

Pre-Portuguese Maritime Crafts of India - The Ethnological Evidence

by

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There is ample evidence of cultural and trade contacts between South Asia and the Roman Empire. Both the overland and maritime channels played a role in patterns of communication and distribution. Although Roman trade fuelled bullion into South Asia, Roman demand was in no way a unique intervention in the trans-Afro-Asian sphere of trade. By the 11th century A.D. Arab trade replaced the earlier linkages, which had intermingled with Buddhist pilgrim routes. Beneath the religious façade of Buddhism and Islam, there was a continuing flow in secular trade goods and commodities. Apart from the land routes, maritime channels were also in existence (Varadarajan, 1983, 343-356; Varadarajan, 1987, 90-108). India's role in the overland trade does not pose any major problem but the question continues to be raised as to whether India was an active or passive participant in patterns of exchange by sea. Ethnological evidence clearly points to the existence of a vibrant maritime tradition in this country.

An important facet of South Asian boat building tradition emanated from attitudes to the law of the sea. In fact, there was an absence of any stake in exclusive maritime spheres. Nor did pennant and banner extend any challenge at sea. Piracy posed a hazard but no boat was developed to specifically engage in bellicose activity at sea. The ram, developed in Mediterranean shipping, was noticeably absent in the South Asian sphere. Jean Deloche shows the depiction of a ram in a Maratha vessel of the *gurāb* category. In this connection it is important to remember that the *gurāb* was an Arab battle ship, which made a major entry into the Maratha navy brought into being by Shivaji¹.

The ethnological data is itself a subtle layering of diverse sources drawn from ethnobotany, hydrographic attainments, understanding of climatic factors coupled with the play of human ingenuity backed by the harnessing of animal power. Not to be forgotten is the cultural mould, which defined the parameters of transmission of technical skill, allowing for the play of creativity in the absence of which tradition would stultify.

Apart from *śāl*, *Shorea robusta* Gaertn., and teak, *Tectonia grandis*, L., there were several other varieties of wood, which satisfied the needs of the boat maker(John Eyde,

¹ For *gurāb* see Fahmy, 1966, 132-134; Christides, 1995, 111-121. For the Maratha *gurāb* see Apte, 1973, 134 plate 10; Deloche, 1987, 167,178.

1835). Not only were different varieties of wood utilised in different sections of the boat, but the diversity in watercraft found plying along the Indian coastlines, also necessitated multiple sourcing of wood.

Hydrological conditions of the Arabian Sea along the western Indian coast were quite distinct from those obtaining in the Bay of Bengal. Fair weather sailing was practiced in both areas. However while the gradient of the western continental shelf is approximately 1:30, on the east coast the equivalence is 1:15. These disadvantageous circumstances on the east coast are further aggravated by the prevailing climatic conditions. During winter, the fair weather sailing period, the Northeastern trades are activated in the sub-tropical belt extending between 40° – 50° North. The feature of interest to India is the wind pattern flowing outwards from the Gobi desert belt. Whereas in the west, the Himalayan range serves to break the force of these winds, which then flow with reduced velocity into the Arabian Sea, in Eastern India the strength of the wind is untempered because of the lower height of the mountain ranges in this region. These winds gather further force as they move over the Bay of Bengal and culminate in seasonal cyclones between October to December and April to May. During this period of cyclonic turbulence the swelling seas can attain a height of five metres. The sea can be equally high during the period of the Southwest monsoon between June and September. In fact, the fair season can be said to prevail only during the months of January, February and March. Hence, while long distance sailing is feasible in the Arabian Sea during the winter months the sea is less sympathetic on the east coast. However, coastal sailing during the day is a feasible proposition.

The Indian sub-continent is notable for its ecological and climatic diversity. This is reflected in all spheres including that of the range and diversity of its coastal sailing craft. These can be categorised as:

- Rabbeted, planked, sewn boats and variations thereof
- Pegged or tree nailed
- Outriggers and other balance board crafts
- Catamarans
- The crafts of Orissa
- Coastal sailing crafts of West Bengal

Dugouts have received incidental rather than specific mention in this article. It is also important to remember that seagoing vessels in India have tended to fall into three categories: coasting or long distance boats, fishing crafts and vessels that cater to ship to shore activities.

F.E. Paris had noted circa 1843 that the Madras *masula* was not used for fishing. Its exclusive sphere of activity was the servicing of ship to shore requirements (Paris, 1843, 37).

Rabbeted, Planked, Sewn Boats and Variations Thereof

The practice of this carpentry technique, the so-called *vadhera* procedure associated with Gujarat, extends between Lamu on the East African coast to coastal Orissa. The literature on this category is extensive². There were several variations in the technique of sewing. In Gujarat the sewing was discontinuous and tension was maintained by the introduction of a wooden wedge in each set sewn (see Varadarajan 1995, 174 and figs. 15,16). Ribs were nailed and clenched. A similar joinery was to be found in the Kerala *pattemar*, of larger dimensions. Professor S.Q. Fatimi has pointed out that Arab ships sailing to the China Seas were necessarily nailed. However, it is not clear if this form of nailing is to be identified with the *vadhera* technique (Fatimi, 1974, 149-156). In Lakshadweep, with the exception of Minicoy, planks were meticulously planed and flush laid without recourse to rabbeting. The procedure of continuous sewing was duplicated in the *masula* tradition of Tamil Nadu and Andhra Pradesh and Orissa. However, a feature of *masulas* in the region of Madras was the presence of the same sequence in sewing both inboard as well as outboard in all sections where there was a junction between the central plank and garboard and other hull strakes. In view of the variations to be found in sewn boats scattered along the coast of Peninsula and Western India, and taking into cognisance the easy availability both of essential building material as well as other sailing necessities, a strong case can be made for a South Asian origin for the coir sewn dhow of the Arabian Sea.

Pegged and /or Treenailed

While pegging and sewing need not necessarily be mutually exclusive, the carpentry tradition found in Minicoy and the Maldives have an overlap with the lashed lug *jong* tradition of Indonesia³. Minicoy, enjoying the same culture and language as the Maldives, was brought under the authority of Cannanore in the early 16th century. In the lashed lug tradition the planks of the hull are pegged together across the width of the individual planks. Luting rather than padding across the seams, makes the boat watertight. Earlier, the planks were further trussed together by rope passed through cleats giving rise to the term, lashed lug.

² See for example, Sentence, 1981, 1-9; Prins, 1982, 85-100; Kentley, 1985, 303-317; Varadarajan, 1995, 173-178; Varadarajan, 1998.

³ For the lashed lug tradition see Manguin 1985, 319- 343; Manguin, 1989, 201-202.

Until the first decades of the 20th century, the pegged Maldivian *oti* was a recognized local cargo and passenger sailing ship.

Outriggers and other Balance Board Crafts

In view of the wide dispersion of the outrigger, the presence of which can be noted in the Blue Nile, apart from the evidence on the Madagascar coast⁴, the question may be raised as to whether there may have been more than a one centre of diffusion, for such craft. The focal point has generally been associated with Indonesia. As a preliminary step, categorisation could be made based on the method of joinery followed when additional timber is added to the dugout as also the joinery effected at the union between boom and float. Hornell has pioneered the study of a number of different joineries used to attach boom and float⁵. These need to be taken further. While several of the crafts studied by Hornell are no longer in existence analogous samples may still be traced. Among these, the outriggers of Sri Lanka merit further study (See Gunawardana, 1987, 81-88).

J. Neyrit remarks circa 1931 that there were two types of outriggers in Sri Lanka (both now extinct), the fishing craft, *oruwa* and the small cargo vessel, the *yatra dhoni*. The first was noted for its swiftness and the second for the fact that it could attain as much 50 tons (Neyrit, 1974, 255-257). Along the Indian coast, the single outrigger with joinery reminiscent of the Gujarat *vadhera*, may be seen near Goa. This appears to be a variant of the Ratnagiri and Raspur category briefly described by Neyrit, (see Neyrit, 1974, 247-248). These outriggers are used only during the season of the Northeast monsoon (Paris, 1843, 22). The Konkan name for the Ratnagiri outrigger was *akāda hōdi*. Circa 1937 these ranged between 20' to 16' in length. A shallow dugout, with its sides rising to a height of about 3", could form the base unit of the hull. Alternatively, three planks could be used, the upward rising side planks being rabbeted to the central one. Gunwales, also rabbeted, were added to this structure to provide increased freeboard. As in Indonesia, the booms, locally called *bowkār*, were made of bamboo. The *bowkār* are directly attached to the *ūldī*, the float, made of the timber, *Erythrina indica*. The Spanish windlass, *tāngrī*, is used to attach the booms to the gunwales and also to the float. A double grommet in coir is used for the first attachment and a

⁴ James Hornell, 1939, figs.2, 3,4,429-431; *ibid.*, 1940,133; James Hornell, 1944, 3-18; 169-185.

⁵ See Hornell, 1945a, 6-7. Hornell, 1946, 254-256; Hornell, 1923, 148-152, 157-161, 183-185, 226-228.

single for the second. The grommets are twisted and tightened by a rod, which also functions as a lever⁶.

Hornell, circa 1945, takes note of a dugout at Kilakkarai in which a single curved boom is directly attached to a very small short float⁷. The contrivance could be changed from one side to the other. In 1993 this author photographed a *vattā* with a single *kanna kattai*, outrigger, at Naina & Co., OJM Estate, Kilakkarai. The canoe described by Hornell had been transformed into a frame first, planked, double-ended boat but the outrigger has remained basically the same (cf. Blue *et al* , 1998, 47). The present day Kilakkarai *vattā* has a leeboard, a feature of which Hornell took special note (Hornell 1923, 155). Neyrit has remarked that in the region between Mangalore and Cape Comorin the outrigger could be utilized or dismantled depending on the conditions faced at sea (Neyrit, 1974, 247-248).

Apart from single outriggers, there are several examples of sea going crafts, which utilise balance boards in South India (Hornell, 1945b, 222 – 227; Hornell, 1945a, 12 – 16). Hornell has noted how these vessels were used in the pearl fisheries off the southern tip of peninsula India. Hornell had noted that in the balance board craft found between Rameswaram and Ammapattanam, the hull could either be a dugout or be planked⁸. A northern variant was found in Adirampattanam and Muttupet. These hulls were narrower and longer and the majority had a three masted lug sail. Such planked boats may be found to this day at Adhirampattinam, being called *vaḷḷam*⁹. Insofar as carpentry usages are concerned, it

⁶ Hornell, 1937, Part II, 42. It has not been possible to refer to the published article. The citation relates to a pre-publication script sent to Hornell for correction, which this author found among the original papers of Hornell in the *Hadden Collection*, Central Library, University of Cambridge.

⁷ Hornell, 1945a, 15, fig.9. A description, circa 1924, reads thus: “In this model the out-rigger is attached by one pole only instead of two, as in Inv. 1924 – 580. This type is also used at Kilakkari and the out-rigger is so arranged as to be easily shifted from side to side when necessary. In both models the canoes are dug-outs to each side of which a narrow vertical wash-strake has been added. The mast, which carries a large lugsail, is stayed fore and aft, while the halyard is made fast to the pole of the outrigger so as to form a shifting stay. Approximate dimensions:- Length of canoe, 36ft; length of float, 15 ft., distance of float from canoe, 18 ft. ”. Imperial Science Museum, London, Library, Label, Inv.1924 – 579. Details from the same source relating to a two boom Kilakkarai outrigger reads as follows: “This outrigger canoe represents a type used by the fishermen of Kilakkari, on the south-east coast of India, for their pearl and chank-shell fisheries off the north-west coast of Ceylon. The outrigger would appear to have been derived from that of the typical outrigger canoes of Ceylon, but in these Indian canoes it is not permanently fixed on one side as in the Ceylon vessels, but so arranged that it can be quickly shifted from side to side as the vessel tacks. In these canoes, therefore, the bow and stern are permanently differentiated and in consequence a curved rudder is fitted to the stern. Approximate dimensions:- Length of canoe, 36 ft.; length of float, 18 ft.; distance of float from canoe, 15 ft. *Ibid*. Inv.1924 – 580. Also see Neyrit, 1974, 260 – 261.

⁸ An earlier description, scripted circa 1924, is appended: “This model represents a type of boat in use on the Madras coast at Tirupalakudi in Palk Bay. In it, stability under sail is obtained by the use of a balance-board of Palmyra wood, which can be loaded on the weather side with one or more of the crew and which can also be run out further on the weather side so as to give additional leverage when required. Some of these boats are dug-outs, others are carvel-built”. Imperial Science Museum, London, Library, Label, Inv.1924 – 581.

⁹ In view of the present day confusion between *vaḷḷam* and *vattā* it would be important to refer to a description of the Adhirampattinam balance-board craft, circa 1924, which reads thus: “Boats of this type are used at

is to be noted that despite the diversity in boat typology, the shell first method is the universal technique practiced in traditional boat carpentry in India. The use of the scribe board and construction based on the frame first principle appears to have been an innovation introduced either during the colonial regime or by members of the Indo-Norwegian Project, sponsored by the Food and Agriculture Organisation, United Nations ¹⁰.

Catamarans

The catamaran is to be found in the region extending between Quilon / Kollam in Kerala to Puri, Orissa. Rajamanickam has remarked that in districts Trivandrum and Kollam, the only regions in Kerala where the catamaran, locally called *ca: Latta Di*, are to be found, the users are the local Latin (Catholic) Christian fisherfolk (Rajamanickam Arul Raj, 1991 (II), 70). These fisherfolk are the descendants of the Parava community who had been converted to Roman Catholicism by the Portuguese between 1535 and 1537. The Paravas had been active on the Pearl Fisheries Coast of the sub-continent and were culturally Tamil rather than Malayali¹¹. While the presence of the dugout along the coasts of Karnataka and Malabar is undoubtedly ubiquitous, the same could be said in relation to the catamaran on the southeast coast¹².

The introduction of the catamaran to Kerala, thus, appears to have been through the agency of the Parava community in earlier times. The Kerala catamaran was not flat. The two garboard strakes tilted upwards to form a rim along the two outer edges. The oar also functions as a steering oar¹³. Hornell traces the different kinds of catamarans found along the coast of Tamil Nadu, linking the form with local hydrographic conditions (Hornell, 1946, 62-

Adirampatnam where shallow water extends for a long distance out to sea. In consequence, two quarter steering-boards are fitted instead of a rudder and these, the steersman, who sits on the aftermost thwart, manipulates with his feet. A lee-board is never shifted from its central position. The boats are dug-outs to which are sewn washstrakes about 9 in. deep.... The mast which is stayed fore and aft and also to the balance-board, carries a large standing lug-sail." Imperial Science Museum, London, Library, Label, Inv.1924 – 582; Photo. 518/54.

¹⁰ The Indo-Norwegian Project, with its headquarters at Cochin, was initiated on 17 October, 1952 and came to an end on 31 March 1972. The Integrated Fisheries Project replaced it on 1 April 1972. The fact that traits such as practice of frame first carpentry and usage of the scribe board call for an explanation is passed over by the Kentley team. See Eric Kentley *et. al.*, 2000, 146-147. Although the Tamil manuscript, *Kappal Sattiram*, a manual on shipbuilding, was compiled at Tarangambādi (Tranquebar) in 1698, it is not clear to what extent traditional Indian methods may have been influenced by European practices. See Panikkar, Srinivasan, 1973, 16.

¹¹ Fernando, 1977, n.23, p.114: also see McPherson, 1993, 170. The Mukuvars, who had also been converted by the Portuguese, hailed essentially from the Malabar coast. Fernando, 1977, n.17, p.9.

¹² In present times there is no tradition of the fashioning of dugouts in Tamil Nadu. These are all acquired from Kerala. This is also borne out in the description of the Tamil Nadu *tōni* by Rajamanikam, Jayakumar (1991, III, 14).

¹³ See 71 and plates IV, V in Rajamanickam, Arul Raj, 1991 (II).

63). Circa 1932, six types of catamarans are noticed along the coast of erstwhile Nellore, Chingleput and South Arcot districts. These comprised:

- i) *Thundimaram*, made from four logs with the length ranging between 13' 6" to 10' 6", and breadth between 4' 6" to 2' 3". This was used in hook and line fishing with a short line.
- ii) *Melamaram*, made from five to six logs, with the length ranging between 21' and 13' 6" and breadth between 4' 6" to 3', used both for short and long line fishing¹⁴.
- iii) *Sirumaran* or *kuthidi*, made from four logs, having a length of 16' 6" to 13' 6" and breadth between 3' and 2' 4". Small nets were used in fishing.
- iv) *Mengamaram*, made from four logs, the length ranging between 19' 6" and 16' 6", the breadth between 3' 9" and 3'. The net used in fishing is the *kola velai* (Hornell, 1924, Part 1, 70).
- v) *Periamaram*, made of five logs, the length ranging between 19' and 16' 6", the breadth between 3' 9" and 3'. When fishermen undertake fishing with the *mada valai* net, they embark on three *mengamaram* and one *periamaram*¹⁵.
- vi) *Kolamaram* are made from between 6 to 7 logs, the length being between 28' 6" and 24' and the breadth, 6' and 4' 6". These are fitted with two leeboards and are used to catch flying fish, *Cypsilurus* sp.¹⁶ Hornell categorised these as among the most highly specialised among the Coromandel range of catamarans (Hornell, 1946, 65).

The shape and structure of the catamaran changes as we proceed northwards, from the one found in the *teppa* of erstwhile district Vizagapatam and that existing in district Ganjam. The two halves of the *teppa* of district Vizagapatam are lashed together and above these a washboard is sewn¹⁷. The *teppa* of district Ganjam is analogous to that found in Puri in present times. The transition from raft to a rudimentary pegged boat is much more clearly articulated here¹⁸.

¹⁴ Hornell notes that long lining, the positioning in the sea of long lines set with a large number of baited hooks, is not practiced in the Coromandel but was highly developed on the west coast, particularly along the Malabar coast. Hornell, 1924, Part 1, 78.

¹⁵ Hornell describes how fishing is undertaken with the *mada valai* fishing net. Hornell, 1924, Part 1, 61-65. According to him, two four log and two three log catamarans are used in *mada valai* fishing. *Ibid.*, 64.

¹⁶ See Copy of note sent from Assistant Inspector of Fisheries, Krishnapatam to the Assist. Director of Fisheries (Inland) Madras, dated 26.8.1932, in *Haddon Collection*, Envelope 10049, Central Library, University of Cambridge (unpublished); Hornell, 1924, Part 1, 76-78, Hornell, 1946, 65-67.

¹⁷ Hornell, 1946, 67. Circa 1924, a leeboard was mounted on each side of the vessel. Imperial Science Museum, London, Library, Vizagapatam Catamaran, Label Inv. 1924 - 575.

¹⁸ The method of construction is described in Hornell, 1946, 67.

The Crafts of Orissa

The crafts of Orissa mark the transition between the crafts of the southern coasts and those of Bengal. While there is some commonality between the boats of Bengal and those of Orissa there is little overlap between Bengal craft and those of the southern coasts. The basic method of plank joinery in Bengal is that of stapling with iron cramps while plank joinery through sewing is the predominant form in the south. The southern crafts of which variants may be found in Orissa comprise the *teppa*, *podhua* and *nava* (Tietze, 1985, 34-36). The *teppa* has already received notice above. The model is the same but the size is differentiated, the smaller *teppa* comprising three or four logs, the largest being the two logged kind (Tietze, 1985, 34-35). The *podhua* falls into the *masula* category despite small degrees of variation within this group (Kentley, 1999, 188-195, Rajamanikam, Thivakaran, 1991 (IV), 90-93). The *nava* is a flat-bottomed, planked and nailed boat. It awaits detailed analysis to date as far as carpentry aspects are concerned (see Rajamanikam, Thivakaran, 1991(IV), 89-90).

The overlap with Bengal is to be noted in keeled crafts such as the *choat*, *dinghy*, *salti* and *sabado* (Tietze, 1985, 32-34, 194-199). The two boats types, which can be categorised as bearing an Orissan benchmark, are the keeled reverse clinker *pāṭiā* and the clinker based *danga*¹⁹. The feature to be noted in relation to these crafts of Orissa is that all have a keel and are sea-going vessels.

Coastal Sailing Crafts of West Bengal

Unlike the boats of coastal Orissa, Bengal boats are essentially riverine. However, boats which ply in the estuary region such as the Sundarbans fall into a separate category. These include the keeled *choṭ*, the *pāṭiā*, and the *sultani*. The *choṭ* is a double pointed keeled boat. It is to be found in the Rupnarayan, Rasalpur and Haldi rivers and functions as a fishing, cargo and tug boat. Plank joinery follows the traditional Bengal method of rabbet jointing and stapling. The keeled *pāṭiā* has three methods of horizontal plank joinery - reverse clinker, carvel and clinker. It is to be found in the Digha area adjoining the Subarnarekha river in West Bengal. The keeled *sultani*, a cargo boat, enjoys wide

¹⁹ Tietze, 1985, 32-33. The *pāṭiā* has been documented by Varadarajan, Bhattacharya, see *Report*, Chapter 13. The *pāṭiā*, in fact, has the reverse clinker element. It has not been possible to verify the clinker element in the *danga* as described by Tietze.

dispersion. In the south it is to be found at Nurpur, Phalta and Diamond Harbour in South Twenty-Four Parganas, in the Kakdwip region and in Sagar Island. The method of construction appears to be intermediary between shell and frame and planks are nailed rather than stapled²⁰.

The conclusions, which may be drawn from this brief survey is that, the maritime crafts of coastal India had evolved in response to specific requirements and were in close consonance with prevailing hydrographical conditions. Sailing peoples are quick to absorb tested innovation and in this context it is important to remember that the Portuguese had themselves absorbed features of Middle Eastern if not Arab sailing crafts before they had embarked on the Discoveries²¹. The diverse methods of boat joinery practiced by traditional South Asian boat builders also bears out this statement. However, whether a boat is frame first, shell or an intermediary stage between the two, the core area dealing with methods of measurement and procedures adopted for shaping, is indigenous. This is borne out by the methods evolved for fashioning the *Kakdwip Trawler*, which made its entry into the West Bengal maritime scene as late as circa 1979 -1980. This element of tradition and innovation has to be borne in mind when dealing with the transfers, which had taken place when the Portuguese appeared on the scene during the 16th century.

²⁰ Paris noted circa 1843 that the only Bengal craft, which was not stapled, was the cargo carrier with clinker laid strakes, the *Patile*, but even among these, there were a few variants which were stapled. Paris, 1843, 43.

²¹ Filgueiras, 1975, 59. Cf. Cortesão, 1975, 238-239, 241, 244-245.

ABBREVIATIONS

Report Lotika Varadarajan, Swarup Bhattacharya, *Report, Boat Typology and Fishing Communities, Bengal*, National Institute of Science, Technology and Development Studies, New Delhi, to be submitted to the Department of Ocean Development, New Delhi.

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