

VERNACULAR NAUTICAL ARCHITECTURE IN TRANSITION: A CASE STUDY OF TRADITIONAL SRI LANKAN FISHING CRAFT

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Abstract

This paper concerns the so-called "catamarans" often considered archetypal Sri Lankan craft. These are of great antiquity although their age can only be guessed. The vernacular form evolved from the available bio-resources and the nature of inshore waters. The craft were made only of wood with all fastenings being, by choice, of coconut coir rope, a common Indian Ocean till technology till comparatively recently. They were dual-element craft, comprising of dug-out hull connected to outrigger float by spars. The entire craft was "flexible" and thus could cope with surf-induced torque. The hull being a monoxylon, its tough, rounded bottom could withstand frequent abrasion from crossing sand spits and being hauled up the beach. It was essentially a "skimming" craft, without a displacement hull and, hence, completely different from the double-outrigger craft of south-east Asia and Madagascar and the east African coast. Its origin can, perhaps, be linked to those of Oceania. The Sri Lankan craft remained unchanged for what must have been millennia. In the last quarter of the last century, changes manifested themselves: the gradual use of iron nails; the increasing use of GRP and of nylon cordage; the use of outboard motors and the consequent morphological changes such as the substitution for the double-ended

configuration of a fixed bow and stern and others. The reasons for change included deforestation, changing priorities in life, cost of manufacture, loss of skills etc. that are dealt with in the paper. An important aspect is that, even the use of new materials and techniques has not changed the basic dual-element form of the craft. This apparent contradiction raises a fundamental question: when, in the course of transition, does a vernacular form cease to be vernacular? This paper is the first attempt to record the process of the ongoing transition of these craft.

Preliminary Remarks

The relevance of nautical architecture to this seminar

There are many more aspects to the vernacular than the built environment and settlements. Watercraft, which are water-borne work platforms and even floating homes, have their vernacular forms. In this paper I intend to draw your attention to one of these: the Oru, the archetypal fishing craft of West and South Sri Lanka, which is on the cusp of disappearing or of being radically transformed. Given the concerns of this Seminar, it may be noted that the users and builders of these craft also live in seafront settlements that can be also classed as vernacular. Robert Grenier, long time President of ICUCH, told me that, world-over, traditional fisher-folk lived in communities very much like these, and that even the size and their spatial disposition of individual houses were similar to ours. This was nearly twenty years ago. Later, when I was asked to review "*The ARCHITECTURE of an ISLAND: The Living Legacy of Sri Lanka*" (Ronald Lewcock, Barbara Sansoni and Laki Senanayake) I remarked on the parallels between the architecture of vernacular buildings and of the oru, stemming from their shared parentage. (Devendra:)

Our fishing craft are a product of nautical architecture. Commonly called "Naval Architecture", it is known both as a discipline and a specialization. I, however, use the term "nautical" instead of "naval" as I am dealing with vernacular craft in the building and design of which the scholarly and scientific disciplines of formal Naval Architecture are not followed. Certainly, such craft were purpose-built, by builders who drew upon tradition and

experience and not upon drawings, calculations, basin trials etc. They are the products of a design process, far removed from that of "Naval Architecture".

Introduction

Definition and scope

The Oru – to use its plural, or stem form in Sinhala (oruwa being the singular form) – is an outrigger canoe. It is dual-element craft: a marriage of a dugout log hull and a balance log (or outrigger). They are commonly and incorrectly called "catamarans" in English. This nomenclature is an accident of history and cannot be undone. But a recent dictionary of watercraft (Mariners' Museum, 2001: 123) lists thirteen geographical regions in which the word "catamaran" is used to denote a raft, and is very specific in its overall definition:

catamaran

1. Generic term for a shaped raft of bamboo or logs found in numerous parts of the world...
5. Sometimes mistakenly applied to an outrigger canoe.

The word "catamaran" is, in fact, derived from the Tamil word *kattu-maram* which denotes a shaped-log raft. Early English writers mistakenly applied the latter name to denote the oru, and this misnomer has, since, become standardized. For readers of this paper it is essential to know the difference. Let me explain. The oru of the fishermen is basically a dugout canoe which retains the shape of the log (orukanda). It is modified by plank strakes

sewn vertically to the gunwales to increase freeboard (i.e. height above waterline), and a single outrigger balance-log (*kollaeewa*) connected to the dugout hull by two flexible booms. The composite structure comprising hull and outrigger is the *oruwa*. Other major functional features of the craft are removable: rudders, leeboards, oars, masts and sails. All parts attached to the dugout hull are fastened with coir rope, either by sewing or by lashing. *Oru* are found in several configurations: variation being dictated by function. In calm inland waters, the plank strakes, masts and sails, rudders and leeboards are not used while, at sea – the working environment of the dominant form of *oru* – the type of fishing carried out dictates the size, and such additional features as rowing rails.

My focus will be on the *oru* but I will also touch upon the two other types of fishing craft in use in Sri Lanka.

(1) The “shaped-log raft” already referred to, which exists in two forms – *kattu-maram* and *theppam* – both of which are derived from Indian forms and bear Tamil names. Both are made of logs, shaped to facilitate sailing at sea. *Kattu-maram* (“lashed log rafts”) are larger, with 3-5 logs lashed side-by-side with coir rope, with a removable, shaped bow-piece attached to the bow. The smaller *theppam* (“pegged-log rafts”) differ from them in size and the absence of a bow-piece but mainly in the manner of lashing: the logs are more finely fitted, and pierced breadth wise, through which two long, two slightly bent pegs passed which protrude outside the logs. These protruding pieces are the “pegs” which make lashing, and the removal of lashings, are made easier.

(2) The other type of fishing craft is the beach-seine boats called *ma-dael-paru* in Sinhala. It is a large, scow-ended craft with vestigial twin-hulls, rectangular in plan, with high freeboard, used for laying off-shore seine nets and not for sailing.

For the purposes of this paper no further description of these types is necessary.

This paper deals with the traditional fishing boats mentioned and the transition they have now undergone. I have structured this paper as follows. It will first try to explain why the *oru* is considered a vernacular form. Next it will describe its form and structure. Then it will deal with the heart of this presentation – an aspect of the *oru* that has hitherto not been explored – namely, the transformation of the *oru* away from a strictly vernacular form, and the parallel process in the *theppam* and the *ma-del-paru*. Finally, some questions that arise from this transformation process will be discussed.

Is the oru a vernacular form?

I required an objective definition of the term “vernacular” to buttress my own understanding of it which is derived from language studies. On the internet I found www.answers.com which provided definitions of both the noun and adjectival forms. As our interest is essentially the latter form, I give it below, with my emphasis underlined:

1. Native to or commonly spoken by the members of a particular country or region.
2. Using the native language of a region, especially as distinct from the literary

language: a *vernacular poet*.

3. Relating to or expressed in the native language or dialect.

4. Of or being an indigenous building style using local materials and traditional methods of construction and ornament, especially as distinguished from academic or historical architectural styles.

5. Occurring or existing in a particular locality; endemic: a *vernacular disease*.

6. Relating to or designating the common, nonscientific name of a plant or animal.

I can now continue on the assumption that "vernacular" refers, in essence, to something that is particular to a region; is indigenous in style; and uses local materials and traditional constructional methods and ornament. Within these parameters, the *oru* is definitely a vernacular watercraft.

The regional limits of the Oru

I have already spoken of the *oru* as a single-outrigger dugout canoe. Single and double outrigger canoes are to be found in Madagascar and the east coast of Africa, in and around Sri Lanka, in the Indonesian archipelago, and in the distant islands of Oceania. In each area they are distinctively different, with the main differences being those between single outrigger craft, double outrigger craft and double hulled craft. In the Indian Ocean the double outrigger craft are found in the western and eastern rims while the single outrigger, common in the Pacific Ocean, is found only in Sri Lanka, Kerala and the Andaman Islands. (Hornell: 1943). In Sri

Lanka, the centre of this grouping, they are found only in the South and Western coasts: the coasts furthest away from the looming presence of India. James T. Hornell, the pioneer of 20th-century studies in watercraft the world over who once served as an advisor to our Department of Fisheries, made the oft-quoted perspicacious remark that

No greater contrast can be found in small craft designing than that between the types used on opposite sides of the Gulf of Mannar, South of latitude 9 degrees N. On the Indian, or Tamil, side the catamaran or boat canoe alone are employed; on the Sinhalese side, the outrigger canoe is the national and dominant design, the catamaran being used only in the northern, or non-Sinhalese part of the island and by migrant Tamil fisherman in Colombo, with the dug-out restricted to its proper sphere of usefulness on rivers and inland waters. (Hornell: 1943:) (emphasis mine)

Thus, even though Sri Lanka was the centre of the Indian Ocean single outrigger culture, the heartland of the culture was that area that Hornell delineates: south of the Gulf of Mannar, meaning, the western and coasts. It may be noted, in passing, that with the change of the monsoons the fishermen and their *oru* moved overland from west to east and back again. This migration came to an end in 1983 and hence the presence of *oru* in the east coast has diminished. A Fisheries Department map of 1958 gives the following distribution of *oru*: Western Coast (Kalpitiya to Galle) – 4000; Southern Coast (Galle to Hambantota) – 1900 [a grand total of 5900]; and Eastern Coast (Kuchchaveli to Akkaraipattu) – 1500. The west and south were, therefore, the heartland of

the oru where it flourished and, in fact, may have been born. Last year the definitive record of the last of the vernacular oru of this area was, at last, published (Kapitan: 2009). Beyond our shores our nearest neighbours – in terms of nautical culture – are the Laccadive Islands, the Andaman Islands and, in India, Kerala with whom we have had a long history of maritime contact. This is an interesting grouping and, as far as mainland India was concerned the islands were, perhaps, the “lesser tribes without the Law”. Eric Kentley, who systematically studied the *ma-dael-paru* of Sri Lanka and the *masula* boats of the Coromandel coast was moved to say:

Although the boats of Sri Lanka share with several other boat types of the Indian Ocean a common technique in fastening planks, indeed a special method of sewing, this is a single attribute and not sufficient to place Sri Lanka within a broad ‘Indian Ocean boat building culture’. In terms of maritime ethnotechnology, Sri Lanka has a distinctive culture: sewing may be the only imported trait (though it cannot be ruled out that it developed here first). (Kentley: 2003: 180)

Note that he places our maritime ethnotechnology outside the Indian Ocean boat building culture. This independent authority justifies the position that our nautical culture was a vernacular one.

Form and Structure 1: the operational environment

Oru were in use both on the sea and in sheltered inland waters. On river, lake, canal and lagoon, where there was no turbulence

the oru was merely a hollowed-out log joined by spars to a balance log (the *pila oru*) which was quite stable in that environment. At sea, however, the dugout log could ship water and vertical plank extensions were sewn on to increase freeboard and prevent the hull from being swamped. This required the outrigger booms that curved downwards from the top of the vertically extended hull to the balance log low in the water. With sails on bamboo sprits and being double ended, it could efficiently “change ends” or “shunt” instead of tacking in the western manner. It remains a fast and maneuverable sailing craft able to sail close to the wind. The oru operated in comparatively shallow inshore waters, with shelving beaches, off-shore reefs, heavy surf close to land, a negligible tidal range, and prevailing currents and counter-currents subject to abrupt change. In such waters, the craft had to be of shallow draught and hardy construction with a bottom sturdy enough to withstand abrasion in the sandy shallows and the shelving beaches on which the craft were beached in fair weather. It had also to be able to breast, or ride the surf while remaining essentially a workboat. The oru (with no keel), with its shallow draught dual element form and satisfied all requirements. Without a keel it could cross the reefs without difficulty. Its dugout hull with ‘sewn-on’ extensions made it a ‘flexible’ craft able to cope with the torque experienced in the surf.

This operating environment required a craft with the following characteristics:

- Tough hulls, of freely available material, that could withstand long-term abrasion and cross sand spits so that the same craft could work at sea and on river

- Fastening with easily replaced “sewing” material, which assured a ‘flexible’ craft at sea.
- A shallow draught, and bi-pedal configuration which enabled ‘skimming’ over surf and beaching upright ashore.

Form and structure 2: structural resource

Constructional material was easy to find. The south-west of the island – the heartland of the *oru* – was, until the 19th century, under heavy rain forest cover which afforded builders a wide spectrum of timbers. Vitharana (1992:), speaking of the last surviving *oruwa* fishing craft, lists thirty-eight different types of wood used for seven major parts of the craft: 03 for the Hull, 05 for the washstrakes, 05 for the Booms, 02 for the Balance log, 08 for the Rudder, 04 for the Mast, 05 for the Oar blade and 06 for the oar handle. A larger palette may have been available earlier. Iron and steel were produced locally, and steel adzes used to hollow-out the log boats. But, importantly, iron nails were not used to fasten parts of the boat together; coconut-fibre rope being the preferred alternative in most of the Indian Ocean cultures. Since this palm propagated itself around the coast, and was also cultivated inland, there was no shortage of rope. Coconut timber and fibre were widely used elsewhere in the Indian Ocean region, too. Gunawardana (1990:), quoting al-Idrisi, says that Arab ships from Oman came here to obtain rope, coconut tree trunks for masts and spars and timber for planking, as well as to place orders for ships which were constructed here. Commercial coconut plantation is referred to in the reign of King Mahadathika Mahanaga (9-21 A.D.). That

foreigners knew about this is borne out by Aelian, (170-235 A.D) who says that:

“... this island in the Great Sea which they call *Taprobane* has palm trees wonderfully planted in rows, just as in lush parks the park keepers plant shady trees.”

(Weerakkody 1997: 235)

The bio-diversity of south-western Sri Lanka provided the boat building elements required to build a vernacular craft with the desired characteristics:

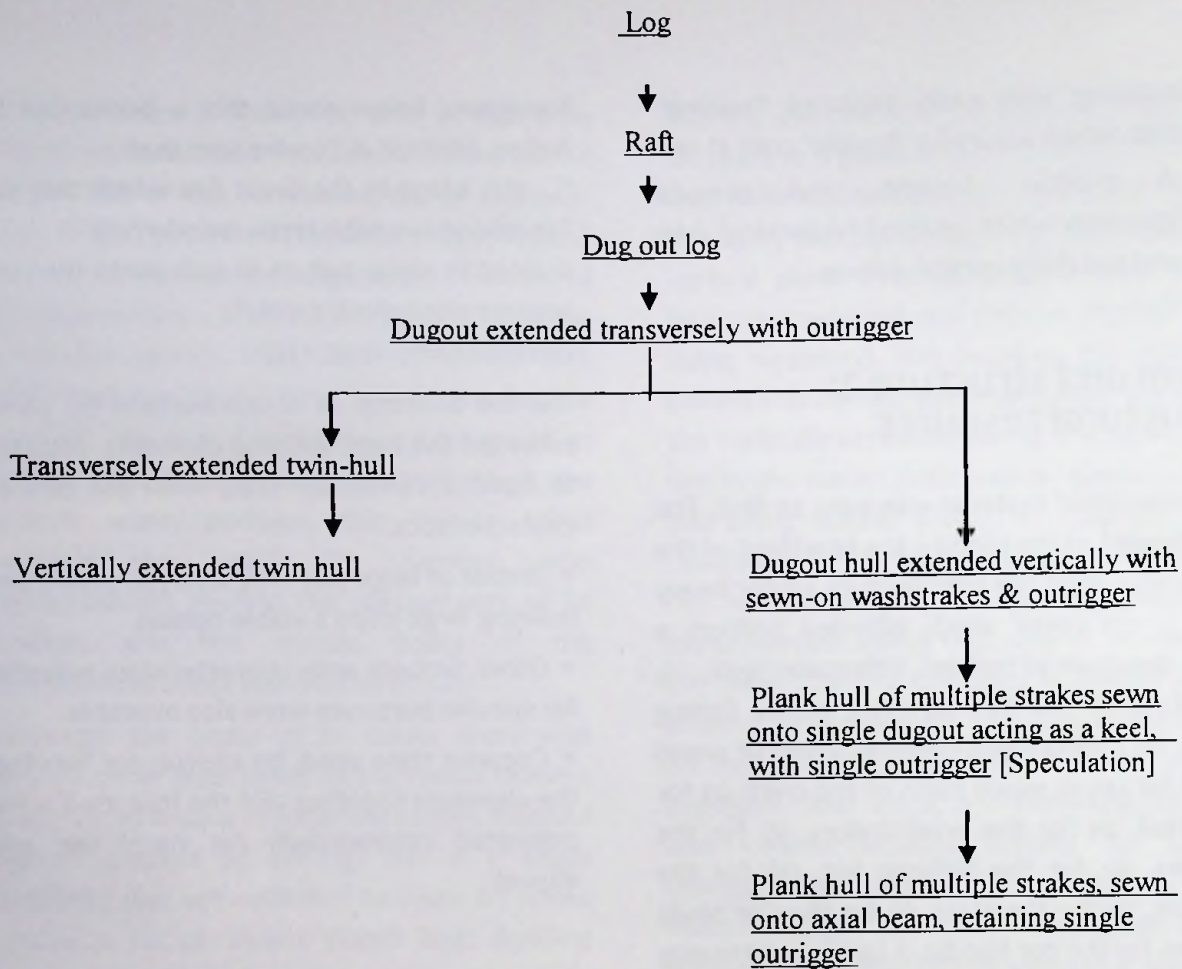
- Timber of large size was freely available and building large ships a viable option.
- Other timbers with characteristics essential for specific purposes were also available.
- Coconut rope used, by choice, for ‘sewing’ the elements together and the tree itself were cultivated commercially for naval use and export

Transformation

Rationale

So far we have traced the birth of the *oru* to a specific heartland; traced how the inshore maritime environment determined its form and structure; and seen how the biodiversity of the heartland provided all necessary boat building elements. The *oru* required very few materials: in fact, only wood, coir rope and cloth for sails. With this modest range of requirements, the craft persisted, changing as necessary, for a period unknown to Man: the oldest found, studied, recorded and dated is of *Artocarpus nobilis* and is C14 dated to 2300BP ±

Fig. 1



100 years (circa 380 BCE). The evolution of this vernacular form in sequence is given in Fig.1.(above)

Transformation of this base form sparked off by one, or more factors, such as:

- Drying-up of bio-resources
- Lack of demand for the craft
- Loss of skills required
- Availability of alternatives
- Change of life-styles

No doubt there are other factors but, among all those listed, only the second did not affect the *oru* or the *Kattumaram / theppam* and *ma-dael-paru*. In other words, there was a

steady demand for fresh fish in a country where meat-eating was not widespread, and the fishermen and their craft played an important role in community life. However, major socio-economic developments had begun to influence the south and west, stemming from changes that began in the 16th century. Without detailing the reasons it is sufficient to note that this least “developed” region in ancient and medieval times was transformed as the most commercial and urbanized region in the country, and that the new economy touched and radically changed the life of all those who lived there.

The pressures exerted by these factors made

the boat builder and owner to look for ways to build, maintain and use the craft by resorting to various stratagems. Building of new oru ceased to be easy with the clearing of the forest cover for coffee and tea plantations and the urbanization of the west and south. Simply put, suitable trees were difficult to find and the laws pertaining to their felling were equally difficult to deal with. Coconut fibre also became a scarce commodity. Rope has to be woven by hand to reach the standards required for high-risk work, but with coir manufacture becoming mechanized, fishermen were forced to weave their rope themselves. New boats were thus built irregularly and tended to be smaller, and the cost considerably higher. Hence means had to be found to maintain the older ones in operational condition. With new boats not being built, the traditional builders found their skills no longer in demand. For a while, though, a part of their skills were useful for the upkeep of the older boats, but not for long. When the Omani builders of the "Jewel of Muscat", a replica of a 9th century Arab ship came here two years to find specialists in sewing with coir rope, they could find only one who was sufficiently skilled and they recruited them from Cochin. If sufficiently large trees, necessary quantities of high quality coir rope and sufficiently skilled builders were not available, alternatives had to be found – because fishing was an occupation and livelihood and important to the community.

Process

The first constructional material outside those

dictated by tradition was iron nails, clenched or riveted. It began with their use to fasten wooden patches on to the hull. The earlier practice had been to remove the damaged section, making a neat rectangular opening which was filled in and covered over by a rectangular wooden "plug patch" sewn on to the main hull. Even in the 1960s, if not earlier, patches nailed/riveted to the hull, instead of being sewn on became common. I can only assume that the reason was mere simplification. Iron nails/rivets corroded in seawater and would have been replaced later by copper nails. The copper or aluminum alloy coins served as a 'washer' (the technical term being 'rove') between the nail head and the wooden hull to reduce rusting and, I presume, that the coins would have been used after iron nails or rivets proved unsatisfactory. Nails were thus the first non-traditional material to be used.

The traditional material that made its absence felt, in a major way, was coir rope. By this time the builders had already become maintainers, and they required quantities of quality rope to keep the oru seaworthy. All sewing and lashings on board were replaced within 12-18 months, generally soon after the Sinhala New Year. If there was no rope there was no boat, and so an alternative was found: nylon cordage which was freely available in a variety of sizes by the early 1970s. It had its advantages and disadvantages, but price and availability were strong arguments in its favour.

So far, the transformation was entirely a matter of substitution of one constructional material for another. The next stage was the transformation of the oru from a sailing craft to a mechanized one. The first outboard motors (OBMs) made their appearance in the 1970s. In

stage one of the transformation process the motor was attached to the after boom. The OBM provided motive power and steering capability. The effect was to change the entire rationale of the oru form. The oru was a double-ended craft with each end serving as the bow whenever the set of the sail was changed. Now that the craft had a fixed bow and it could only use its sail when the motor was removed. In the second stage, once the motor had proved its value, one end of the craft was sawn off, creating flat surface ('transom stern') to which the motor could be permanently affixed. This change both improved the sailing qualities of the craft and made it impossible to sail.

While this transformation was taking place, another new material was making an appearance. "Glass reinforced plastic", or GRP, locally called "fiberglass" was already used in building mechanized fishing craft. It first entered to oru scene as a material that could be used to apply patches to even old wooden hulls. Soon, small paddled oru hulls were made on moulds and found to be satisfactory: however only the hulls were of GRP, with the booms and balance logs being yet of wood lashed to the hull. Hulls of larger, seagoing oru were next on the scene, with the stern fashioned specifically to accommodate larger outboard motors. Greater power meant greater speed. The stern-mounted motors, when revved-up "dug" into the water lifting the bow partly out of the water as the craft now planed under power.

The change in the way the hull behaved under extra power required the hull to be redesigned. Accordingly, the bows were sharply raked upwards resulting in the oru acquiring a planing hull. To benefit from the planing, spoilers were

introduced on both sides of the hull to deflect the bow wave generated.

Yet booms and outriggers from old craft were lashed onto these "state of the art" GRP hulls. I have since noticed that outriggers of GRP are beginning to be used and have seen one smaller craft with both outrigger and booms of GRP. How widespread these are I do not know but I have no doubt that they will be in common use in the not too distant future.

It is interesting that the booms have been the last to fall victim to GRP. Vitharana (---) says Of any dugout outrigger canoe it is the boom, of all its parts, that comes under almost constant and, at times, the most tremendous strain; and a broken boom means, invariably, a capsized hull. If a mast, rigging and sail stand the onslaught of a gale-force wind and the outrigger remains buoyant, a weak boom – just one of the pair – can spell death to the crew.

Perhaps the requirements of a safe boom cannot yet be met by GRP – though I have seen them in use in beach boats in Hawaii.

- Hulls are not made of dugout logs but mould of a synthetic material.
- Sewing has been limited to simple gunwale beading, as the vertical washstrakes are now part of the moulded hull.
- Sewing, however limited, and the still essential lashing are done with nylon rope,
- The hull form is no longer double-ended, but has a considerably modified .fixed bow,
- Polypropylene fertilizer bags are used as sail-cloth, particularly on the east coast.
- The seagoing oru are no longer sailing craft but are mechanized craft.
- *Theppam*, are also moulded of GRP in one piece without any lashings.

- *Ma-dael paru*, which were not built a decade or two ago due to the cost, has reemerged in GRP, courtesy of aid following the tsunami of 2004

Question: does “transformation” put an end to the “vernacular”?

This is the question I would like to pose. The *oru* was a regional craft, built of wood and coir rope to suit a particular maritime environment; double-ended, married to an outrigger and powered by sails. To day it is built of GRP and nylon, powered by a, outboard motor, and neither double-ended nor a sailing craft. It uses no single material of which it was originally built. The traditional shipbuilders have gone, and factory-built craft are bought off the shelf. On the other hand, the craft – though considerably modified – still retains its dual-element form and, its use is still limited to the same region. In India and the Gulf States I have witnessed the same phenomenon: old boat forms cloned in GRP. Reviewing ‘Boats of South Asia’ (McGrail et al:) for the International Journal of Nautical Archaeology, I

raised the question in relation to our own fishing craft:

... how far must the materials of traditional boats change before they [i.e the boats] cease to be traditional? In extreme cases—as in the *vallam*, *oru*, and *teppam* of Sri Lanka and more complex craft seen in the UAE—the traditional form is reproduced completely in fibreglass and made on a mould.

Today I would re-phrase this thus:

If the craft retain the form of the older, vernacular craft, but are built of completely different materials and are used within the same regional limits, can we consider them as belonging to the vernacular tradition?

Conclusion

I present this very early exposition of the process of transformation of a vernacular structural form with due humility. It is certainly not comprehensive enough but, to one whose interest is in pre-modern watercraft, it appears logical that this seminar is the correct forum at which to pose my questions and seek guidance. Thank you.

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