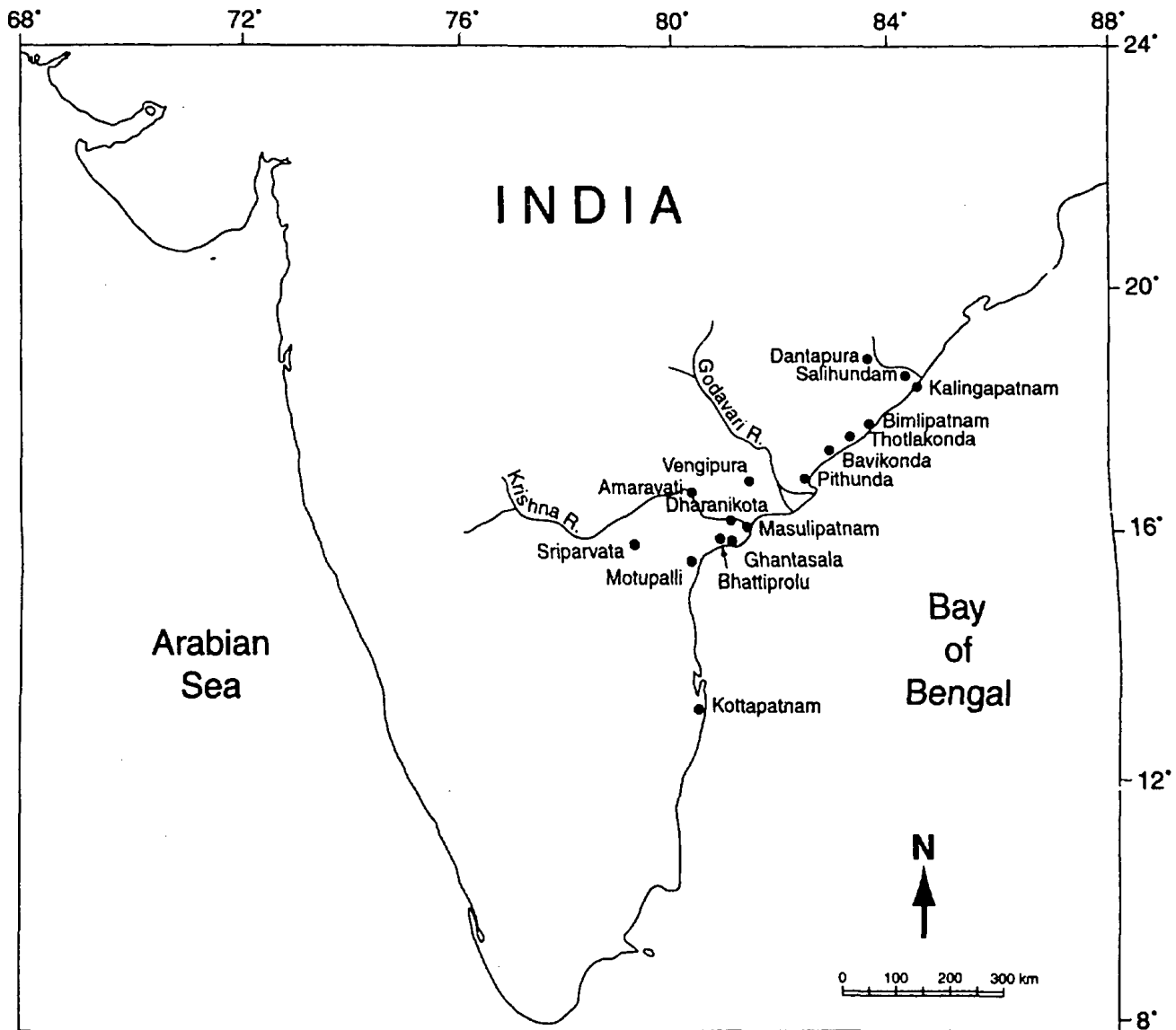


Fig. 1 Ports and Trade centres of Andhra Pradesh

Ports of Andhra Pradesh

Kalingapatnam

Kalingapatnam, the ancient port city of Kalinga, is situated at the mouth of the river Vamsadhara. Kalingapatnam was variously known as Kannagar, Katikardana and Kartikeyadhama. The Chicacole grant (Fleet 1984) of King Indravarman and Narasingapalli plates (Majumdar 1984) of King Hastivarman of the Eastern Ganga dynasty refer to Kalinganagara, the capital city situated near the seashore. Earlier explorations at Kalingapatnam revealed megalithic Black and red ware along with black and grey ware treated in kaolin paint under a black slip (Ghosh 1989) the subsequent exploration brought to light red slipped ware, Rouletted ware, bricks of (44x22x8 cm), a stupa and habitational mounds at Kalingapatnam and Nagarlapet (*IAR* 1976-77: 10). The excavations carried out by the Archaeological Survey of India in the stupa mound between 1977-78 and 1979-80 brought to limelight a wheel plan stupa, megalithic black and red ware, micaceous black ware etc; including a number of Gupta period gold coins (Rao 2002). Some remains of a brick wharf and structures have also been traced (Sree Padma 1991). The size of the stupa and offerings made to it in the form of gold grains suggest that a number of devotees and merchants visited this site. It appears that the mission of King Asoka went to Suvarnabhumi from Kalingapatnam. Scholars are of the opinion that the sea washed out Kalingapatnam and some remains can be noticed in the nearshore region and the rest has been silted up over the years (Rao 1971-72).

Dantapura

The Korni Plates of Anantavarma Chodaganga (Sitapati 1926) refer to Dantapura, situated on the southern banks of river Vamsadhara (approximately 6 km) from Srikakulam Road Railway station. Ptolemy refers to the apheterion immediately to the South of Palur, where the vessels bound for the Malay Peninsula ceased to follow the littoral and entered the high seas. S. Levi mentions that Dantapura was a trade centre having contacts with the other ports of India and Persia during 6th century BC. The port of Dantapura had overland trade contact with Tamralipti on one hand and Burma, Ceylon and the Far East and East Indies on the other (Law 1967). The Buddhist and the Jaina texts gave evidences of Kalinga's overland and sea borne trade with overseas countries from Dantapura.

The excavations at Dantavaktrunikota by the Department of Archaeology, Andhra Pradesh in 1994 revealed the ruins of brick structures and Buddhist stupas. The pottery include Northern Black Polished ware (NBP), Rouletted ware, grey ware, dull red ware, red slipped ware and knobbed ware spread over an area of 500 hectares of land (Subrahmanyam 1994) shows the trade contacts of Dantapura with other parts of India. The site is surrounded by a earthen rampart. The geographical position and the exploration evidence corroborate the identification of Dantavaktrunikota with ancient Dantapura. Further, the results of the excavation concluded the long-standing confusion about the location of Dantapura and Palur. Now it is clear that Dantapura and Palur were two separate ports contemporary to each other.

Pithunda

Pithunda was another port and flourishing trade centre of Andhra. The Hathigumpha Inscription of Kharavela (1st century BC) states that Kharavela invaded the coastal belt of Andhra and captured the port and market town of Pithunda and renovated the port (Jayaswal 1983). Pithunda

was also known as Pratipalapura. The explorations at Pithapuram (identified as Pithunda), 20 km north of Kakinada yielded brick structures, sherds of Rouletted ware and Black and red ware from a mound datable to the Early Historic Period. Bhattiprolu of Krishna district is generally identified with Pithunda of the Hathigumpha inscription of Kharavela. Ptolemy locates Pithunda in between the deltas of the rivers Godavari and Mahanadi (Levi 1926). Further, he mentions that Pithunda was a centre of textile industry and great mart in the region of Maisolia. Archaeological evidence suggests that there was an abrupt end to Buddhism at Bhattiprolu. The Jaina text *Uttaradhyayanasutra* mentions Pithunda had trade relations with Champa (modern Kampuchea) even in the days of Mahavira and was a famous seat of Jainism (Sarma 1990).

Dharanikota

The excavations at Dharanikota brought to limelight a rock-cut navigation channel of 15 feet depth and 70-85 feet width, connected with the river Krishna. The findings include glass earrings, glass bangles, glass objects, copper and lead coins, black and red ware, NBP ware and sherds with Brahmi inscriptions (Raghavachary 1972-73). Though Dharanikota is located away from the sea big ships could travel even beyond Dharanikota. The hinterland region of Dharanikota was rich in producing large quantities of grain, cotton and forest products. The presence of a warehouse on the bank of River Krishna is evident that Dharanikota was an inland port during the early centuries of Christian era. The brisk structural activity marked by the construction of a huge wharf raised on postholes at right angles to the navigational channel. The wharf extends to the height of 3.36 m. A brick structure was constructed close to the wooden wharf all along the channel on its inner side and an earthen embankment was raised at the back (Ghosh 1989). The presence of Rouletted ware, arretine ware, Roman amphorae, Roman coins and double mast ship motif Satavahana coins testifies its contacts with other parts of the world (Sarma 1980). The donative inscriptions found at various Buddhist cave temples of western India confirm the claim made by the Roman traders that they were residents of Dhanyakataka (Dharanikota). The art, which flourished in the region, was known as the Amaravati School of art and spread to many regions of Southeast Asian countries. Several excavations, which were carried out at Dharanikota suggests that Dharanikota was a inland port, trade mart and Buddhist centre flourished since 4th century BC to 14th century AD.

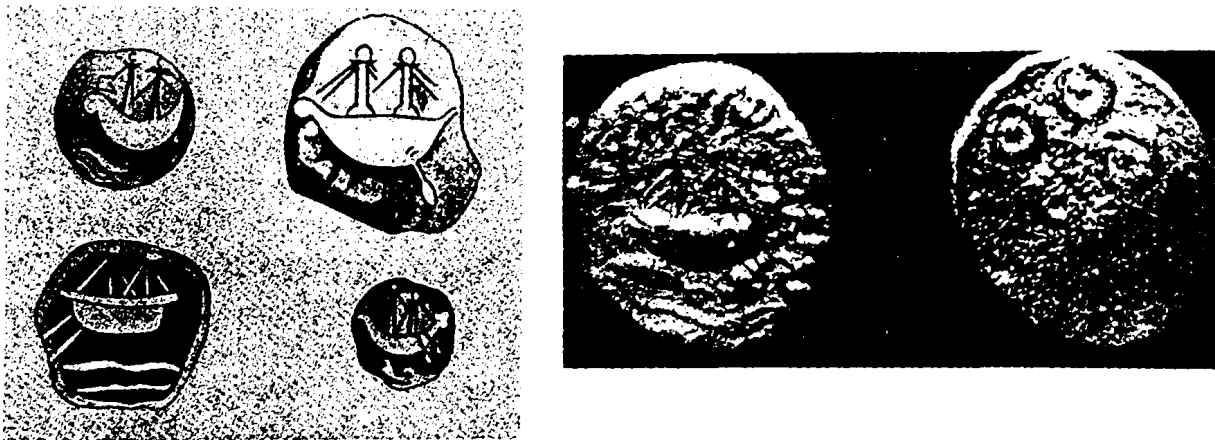


Fig. 2(a & b) Ship motif coins issued by the Satavahana kings

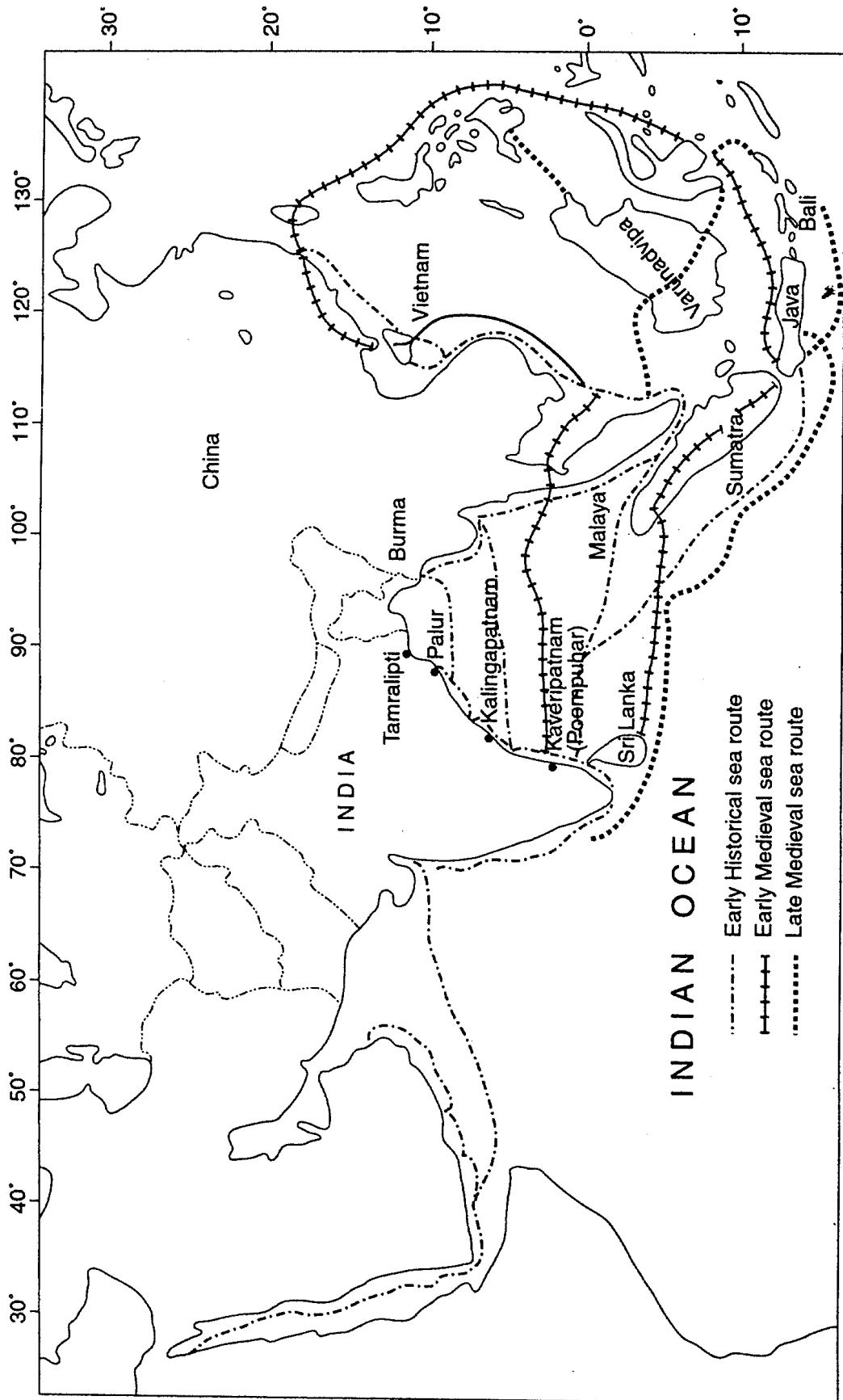


Fig. 3 Map showing the sea routes between India and Southeast Asian Countries

Motupalli

Motupalli near Bapatla in Prakasam District served as a port from the beginning of the Christian era to the late medieval times. It is known as Desuya Konda Pattana. Archaeological and inscriptional evidences show that Motupalli was a port during the rule of the Satavahanas, Kakatiyas, Reddys and Vijayanagars. However, the discovery of Rouletted ware and stamped ware suggests that Motupalli also served as a port during Early Historical Period (Reddy 1999). The inscription of Ganapatideva, the Kakatiya ruler on a pillar in the premises of a temple at Motupalli states that the lives of the both foreign and Indian mariners are treated as valuable as that of the ruler Ganapatideva himself. Further it provides a long list of import and export trade items which invariably reveals the busy activities of this port.

Motupalli had trade and cultural contact with Japan, China, Sri Lanka, Bhutan, Pegu, Burma, Sumatra, Java and Borneo. Large size wreck ships plying from Motupalli required a crew of 300 men whereas smaller vessels needed 150 to 200. The Chinese ships such as Jongu, Zu and Kakam also visited this port frequently (Sree Padma 1992).

The famous '*abhaya sasana*' (charter of security) (Hultzsch 1982) issued by king Ganapatideva AD 1244-45, the contents of which were reaffirmed by the successive Reddy rulers, throws a welcome light on the care taken by the rulers of Andhra to encourage maritime trade. The merchants traded in goods like camphor, rose water, ivory, pearls, silk, arecanuts from Motupalli port. The coastal towns such as China Ganjam in Prakasam district, Divi or Hamsaladivi to the north of Krishna and Krishnapatnam served as trade centres. The other inscription issued by the Reddy rulers at Motupalli had encouraged free trade with places all over the world.

Kottapatnam

Kottapatnam was another port town mentioned by Ptolemy as Kottis. Presently it is a small village in the district of Nellore. The ancient port site of Kottapatnam is 500 meters away from the seashore and an irregular shaped creek passes through this village. It appears that the creek could be an artificial channel, which was dug probably for the berthing of the ships. The ancient habitational remains in the region have been scattered over more than one kilometre. The findings include Rouletted ware, Roman glass pieces, stamped ware, Caolin pottery, Porcelain, Chinese ceramics and glazed ware and the Ming dynasty coin having Chinese script and a square hole (Rao 1994). The archaeological evidence indicates that Kottapatnam continued as a port from 3rd century BC to 15th century AD and the contacts with Southeast Asian countries started from 3rd century BC onwards (Rao 2001). Kottapatnam served as a famous port for national and international trade and commerce. The site is still promising for future investigations.

Machilipatnam

In ancient times Machilipatnam was known as Masulipatnam. Ptolemy has referred Masulipatnam as Maisolia. Masulipatnam was point of departure of vessels bound for Southeast Asian and West Asian countries in olden days. The inland trade route, which was started from Masulipatnam, connected to Broach passing through Ter, Paithan and Ajanta. The Indo-Roman trade activities were continued through this route connecting the east and west coasts of India. Masulipatnam was centre of trade and commerce in the early centuries of Christian era. Ships laden with varieties of cotton cloth, yarn, silk, cowries, semi-precious stone, glazed ware etc were

sailed to Burma, Ceylon, Indonesia and other countries. Masulipatnam became more prominent during the Golconda kingdom. The port declined because of formation of sandbars, narrowness and shallow water, which did not allow movement of bigger ships for handling the cargo. Afterwards Nizamapatnam came to limelight.

Minor ports

Salihundam

Salihundam, located on the right bank of river Vamsadhara near the foothill, was a trade and culture centre from 3rd century BC onwards. It served as a beacon for the ships anchoring at nearby Kalingapatnam (Sila Tripathi 2000). The excavation findings from Salihundam include stupa, Viharas, Tantric Buddhist images, brick platforms, punch marked coins, Puri-Kushana coins, Roman and Satavahana coins, potsherds with Brahmi scripts, Rouletted ware and Red Polished ware. During excavations two inscribed conches discovered in the monastic precincts reveals the name 'Salipataka', perhaps the ancient names of Salihundam. The finding of Rouletted ware and Roman coins of Tiberius of (AD 14-37) indicate that the port had trade relations with the Romans (Subrahmanyam 1964). Salihundam flourished continuously from 3rd century BC to 8th century AD. On the basis of pottery and Roman coins it is suggested that navigators and traders frequented Salihundam. The findings of Salihundam are similar to those found at Arikamedu, Nagarjunkonda, Sisupalgarh, Hastinapur and the Buddhist images are reminiscent of Gandhara features (Ghosh 1989).

Bavikonda, Thotlakonda and Pavurallakonda

The other Buddhist sites located on the coastal area are Bimunipatnam, Visakhapatnam, Pavurallakonda, Thotlakonda and Bavikonda. It is interesting to note that the hillocks around Visakhapatnam such as Pavurallakonda, Thotlakonda and Bavikonda are locally known as Risi Kondulu (hills for monks). The excavations at Bavikonda yielded stupas, votive stupas, Buddhist viharas (monastery), rectangular halls, relic caskets datable to 3rd to 1st century BC. Each monastery can accommodate more than a hundred monks. The other finds of the excavation include black and red ware, Rouletted ware, Satavahana, Augustus (31 BC-AD 14) and Tiberius coins (AD 14-37) (Krishnasastri 1992). Double mast ship motif coins were discovered at Thotlakonda in which one ship is shown anchored while another is shown sailing. The maritime activities of Andhra can be established from the findings of Roman coins. The pottery, Roman coins and inscriptional evidence show that Bavikonda flourished from 3rd century BC to 2nd century AD. River Gosthani flows nearby to Pavurallakonda, which served for navigational purposes during the early historical period. The excavations brought to light Roman and Satavahana coins, inscribed pot and pottery including black and red ware, red polished ware etc. The findings are datable to 3rd century BC to 2nd century AD (Subrahmanyam 1999).

Ghantasala and Koddura

Ghantasala was a sea borne trade centre situated near Machilipatnam. Ptolemy referred to this region as Maisolia. The hinterland region of Ghantasala was producing rice and textiles, which helped to develop into a trade centre. Ghantasala had close contacts with neighbouring Buddhist centres. It is located away from the coast however; a canal called Upputeru was dug to connect with the sea. During high water, ships could move into the inland port of Ghantasala. Several

mounds are located in and around Ghantasala from where Roman and Satavahana coins, early historical pottery, Buddha images have been reported. The Buddhist findings of Ghantasala closely resemble with Amaravati art.

Ptolemy mentions Koddura as a port that served till 17th century AD. The neighbouring village Vallanadapalem attests to this fact. Vallandu is the Telugu name for Holland or Dutch. The Dutch who came to India during the 17th century AD and had many settlements on the East Coast and Vallanadapalem is one of them.

Epigraphy and Numismatic evidences

The value of oceanic trade was well understood by the rulers of Andhra, which can be recalled from the ship motif coins issued by the Satavahanas (Fig. 2), Salankayanas and Pallavas. These coins are found all along the coast of Andhra.

The ship type coins issued by the Satavahana king Vasisthiputra Pulumavi, the son of Gautamiputra Satakarni, are classic examples that indicate the importance of marine trade. The circular lead coins depict both double mast and single mast ships anchored in mid sea. Gautamiputra Yajna Sri and his successor continued the same type of coin more prominently and have been discovered from many sites along Southeast coast of India. A unique coin now in the British Museum shows the device very clearly and what is more interesting is the portrayal of cargo vessels approaching the anchored ship. The Salankayana king Vijaya Devavarman who succeeded the Satavahanas in the Vengi country issued the double mast ship lead coins. The Salankayanas were also powerful having trade contacts with Southeast Asian countries and furthered the cause of Buddhism as well as Brahmanical religion beyond the shores (Sarma 1992).

The contact of the Ikshvakus with Sri Lanka was so extensive that a monastery was built for the accommodation of monks of Sri Lanka at Nagarjunakonda. The Ikshvakus had maintained contacts with Southeast Asian countries followed by the Chalukyas. Gold coins of Saktivarman of the Vengi Chalukya family were found in Arakan, Siam and Burma. There was a lull in these contacts after the downfall of the Chalukyas for sometime and the same was revived under the rule of the Kakatiyas who renovated the ports and made them functional. This continued even during the rule of the Reddys and the Vijayanagars.

The other evidences are the terracotta sealing with ship symbol occurs in Central Thailand. Bronze coins with ship motif with a cow or bull on the reverse were reported from Klong Thom and Khuan Lukpad, which were probably in circulation among the merchant class (Higham 1989). A stone seal found at Nakorn Pathom shows a two masted ship. A carnelian seal inscribed in the south Indian characters of the 5th century AD contains the name of Vishnuvarma who was either a king or a trader.

The inscriptions of 1st and 2nd century AD of Andhra Pradesh mention master mariners resided at Mahanagapurvata and Ghantasala. The Indo-Roman trade of this period is well known and the port towns of Andhra were humming with activity. The script of inscriptions found at Ligor, Malay Peninsula and the Province Wellesley resemble the script of early Pallava (Gerini 1974). The earliest inscriptions are found from Kutie estuary of Borneo and palaeographically these inscriptions can be datable to the end of 4th century AD (Nilakantha Sastri 1949). Even the Tailang alphabet is identical with the Vengi alphabets. The Burmese traditions indicate that the Salankayanas of Vengi were responsible for the spread of Buddhism to Burma (Ayyer 1987).

Some early Sanskrit inscriptions have been recorded in western Java. According to Burnell (1878) and Rawlinson (1916) the script resembles the ancient Telugu or Vengi script. On palaeographic grounds the script can be placed in the middle of the 5th century AD. These inscriptions suggest that the successors of Purnavarma issued to commemorate his valour. Taking into account all the epigraphical details, it can be surmised that Purnavarma might have been a descendant of the Vengi rulers.

The Motupalli pillar inscription of Ganapatideva AD 1244-45 assures safety to traders (*abhaya sasana*) arriving from all continents (Svadesi and Paradesis) risking the sea voyage and its hazards like storm attacks and shipwrecks. The levies (usually 1:30) on the items of import and export have also been listed with great details and speak of the flourishing international trade from Motupalli port, which was provided with warehouses. Besides the mention of several continents, islands, foreign countries and cities specific mention of Chini (China) is noteworthy.

Another inscription from Motupalli of Annapottu Reddi AD 1358 mentions that law of the state is applicable for the merchants on the sea and shore towns. The merchants could move freely in any part of Motupalli. The levy was not applicable for foreigners. Foreigners could sell their merchandise to whomsoever they like and buy articles of their choice. The cloth for women was not to be levied. But for other items of merchandise the duty was to be levied as before. This was the procedure followed in the place for security to persons in distress (Srinivasan 1990).

Art Evidences

In ancient times, long distance trade was not possible without halting at intermediate places for want of water and food. Sailors voyaging from Tamralipti, Palur, Kalingapatnam, etc. to foreign countries used Nicobar Island as halting station. Some times ships used to go to Java directly then to Ceylon and other ports on the east coast of India. Sailors, merchants, artists, sculptors and missionaries come from different parts to the nearest port and then sail to Southeast Asian and Far East countries and follow different sea routes (Fig. 3). The artists and sculptors carry their ideas and innovations and in return they bring some new ideas, which can be gleaned from the art evidences of Andhra.

The cultural and religious contacts of Java and Andhra can be traced from the early centuries of Christian era. Traces of the early Buddhism having Andhra influence has been found in various places of Southeast Asia. The contact of Andhra with Borneo can be traced through inscriptions and art. The stone images of Buddha found at Pong Tuk of Siam (Thailand), Bangoen (Borneo), Palembang (Sumatra) and the bronze images of Buddha found at Pong Tuk and Bangoen are in the Amaravati style. The bronze sculpture of Buddha found at Sawan Kolak clearly resembles that of the sculpture from Budhani near Amaravati (Gerini 1974). Buddha images of Amaravati style have been found at Jamber in Eastern Java.

The excavations at Pong Tuk on the right bank of the river Mekong or Kanburi in the province of Ratburi show the remains of Indian culture. Prominent among these finds is an exquisite bronze sculpture of Buddha, of the early Amaravati School of 2nd century AD. Remains of two structures having circular and square plans have been unearthed resembling the early structures at Anuradhapura in Sri Lanka, built under the influence of Amaravati art and architecture (Nilakantha Sastri 1978). The Amaravati School of art influenced even the Buddha images of Sri Lanka.

A number of Sanskrit inscriptions datable to 3rd-4th centuries AD have been noticed at Annam. A bronze Buddha statue of a metre in height was found at Dong-duong, was modelled on the Amaravati style of art standing with the right hand in *chinmudra* and left in *kataka* posture with the robe draping the entire body only leaving the right shoulder bare and falling in a straight fold at the back (Nilakanta Sastri, 1949). The study shows that during early centuries of Christian era Buddhism had a strong hold along the east coast of India. The Buddhist monks and mariners together jointly carried out in spreading the Indian culture to other parts of the world.

Shipwrecks in Andhra coast

During the last five thousand years, a large number of ships of various countries were lost in Indian waters due to natural calamities like cyclone, human error and warfare. So far no proper record of ancient ships and cargo lost before the 16th century is available, but a few references to shipwrecks are found in Jataka stories and inscriptions. The Indian art also depicts a few scenes of wrecks. The marine records of the archives at Delhi, Kolkata, Bhubaneswar, Panaji, Mumbai, Hyderabad and Chennai, provide information about the ships that sank in Indian waters. The ships wrecked in Andhra waters (Fig. 4) were the wooden sailing vessel St. Helena of East India Company carrying cotton bales from St. Thomas to Madras in 1714 about 40 miles north of Pulicat. Out of 608 bales 383 was recovered. Dart Mouth carrying treasure is said to have sunk off Masulipatnam in 1719. Governor Keating another ship, which sank due to storm in 1812 near Nellore, was carrying Kings stores. Another sloop class ship *Wielhelminah* wrecked on the shore of Krishnapatnam near Nellore on 30 June 1814 but part of the cargo of the ship was salvaged. On 1st January 1819 the wooden sailing ship *General Brown* wrecked on the sunken rocks off Bimlipatnam of Vizagapatnam district due to human error and the steamer class ship *Emma* wrecked at the southward point of Divy off Masulipatnam on 12th June 1849. The East India Company's wooden sailing ship *Alfred* sailing from Madras is said to have sunk off Kalingapatnam on 27th January 1853. A barque carrying iron and great quantity of private valuable property wrecked on the sandbank off the mouth near the southern bank of the River Krishna in 1853. The French ship *Le Monarque* wrecked off Coringa in 1859 lost a few of its crewmembers. A wooden sailing private Aberden ship *Kindrochat* of 1856 sailing from Calcutta to Madras wrecked in 1859 due to human error. *Mohideen Abdul Kader Nasar Rulla Thyca* Schooner class of Indian vessel is said to have sunk near Masulipatnam in 1912 (Sila Tripathi et al 1994). The British Library, London, archived documents of all English East India men voyaging from London to Asia between 1600 and 1833 mention that the French captured two ships; *Kent* 1800 and *Princess Charlotte* 1804 at Vizagapatnam in the Bay of Bengal (Per. comm. A.J. Farrington).

Prospects of maritime archaeology in Andhra coast

Andhra Pradesh with a long coastline and network of rivers is a potential area for searches in marine archaeology. The Bay of Bengal is an area prone to cyclone. Rainfall in the catchment area is caused by storms and depressions, which are frequent in the Bay of Bengal during the monsoon season. Storm tides also frequently occur and cause considerable devastation. These factors might have either buried or washed out structures related to maritime activities. Historians believe that weak successors, weak economy, attack by neighbouring kingdoms and similar reasons attributed to the decline of maritime activities. On the other hand, the geological processes such as coastal erosion, sea level changes, tectonic activities, sedimentation, formation of sand bars and spits also seem to have been responsible for the decline of ports (Sila Tripathi 1993).

Andhra Pradesh coast has experienced high wave environment in association with strong current, which prevails during SW monsoon (Chauhan 1991). These phenomena caused great quantity of sedimentation along the coastline and in the navigational channels, which might have contributed abandoning of ancient port and trade centres of Andhra.

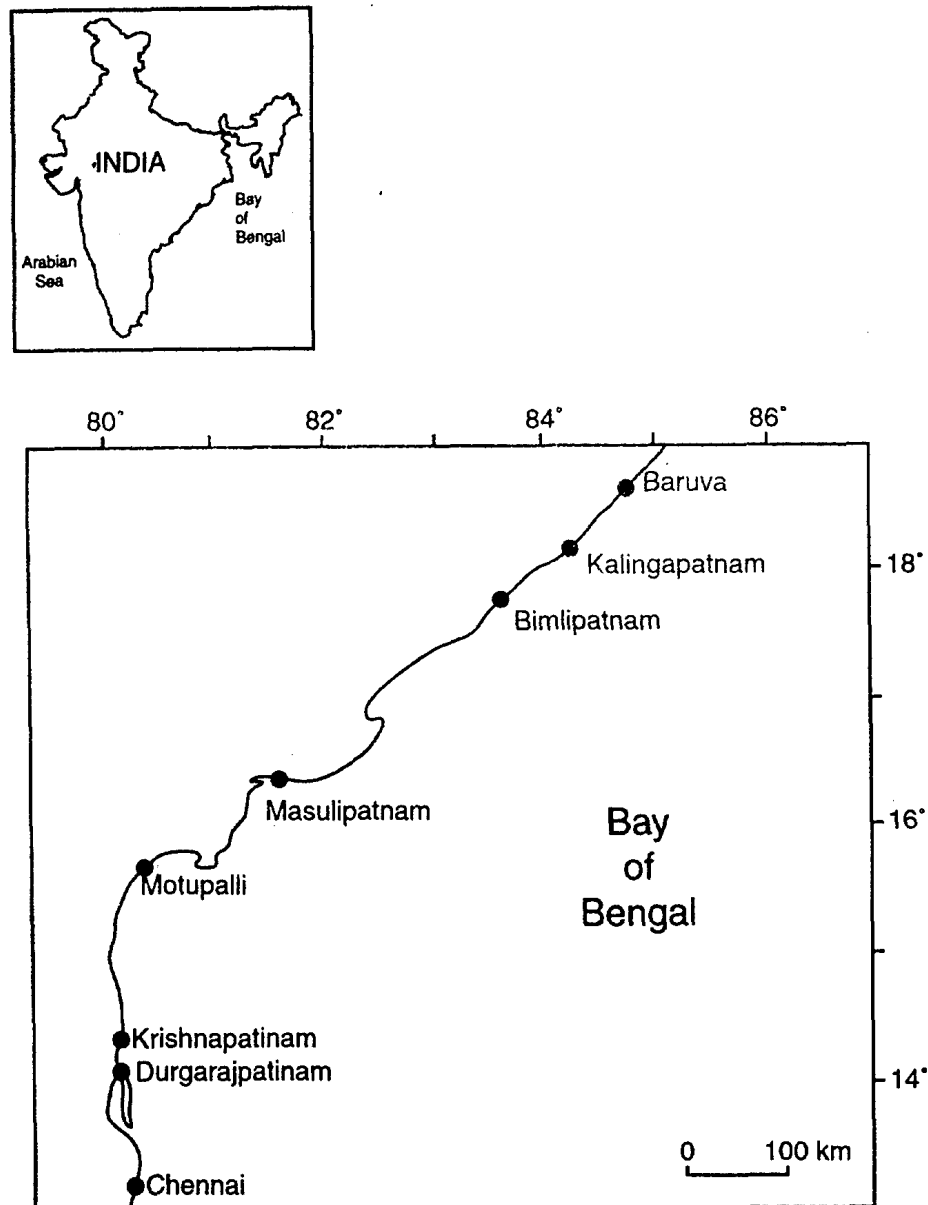


Fig. 4 Ports and location of shipwrecks of Andhra Pradesh

The Quaternary period has witnessed frequent rise and fall of sea level, which has influenced the coastal landforms. A number of sites belonging to different periods have been brought to light in the onshore and inland area all over India and attempts have been made to understand the chronology, ecology and settlement pattern. The study at Rishikonda, Singarayakonda and other sites shows that the coastal Andhra Pradesh provides three high stands of sea at 20, 7-8 and 3-4 m above the mean sea level and occurrence of Palaeolithic tools (Subrahmanyam & Sireesha 1990). In

lower Godavari Basin, Palaeolithic tools occur along with stream gravels and some are mixed with lateritic material. The survey in the nearshore region may yield similar kind of evidences, which would help to understand more about the Palaeolithic culture of coastal Andhra in relation with rise and fall of sea level.

In course of exploration at Kalingapatnam the local people informed that there are some old structures lying underwater, which hinders navigation. However, they were unable to tell the period and other details of these structures. This confirms that some natural factors caused the submergence of these structures. Even during rainy season people collect gold coins belonging to the Roman, Vishnukundin, Chalukyas and Kakatiya dynasty from the mound.

The change of coastline in the Godavari region forced the formation of alluvial deposits in the bay and advanced some 20 km to the north at Uppada where beach is worn away by erosion. During low tide people collect coins from a probable submerged site.

The Motupalli inscription was issued for the safety of marine traders those who lost their cargo etc; in storms and shipwreck. Hence, it appears that there may be some shipwrecks off Motupalli belonging to the Kakatiya period. Some ruins at Motupalli are partly underwater. Dugarajupatnam in Gudur Taluka was a port town during the reign of Ranati Cholas of the 6th and 7th century AD. The Jaina Palli of Krishnapattanam near Nellore belonging to the later Chola period now submerged in the sea. Archaeological remains are lying only 500 m away from the shore of Kottapatnam; hence its remains may be in underwater which cannot be ignored.

Geophysical surveys have been carried out off Visakhapatnam and Bimlipatnam, in the Samala Konda Bay and Pudimadaka Bay to study the geological formations. Besides geological formations some isolated anomalies such as submerged objects were recorded at Bimlipatnam, Samala Konda Bay and Pudimadaka Bay (Rao 1988). Probably these could be archaeological objects. Even the shipwrecks such as Dart Mouth, which was carrying treasure, sank off Masulipatnam in 1719 and Governor Keating carrying Kings stores that sank in a storm near Nellore in 1812 can be explored to understand the shipwreck archaeology of Andhra Pradesh.

The exploration of Puduru in the District of Nellore has brought to light amphorae, terracotta ringwells, red slipped ware and Rouletted ware. The amphorae and terracotta ringwells are similar to those were found at Poompuhar, Kanchipuram, Karaikudi, Arikamedu and Vasavasamudram. The finding of Rouletted ware, stamped ware, knobbed ware, amphorae, NBP, Punch marked coins, Roman coins, Buddhist settlements etc all along the east coast of India suggests that a network was existed among the ports, mariners, traders, trade and cultural centres starting from the Ganges to Kanyakumari. The community living in the coastal region engaged in maritime activities and probably patronised Buddhism. Further explorations would shed more light on the maritime activities of Andhra Pradesh.

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