

MARINE ARCHAEOLOGICAL EXPLORATIONS OF TRANQUEBAR-POOMPUHAR REGION ON TAMIL NADU COAST

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Introduction

The east coast of India was studded anciently with several ports (Fig.1) such as Tamralipti (Tamluk), Dosarne (Dhauli), Kainapara (Konarak), Palura (Gopalpura), Kalingapatnam, Vengipura (Peddavegi), Maisolia (Machilipatnam), Kadal Mallai (Mahabalipuram), Mylapore, Poduke (Arikamedu), Kaberi (Kaveripatnam, also known as Poompuhar), Nikam (Nagapattinam), Periapatnam, Colchi (Korkai) and Comari (Kanyakumari). Of these, the present paper is concerned with the offshore exploration of Kaveripatnam-Poompuhar zone and also

Tranquebar (Tarangambadi) which was a satellite port or suburb of Poompuhar, the famous port-town of the Early Chola Kings of Tamilagham (Tamil Nadu).

Before giving an account of three offshore expeditions (in May 1989, March 1990 and March 1991) to Tranquebar-Poompuhar it is necessary to refer briefly to the results of the onshore excavation undertaken by the author in 1962-65 and subsequently by K.V. Raman and K.V. Soundara Rajan at Kaveripattinam (Kaveripatnam). According to *Manimekhalai* the port city was submerged by the sea as a sequel to the wrath of Indra whose

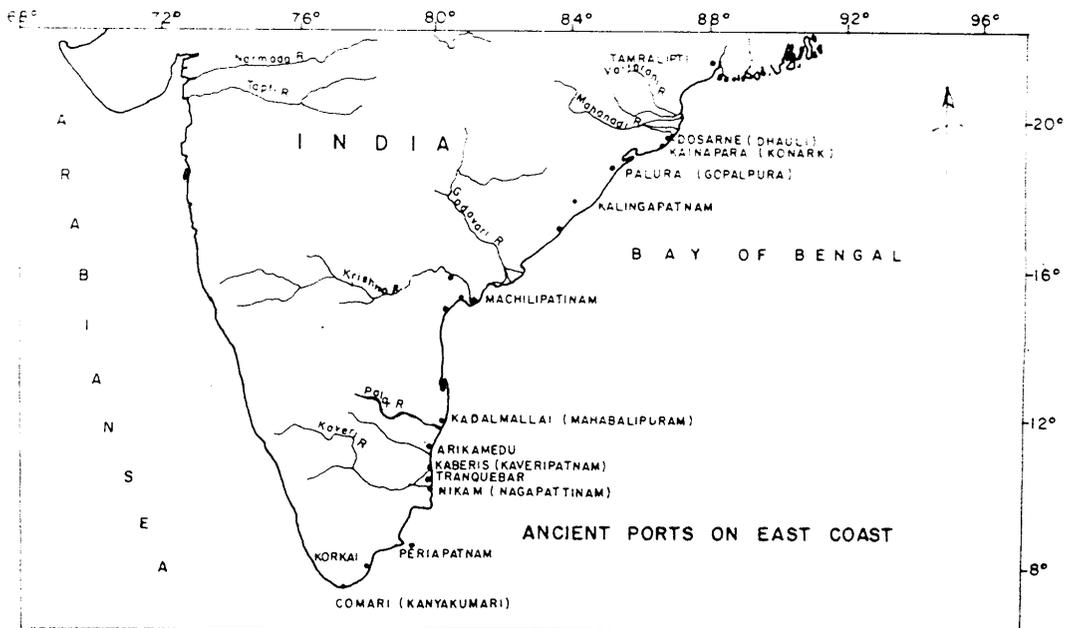


Fig. 1 : Ancient ports on East coast.

festival the inhabitants failed to celebrate. It is the submerged city and shipwrecks that interest the marine archaeologist. The Sangam text *Silappadikaram* says that Poompuhar (Kaveripatnam) covered an area of 4 Kavatham approximately 30 square miles. It must have included Tarangambadi, modern Tranquebar, which Wheeler considered as Kaveripatnam (Wheeler 1976, 52). The author of the *Periplus of the Erythraean Sea* refers to it as Kabera (Schoff W.H. 1974, 2nd ed.). Its boundaries according to *Silappadikaram* extended upto Karuvendanathapuram and Kadankondan on the west, Thiru Kadavur on the south, Kalikamur on the north and the sea on the east. It encompassed 30 villages and could boast of 60,000 families.

The legend of Kovalan, the merchant, and Kannagi his devoted wife, who was enraged by the most unjust beheading of Kovalan by the Pandyan king at Madurai, has given rise to the Kannagi Cult and Poompuhar has become a place of pilgrimage. The tragic events form the main story of the epic *Manimekhalai*.

Onshore Excavation (1962-65)

Onshore excavation of Kaveripatnam was undertaken by the author with a view to reconstruct the early history of Tamil Nadu and to throw light on its overseas contacts with South-east Asian countries. The surface exploration of Kilaiyur, a part of Kaveripatnam, in the years prior to 1963 had yielded square copper coins with the tiger emblem which was the royal crest of the Early Cholas. Other finds included beads of semi-precious stones and amphora pieces. The most significant discovery is an I-shaped brick structure exposed in the ancient channel of Kaveri at Kilaiyur which is now completely silted up. The ^{14}C date of the samples taken from wooden posts anciently fixed along this structure is 316 ± 103 B.C. which antedates the reign of the Early (Sangam) Chola Kings. The brick structure with a drain for water flow and a platform supported by wooden posts for handling cargo (Pl.I) served as a wharf built in the channel of the river Kaveri (IAR 1962-63, 13). Ancient texts say that the cargo laden ships could sail from the sea right into the



Pl. I : Brick wharf of 3rd Century B.C. in one of the ancient channels of Kaveri - Kaveripatnam.

river, perhaps upto the wharf without slackening the sails. At present the old course of the Kaveri river in Kilaiyur is turned into a rice field and cultivation is going on. Another sector of ancient Poompuhar (Kaveripatnam) city is Pallavaneswaram where a temple of Siva is situated. Excavations undertaken here brought to light a series of cells or rooms of a Vihara of 4th-5th century A.D. where Buddhist monks used to live. Its longitudinal walls are 1.7m thick and the transverse ones 0.9m. A beautiful image of Dhyani Buddha was an important find from the Vihara. Another brick building noted for stucco plaster and floral designs was also laid bare in the course of excavations. Further south, a Buddha pada of Palnad (Andhra) limestone was found. Thus it is obvious that Kaveripatnam was a very important centre of Buddhism noted for its stupa, caitya, vihara and metal images of the Buddha besides the symbolic pada (feet) of the Lord carved in stone which corroborate the description of the town given in Manimekhalai. While the wharf, coins, beads and seal found at Kilaiyur bear testimony to the description of the port.

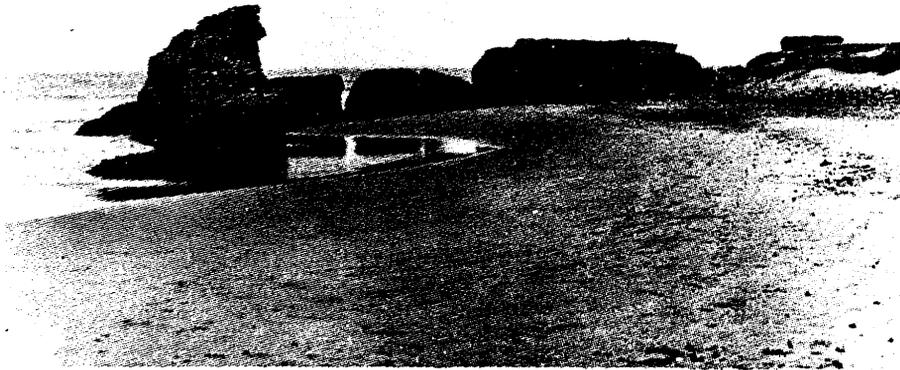
The spread of Buddhism to Sri Lanka in Mauryan times had its impact on the commercial activity of the Andhra and Tamil Nadu ports such as Amaravati (Dharanikota); Kaveripatnam and Nagapatnam, which developed into important centres of Buddhism. The ancient Magawa, a monastery of Tissa, in Southern Sri Lanka got its name Mahanaga Stupa after the Mahanaga Parvata of Guntupalli (Sarma I.K. 1990). Kanchi and Kaveripatnam were two important centres of Buddhism. The intellectual Visnugopa of Kanchi was known as Kanecheyaka in the Allahabad Prasasti. The 2nd century B.C. inscription of King Kharavela refers to Tramiradesasanghatam, that is, confederacy of the Tamil countries. Sarkar mentions the reference in a Chinese text, Chien Han Shu of 1st century A.D. that the Chinese kings sent presents to the ruler of Kanchi which was known as Huang Che (Sarkar H., 1970, 328). According to Lokesh Chandra, the great wealth of Kanchi had its reflection in the name Manimekhalai given to the Sangam text as the Chinese traded in pearls and jewels from 2nd century B.C. onwards.



Pl. II : Mouth of present Kaveri river near the sea - Vanagiri.

The rock inscription of Pulankuruchchi in Ramanathapuram district of Tamil Nadu refers to a chief donor as Kadal-aggaperumpadaittalaivan who must have been the Captain of a large naval force during the year 192 of the Tamil era of the founder King Chendran Kurran of Kalabhra family. Although this inscription is ascribed to 4th century A.D; the King Chendran Kurran is believed to have lived in the 2nd century A.D. The Kalabhras are said to have come by sea to the south. The onshore excavation in 1962-65 at Velliyan Iruppu (Whiteman's Colony), a suburb of Kaveripatnam brought to light brick structures of 9th-12th century A.D. in the fourth phase of occupation. A copper coin of later Chola King Raja Raja I found here is datable to 11th century A.D. The semi-circular brick structure exposed in the excavation at Vanagiri another suburb served as a reservoir (IAR 1963, Pl.XIV). Its internal diameter is 8 m. and the extant height 2m. The reservoir was connected with the river Kaveri through an inlet channel. The Roulletted and Megalithic Red Ware associated with it sug-

gest 1st-2nd century A.D. for its construction. Manigramam, which derives its name on account of several beautiful beads of semi-precious stones was also part of Kaveripatnam (Rao S.R. 1965, 163-165). K.V. Raman's excavation in Pallavaneswaram temple area with the 10 ft. thick habitation debris yielded late Chola coins and terracotta tiles of early medieval period (IAR 1966-67, 1). The Sampapati Amman Temple mound excavated by K.V. Soundararajan yielded two terracotta ring wells of the pre-Late Chola period. From the archeological evidences briefly mentioned above, it is obvious that the ancient port-town of Kaveripatnam (Poompuhar) extended from Puddupuram (11° 9' N) north of Kannagi statue at Poompuhar as far south as Vanagiri where the Kaveri presently joins the sea (Pl.II). In fact its suburbs or satellite towns extended further south upto Tranquebar (11° N) as revealed by the author's exploration of the coast line from 1989 to 1991. Another important evidence from onshore excavations which should be taken note of by the marine archaeologist is that the ancient township of



Pl III : The battered brick wall in the sea at Tranquebar.

Poompuhar of 3rd century B.C., indicated by the brick wharf of Kilaiyur was destroyed by the sea and as a sequel to the transgression of the sea the township was shifted landward in the 2nd-3rd century A.D. which is attested by the brick reservoir of Vanagiri. The offshore survey of 1989-91 has yielded corroborative evidence of submergence by way of brick structures in the shallow waters of Vanagiri. The township extended gradually southward upto Tranquebar where again 1989-91 explorations have revealed terracotta ring wells and storage jars of 3rd-4th century A.D. in the intertidal zone. There must have been another transgression during this period. Further shifting towards Pallavaneswaram and Velliyan Iruppu is indicated by the onshore evidence. It is this onshore evidence and the tradition that Poompuhar was swallowed by the sea that induced the Marine Archaeology Unit (now designated as Marine Archaeology Centre) of NIO to take up offshore exploration of Tranquebar in May, 1989 and March 1990 and subsequently of Poompuhar region in February- March 1991. The NIO Geophysical Sur-

vey Group in collaboration with the Department of Archaeology of Tamil Nadu State, had carried out in 1982 sonar and magnetometer survey in the sea from Poompuhar to Vanagin almost upto Tranquebar and reported eighteen features. A summary of the Side-Scan Sonar, Profiler and Magnetometer surveys carried out by NIO scientist V.L. Subbaraju and K.H. Vora in collaboration with Dr. R. Nagaswami, Director, Tamil Nadu Department of Archaeology is given in PPMA (Rao 1987).

Offshore Survey of Tranquebar by Marine Archaeology Unit, May 1989

On a reference made by Shri M. Srinivasan, Manager of the Tranquebar Branch of Integrated Fisheries Department the Marine Archaeology Unit (MAU) and the Regional Centre of the National Institute of Oceanography, Waltair undertook offshore survey of Tranquebar in May 1989 with a view to locate a shipwreck said to be lying buried in the sea bed and causing great obstruction to fish-



Pl. IV : Late Chola Temple partly collapsed owing to the transportation of the sea at Tranquebar.

ing operations. The east coast is a high energy zone and the month of May is not very favourable for marine archaeological exploration or geophysical survey, but the operations could not be started earlier because the geophysical instruments were engaged on other projects of NIO and Dr. T.C.S. Rao, Scientist-in-Charge of Waltair Centre was also otherwise busy. The type of boats needed for geophysical survey, airlifting and diving are not available in Nagapattinam, the nearest port with a jetty. The expedition party reached Karaikal on 11th May, 1989 and after loading the heavy compressor and diving gear at Nagapattinam in the trawler *Sona* (KKD 1799) suitably modified for marine archaeological survey, it joined the other vessel *Koti* (KKD 1759) and the surface landing motor boat on the 12th in Tranquebar waters. All the three vessels had to be chartered from Visakhapatnam. The five diver-archaeologists were assisted by commercial divers of Vishal Diving Company, but turbulent sea prevented serious diving. The massive brick protection walls of the 17th-18th century at Tranquebar have been toppled and fragmented by the battering

of the waves (Pl.III). A few hundred metres north of the brick wall, there is a Museum which houses some anchors, boat models and other antiquities; nearby there is a Late Chola Temple of the 11th century locally known as Masalamani Temple. A large part of the temple has also collapsed owing to the transgression of the sea (Pl.IV). Closeby, terracotta ring wells datable to 3rd-4th century A.D. are exposed in the intertidal zone. What is highly intriguing is that coins of different dynasties are washed ashore in high tide. The local fishermen have been collecting them almost daily (Pl.V) and selling them to Indian and foreign coin collectors. The majority of the coins are of copper belonging to Danes and Late Chola rulers, but a few lead, gold and silver coins are also available (Pl.VI). Such a large number of coins cannot be expected unless there was a shipwreck or a business house submerged in shallow waters.

Objectives

The main objective of the Marine Archaeological Expedition was to locate the ship-



Pl. V. Tranquebar local fishermen collecting coins on the shore.

wreck suspected to be a hindrance to fishing. Secondly a bathymetric study upto 20m depth was necessary to understand the geological features and locate submerged structures if any. Before undertaking search, the environmental conditions, bottom topography and coastal geology were studied.

The sea was rough throughout but off-shore magnetic, side-scan sonar and profiler survey was possible. The visibility was zero upto 15m depth and the sea became very rough after 11.00 a.m. However some highly significant features were recorded on sonograph. We had a bitter experience of over-stretching survey and diving operations upto 2 p.m. on 25th March. With great difficulty the surf-landing craft brought the first batch of staff to shore and while returning to *Soma* for bringing the second batch, it tossed heavily and even the highly experienced sailor was thrown out of the vessel. Fortunately Ranga, the cook, saved him by throwing a rope before he was drawn under the propeller. Tracking for side-scan sonar was done both parallel to the shore and perpendicular to it. A report on the bathymetric study and sonar survey undertaken in an area of 10x14 km from Chinnarkudi in the south

and Vanagiri in the north (Fig. 2) by Dr. T.C.S. Rao and his colleagues has just been published (Rao T.C.S. 1991).

Rao used F-Y Norway Shallow Echo-sounder for bathymetry and Baiting magnetometer for locating ferromagnetic objects.

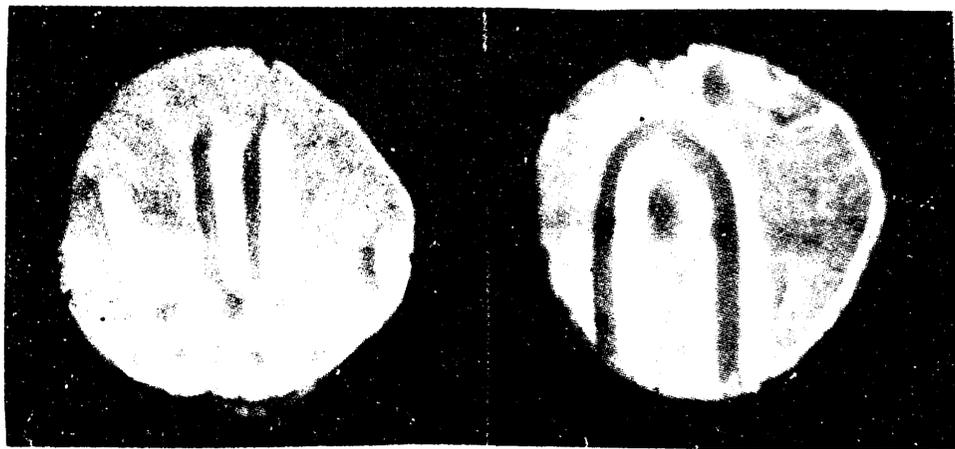
Results

Side-scan sonar and magnetic survey showed certain features in 10-11m depth opposite Masalanani Temple and further north opposite Chinnavanagiri. To the south of Tranquebar a feature of the shape of a boat has been registered.

Tenth Marine Archaeological Expedition, March 15 to March 26, 1990

It was found necessary to check manually whether the semicircular and circular objects noticed in May, 1989 were manmade structures or natural features. Hence for locating them, side-scan sonar, profiler and echo sounder were deployed by T.C.S. Rao's group.

Two boats *Soma* and *Koti* were chartered for diving and survey, Manavi and Bandolker

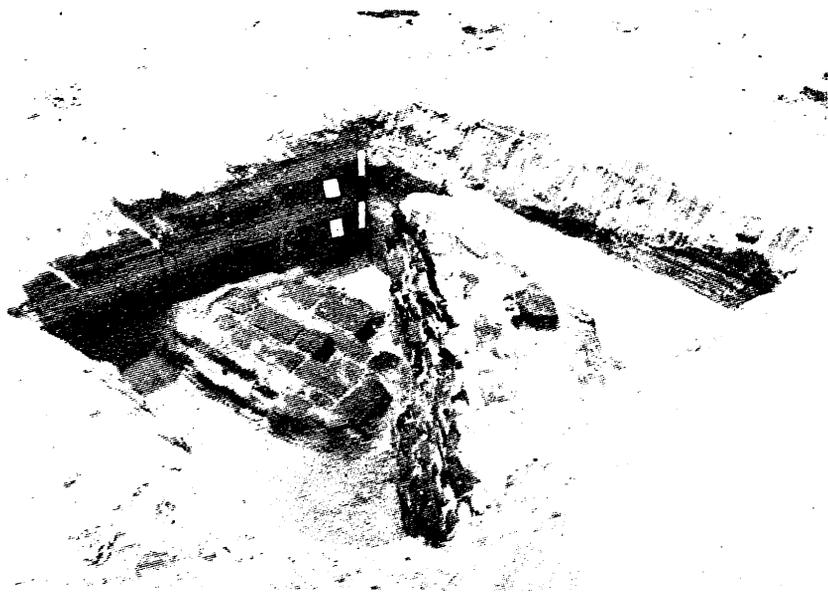


Pl. VI: Gold coins from the sea collected by local people - A standing figure is visible on the obverse.

dived between Sinnarpet and Chinnavanagiri at 10-11m depth where the sonograph showed semicircular objects on the sea floor. These objects partly covered by sediment are similar to the cairn circles in Chingleput district, and further south, the cairn circles of Tranquebar have a pebble tumulus with small rolled boulders underneath forming the outer circle. They are noticeable at buoy 5 opposite Masalamani Temple, and were surveyed again by Manavi Thakkar, Alok Tripathi and Sila Tripathi; the objects recovered included a large number of conch shells, a couple of granite blocks and two bricks. On 21st March two other circles were discovered. One is 15m in diameter and the other is 10m (EW) and 6.35m (NS) in diameter (Fig. 2). Since the concretion formed on the tumulus prevented deeper digging in the circle, the full section could not be drawn. The visibility being extremely poor, no photograph could be taken. The boulders used are 40 to 45 cms. in diameter. Diving was done at 12m depth near buoy 2, where the sonograph had recorded some features. A few metres north of the Fort are

semicircular objects (Profiles DD, 7 and 8), buried partly under black clayey sediment. Two ovoid formations are like circles with a tail-like passage; one of them is 60m long.

A very limited excavation revealed that below the circle is a beach rock. More such circles have been recorded in 8m depth opposite Masalamani Temple. The survey by NIO in 1981 had also recorded a few circular objects. The analysis of a couple of boulders from the excavated cairn revealed that they contained metamorphosed anorthosite gneiss of Archaean origin (Nair R.R. and Purnachandra Rao 1991). This variety of rock is available near Pathalur (on the Kaveri river) also from Sittampudi to Suryapatti in Salem district and around Kadalur in Tiruchirapalli district. The boulders are overgrown with shells, cemented in a beach environment and thus formed a shelly limestone. The analysis of sediment sample indicates a high energy environment at the site. The very fact that the Tranquebar Cairn Circles are in 7 to 8m water depth makes them earlier in date than those



Pl. VII : Tranquebar - A brick structure in intertidal zone exposed in excavation.

on land near Korkai. The megaliths of Tamil Nadu are dated between 1000 and 300 B.C.

The habitation debris in the section north of Murugan Temple above the HWL was excavated and late medieval brick structures were laid bare in a trench 5 x 5m. Structure 1 is sealed by layer 1 and structure 2 by layer 1A (Pl.VII). Below Str.2, the pottery, mostly red ware, was found in layer 2 and layer 3, the former being whitish sand and the latter brownish.

Dr. N. Kasinathan, Director Archaeology, Madras, informed us at Karaikal on 22nd March, 1990 that the Tamil Nadu Chief Minister had announced that underwater exploration of Poompuhar will be taken up in cooperation with the Marine Archaeology Unit of NIO. This was a welcome move in view of the readiness of the State Government to support preservation of underwater cultural heritage.

Joint Marine Archaeological Expedition of Marine Archaeology Centre of NIO and the Department of Archaeology, Tamil Nadu State, February-March, 1991

In view of the discovery of the submerged city of Dwarka by the Marine Archaeology Unit of NIO and also the encouraging result of the geophysical survey off Tranquebar and Vanagiri in 1989-90 which indicated two submerged river valleys and a shipwreck opposite Chinnavanagiri, the Government of Tamil Nadu showed its readiness to extend financial assistance to a joint underwater survey of the city of Poompuhar (PMR) said to have been submerged by the sea. The author had discussions with the Minister of Education, Secretary Finance, Secretary Department of Culture, in March, 1990 and finally with the Advisor in February, 1991.

Dr. B.N. Desai, Director, NIO, Goa and Dr. Avvai Natarajan, Secretary, Culture, Madras, exchanged letters outlining the nature and methodology of the proposed offshore survey by the Marine Archaeology Unit.

On the basis of the anomalies recorded in sonograph it was decided to resume survey in 4-7m water depth if the visibility was tolerably good. Otherwise exploration had to be done in deeper waters where visibility may be better. But the sea continued to be choppy on 3rd March and the scientific equipment could not be loaded in catamarans at Vanagiri even on 4th March. On the 5th, the trainees of the Tamil Nadu Archaeological Department (TNAD) were instructed how to start the newly imported HP Compressor and fill the bottles with air. The functions of various gadgets were also explained. On the arrival of the boats *Sona* and *Koti* and the surf-landing motorised craft at PMR, *Sona* was sent on 6th to Nagapattinam for loading compressor etc. Bandodkar supervised the operation. In the morning, the bottles and suits were taken on a catamaran at Vanagiri to try if the equipment could be safely carried across the high surf zone but the rolling of the catamaran belonging to Mr. Somu caused leakage of a bottle and all the staff on the catamaran were drenched. Ultimately we reached *Koti*.

Geophysical Survey

On 6th March from 9.30 a.m. onward the vessel *Koti* started tracking the side-scan sonar and echo-sounder in 6 to 7m depth from Vanagiri at 4 knots speed towards the Light House north of PMR. Opposite the two palm trees, a sand bar at depth 5m was recorded and opposite Kaveri mouth small objects in 2 rows on either side of track were recorded about 1 km from shore. On the southward re-

turn run of the vessel, a submerged channel-like section was recorded in 6-7m opposite Vanagiri Temple and also a few stray objects opposite PMR huts.

To our great relief the sea was calm on 7th and the Surf-Landing Vessel (SLV) could beach opposite the shell cottages and the equipment (bottles, cameras, etc.) could be loaded directly. At 8.15 a.m. *Koti* and *Sona* left PMR along with SLV to a spot where in March, 1990 an object similar to a shipwreck was recorded. Mr. Muniswami, son of Manickyam also accompanied our vessel speeding at 15 RPM in his catamaran so that he could go close to the wreck site by observing the school of fish. The spot was tracked on side-scan sonar and an object 2-3m high was seen on starboard side of *Sona* at 19m depth about 5 km opposite Vanagiri at 9.50 a.m. The depth was not recorded correctly by echosounder as the battery was weak, but soundings were taken and depth noted as 19m. While tracking, the fish of the side-scan sonar got entangled with the rope of the buoy and dragged it. Fortunately the alert crew stopped the vessel and got the fish safe.

There is an advantage in engaging vessels, the crew of which know the nature of our work. They are alert and attend quickly to problems faced in underwater exploration, airlifting and geophysical survey. After refixing the buoy at 1.15 p.m. the vessels left for shore as the sea was rough. The boat *Koti* was sent to indicate the position of wreck (PMR 1) with reference to a landmark. It returned at 7°. The wreck is opposite two palm trees south of Vanagiri temple (Yellamma). The object discovered on 7th March, suspected to be a shipwreck at site PMR 1 was explored on 8th. Initially at 10.05 a.m., Shri Kumar of Vishal Divers could not reach the object, but however, Chinni reported a conical Siva linga type object protruding over the debris. Next

Manavi Thakkar and Gaur found two circular features recorded on sonograph. The protruding object is greenish and seems to be of a copper alloy. A sketch of the objects lying around, including iron strips (perhaps cannons), a ladder and two circular objects was prepared by Manavi and Gaur. It was confirmed that a shipwreck lay buried in sediment in two parts, its western part, 1m above sea bed and the eastern part 2.5m above the bed. On 9th all MAU diving staff dived for 50 minutes each at 19-20m depth and worked safely thereby proving their competence to explore and work hard on a wreck at 20m depth. Manavi, who resorted to scuba diving was swept away in the current and Sila was sent to help her. Both came back safe. The Nikonos Camera which slipped from Manavi's hand was later recovered and no damage was done. The exciting discovery is that the ship that sank here carried several lead ingots, 18 of which were lying in a row. Obviously there was not much disturbance after the vessel sank. A cannon and what is suspected to be a porthole are visible, but poor visibility came in the way of taking clear photographs. There are two rectangular sheets (steel?) besides a ladder noticed in the cluster of things. Heavy growth of barnacles and oysters, some still alive on the objects, make it extremely difficult for the divers to reach the surface of the cannon, ingots, etc. Slow chiselling was done to remove the incrustation to avoid damage to any object. Till 1.00 p.m. the divers were working on the scattered objects. T.C.S. Rao who was carrying out sonar survey 5 km opposite Chinnavanagiri (not far from PMR 1) reported another object 40 x 10m having the shape of a ship (?) recorded on sonograph. Shri Bandodkar was sent to the site (designated PMR 2) and he had placed two marker buoys there. By 2.00 p.m. Manavi and Chinni dived but as the buoys had drifted, the object could not be explored.

It must be recorded that no one is allowed to work for more than 50 minutes altogether in a day at 20m depth. Each time 2 or 3 divers have to go in a team for chiselling or drawing or clearance work. As we have in all 9 divers (including Bandodkar, Manavi Thakkar, Sila Tripathi, A.S. Gaur, Y.D. Sharma and 4 of Vishal Diving Company), underwater excavation and documentation was possible for 3 hours only, in a day, especially between 9.30 a.m. and 12.30 p.m. The expedition party left the shore at 7.30 a.m.

Among small finds, a brick measuring 22 x 13 x 5cm is noteworthy. The brickbats appear to be net sinkers of modern fisherman who do fishing here.

At PMR 2, the sketch suggests an oval shaped object measuring 30 to 35m E-W and 10m N-S. According to T.C.S. Rao the object is a structure with an opening on one side.

The fishermen who were asked to keep off Vanagiri - Pudupet (North of PMR) in the forenoon to enable the expedition party to conduct sonar survey, did not heed the request, with the result that the survey in 9 to 11m depth had to be abandoned. The fishermen's boats and the sound from their engines gave wrong signals on the sonograph.

The sea was calm on 10th March and in spite of cloudiness, the visibility being fairly good, diving was done from *Sona*. Geophysical survey was done in 9-11m depth along the coast from Kaveri mouth (Vanagiri) upto the Light House north of PMR. The purpose was to locate structural remains, if any, and to trace the extension of the Kaveri in the sea. On 11th, the ingots were cleared and photographed in situ. From 10th to 15th, sonar survey continued in shallow waters.

Instead of fixing a grid for drawing a site plan of the wreck at PMR 1 it was necessary

to fix 12 spikes of 2m length along the edge of the wreck site, tie strings and take measurements. As the sonograph recorded black patches at -8.5 opposite the white building north of Kannagi statue, diving was done and samples were collected from the sea bed at 8.5m depth to see if any pottery could be found. The sediment consists of fine sand and darkish clay.

A submerged channel was recorded on sonograph on 12th March at 300m seaward of the statue, at 8.5m depth. Here Ramamurthy and Selvaraj were trained in buddy diving. An unfortunate accident took place on 12th. The generator on *Koti* caught fire, as the crew on their own, put kerosene in the generator when it was on. As the boat was rolling heavily, kerosene oil was spilt and the generator caught fire. Fortunately no damage was done to the boat or costly scientific equipment. The fire was extinguished. All attempts by divers to trace the generator thrown in the sea, opposite Kaveri mouth in 8 to 9m depth failed.

On 13th, the sea was choppy and visibility was nil, but diving was done in 5m depth opposite Light House and no structure was traced. On the other hand at 8m, 300 to 400m seaward of the white tiled house, 4 dressed stones were found, one of them was brought on board. Soil sample collected here consists of dark hard clay. Further landward diving in 5m depth did not yield any habitation evidences. Diving and clearance work on the wreck site at PMR 1 on 15th March revealed the conical object of a copper alloy projecting over a U-shaped metal object. Two iron pipes 3m long and 2 iron rings were exposed in air-lifting upto 3m depth.

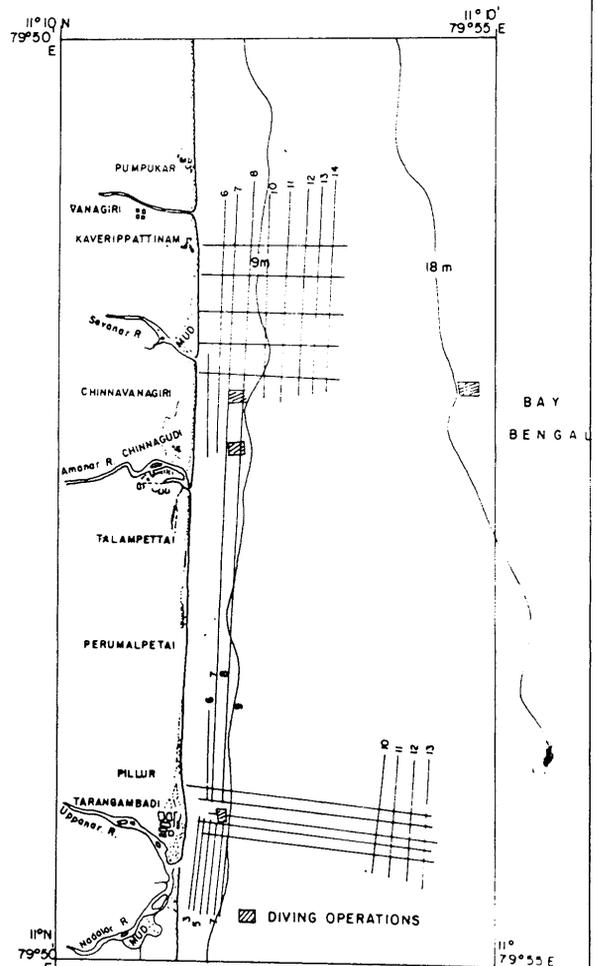
The object at PMR 2 at 23m depth to the north of PMR 1 was surveyed by Dr. T.C.S. Rao on 16th and 19th March. There are actually 3 objects, the central one being oval

shaped with an opening on the northern side. Its longer axis is 20m. There is clay deposit on the eastern flank beyond which another semicircular structure is seen. To the north-west of the central object one or more oval-shaped object is found. This complex was manually surveyed by A.S. Gaur, diver-archaeologist of (MAU) and Chinni and Kumar of Vishal Diving Company on 23rd. They have reported a horse-shoe shaped object, its height being 1 to 2m. A few stone blocks were found in the 1m wide arm. The distance between the two arms is 20m. Whether the object is a shrine or some other man-made structure now at 23m depth, remains to be examined in the next field season. This shall be given as much importance as the shipwreck in PMR 1. The lead ingots, cannons etc., shall also be recovered. At least two heavy airlifts are needed to clear the sediment accumulating over PMR 2, while 4 or 5 divers have to work simultaneously on the wreck at PMR 1 not only for retrieving the ingots, cannons etc. but also to expose the wreck after removing heavy incrustation of barnacles. Both PMR 1 and PMR 2 can be photographed before, during and after clearance. But photographing submerged brick structures in 5-9m depth near Vanagiri and PMR is impossible because of zero visibility in the high energy zone where waves are continuously battering the shores and structures. The work of underwater exploration continued upto 27th March. On the subsequent days, recording and packing of antiquities and equipment was done. On the whole, the expedition lasted for 45 days, from the time the party left Goa on 20th February, 1991.

Training in Marine Archaeology

The Director of Archaeology, Tamil Nadu State, deputed Mr. Ramamurthy and Mr. Selvaraj for training in Marine Archaeology. Although they were more than 30 years

of age (prescribed for training), relaxation was given in their case. In the first instance, technical details about the scuba diving gear, namely, diving suit, demand valves, air bottles, fins, goggles and masks and also the operation and use of low and heavy pressure compressors, generators, underwater camera and the precautions to be exercised were explained. Problems of buoyancy, underwater pressure, current and swells were made known. They were trained in swimming in the sea. In the next stage, buddy diving was taught under the expert supervision of Mr.



Bandodkar. Finally they were made to dive in shallow waters of 5 to 6m depth. They were invited to attend the Training Programme Lectures and Practicals conducted in Goa in the month of October so as to make them dive in atleast 10m depth and learn underwater survey, excavation, retrieval and preparation of drawings. But they did not attend the course.

Findings

The ancient city of Poompuhar was not confined to the present mouth of Kaveri near Vanagiri. It extended both northward and southward along the coast and landward also. Hence onshore survey was done from Pudupet upto Tranquebar and the intertidal zones were explored as a result of which terracotta ring wells (Pl.VIII) and jars in situ were discovered between Vanagiri and Tranquebar. They are datable to 1st-5th century A.D. if not earlier. Offshore survey of shallow waters brought to light submerged brick structures in 5 to 7m depth between Vanagiri

and Poompuhar, but owing to poor visibility, it was not possible to photograph the underwater parts of the buildings. Those portions which become visible in lowest tide have been photographed (Pl.IX). Another attempt can be made to photograph these ancient structural remains which must be contemporary with, if not earlier than the earliest terracotta ring wells. Hence we are inclined to place these brick structures in the first few centuries before Christ because they are in 5m depth whereas T.C. ring wells are almost onshore (except that they are submerged in high tide). Another reason for placing the brick structures in the pre-Christian era is that the ^{14}C date of the brick wharf of Kilajyur onshore, excavated by the author in the sixties is 3rd century B.C.

A highly significant achievements of the Poompuhar underwater exploration of February-March, 1991 is the discovery of a large shipwreck which carried a huge quantity of lead ingots dated 1791 and 1792 A.D. and inscribed W.BLACKETT which must be the



Pl. VIII : Tranquebar - Terracotta ring well in the intertidal zone.

name of the company manufacturing or dealing in lead ingots. It seems to be an English firm. Whether the ship which carried ingots was going to a foreign country or coming to an Indian port is not clear. Since England was not producing any significant quantity of lead, but needed it for making lead shots and utensils of lead-alloys, it could have imported the material from India which was known for exporting lead, e.g. Jawar Mines in Udaipur district of Rajasthan. It is necessary to identify the source of lead and manufacturing or trading company, and the ship which carried it, besides ascertaining the men and other cargo lost. This entails full scale excavation and retrieval of the lead ingots and other antiquities such as cannons etc. The hull of the ship should be examined as it will enable us to know the design of the ship and material used in its construction. The country to which it belongs and destination and countries visited can also be ascertained. Of equal importance is the large horse-shoe shaped structure in 25m depth. The dressed stone block recovered may indicate that it is a man-made struc-

ture. This will have to be confirmed by extensive airlifting and clearance. The plan, purpose and date of the feature must be ascertained.

Recommendation

The partial submergence of a town of the early historical period in the sea near Poompuhar is fairly well indicated by the brick structures in 5-7m water and perhaps by another feature in 25m depth. The former should be surveyed and if possible photographed. Airlifting here as well as in PMR 1 and PMR 2 is very essential for recovery of cargo of shipwreck and exposing the ancient structure-like feature in deeper water. A larger team of divers with 2 airlifts, a geophysical survey team and marine archaeologists will have to work in March and perhaps part of April. Subject to vagaries of weather and sea conditions, it should be possible to document the wreck and structures in deeper water and recover a large number of antiquities, and perhaps partial submission of



Pl. IX : Poompuhar - Submerged ancient brick structures partly visible in low tide.

Poompuhar indicated by shallow water brick buildings can be dated. The city extended about 3 or 4 km along the coast, if intertidal zone remains are taken into account. If the horse-shoe shaped double rowed feature 5 km seaward of Poompuhar is proved to be a stone building of significance it can be said that a large part of Poompuhar went under the sea. In any case, atleast in March- April, 1992, excavation is absolutely essential. A highly useful data on sea level fluctuation and erosion of Tamil Nadu coast is being collected as a result of offshore exploration. Perhaps this is the first site where definite stages of transgression and regression of the sea can be easily determined since archaeological signatures are available upto the shore. They include beach rock and cairns in 7-9m depth, ring wells in intertidal zone, eroded Chola Temple and Danish Fort. The rate of sea level rise when ascertained will be an important contribution for planning ports.

It is really gratifying to find that Tamil Nadu is the first State to promote preservation of underwater cultural heritage.

The Marine Archaeology Centre and National Institute of Oceanography Expedition Party, acknowledge with gratitude the help extended by the Secretary, Department of Culture and Tamil Development and the Director of Archaeology. Dr. Avvai Natarajan braved the rough sea and studied the underwater search etc. Dr. N. Kasinathan took part in the exploration and showed eagerness to learn the intricacies of offshore survey. It is hoped that two or three young qualified archaeologists from the Tamil Nadu State or Universities will be deputed for availing the opportunity of training in marine archaeology which is now a well recognised course. Even the Indian Navy, had recently sent a Lt. Commander to undergo training, in October, 1991.



Pl. X: (From left to right) Dr. A.H. Parulekar, Mr. C.T.C. Dobbs, Prof. G. Venkatasubbiah, Justice Rama Jois, Prof. U.N. Roy, Dr. B.U. Nayak, Dr. S.R. Rao.

References

1. IAR (*Indian Archaeology*). A Review, (1963-64).
2. Nair, R.R. and Purnachandra Rao (1991), Present Publication.
3. Rao, S.R. (1965), Excavations at Kaveripattanam in *Transactions of the Archaeological Society of South India*, Madras.
4. Rao, S.R. (1987), *Progress and Prospects of Marine Archaeology in India*, National Institute of Oceanography, Goa.
5. Rao, T.C.S. (1991), Marine Archaeological Survey Off Tranquebar, Tamil Nadu Coast - Preliminary Result in *Recent Advances in Marine Archaeology*, (Ed) S.R. Rao, Madras.
6. Sarcar, H. (1970), Buddhist contact of China in *India's Contribution to World Thought and Culture*, (Ed) Lokesh Chandra, Madras.
7. Sarma, I.K. (1990) Ancient Andhra Ports, Religious Centres and Sea-Faring in *Journal of Marine Archaeology*, Vol.I, 1990, Goa.
8. Schoff, W.H. (1974), *The Periplus of the Erythrean Sea* (1st Edition 1912), London.
9. Wheeler Sir Mortimer (1976), *My Archaeological Mission to India and Pakistan*, London.