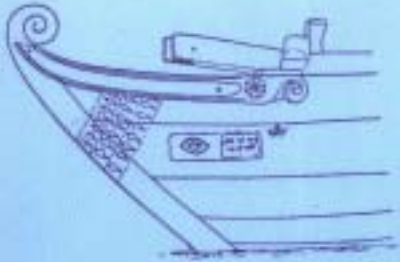
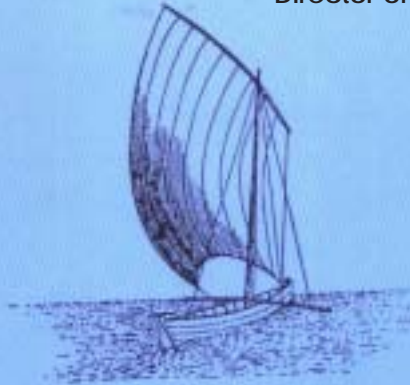


The Origins and Ethnological Significance Of Indian Boat Designs



JAMES HORNELL

Director of Fisheries, Madras Government



Memoirs of the Asiatic Society of Bengal
Calcutta 1920

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PREFACE

(to this re-issue)

Fishing in India has a great antiquity, but very little documentation exists of the technical aspects in any of our ancient or medieval records and literature. It is only in colonial times that substantial documentation emerges on fishermen and their occupation. The role of the Madras Fisheries Department is the most significant in this. Set up in 1907 under Sir Fredrick Nicholson, its remarkable work in fisheries documentation will put to shame all our post-colonial efforts. What was wonderful was the extraordinary grasp the top officials of the department had about the link between man and nature and the role of technology in fisheries. The concern for fish resources and the fishermen comes out vividly in the reports of the Department. The concern for fish resources can be gauged by the fact that in the 1920s, the department had introduced regulations on the fishing nets of Malabar as they were catching juveniles. The concern for the fishermen was indicated by the setting up of fish curing sheds where salt was supplied to fishermen at concessional rates to counter the negative impact of the British salt act that prohibited local manufacture of salt.

Sir Fredrick Nicholson, the wise and visionary founder of the Department was succeeded in 1918 by James Hornell, who during his long career in the Department developed into a multifaceted personality making major contributions to marine biology, fishing technology and anthropology. According to a department annual report, "Mr. James Hornell who was temporarily appointed for a year in July 1908, came in from 1st July 1909 onwards for a new contract as Marine Assistant and Superintendent of the Pearl and Chank Fisheries". From 1908, Hornell worked on a wide range of projects and studies in fisheries and acquired first hand information of fisheries all over India. He is best remembered for the wonderful documentation of the craft, gear and fishing methods of India that prevailed at that time. Given that the fishing methods did not change significantly till very recently, and that his descriptions are still valid in many parts of the coast, one can safely assume that the portrait of Indian fishing drawn by Hornell represents the situation that prevailed over many centuries. The value of his work will only increase with time.

The remarkable insight that Hornell had on the implications of trawling in our coastal waters is worth mentioning here. In 1908, the Madras Fisheries Department conducted fishing trials using a steam trawler on the Malabar Coast. Hornell who was in charge of the trials, in his report writes "...the prospect of developing a profitable inshore trawling industry on the Malabar and Canarese coasts is sufficiently promising to justify effort and capital being put into a working trial of the business were it not that the establishment of such a fishery would be likely to prove detrimental to existing inshore fisheries... This might be occasioned both by (a) an active interference by hampering the canoe fishermen while occupied in shooting and hauling their nets and (b) by disturbing the sea bottom." Ironically, 70 years later, the fishermen of Malabar had to fight for their survival against inshore

trawling introduced by our post independent scientific-bureaucratic establishment in the name of fisheries development completely ignoring such words of wisdom. It is a sad commentary on our times that one has to go back to colonial administrators' reports to understand that "development" cannot be at the cost of the fishermen.

By the time he quit as Director of Fisheries in 1923, Hornell had many remarkable articles to his credit. Much of the originals or reprints are to be found in the reports of the Madras fisheries department which are now lying in a moth eaten condition in the Department library in Teynampet, Madras. This wonderful treasure trove of information on fisheries is currently unknown to most persons interested in the fisheries sector. Making the documents and papers accessible for the general public is of great importance as looking back at the past is not just for nostalgia. The wisdom contained in them will help us avoid making new mistakes and also avoid repeating the old mistakes.

SIFFS is currently organising a South India Fisherfolk Festival at Trivandrum on the 14th, 15th and 16th of September 2002. A major attraction of the festival, among other things, is an exhibition of the varied boat types of south India. On this occasion, it is appropriate that we honour James Hornell by re-issuing this paper that looks at the craft types of India and speculates on their origins and the reasons for their use in particular parts of the coast. While being a reference to all fishing craft enthusiasts and fisheries technologists, it is also something to excite the social scientists, especially the anthropologists.

It is worth mentioning that this paper is titled as Part I. A subsequent paper, presumably Part II, deals with Hornell's researches on the ethnicity and origins of Indian fisherfolk. Based on measurements of nasal index and other physical parameters, he speculates that the Parava fishermen are of proto-Polynesian stock and the Vellalas engaged in agriculture come from the Mediterranean stock. Those interested in anthropology are advised to look it up.

It is a great pleasure for SIFFS to bring out this publication and we hope it whets the appetite of the readers to go back to archival material on fisheries. If the response is good, maybe more of the earlier documents will be brought out by the various fisheries institutions in the country. Perhaps, SIFFS can also contribute further in this regard.

A word of appreciation is due to C.R.Aravindan of the SIFFS computer centre, for diligently working on producing a document that is close in "look and feel" to that of the original. While the typesetting is fresh, the sketches have been reproduced from the original.

V.Vivekanandan
September 2002

The Origins and Ethnological Significance of Indian Boat Designs¹

By JAMES HORNELL, Director of Fisheries, Madras Government

[With Plates I-VI]

PART I - BOAT TYPES NOW EXISTING IN INDIA

During recent years several ethnologists have endeavoured to adduce evidence of the spread and penetration of ancient Mediterranean culture by sea along definite trade routes from the Red Sea to India thence eastwards to the myriad islands of the Malay Archipelago and the Pacific and onwards to the American continent itself. A great diversity of customs and many domestic articles of utility or ornament have been examined to see how far they bear out this hypothesis. The enquiry from which originated the following essay, was commenced with a view to see what light an examination of the main types of sea and river craft found in India at the present day would shed upon this theory of a cultural world drift from west to east. The investigation had not proceeded far when it became apparent that a greater and far more important problem was involved and that a careful study of what had appeared at the beginning as disconnected and unimportant facts was capable of throwing much needed illumination upon a hitherto unknown phase of the race problems of India.

One of the earliest facts we ascertain when investigating the designs of Indian coast craft is the correlation of particular designs with definite regions on the coast line characterised by some clearly marked physical features and usually also by racial divergence. The amount of overlapping is comparatively insignificant and from all we can see the prevalent designs of fishing craft are the same now in each region as they were hundreds of years ago. Only in the larger coasting craft do we find evidence of considerable recent change in design.

¹ Read in abstract at the Lahore Meeting of the Indian Science Congress, January 1918.

The coast and island regions distinguished by characteristic boat types are as follows:-

- a. The North-West Coast, comprising Baluchistan, Sind, Kutch and Kathiawar,
- b. The Bombay Coast southward to Mangalore,
- c. Malabar and Travancore,
- d. The Gulf of Mannar,
- e. Palk Bay and Strait,
- f. The East Coast northwards of Point Calimere,
- g. The Maldiva and Laccadive Islands,
- h. The Andaman and Nicobar Islands.

Each of these regions has its own boat types, its own characteristics in weather climate and coast formation. In frequent cases characteristic boat types are co-extensive in range with the limits of race and language or the influence of foreign sea- trade. The North-West Coast is arid and stony, with physical and climatic conditions closely approximating to those of Arabia and, as we shall see, Arab boat designs are dominant and characteristic. In Bombay itself we get the same types mingled with others truly Indian in origin, but southward in the much indented coast moist and well wooded, that stretches to Goa and Mangalore, we find Arab influence ousted by indigenous and Polynesian types, but reviving partially in Malabar where though the Malayali adheres to the indigenous dug-out design, the Arab type is largely built at those Mappilla centers where the strain of Arab blood is appreciable, as for example at Calicut, Beypore and Ponnani.

Turning Cape Comorin we find that Polynesian and Indigenous types have held their own successfully against the Arab. The former influence at the present day is found best developed on the Ceylon side among the Sinhalese; in India it is seen in strength in the north-west corner of the Gulf of Mannar and universally in Palk Bay and Strait; elsewhere on this section of the Indian coast indigenous designs of catamaran and canoe are well-marked and unusual.

Northward of Point Calimere is the real home of the catamaran, a truly Indian type, specialized for use upon the surf-beaten Coromandel and northern Telugu coasts where the catamaran and masula boat must continue to hold their own wherever there be no harbours of refuge, such as Madras and Cocanada.

In Bengal the smaller coast craft have little importance, the types seen being really varieties of Ganges dinghies and of dug-out canoes, whilst in Burma, Mongolian and Malay influence is paramount, modified in type by local conditions and the innate unskillfulness of the Burman in boatcraft.

River craft are types apart and throughout India are all very archaic in their general features, resembling ancient Egyptian and Mesopotamian types so closely that they vivify scenes on the Nile and the Tigris in the days of Rameses and Assurbanipal.

THE NORTH-WEST COAST

Sailing along the Mekran coast, past the mouths of the Indus and thence past Kutch and Kathiawar to the Gulf of Cambay, the Arab voyager finds this coast but a continuation and outlier of his own arid sandy home-land; this has been the only land in India that the Arab has occupied even temporarily, Sind and the lower valley of the Indus having been occupied by the Arab Kasim early in the eighth century, though we have records of Arab naval raids on this coast as early as 636 A.D., only four years after the Prophet's death.

Although Arab domination in Sind and the adjacent lands was short-lived, trade with the Persian Gulf and the south of Arabia has existed from time immemorial, and it is therefore natural to find Arab influence exclusively dominant in boat and ship design everywhere along this coast. Whether in the great kotia, the Indian sea-going sister of that handsome matron, the Red Sea and Persian Gulf baggala, or in the humbler machwa of the fisherman and in the coasters known as nauris and dhangis, several principal characteristics are seen. All hoist the Arab lateen; all lift to the long swell of their seas the great forereaching grab bow; all have a deep forefoot and a

raking stern. The machwa is entirely open and undecked whereas the kotia and the baggala have a high castellated decked poop and a properly laid main deck.

The universal rig is the lateen, wider and stouter in form than the loftier and more elegant felucca-lateen of the Mediterranean. The true Arab pattern of cutting off the fore angle of the sail is followed, so that a short perpendicular edge of luff of several feet in length is given below the heel of the yard. The baggalas, kotias, nauris, dhangis, and some of the larger machwas have both main and mizzen masts; the former is a stout heavy spar stepped nearly amidships with a great rake forward to enable it to carry the weight of the heavily yarded sail in the right place. The mizzen is a much smaller spar with a less pronounced rake forward. Of rigging there is remarkably little, usually only a forestay and a pair of stays on either side. The yard is hoisted by a stout halyard passing from the fore side through a sheave at the masthead with an enormous three-sheave wooden block stopped to the end. The purchase leads to another gigantic four-sheave block placed just in front of the poop an arrangement identical with that used by the Egyptians in the rig of the great galleys that sailed on that wondrous voyage to Punt some 1600 years before our era. Upon the buggala and the kotia as the aristocrats of these seas, the builders lavish much skill and care. Their high poops have the stern windows (the aft end being of that obliquely truncated form known to sailors as a raked transom stern) often highly ornamented with a considerable amount of conventional nautical carving- scrolls, rope designs and simple arabesques. The bottom, to about the water line, is sometimes coppered but generally is coated with a white pitch most characteristic of Arab ship finish, carried upwards in a wide sweep on either bow. Above this the hull and the poop superstructure are soaked and scoured with oil after every overhaul and to the eye (the nose should not be consulted) the rich red-brown colouring taken on after several applications is particularly pleasing. The bow is notably low and unobtrusive, and this taken in conjunction with the high poop is distinctly an antique combination of much significance. To see a great kotia foaming through the water with a fair wind, the sun lighting the great spread of white sail and red carved poop, is one of the prettiest sights in Eastern seas and one that instinctively heightens our respect for the race that has evolved the type, powerful and admirably fitted for deep-sea service.

At several of the larger ports of the North-West coast the building of kotias and machwas is an important industry, in spite of the fact that nearly all the timber has to be imported from the Malabar coast. Here are built the fine kotias, running from 50 to 80 feet in length and up to 150 tons in size, which trade with Cochin and Calicut to the south and as far as Zanzibar on the west. Constant and intimate traffic is carried on with the Persian Gulf and many of the vessels built in India are constructed to the order of gulf Arabs or are sold eventually to them.

These trading craft are divided into numerous varieties by native seamen; some by differences apparently so slight that the uninitiated has difficulty in appreciating them. The main source of trouble is that boats of essentially the same build are given different names dependent primarily on the race of the owner and signalized by divergence in small detail, usually of ornament. Thus the *baggala* and *gunjo* are the Arab forms of the Indian *batel* represents the Arab *sambuk*.

The *baggala* is usually built by Arabs in their own lands; is two and even occasionally three-masted, fully decked, with a high poop, truncate stern with counter, rudder trunk and ornamented quarters. In size commonly between 300-400 tons, rarely reaching 500 tons' register.

The *kotia* is built in India for Indian owners; in great measure it is the native craft of the coast of Kutch and Kathiawar. In appearance it approaches closely to the *baggala* type, being two-masted, with poop, carved square stern and quarters; usually with a rudder trunk. In size it runs generally under 200 tons, but in spite of its smaller size it makes equally long voyages as its great relative, the *baggala*, often making round voyages from Katch Mandvi to Bombay, thence to Madagascar or the African coast, back to Bombay and on home.

Kotias are the oceanic tramps of Indian craft, willing to go wherever remunerative freight offers, be it Chittagong or Jeddah, Nossi Bé or Colombo. Often the better found are copper bottomed; if not, they have the usual chunam and grease mixture applied to the under-water parts. They are built

chiefly at Kutch Mandvi, and on the Kathiawar coast, but a fair number are built at Mangalore and Calicut.

From baggalas of equal size they are distinguished, as are so many of these Eastern crafts, by the distinctive ornament upon the stem-head. In the baggala, this consists of a bollard-shaped prolongation of the stem-post, encircled by carved rings and often surmounted by a short peg; in kotias a striking ornament, the so-called "Parrot's head", forms a characteristic figure-head. This latter ornament is a very widely spread Indian *motif*, seen again in the gunjo and the nauri. The gunja or gunjo is an Arab-owned kotia, built for or transferred to an Arab port. The only recognisable difference is usually the form of the stem ornament; the "Parrot's head" has been reduced to a geometrical circular disc with a curved bar on the aft side in place of the beak and with a crest-like ornament on top.

Last of all the square-sterned traders commonly seen on the North-West and Bombay coasts is the Arab *sambuk*, a roughly built two-masted decked coaster with low poop and plain stem-head. They hail from the Zanzibar and Arabian coasts, and range to 200 tons register; being seldom built in India they should properly find no place in this list, but as they constitute an essentially Arab type and are numerous in the ports of Western India it is as well to include them, as they grade into the next form:-

The *batel*, a still more primitive coaster of the baggala and sambuk type, from which it differs in being undecked except at the extreme ends and being without poop. The stern, stem-head, and general appearance are as in the sambuk. As a rule only one mast is carried, but in the larger ones, which run to 100 tons, a small mizzen is stepped at the after - end of the keelson.

An altogether different from of Arab trade is the *boom* or *dhangli*, a cheap and older form of a small sized baggala, from which it differs chiefly in the form of the stem terminal and in having a sharp, raked stern in place of the counter and highly ornamental broad stern. They are decked and with a poop, and are generally smartly painted along the topsides in broad fore and aft bands.

The stem – piece is plane and short, bounded by two converging horn – like bars of wood continued forwards from the gunwale.

Dhangis run to 200 tons, are rigged similarly to two – masted buggalas and are said to be exceptionally fast sailors. They are generally owned by Arabs, but are built chiefly on the Indian coast between Karachi and Calicut.



Fig 1 – Fishing machwa, Karachi

The *nauri* is very much like the dhangis in essential details but has a characteristic “Parrot’s head” stem ornament, bespeaking Hindu influence in place of Arab. Beak and eye are distinctly recognizable with a carved crest addition at top, from which the simplified form seen in the gunjo must have been derived. They run to about 80 tons register and trade between India, the Persian Gulf and Zanzibar. They are generally built on the Kathiawar coast.

The boom or dhangis and the *nauri* are the least changed of the Arab type of trading vessel bespoken by their plain double-ended form. The others, baggalas, gunjos, and sambuks is well as kotias and batels, respectively Arab and Indian, show distinct Portugeese influence, for their high poops and squared sterns derive these characteristics features directly from the early caravels. The richly carved stern and quarters of the great baggalas and kotias are almost identical with those of 16th century European vessels of the same size.

The *machwas* used for fishing and minor coast traffic are of two varieties one having the typical transom stern (Fig.1), the other lean in the quarters and terminating sharply in a greatly raked stern post. The latter type is by far the more common and is the fishing boat design *par excellence* on the coast and indeed as far south as Bombay. It has but a single mast, usually made to unship, and the stern is low and mean in marked contrast with a towering poop of the deep-sea type. The bow is slightly higher and more prominent than the stern, ending sharply and without ornament. Right aft is a "crutch" formed of two uprights set one on each quarter, and connected above by a cross bar on which the long yard and even the mast itself rest when the boat is lying to her nets. Still smaller is the harbour jolly boat, built on the same lines and also used largely for inshore fishing.

In the innumerable creeks of the delta of the Indus the primitive dug-out is greatly in evidence. It is of the usual type and only very rarely have I seen it fitted with an outrigger; I have however seen it as far west as the mouth of the Hab river in Baluchistan.

THE BOMBAY COAST

Here within the comparatively short range of 650 miles from the head of the Gulf of Cambay to Bhatkal at the southern limit of North Kanara, we get considerable diversity of coast with corresponding variety in the coast craft, which show essential differences from the Arab types of the North-West coast. The races furnishing the fisher and sailor classes are equally varied, both in origin, language and religion.

In the northernmost or Cambay section for 150 miles we get shoal water and sandy bottom extending far to sea, and not a single harbour that can afford shelter to fishing craft. The estuaries along this coast are also rapidly silting up and hence it is that the boat people of these parts have to combine coast trade with fishing; to do so necessitates the use of large boats and hence we have the apparent anomaly of a poor fisher coast sending to sea the largest fishing boats to be found anywhere in India. The type used is a large machwa of handsome and careful construction. Of these there are about 270 in all,

ranging from 10 to 20 tons burden manned by a crew of eight men. The supply of fish in their home waters being limited, the great majority of these boats resort to the south Kathiawar coast for three months in the fair weather season, taking to the carrying trade when the fishing becomes unprofitable. The cost of these boats runs to Rs. 2,500 in the case of the largest. They are undecked save for a short length at the stern. The stem is sharp and raked strongly, the stern truncate with but slight rake. The hull is nearly black in colour, from frequent applications of oil and sometimes of thin tar. According to the duty required the details of rig and equipment vary. As cargo boats they carry two masts, both with the Arab Lateen, and heighten their freeboard by means of temporary mat and bamboo weather-boards. When on this duty they display the characteristic Hindu "Parrot's head" stem ornament, exactly as in the big kotias of Kathiawar.

When employed as fishing boats the mizzen is not stepped; the figure-head also is taken down and left ashore to permit of the use of a sheave fitted in a slot in the stem-head when riding to the nets. The temporary weather-boards are also removed and the boats are stripped to the gunwale in order to have the advantage of the lowest free-board possible when hauling their great nets. As typical Indian craft, the Gujarat machwas built at Bulsar, Billimora and adjacent ports, as opposed to the smaller ones of Arab design such as sambuks and Karachi machwas and jolly-boats, show an essential difference in the way the hull is constructed. In all Arab style boats the planking is laid edge to edge, thereafter rendered watertight by caulking; in the Indian design, the edges of the planks are grooved or rabbeted to fit one another closely and in the grooves are laid strands of cotton and a layer of putty. (The latter is made by boiling together a mixture of resin and oil which is subsequently hammered into a paste like mass). The planks are then drawn together by lashings passed through holes bored in adjoining strakes tautened by means of wedges driven in between the lashing and the planks. When drawn sufficiently tight, long iron nails are driven through the planks and the ribs, the projecting inner ends being beaten down to serve as clamps. This method of construction renders the repair of damaged planks a matter of difficulty but these men look down in contempt at what they consider the crudeness of the caulked planking of Arab-style vessels. Battelas are of the same design but larger only for cargo.

Where the fisher crews are Hindus (some are Roman Catholic Christians), old time propitiatory ceremonies are carried out upon appropriate occasions, which are useful for comparison with those used elsewhere. The simplest of these is performed each time the boat leaves shore; when the nets have all been taken aboard and the boat is moving off from the landing place, one of the crew empties a chatty of water over the prow¹. Far more elaborate are the special rites performed usually once a season to the local deity of the locality where the fishing operations are carried on. Usually this is one of the aboriginal village deities—a goddess almost invariably. At Velan in South Kathiawar, the goddess of the harbour promontory is invoked with cries of “Mata! Mata!” as a goat is killed and coconuts are broken at the prow. The men say they know no proper prayers, so merely invoke the deity by name. Usually several boats share the cost of the offerings, which are made on a date convenient to the men. Occasionally if one boat experiences bad luck while others are making good catches the unlucky crew will make a special offering at their own cost to ensure better fortune. A crude vermilion figure of Ganapathi, 4 or 5 inches high is often painted near the mast or at the stern as a further bid for the favour of the gods.

For inshore fishing, small open boats, of the same general design, of 3 to 10 tons’ burden, are employed, manned by three or four of a crew.

The larger craft used solely for cargo purposes in this region — Cambay to Bombay — consist of the *battela* and the *padao*. Both may be described shortly as large editions of the Bulsar fishing machwa, battelas running from 40 to 100 tons’ register while padaos range from 30 to 60 tons’. Both are ordinarily two-masted, but occasionally a very large battela carries a third mast right aft. Both carry a long jibboom inclined sharply upwards. High-peaked rather baggy lateen sails are favoured.

Battela and padao are alike square in the stern, which is little raked; the larger battelas have a counter sometimes elaborately carved and painted, together

¹At Tuticorin the Roman Catholic fishermen similarly splash water on the bow as the boat leaves the beach; our own custom of breaking a bottle of wine over the bows of a ship when being launched probably has a common origin.

with a rudder trunk. All have means for erecting temporary weather-boarding in the waist a feature characteristic of all Gujarat boats, whether they be battelas, padaos or fishing machwas. As might be inferred from the geographical range, the battela forms a link between the baggala and kotia on the one hand and the more southern pattamar on the other, the stern part of the hull being closely related to the former whereas the rig, particularly in the greater rake of the masts, the cut of the sails and the presence of a jibboom, approximates to that of the pattamar.

KONKAN COASTERS

From Bombay to North Canara and indeed as far as Mangalore, an entirely different type of coaster is seen, the pattamar. Here we get at last a design which is certainly indigenous and influenced slightly or not at all by European and Arab example.

Pattamars are readily distinguished by their great sheer fore and aft, the long curved overhang of the bow, their great beam in the quarters, particularly when, as in the true type, the stern is rounded, and more than all by the great rake of the two masts, whereof the main is often nearly as long as the foremast.

They carry a long slender jibboom rigged in or out as required and in the largest size a third short mast right aft.

The great relative length of the aftermast is noteworthy; its sail is larger than in the Arab type of boat, and instead of being seldom set when off the wind – the Arab habit – it is in general and constant use and figures as a principal and not an accessory sail.

These boats, unlike kotias and baggalas, are essentially coasters and fair-weather craft. Hence we find neither permanent bulwarks nor properly laid deck. When required a temporary bulwark of matting and bamboos is employed, further protection for the cargo and crew being provided by a pent-house structure thatched with coconut leaves, between the masts. Fore and aft there is a short length roughly planked over, the remainder being

lightly covered with split bamboos laced together and laid on the athwartship beams; it is just strong enough to support a man's weight. The true type is best among the smaller sizes; these hail chiefly from Ratnagiri and Rajpur. In the larger sizes foreign influence is apparent in the transom form of the stern and in the short raised poop, very commonly seen, and the plain oiled treatment of the hull.

Pattamars have none of the fine finish loved of the Arab. No carving adorns the poop when present, neither is the hull brightly banded with gaudy colours and only some of the largest are lift handsome in well-oiled nudity. Usually a coating of dull earthy paint, dark red by preference, is applied above the waterline with a black gunwale and sometimes a white ribbon fore and aft. In those with poops and transom sterns some crude ornamental painting is attempted- stars and imitation ports the favourite. Pattamars are built chiefly at Konkan and Kanarese ports. They range up to 180 tons register, but the majority are less than half this size.

This type has undoubtedly developed from that of the large fishing boat still used at Ratnagiri and Rajpur, which in turn, as we shall see, is evolved from a spread and built-up dug-out. The pattamar has also many points of family resemblance to the old style coasting craft of Ceylon, as typified in the Yatra-dhoni — especially in the character of the bamboo-decking, presence of a jibboom, and in evolution from an outrigger fishing boat. Comparison enables us to see how far the pattamar has travelled- the original square sails became a square-headed lug and then by reduction of the luff, the Arab lateen of the present day. Similarly the jibboom increased in size and importance, and from the sewn planking we have progressed to a bolt-secured hull. In steering, the original primitive form of rudder completely exposed outside the stern of the vessel with tiller fitting over the rudder-head, has been retained. The palm-thatched pent-house cabin is another well-marked primitive feature.

KONKAN FISHING BOATS

The section of the coast from a little north of Bombay and on as far south as Jaigarh of Jaigad, a few miles north of Ratnagiri, is generally rocky, well

provided except in the north with numerous good harbours, bays, and creeks to shelter the mosquito fleet of fishing boats that crowd this coast. The fishermen are almost exclusively Hindus. The machwas in this section are large for the same reason as those of the Gulf of Cambay- their need to go far to reach the fishing grounds. A fine sea-boat is a necessity and in the larger boats hailing from the ports in the vicinity of Bombay, the fishermen have adopted a modification of the pattamar type of coaster for those which operate in offshore waters. A typical 7 ton Bombay fishing machwa measures 47 feet in length over all, with a beam of 11 feet and depth of 3 feet. The bow is long and raking with great overhang and considerable sheer, so that the actual keel length is short relatively to the beam. Hence these dimensions give a shallow beamy craft with great buoyancy both forward and aft- well adapted to the local conditions of the coast.

The rig consists of a large mainmast and small mizzen, both with considerable rake forwards; the sails are the usual pattamar lateens.

Like its large brother it possesses no permanent deck, but a temporary one is laid when necessary. These boats run the Cambay boats close in the matter of size, the larger ranging from 10 to 15 tons' burden with crews of from 10 to 12 men, the smaller from 5 to 10 tons with proportionately fewer hands aboard. Bombay harbour shelters a host of smaller single-master machwas otherwise of similar build, together with still greater numbers of small double-ended canoe-shaped fishing boats carrying a single mast and lateen sail. All these small craft come under the generic name of hody but the men themselves have several distinct terms to distinguish varieties possessing some special detail or more frequently applied according to the work they are engaged upon. In size a typical hody may be anything from 22 to 40 feet in length by $2\frac{1}{4}$ to 8 ft. beam, with a resister tonnage of from $\frac{1}{2}$ to 6 tons. They represent a widened copy of the ordinary West Coast dug-out, called toni in Bombay, built up of planks; indeed in the case of the very small ones, the boat is actually a dug-out. An ordinary rudder is fitted to the stern post by lashings or by iron gud, geons and pintles in some boats. Stem and stern are curved at about the usual angle adopted in dug-outs. These boats are quite open and unlined, but from the stem-head to a point just abaft the mast a weatherboard about

one foot wide is fitted along the gunwale to keep out the seas and spray. At times they employ an outrigger of the same form as we shall see is employed by the smaller Ratnagiri boats, to increase stability; *this locality (Bombay) marks the northward limit of the habitual use of this device on the west coast of India.*

From Bombay to Jaigarh some 100 miles south, machwas and hodys of the Bombay pattern, manned almost entirely by Hindu fishermen, continue the characteristic fishing craft in common use. From this point (Jaigarh) southwards to the Kanarese border, Muhammadan influence prevails except in Portuguese territory, where the fishermen are mostly Christian. The coast along the whole of this stretch is particularly well-adapted for fishing, the shore line indented with creeks and sheltered coves, and with numerous harbours and estuaries which provide shelter for fishing craft and coasters of every size and of varied description. The bottom right to the shore is usually sandy and hence inshore net fishing is practiced to a far greater extent than to the northward of Jaigarh.

Ratnagiri and Rajpur are the two great fishing centers on this part of the coast north of Goa; the Muhammadan fishermen (Daldis) of these ports have made the name of Ratnagiri famous along the whole west coast by reason of their intrepidity and skill, in which qualities they far exceed the fishermen of Kanara and Malabar. For deep-sea work they employ a beamy single-masted lateen-rigged machwa of low freeboard, while for inshore fishing they are fond of outrigger canoes of varied form and size.

The deep-sea Ratnagiri and Rajpur boats are of three sizes, and many of them fish for part of the year, usually on contract, on the Kanarese and North Malabar coasts, regularly coming as far south as Mount Deli and occasionally to Cannanore.

These boats are employed almost exclusively in drift-netting; the two larger sizes are single-masted lateen-rigged open boats, very broad in the beam, handsome in their lines, with long overhanging bow, round stern and raked stern post. Like Danish and Nordland open fishing boats they are low in the waist- to facilitate handling of the nets- and have therefore comparatively low freeboard; both alike fit a weatherboard when heavily laden and both

depend on a single mast and single sail. The smaller of the two large Ratnagiri boats returns daily to port, but the larger, which is used in deep-sea shark and ray fishing, frequently keeps the sea for several days.

The smallest type of Ratnagiri deep-sea boats is an extremely interesting development of the outrigger canoe. The basis, in common with the better known Ceylon form, is a dug-out canoe, which, having first been softened, has the sides cautiously and slowly spread by means of wedges till they attain a distinct flare. On the flared edges a series of strakes, also flaring outwards, is raised-Malay fashion- till the slab-sided crank dug-out is changed to a beamy and fairly roomy boat capable of carrying quite a heavy load of nets. A single outrigger is boomed out in the usual manner and the boat carries a lateen sail of the same type as her larger sisters.

All these boats carry a very small outrigger canoe as net tender. In this the original dug-out is left unspread, and as the outrigger can readily be dismantled this form has the advantage that it can be easily taken aboard and stowed out of the way.

A hurdle-like mast-crutch similar in form to that described above in the case of Sind fishing boats is fitted aft on Ratnagiri boats of every size. Usually it is neatly ornamented. It seems clear that the larger boats have been modeled upon the built-up canoe form, the outrigger being dispensed with as soon as increasing beam gave sufficient stability without recourse to such an awkward contrivance. To the Ratnagiri coast people seems due the credit for the first advance in boat-building made on the west – coast of India; there it is that we have to look for evidence of an outside influence long antedating that of the Arabs and the Portuguese.

The Ratnagiri and Kanarese pattamar coasters are in turn cargo carriers designed on the same general lines. On the Ratnagiri coast, using this term in a wide sense, what may be termed the Ratnagiri type of single-masted fishing machwa and two-masted coasting pattamars exist side by side with outrigger canoes, built-up outrigger boats and ordinary creek dug-outs, but after Malwan, a little to the north of Goa the Ratnagiri machwa dies out completely,

leaving the major part of sea-fishing to be done by outrigger boats and canoes, with operations confined almost entirely to the inshore waters. The largest outrigger boat is one used in seining, the so-called Rampan boat. This is merely a long, deep, widely-spread canoe-shaped boat fitted with an outrigger to give stability. Stem and stern are nearly similar and no mast is carried, the boat being rowed while the net is being shot.

After we pass Goa the number of true dug-out employed in fishing rapidly increases, and especially at Kumpta, Honavar and Mulki, these *pungayis* are very numerous. They are the same as the odam dug-out of Malabar. They are of considerable size, from one to 3 tones' burden, and each carries a crew of 8 men normally. In South Kanara these fine canoes are still more in evidence whereas the outrigger boat is seen only in commission in the case of the Rampan boat which, be it noted, is of comparatively recent introduction on this section of the coast, having been introduced from Goa. The kanarese fisherman and boatmen suffer distinctly from a lack of enterprises and there is a little to be learned from a study of their fishing craft. Either they are outrigger boats borrowed from their northern neighbours, or are primitive dug-outs from the south.

Typical of their lack of boat-building skill are the coffin-shaped backwater cargo carries of Mangalore. Although this is one of the busiest ports on the west coast, full of finally modelled fishing and coasting craft in their fair weather season, these boats are slab – sided, sharp ended, punt – shaped craft – bad plank – built enlargements of a dug – out canoe; they boast no rudder, have a single mast bearing a square sail as unnautical in shape as an inland tailor would cut and fashion but presumably are cheap to construct and answer their purpose in the calm waters where alone they are used (P1.V, Fig. 4).

MALABAR AND TRAVANCORE

The dug-out and the pseudo – dug-out – its counterpart in planks – have the field entirely to themselves in this long stretch of coast from Cannanore to Quilon. The former is beautifully fashioned craft, the latter – like the Mangalore lighter – ugly travesty. The dug –out is more numerous and while it ranges in

size from a tiny one – boy canoe to the big *odam* with its crew of eight, the plank- built canoe is usually of the large size only. It is practically in evidence at Tanur, where it appears to be in the majority.

There is so little variation in the type that there is almost nothing to say of them. None is provided with a rudder, steering being effected by means of a big paddle on one quarter, used for propulsion as well as control. Few of them use a sail; when they do, it is either a small and ineffective square sail or a spritsail. Beach lighters, the equivalent of the masula boats of the East Coast, are again merely clumsy flat bottomed enlargements of the plank-built fishing canoe, but the large cargo lighters which have often to carry cargo to steamers in the outer anchorage at Calicut are weatherly craft reproducing in a rough and untidy form the Arab features of grab – bow, deep fore-foot, sharp ranking stern and large lateen sail. They are undecked, without poop, and are indeed but large editions of the single – masted Bombay machwa. The strength of the Arab strain in their design at Cannanore, Calicut, Beypore and Ponnani is due to the long-established trade connection between these centers and the Arabian coasts, and to the not inconsiderable infusion of Arab blood among the better classes of the local Mappilla population. Particularly close is the Arab connection with Calicut. As soon as the south-west monsoon moderates, Arab buggalas begin to arrive, those from the Persian Gulf with dates, those from Karachi and Bombay with more general cargo. The cargoes having been discharged, those requiring it are hove down on the beach to get advantage of the excellent repair facilities existing here. Then the return cargo of Gulf boats must comprise a big assortment of ship-building materials for the boat-building yards of Bahrein, Koweit, and the Tigris and Euphrates; the *nahkudah* and his men have a busy time for weeks on end, selecting and chaffering over the purchase of timber and coir yarn, blocks and bolts, and all the varied etceteras of ship chandlery. Then the timber must be sawn and the coir yarn twisted into cordage and the huge hawsers these men love, under their immediate supervision.

In South Malabar, in Cochin and in Travancore, where an extensive inland water trade exists by virtue of the great network of backwater channels in the low footland skirting the Ghats, particularly fine dug-outs are employed.

Compared with the coast canoes, they are wider and more roomy; that they are not used on the coast is due to their great weight which would prevent easy beaching. They are undecked, but cargo and passengers are securely protected against rain by a beautifully constructed arched roofing of cadjans made partly in sliding sections for ease in loading and unloading. Paint is never applied and save in the ornamentation of the prow they are severe in line and wanting in decoration. A rich aroma of ancient and rancid fish oil hangs over all, this being found most effective as a preservative for the wood, to which it imparts a rich brownish-black tint that harmonizes with the heavily shaded banks of these tree-shadowed waterways.

For festive occasions specially long and narrow canoes are brought from their sheds. These are known generally as snake-boats, and while those of Cochin are remarkable only for their length, those of Travancore are unique in design throughout India. Instead of being deep and slab-sided as in the Cochin type, the Travancore snake-boat has had the gunwale so cut down that the transverse section of the boat is a very shallow crescent; the freeboard in consequence is reduced to a minimum. The stern curves high above the steersman in fashion like that of the Phoenician galleys depicted on Assyrian sculptures. Like the latter also the prow is remarkably low and ram-like, ornamented in the case of the Travancore boat with a large metal boss in the place where the bronze spur occurs in ancient war-galleys. A further point of resemblance is that the oars end in rectangular paddle blades.

Apart from the modern cargo lighters which date back only to the introduction of steamer traffic on this coast, no sea-going vessels have here their home. This is not due to any lack of skill in shipbuilding for the Malabar shipwright class are renowned as among the best of their craft in India, so much so that they are in demand as foremen shipwrights in the building of lighters, schooners and brigs at every shipbuilding center on the south-east coast from Tuticorin to Negapatam where this industry still flourishes.

The cause is to be sought rather in the lack of maritime enterprise in the coast population. Stranger craft, chiefly from the Bombay coast, have ever been ready to do all the coast-wise traffic, so, to compete therewith has needed

greater enterprise than the somewhat lethargic or phlegmatic Malayali can compass. Competition would have indeed to be vigorous to oust the Kutch kotia , the Konkan pattamar and the Tuticorin dhoni, and life is too easy in Malabar to justify such exertion. The damp and enervating climate is a very potent brake upon energy and enterprise on that coast.

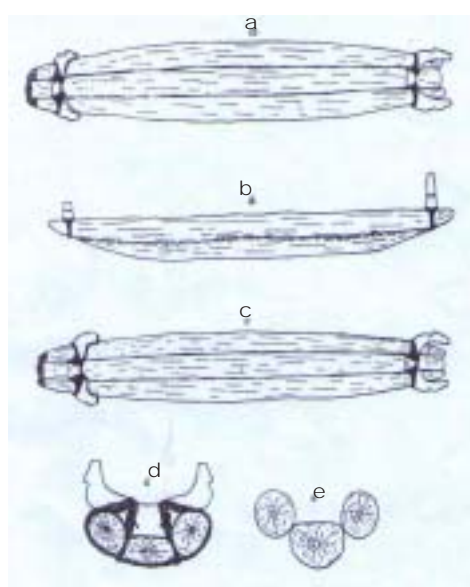
Before rounding Cape Comorin and entering on a world where entirely different conditions prevail, we may note:-

- a. That purely Arab designs prevail along the whole north-west coast.
- b. That while the Arab types have influence from Cambay to a distance of some 100 miles southwards of Bombay, the purity of design has gone and some notable modifications have been introduced; chief of these are the increased value given to the mizzen sail and the addition of a small jib.
- c. That on the Ratnagiri coast the larger boats, both those used in fishing and coasting, appear to have their hull modeled on a, more beamy and shallower type than anything based upon the fundamental Arab design. As the Ratnagiri men employ for their lighter inshore work a much flared dug-out with built-on upper strakes also flared, it is probable that their large boats, beamy and of little depth, have been evolved from the flared dug-out rather than from the deep Arab type.
- d. Between the Ratnagiri region and that of South Kanara, the outrigger in various forms, but none so highly developed as in the Ratnagiri craft, is dominant and hence suggests long-continued employment, and an ancient foreign connection long antedating the advent of Arab influence.
- e. Malabar and Travancore furnish uniform and purely indigenous types of canoe as the only craft in local use, with the trivial exception of recently introduced cargo lighters of Arab design and of a curious form of backwater "snake-boat", used for important water festivals in Travancore, which shows a surprising resemblance in important points with the Phoenician type of armed galley; this is probably merely a case of parallelism.

GULF OF MANNAR REGION

As Cape Comorin is approached going south along the Travancore coast, all the familiar landmarks of the southern section of the west coast begin to change. The Malayali language becomes corrupt with Tamil admixtures, and eventually is lost in an equally uncouth and corrupt Tamil; the habits and customs of the people are also Tamilized, and even more notable is an alteration in the character of the vegetation. The dense humid tropic lowlands where plant life riots in luxuriance and where the coconut dominates all cultivation, gives place to naked sand wastes, the coconut withers away and in its place rises stiff and unbending the formal Palmyra palm and the inhospitable babul. Coincident with these changes, we find the methods of fishing also begin to alter. The crank dug-out canoe to which the Malayali adheres with such touching fidelity, as far north as Quilon finds its supremacy challenged by small catamarans of primitive form, constructed of from 4 to 5 logs tied together raft-fashion. From Quilon southwards both forms of craft exist side by side as far as Colachel where catamarans of improved form- "boat catamarans"- appear and finally oust both the dug-out and the raft catamaran. Between Colachel and Cape Comorin the coast is particularly exposed and surf beaten throughout the year and is also bare of any landing place suitable for dug-out canoes. Beyond the Cape the same form of catamaran is numerous for over 100 miles, ending only at Mukkur in the Ramnad district. Throughout the whole of this tract of coast the only important caste of fishermen is that of the Roman Catholic Parawas, whose ancestors for political reasons become converted to Christianity on the coming of the Portuguese. Besides the boat-catamaran these people use largely a second type of craft – the "boat-canoe" – which consists of a Malabar dug-out spread by wedges and heightened by flared wash-strakes of 9 to 10 inches in width. The two types exist side by side save at a few very exposed centers such as cape Comorin, and both are worked exclusively by Parawas. Nowhere else in India is either type found, so that this strict limitation, being regional as well as racial, is particularly notable. The boat catamarans vary little in size (Fig. 2). They are worked normally in pairs and usually one of the two is slightly longer and wider than the other, the former being 23 feet long by 3 feet wide, the latter 20½ feet by 2½ feet. Of the three logs of which they are made the central one is stouter than the side ones; the whole three are shaped and fitted together in

such a way that the central one fits keel-wise at a lower level than the other two which rise sufficiently high to form a trough-shaped hollow above. At each end the logs are planed flush on the under surface to give an easy entrance. The three are held in position by a transverse two-horned block of wood at either end, where to the logs are lashed securely by coir ropes passed through grooves cut in the sides of the logs. Usually two men form the crew, using, instead of wooden paddles, short lengths of split bamboos wherein they differ from the Coromendel catamaran men who use broad-bladed paddles of two designs. When paddling, which they do as seldom as possible, they frequently stand up spooning the water rather than rowing or padding. That early English mariner who saw them miles out from the coast and probably was the first Englishman to make reference to them, may well be excused for recording his surprise at seeing " distinctly two black devils playing at single stick. We watched these infernal imps about an hour, when they were lost in the distance. Surely this doth portend some great tempest". The description exactly pictures the scene if one be far enough away to overlook the catamaran which floats almost level with the water.



a and c. Large and small units of a pair; b. Side view of a;
d, Transverse section near one end; e. Transverse section at mid-length.

Fig 2-Boat catamaran of Cape Comorin and the Tinnevely coast

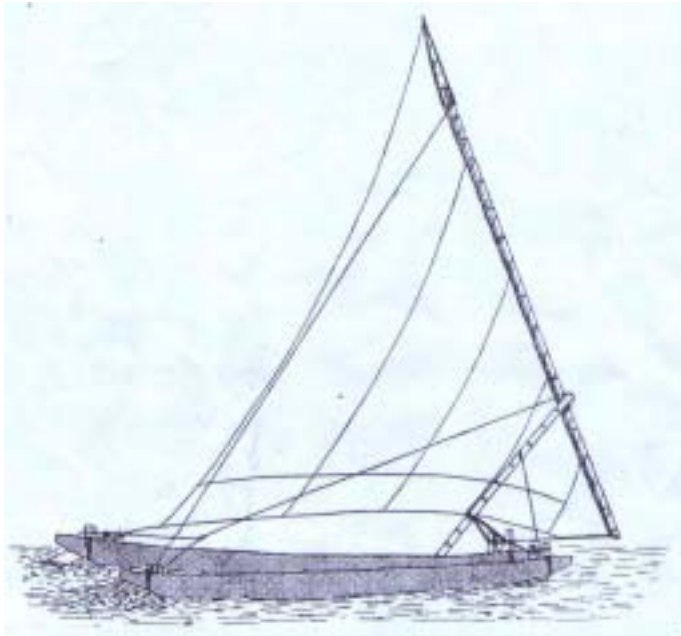


Fig 3- A pair of boat catamarans under sail. Tuticorin

Unlike Coromandel catamarans, the logs are kept permanently tied together, they are neither painted nor oiled, neither is any ornamental carving employed.

To go to and from the fishing grounds a small triangular and nearly equilateral sail is used, fitted to the head of a diminutive spar 10 feet in length, set up with a strong rake forward right in the bows, i.e. at the end which functions as such- both ends are almost alike in structure. A light bamboo yard of considerable length (34 feet) carries the brown tanned cotton sail (Fig 3). Mast and sail are common to each pair of catamarans, the mast being stepped in the larger while the sheet is led to the stern of the smaller, of which the fore end is lashed to the other. The two craft do not lie quite parallel to one another when sailing but diverge slightly aft. This particular form of catamaran appears to be favoured on this coast rather than the wider one seen further north, as affording greater stability in the wicked short cross seas that so much prevail in this region. On the other hand the great surf rollers that career shore wards over long stretches of shoals on the Coromandel coast can be ridden over much more safely by a board - built raft than by a heavy,

deeply keeled craft. The Comorin and Tinnevelly coast is also fairly well served by little coves and bays, which give just enough security even in bad weather for the safe beaching of these catamarans.

Catamarans are used almost exclusively in the particular form of fishing where the *madi valai* is employed. This net is a deep-water or boat seine short from two partner catamarans across the path of shoaling fish. The almost total absence of freeboard in the catamarans enable this net to be hauled with ease, not possible in the high freeboard boats next to be described – a quality that goes far to ensure the survival of this apparently antiquated type.

For other forms of fishing on the Tinnevelly coast, the boat-canoe already alluded to is exclusively used. For the principal methods different sizes are employed. All are termed *ballams* or *vallams*, almost the same term as is used by Mesopotamian Arabs for all dug-out canoes and for all boats of canoe form – long, narrow and keelless.

The essential differences between these canoe-boats and ordinary Malabar dug-out, is that the original dug-out has been spread and its sides raised so that considerable stability is acquired. Instead of depending on paddle for propulsion these boats are designed primarily for sailing and on a fair wind they have a fine turn of speed. Close hauled they perform badly as they are wholly without keel, having retained the original rounded bottom of the dug-out.

The mast is of medium height and is fitted nearly amidships. The rig is a single short and wide lug, not very far removed from the square sail from which it is clearly derived (Fig. 2, pl.v). Except in enlarged models built wholly of planks upon the same lines for coral-stone work, no mizzen is carried. A peculiarity of these canoe-boats is a double pulley fitted in a square truck up on the extremity of the mast to which pointed the yard is hoisted. Owing to the high freeboard and the lowness of the thwarts, so placed to ensure good stability, rowing is difficult and wearisome to those not accustomed to these boats. In one case in which we lent one to some Kilakarai divers they complained so bitterly of this, that fresh thwarts had to be fitted six inches higher than the original ones.

A powerful rudder of elegant shape is employed, fixed with the usual gudgeon and pintle; it descends considerably below the rounded bottom and thus contributes slightly to reduce the disability of want of keel. It is strange that the use of a leeboard is unknown or unpractised seeking that is employed regularly by the outrigger boats of Ceylon, Kilakarai and palk Bay. The introduction of this useful accessory is therefore one of the minor improvements now being brought in by the Madras Fisheries Department.

Various sizes of these vallams are used according to the nature of the fishing. The largest, having crews of 7 or 8 men each, are used in line fishing, 7 to 10 miles off shore; a slightly smaller size, about 27 ft. long, is used off-shore drift netting and by dives engaged in the chank fishery, while still smaller ones are used for inshore lining and netting.

At Tuticorin a few of the largest size are employed also by coral-reef quarriers to supply stone to the local building trade and sea-worn madrepora branches (chulli) to lime-burners. The bulk of this coral-stone work is however carried on by large Plank built boats constructed as already mentioned on similar lines. The average dimensions of these are; - length 34 feet, beam 6¼ feet, depth 2¾ feet, with a load capacity about two tons. Usually they have the same rig as the dug-out type, but when on a coasting voyage they generally fit a short mizzen carrying a small lug. At the same port (Tuticorin) a fine fleet of sailing lighters and coasters has been created since steamer traffic was introduced, and nowhere can the successive steps in the evolution of a new and dominant type be better studied than here. When coastal steam traffic development on the Indian coast about the middle of the last century the cotton presses of Tuticorin built or brought to the port several square – sterned sailing lighters on English lines, rigged as small schooners with fore and aft sail and jibboom. The trade appearing likely to prove lucrative, some of the local Parawa boat-owners began to build other lighters. They rejected the English model as this had been found unhandy in going alongside steamers; instead of that they followed in simplified fashion the lines and rig of the Arab buggalas which at that date regularly traded between Busra, Bombay and Tuticorin. The boat-builders while adopting the raked stem and stern and lateen rig, made both stem and stern sharp as in present-day Calicut lighters. The model did not

serve over-well and gradually the rake of stem and stern sharp as in present-day Calicut lighters. The model did not serve over- well and gradually the rake of stem and stern was reduced till to-day both are almost vertical in the mast instead of being raked forward is now raked very slightly aft and is fixed at about one – third the boat’s length from the bows (Fig. 4). The present day lighter appears as though it had evolved directly from the plank – built canoe used in the coral – stone trade, a course which it has not followed as shown above. Originally Tuticorin lighters, having been introduced by English firms, were known locally as “boats” (boatu), but now this has given way to the vernacular term of dhoni.

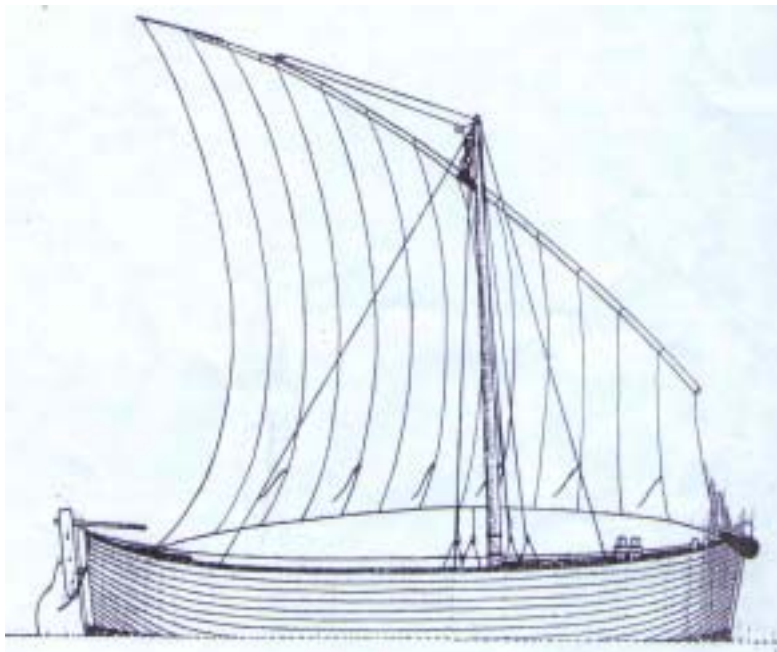


Fig 4 - A Tuticorin cargo lighter

It is interesting to know that the first built native lighters had their bottom coated with white chunam pitch in the Arab style. Later some owners employed tinsheets as a protection, and then with greater prosperity the further step was taken of sheathing in copper. A few have tried Muntz metal sheets, but the general opinion is that copper is the only reliable metal to use. In this I concur, experience of the yellow metal which sheaths the bottom of our Inspection schooner showing it is no protection whatever against the settlement of oysters and other growths, whereas lighters sheathed with copper

keep clean and unfouled. No further sail than a single big lateen is used when engaged in lighterage to and from steamers lying in the roads (Fig.1, pl.v), but when coasting between ports – they now go as far up the Coast as Bombay – they add a jib and small lateen mizzen.

Quite recently a further evolution has been made, an enterprising boat-owner having built several larger vessels (*padagu*) solely for coasting trade. They are two-masted and fully-decked, but retain in the straight stern of the lighter design. As regards rig, they are fitted with jibs but whereas the first one built had a great lateen on the main mast and a fore and aft sail on a big mizzen, the latter ones exchanged the clumsy lateen for another fore and aft sail, so that the final form evolved is a fore and aft schooner rig such as one may see anywhere in British seas among small coasting craft in out-of-the-way places.

CEYLON

No greater contrast can be found in boat designing than that between the types used on the opposite sides of the Gulf of Mannar south of latitude 9°N. On the Tamil or Indian side the catamaran and boat canoe alone are used; on the Sinhalese side, the outrigger canoe is the national and dominant design, the catamaran being used only the northern or non-Sinhalese part of the island, and by immigrant Tamil fisherman at Colombo, while the dug-out is restricted to its proper sphere on rivers and other inland waters.

The outrigger canoe, called *oruwa* in Sinhalese and *kulla* in Tamil, as used in Ceylon is one of the most distinctive craft in the world; moreover its form has become strictly stereotyped, bespeaking very long lineage and an end to the experimental stage. As we see it thus fixed in design, the hull consists primarily of a long dug-out with tumble home curve along the upper side. Upon the original gunwale is sewn with coir yarn a wide vertical wash – strake on either side, leaving a well – shaped opening running the length of the boat, so narrow that sitting on a boom where it crosses the hull – there are no thwarts – a passenger can usually accommodate only one leg inside !

The rig is a high and somewhat narrow double spritsail of a large area. The mast sprit is a stout, carefully chosen bamboo stepped exactly amidships. The

other sprit is fully as long and only a little less strong than the mast. The sail is cotton, usually tanned brown. The outrigger float is a carefully-shaped well-smoothed log of light wood, boomed out permanently by two cross pieces made up, not of a single pole as in the Kilakarai outrigger boats shortly to be described, but of a number of thin flexible pieces bound tightly together fascine-wise.

In outrigger canoe used for sailing, the outrigger must necessarily be on the weather side in order to give the necessary counterpoise. Now the Ceylon type having a permanently fixed outrigger, cannot have any definite stern or fixed rudder. Accordingly we find the two ends are similar, so that either may function as bow as required. In place of a rudder a long-bladed wide paddle is used on what should answer to the quarter, being supported in a coir grommet passed through a hole in the gunwale. On returning from a sea with the wind in the same quarter, the sail has to be reset on the other side of the masts and the quarter paddle shifted to the other end of the boat which now becomes transformed from bow to stern. To compensate for lack of keel, a powerful leeboard is carried at each end, to be used according to which end of the boat is acting as stern. No other boat except these Ceylon outriggers and those used in Palk Bay and Strait and around Kilakarai appear to use this most useful contrivance. It is never used for example in the boat canoes of the opposite Indian coast, whose most notable weakness is inability to sail close hauled and which make a terrible amount of leeway in such circumstances.

The Sinhalese are so wedded to the outrigger that they also apply this device in the design of their small coasters. These were at one time very numerous in the carrying trade between the island ports, giving such an old-world touch as we seldom see in these prosaic days of fussy steam coasters. These Yathra oruwas as they are termed, run to 50 tons' burden. They are usually fitted with two-pole masts and a short bowsprit and are provided with a boomed outrigger of massive size, similar in general structure to those of the fishing boats. No iron is used in putting the hull together; the planks are sewn together with coir yarn in the same manner as is employed in building the masula boats of the Madras Coast, the work being rendered water-tight by lying over the

joints long strips torn from the leaf stalks of palm leaves, with dried plantain leaf stalks put between the plank edges as caulking. To sew the planks together a row of closely set holes is bored along the edges of adjoining planks and through these holes coir yarn is passed and tightened over the caulking strips which are placed both inside and outside the seams in the hull.

No deck is provided, the cargo when loaded being protected by a penthouse covering, thatched with cadjans, a method adding to the archaic appearance of these old-world craft. They hail almost entirely from the coast villages lying between Colombo and Galle – the south west coast – a purely Sinhalese region save for some settlements of so-called “Moormen” – the descendants of Indian Muhammadans from the opposite side of the Gulf. Few of these outrigger dhonis were now in existence and soon they will disappear entirely. Their survival or rather their presence on the Ceylon Coast is of much interest ethnologically in view of the representation of ships of the same general type among the sculptures on the great Buddhist shrine at Boro Burdur in Java, dating back to between 750 and 900 A.D.

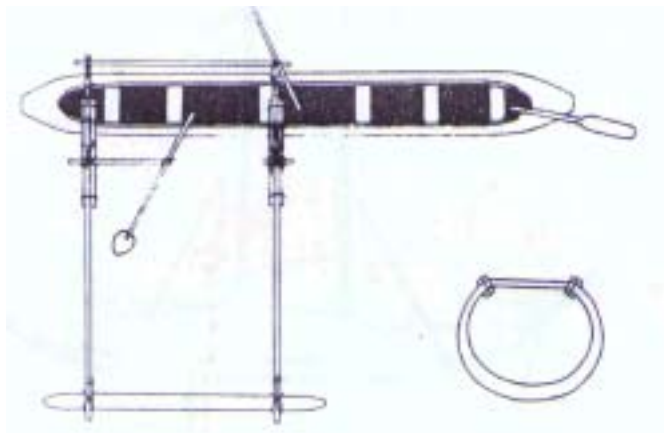


Fig 5- Outrigger canoe used by Jaffna schooners and dhonis as ship's dinghly

The Tamils of the north of Ceylon and the Jaffna Islands do not employ outrigger canoe except small ones carried by coasters for communication with the shore (Fig.5), using instead, according to the character of the coast, either

catamarans or dug-out canoes for ordinary fishing, and undecked plank-built boats for pearl and chank fishing and light cargo work. These last-named are of no special interest, being merely large boats built on the lines of a broad canoe. They have a single mast stepped a little forward of amidships; the rig is a square lug little removed from a square sail. The yard is hauled to the mast-head through a square two-way pulley fitted permanently to the top of the mast, in the same fashion as that followed by the smaller Tuticorin fishing canoes. This square pulley truck is characteristic of the Jaffna rig, as is the love of their owners for a bright green or blue coat of paint over the whole hull, in this differing alike from the Kilakarai habit of leaving the planks bare and from the somber Tuticorin preference for a coat of tar.

KILAKARAI

The Muhammadan fishermen of Kilakarai and the neighbouring villages on the south coast of Ramnd district, at the north-west corner of the Gulf of Mannar, constitute the main diving force whenever a pearl fishery is held in Ceylon waters; yearly they spend some six months in north Ceylon waters fishing chank shells. Hence their relations are most intimate with Ceylon and this may have determined the outrigger canoe as the type of boat adopted here for general fishing purposes. But while the true Ceylon outrigger in its typical form is largely used for trolling by these men, the boats being imported ready for work from Ceylon, those engaged in other methods of sea-fishing, except for pearl oysters, while agreeing in the adoption of the outrigger principle, have shown marked ingenuity in modifying it in several notable details, whereby it has become much more useful for general purposes in contradistinction to the specialization adapted in Ceylon to one limited and specific aim – that of trolling for large fish of the mackerel family.

Two varieties of these modified outriggers exists, the one using a single pole to boom out the outrigger, the other employing the normal two (Fig.6 and Fig.7). The hull is a simple Malabar dug-out canoe, with usually a narrow wash strake added vertically – not flared. The rig is a simple squat lugsail of the same form as is employed in the Tuticorin fishing canoes. No attempt is made to spread the canoe, so without an outrigger it can be used only in calm weather. It is so used occasionally but normally the outrigger is fitted. The latter is smaller than

the Ceylon type and boom pole or poles are weaker and each consists always of a single pole without fascine strengthening. But the most remarkable divergence is that these outriggers are made to unship instantly by a very simple device and can be rigged out on the other side of the boat, thus avoiding the unseamanly custom of the Sinhalese who can never say which end of canoe is the head without looking at the direction they may happen to be sailing ! The Kilakarai boats can therefore employ a rudder fixed at the sharp curved stern by the orthodox pintles and gudgeons. The details of the



Fig 6- A Kilakarai outrigger fishing-boat, with two booms

stays led to the outrigger are readily seen in the sketches given. The device for attaching the booms inboard on the one side and to the outrigger on the other is a form of the Spanish windlass, well known to sailors and shipwrights for exercising force in bending a plank into position and holding it there till secured; the principle is that of the surgeon's tourniquet. In the present instance the loop end of a ring of rope or grommet is passed through a hole either in the gunwale or in the outrigger float, the boom pole is laid over this and the looped ends of the grommet are brought up at each side and over the pole; the end of a short rod or stake is passed through the two loops and then by the simple device of twisting the two loops round one another by means of the rod, the two main parts are bound together with the greatest possible tightness. The free end of the tourniquet rod is then seized to the gunwale or the boom as the case may be, and if the various parts be sound this lashing will maintain attachment under any ordinary violence. Its chief advantage lies in the rapidity with which it can be operated. A couple of seconds suffice to release the boom and scarcely more are required to reship it.



Fig 7- A Kilakarai outrigger fishing-boat furnished with one boom only

For pearl-fishing work large carvel-built boats, long and narrow, are used designed on the lines of a dug-out canoe; they accommodate a large number of divers, and by their length and narrowness are capable of being rowed with the minimum of exertion from place to place in search of a good pitch. Both ends are sharp, the point of the prow being wrought into the usual coiled ornament.



Fig 8 - A balance-board fishing canoe of Tirupalakudi, Palk Bay

PALK BAY AND STRAIT – INDIAN SIDE

From Pamaban in the south to Muthupet on the north, this region has a very distinctive type of fishing canoe. It comes into the class of outrigger canoes, but instead of stability being obtained by a float boomed out on one side, the outrigger consists of a long and heavy plank laid athwart a dug-out canoe or a carvel-built (both are employed), so that each end projects out-board a considerable distance on either side. By loading the projecting section on the weather side with one, two or three of the crew, a very efficient counterpoise is obtained.

Two main varieties exist, the southern form employed from Rameswaram in the south to Annapatnam, halfway up the west side of the bay, and the northern which is seen chiefly at Adirampatnam, Muthupet and the neighbouring villages on the northern shore. The hulls of the former may either be dug-out canoes or, when large carvel-built plank boats of the same general form. The rig is a square-headed lug, set on a mainmast stepped a little forward of amidships. The outrigger in these consists of a long plank of heavy palmyra wood stayed only by a shroud on either side, led to the mast-head (Fig.8). In any but the finest weather the lee shroud is transferred to the weather side of the outrigger plank which then has two shrouds-one at the far end, the other some distance inwards. At the same time the lashing of the plank being loosened, it is run out some distance further on the weather side, giving a lop-sided appearance but increasing the counterpoise leverage. The shrouds give grip to the men stationed on the weather end of the plank.

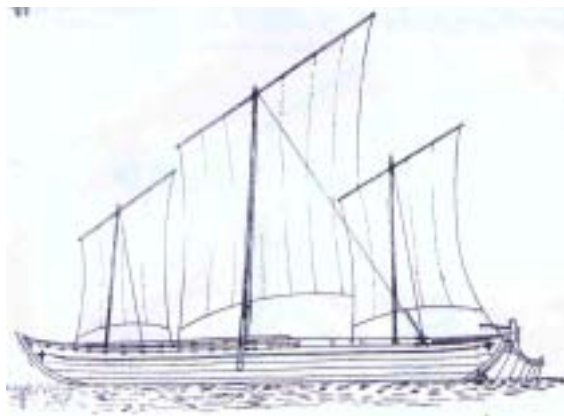


Fig 9 - A large Muthupet balance-board boat. Palk Strait

In the northern varieties, for they differ considerably among themselves in details, the hull is usually narrower and longer than in their southern sisters, while the majority have a quaint three-masted rig that separates them decisively from any other Indian coast craft. Those of Muthupet, called *vala vathai*, are the longest in the locality and instead of being dug-outs are narrow carvel-built boats of canoe form (Fig.9). The average length is 43 feet, with a beam of 4½ feet; depth 2½ feet. The crew consists usually of five men.

Of the three masts the short foremast (13½ feet log) is stepped right in the bows, the mainmast of 22 feet a little forward of amidships and the mizzen (14½ feet) fairly far aft. Only the mainmast is furnished with stays, one on each side to the projecting end of the balance board and one aft. The sails are square-headed lugs. The balance board, *kadisu*, about 17 feet in length, is a plain plank as in the southern forms; according to the nature of the weather some of the crew, in emergency the whole available four, stand outboard on the weather section to prevent capsizing. As the bottom is rounded and without keel owing to the shallowness of their muddy home river, leeway is counteracted by a useful-sized leeboard; with a good wind these long narrow boats under full sail are accounted the swiftest in these seas. The rudder is large and powerful, attached by pintle and gudgeon at the lower end and by coir lashing below the tiller.



Fig 10 - An Adirampatnam fishing canoe

Nearly 200 of these boats hail from Muthupet and the adjoining villages. Some owners leave them bare of paint, while many paint the hulls any colour from gaudy green or blue to sombre black and then ornament the whole length of the sides with crude and conventional devices; the most frequent are diamonds, flags, flower sprays and birds, roughly and inartistically executed, and wholly without vigour or spirit.

Their occupation is that of net fishing but the lure of the pearl sometimes attracts a few to the Ceylon pearl fishery, where their peculiar rig and long narrow hull and curious ornamentation render them conspicuous.

At the neighboring port of Adirampatnam the fishing boats are generally shorter; the majority are dug-outs fitted with wash-strakes and balanced boards and while they occasionally use three masts as at Muthupet, they usually employ the mainmast only (Fig.10) and less frequently as mizzen in addition. The characteristic features are the use of a pair of quarter steering-boards instead of a fixed rudder, and the employment of a compound balance board.

The former have the shape of lee-boards; one is attached on each quarter by a loose lashing passed under the end of the sternmost thwart. The steersman sits right aft on short decked space and manipulates the quarter steering boards with his feet. The sea for a long distance from Adirampatnam is very shallow and muddy, rendering the use of a fixed rudder troublesome, hence the survival of a peculiar variation of the quarter paddles used before the invention of the fixed rudder. In addition a leeboard is also employed by all these boats.

The balance board or *kadisu* is exceptionally long. In the largest boards, which run to 37 feet in length, it attains fully 34 feet in total length (Fig.11). Unlike all the balance boards hitherto described it consists of three section, a median portion 19 or 20 feet long laid athwart the boat immediately in front of the main mast with a terminal flattened or blade shaped section 6 to 7 feet long, added at either end. The latter is thinned and broadened at its further end and slightly twisted, so that the forward edge is depressed a little. The splicing is done by overlapping the ends, which are secured in place by (a) a stout

square peg passed through both in the center of the splice, and by (b) a rope lashing tightened by means of a Spanish windlass. Usually two side stays pass from the mast-head on each side to the balance board, one being attached a short distance outboard, the second where the terminal blade is spliced to the main plank. In others only one stay is used on either side. In all other boats the balance board is heavy and straight; here it has a graceful droop downwards on either side; it's position is permanently fixed and there is no jockeying with it in rough weather beyond the loading of the weather section with one or more of the crew. All the attachments of the balance boards both to the gunwale and to the blade terminals are made by means of the tourniquet device described on p 161.

The plank-built canoes, palagai kattu vattai (Fig.11), are as nearly similar as they can be made to the dug-outs. Sometimes they have a second and shorter balance board, about seven feet long, abreast the mizzen mast; this has no stays led to the outboard ends, and none of the crew ever perch upon the weather end as they do in the case of the main one. Even in the case of the latter there is less recourse to loading it with men than in any other form; the principle of the balance pole is here most perfectly utilized.

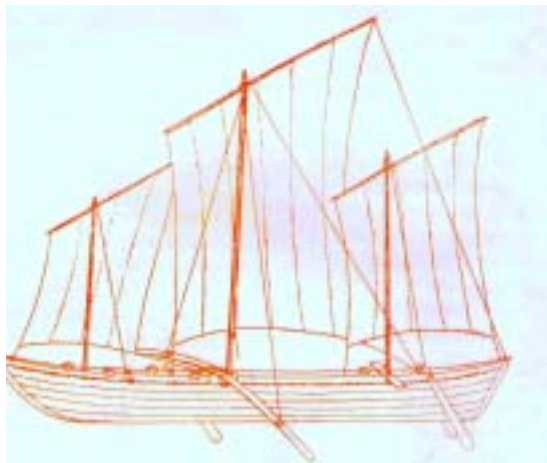


Fig 11 - Three-masted balance-board of Adiramptnam (Palk Strait)

The dug-out form is fitted with a high wash-strake, about 9 inches deep, sewn to the slightly tumble-home edges of the dug-out gunwale.

In Adirampatnam there are about 90 of these boats, 60 being dug-outs, the remainder plank-built. The size of the latter ranges from 18 to 37 feet, with a beam between 2 and 3 feet and depth of 2½ feet. Very light draft is necessary; before the shore is reached long stretches of mud have to be passed. Usually each boat has its own channel home; at low water these long channel, 2 to 3 feet wide, make the mud flats look like a great railway yard with many sidings.

In the shelter of Point Calimere is a little port called Kodikarai, once of the much importance in cross channel traffic with Ceylon, now practically forgotten. It is however an important fishing centre as the fine fishing grounds of Palk Strait are most conveniently reached from here. On the beach we see craft of notable form, the one a heavy transom-sterned cobble used in fishing, the other, one of the most peculiar boat survival in India; at first sight it is liable to be taken for an overgrown and antiquated form of the smaller fishing cobble. It is in reality the largest and heaviest of any balance-board boat surviving (Fig. 12). Its local name is *kalla dhoni*, which being interpreted means "thief-boat"; the only explanation given for this name is that "like a thief, this boats runs very fast".

The hull is of clumsily built carvel from, the fore end curved, with fairly heavy bows. Aft is a low decked-in poop, a foot or so higher than the waist. The stern is of transom design, and is nearly vertical, but instead of the powerful rudder being hung on the sternpost in the usual fashion, the latter is built out at right angles to the stern with thick planks, heavily strengthened with stout battens, to a distance of about four feet. Upon the posterior edge of this is hung a very large rudder, of the heavy and clumsy type characteristic of river and canal craft and seldom seen in sea going vessels. The rig consist of three squarish lug sails borne by three masts. The very short foremasts, only 10 cubits in length, is fixed without stays right in the bows, with a well-marked rake forwards; the main mast stepped amidships is 30 cubits long while the mizzen mast of 28 cubits in length rises from the fore side of poop. Both the latter masts are almost vertical. The outrigger is of the balance-board type seen in the southern Plank Bay fishing boats, differing however in being relatively much shorter; it consist of a heavy palmyra plank laid athwart the gunwales; it projects a few feet out board on each side.

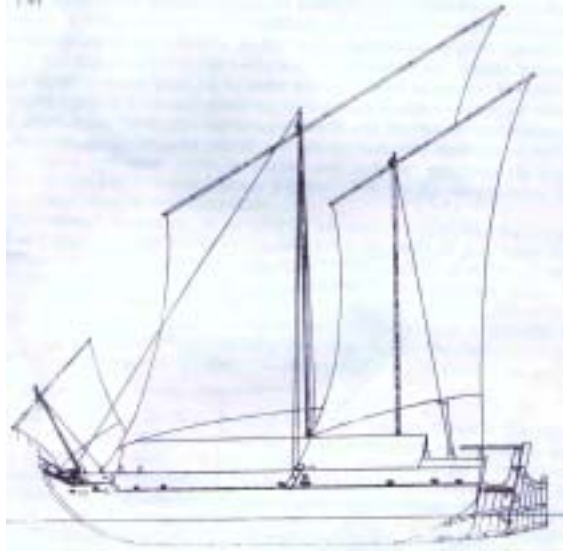


Fig 12 - Kalla dhoni of Kodikarai, Point Calimere

Some of the few remaining boats show a peculiar style of decoration such as is seen nowhere else in India. Up on the hull, which above the water-line is thickly coated with black pitch, a number of vertical white lines are spaced at intervals of about a foot apart, forming squarish compartments. In each of these, between the water-line and gunwale the impressions of a hand in white is seen. On the largest of these boats there were 25 of these hand impressions on each side. In addition, up on the transom stern a white disc occurs on the starboard side, a white crescent on the port – representations of the sun and moon. The owners who call themselves Karathurai Vellalas claim to be a branch of the great Vellala caste with whom the custom is prevalent of marking their doors with hand impressions to avert the evil eye. Of still greater interest is the survival of an eye carved upon either bow, followed by a small square containing the name of the patron goddess of the owner—in the cases noted Amman – surmounted by the Hindus' propitiatory sign of *paravi* (பரவி) or "horse" being added – evidently an offering of the vessel to the goddess honoured as her horse or vehicle (text-Fig.13 and pl. vi, Fig. 3). Be it noted that the only survivals of the use of "eyes" on the bows of sea-going boats in India and Ceylon are the present instance and that of the Jaffna dhonis of Ceylon. The pictures of a three-masted ship and of a Royal barge on the walls of the

walls of the Ajunta caves (A.D circa 600 A.D) show that this custom was in use formerly-probably habitual. The Greeks, Romans and ancient Egyptians followed the same custom, and although it has died out in India save at this out-of-the-world spot, it flourishes among the junks and sampans of China and Indo-China. The custom is not followed by the peoples of Malaysia –possibly because of Muhammadan influence.

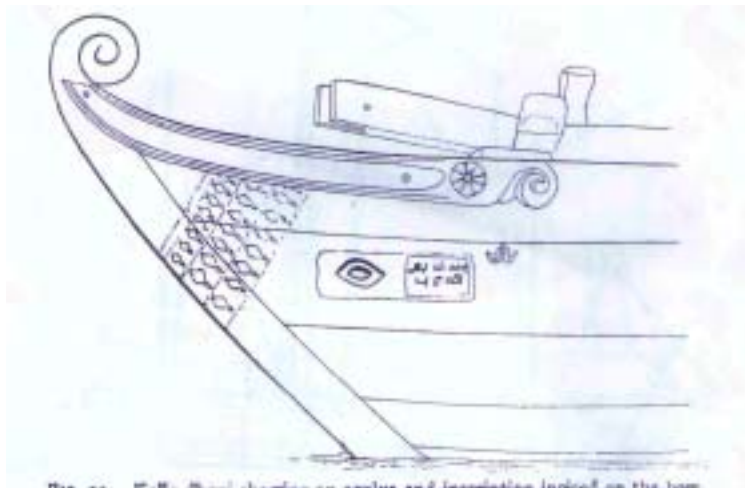


Fig 13 - Kalla dhoni showing an oculus and inscription incised on the bow

Eyes are also fixed upon the bows of the small coasters of the dhoni type owned by Hindus in the north of Ceylon. In this case the wooden eye. (pl. vi, Fig. 2) is carved separately and then nailed to the hull; in the Indian kalla dhoni it is carved in the planking of the bow. The Jaffnese Tamils, long isolated in the north of Ceylon, are noted as having retained many archaic Tamil customs long since lost by their continental kindred and as employing in ordinary speech a form of Tamil closely approaching the classical; the likelihood therefore is the greater that their local vessels retain more archaic characteristics than those of ports more open to outside influences. The same inference may be regarding the Point Calimere kalla dhoni which are employed solely in traffic with the north of Ceylon. The latter also are manned by devout Hindu crews, who are accustomed to worship at the shrine of Mari Amman in Kodikarai after each voyage is safely accomplished.

In special danger of storm the seamen call upon her for help, shouting Amma! Amma! and vow offerings (of money) that they may reach shore in safety. Usually the money vowed is tied in a cloth and nailed to the mast then and there. A Brahman officiated in the temple as *pujari* at the time of my visit; in the comparatively recent days when these dhonis were numerous, the Amman temple was accounted rich – so regular and continuous was the stream of offerings.

In the days when rail and steamer traffic had not bitten deeply into the coast trade, these kalla dhonis ran between Kodikarai and Kayts, the little deep-water port of Jaffna in Ceylon. As recently as 1886 they were busily employed in ferrying passengers and cattle across to Ceylon, and a writer describing the harbour of Kayts in that year ("Ceylon Literary Register," Vol.I, p.24) records seeing about thirty of these boats moored alongshore.

They carried passengers for as little as 12 annas each, to and from Ceylon, a low rate that encouraged much coming and going, so much so that many Jaffna shopkeepers and tobacco growers living at Vedaranniyam, being able to pay weekend visits to their families in Ceylon preferred to leave them there rather than transplant them to India. Were the present Ceylon quarantine restrictions to be removed, with the opening of the railway to Vedaranniyam, it is probable that this old and natural route for traffic between Ceylon and the Coromandel coast would revive and bring fresh prosperity to the neighborhood of Point Calimere.

THE EAST COAST

Along the whole of the East Coast of India the true catamaran is the characteristic fishing craft. Except for the use of big sewn-plank boats used in shore seining and of various forms of backwater and river boats which ply in the estuaries and occasionally venture seawards, the catamaran is dominant the moment Cape Calimere is turned. The surf-beaten sandy coast lines that runs with few interruptions from Tanjore to Orissa scarce knows any other sail but the brown triangle of these sea-going specialized rafts; that their Tamil name, for once purely descriptive – *kathu maram* or "tied logs" – has become

an English word bespeaks the uniqueness of their design. Our ancients, without previous experience of such weird craft, having no name whereby to speak of them, had perforce to use the native term and this has persisted, as the craft itself will persist of centuries to come as the only possible type for use on such an exposed and harbourless coast.

Two distinct types of catamaran exist, the finer and more elaborate model being found on the Coromandel coast, from Cape Calimere to the delta of the Kistna; the other more primitive and less efficient, along the coast further north.

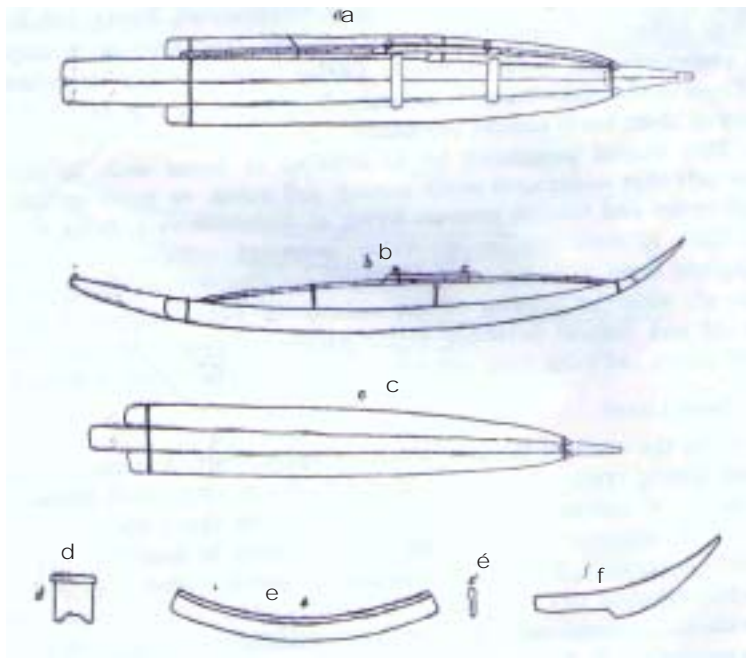
The former type is the Catamaran at its highest possible state of development the furthest possible evolution of the raft idea that shares with the dug-out the honour of being primitive man's earliest conception of a means to gratify ambition for life afloat or, more prosaic, to enable him to cross a river in pursuit of his enemy or to steal away in flight.

But the Tamil sea fisherman has traveled far as a designer since those days, and to-day the fisherman of Madras and Pondicherry have more variation on the type, adapted for different methods of fishing, than can be seen in true boat design in harbour at any English or Scots fishing port.

The general type consists of a variable number of definitely shaped logs of definite relative proportions, tied together raft-wise in a certain order recognized as correct by long-established usage. To these main elements are added a number of accessory pieces in the shape of stem points and some times a rowing-rail.

Catamaran being understood as a raft of logs, the inference is natural that it must be inherently clumsy in its form, board and more or less formless. This is by no means the case with the Coromandel catamarans which possess very considerable elegance in their proportions and often show quite pretty curve lines. Figures 14 and 15 are witness to this.

The prettiest and best developed form is seen in the large *periya maram* form used in conjunction with the *thuri*, *edu* and *painthe valai* nets. This consists of



a. Periya- maram from above; b. Side view of same; c. A Chinna - maram;
 d. Stretcher of rowing rail; e. Paddle; é. Section of same; f. A stem – piece

Fig 14 – Madras Catamarams

four long, narrow logs carefully fitted together side by side securely lashed in position fore and aft. The middle pair project aft about four feet beyond the outer logs, forming a conveniently narrow seat for the paddling steersman who kneels there squatting on *the soles of his feet*, the feet being stretched backwards straight out along the plank. At the fore end where the four plank end at the same level, the two outer ones are worked down laterally leading forwards and the end is then finished off in a sharp upwardly curved prow by the addition of two narrow wedge-shaped stem pieces. The total overall length is 25½ feet with an extreme breadth of only 3½ feet (Fig 14a and 14b).

The device to permit the catamaran to be rowed like a boat is most ingenious. Along the port side a rowing rail made of two bamboos is fixed in the following manner: the fore ends are inserted under the lashing around and securing the

fore ends of the logs, while the aft ends are secured loosely with in a ring of passing also around the outer plank. To raise the bamboo rail to proper height and maintain it there rigidly, a plank stretcher 10 inches high by 8 inches wide, shaped on its lower edge to fit the curved contour of the catamaran log, is introduced and wedged upright (Fig.14 d). A short length of stake to prevent the wearing through of the bamboo rails is lashed up on the latter and in this are two coir loops to take the rowing paddles. An ordinary crew consists of three men, but on occasion an extra man may be carried. In this case two row on the port side, one paddles forward on the star-board bow, and at the stern is the squatting steersman, plying his paddle right or left as required. The rowers have each a little transverse seat resting loose in a groove on the bottom of the catamaran.

When employed in working the thuri valai, proper to this type of catamaran, a second and smaller canoe called *chinna maram* (small logs) is required to assist (Fig. 14c). This is of simpler design, consisting of 3 logs only and one single beak-shape stem piece. The middle plank projects some foot and a half aft beyond the others. No rowing rail is present. The overall length is 21 feet, the width 2 feet 4 inches. The crew consists of two men.

When there is favorable wind going to or returning from the finishing ground, the larger of the pair of thuri valai catamarans puts up a small lateen sail rigged in the manner already described as used in the boat catamarans of Cape Comorin. As with the latter, the smaller of pair ties up alongside the larger on which alone carries mast and sail.

For drift net fishing the irukka maram variety is chiefly employed (Fig.15). This is very similar to the *periya maram* but consists of five logs instead of four, the middle or odd log being the longest, projecting aft some distance beyond the inner lateral ones which in turn project beyond the outer lateral pair. The stern ends therefore in a series of steps. The beaked prow is formed three stem pieces whereon is hooked a single-fluke wooden anchor with stone-weighted shank. A rowing rail is present and mast and sail of the usual type are fitted. This variety is used singly and not in pairs as in thuri valai and edu valai fishing.

A simpler and shorter form constructed of five logs unprovided with any beaked prow and equally without sail and rowing rail is used in line-fishing and hence is called *thundil-maram* or "hook catamaran" (Fig. 16).

Last to be mentioned is the great *kolamaram* of "flying-fish catamaran" in some ways the variety of greatest interest. It is the largest form of catamaran used on the Coromandel coast, where it is found chiefly along the shore-line of the Tanjore district. Only used during the clear-water season of July and August it is more of the primitive raft and less of the carefully designed sea-craft than any of the beaked forms above described. To construct one a couple or even three *periya marams* or *erukka valai marams* are united and (usually) seven of the longest logs are selected and tied side by side, rigidity being obtained by lashing two cross poles over each end. A stem is formed as in the *periya maram* and other forms by lashing five stem pieces at the fore



Fig 15 – An *erukka -maram*, Madras



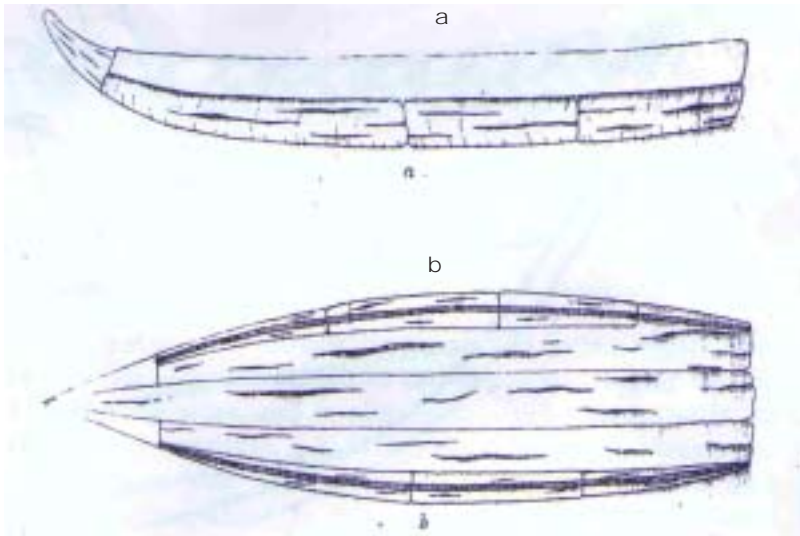
Fig 16 – A *Thundil -maram*, Madras

end. Two short masts each hoisting the usual triangular catamaran sail, are stepped in holes in the outside log of which ever side happens to be leeward, one forward, the other two-thirds aft, and with sails hoisted, this queer craft, manned by seven men, boldly not to say rashly ventures out of sight of land, heading for the *kala pani* outside of the 100 fathom line, where alone can shoals of flying-fish be found. The amount of food and water taken in exceedingly limited and if the shoals are not found within the first day, the

men have no option but to turn and set a course for home. Sometimes they make such an amount of leeway in spite of the use of two large leeboards that they fetch the coast 20, 30 and even 50 miles to the north of their port of departure, and if they happen to have a haul of fish aboard, its condition is then fit only for manure. But the profits often bring a great recompense and a fisherman learns to take such risks.

North of Kistna and Godavari deltas and employed almost entirely by Telugu fishermen, a more primitive and simpler form of catamaran in use than satisfies the Tamil fishers of the Coromandel Coast. On the shores of Ganjam, it consist essentially of five logs brought to a narrowed point at the forward and where two accessory stem pieces being added give a sharp beak point as in the best Tamil types (Fig.17). Aft, the craft is abruptly truncated, the logs being cut off at the same level. Instead of being lashed together with rope, the logs are pegged together permanently, the comparatively small size of the craft permitting the crew to carry it up the beach without separation of the logs. The three median logs usually are the only full-length pieces used, the side ones being made of pieces of old logs pegged on to give the required curve to the side. Upon each of the side logs a deep weather-board set on edge is fixed, to give some slight protection to the crew and gear. The fore end of the each board butts against the aft end of the stem pieces of its own side, giving a clear run fore and aft. Further south, on the coast of Vizagapatam, the size is larger and the workmanship and quality of the timber distinctly superior. In the peculiar craft of the region, called *teppu* in Telugu, we find a stage intermediate between the Coromandel or Tamil catamarans and the pegged-together catamaran rafts of Ganjam. Here the hull consists of two halves lashed together fore and aft when in use. Each half consists of a long log bearing a washboard sewn on upon the outer edge, and with a pointed beak-piece pegged up on the fore end. On coming ashore the rope lashing are cast off, where upon the two halves fall apart, for ease in carrying up the beach. In the largest sizes, a median log is added to give greater beam. This is held in position by means of the fore and aft lashings when in use; in such, the catamaran falls in to three main pieces when unlashd. The median log has also pointed bow piece, but this is loose and not pegged on as is the case with those of the lateral sections. A small loose rudder is used when sailing,

down aft between the ends of the main logs. Two men form the usual crew of one of these craft.



a - Side view to show weather- board
b - View from above

Fig 17 - A catamaran from the Ganjam coast

Alongside of the catamaran is the so-called masula boat of Europeans, but the known as *padagu* or *salangu* among Coromandel fisherman, a large and clumsy open boat used in shooting shore seines, and also as a cargo lighter. Its range extends along the whole of the East Coast northwards of Cape Calimere. On the Coromandel Coast it is distinctly short in proportion to its length and depth, a rather small one measured at Pondicherey being 28 feet long, 8 feet beam and 4 feet deep. In the Vizagapatam and Godavari districts it often runs longer and more elegant, frequently ranging to 40 feet and even upwards in length, with beam and depth about the same as in the southern districts. As the masula boats never go far from shore, mast and sail are not used; a crew varying from 8 to 12 in number perched insecurely on thwarts far forward, provide the motive power with long paddle-sweeps not less than 12 feet in length; steering is done with a very long and powerful paddle suspended in a coir grommet from the projecting head of the stern post.

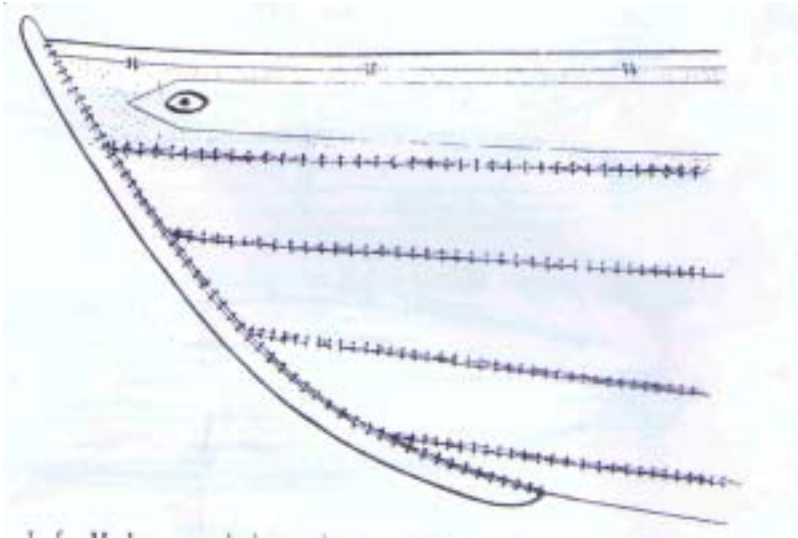


Fig 8 - Fore end of a Madras masula boat, showing the method of stitching together the planks; also as oculus painted close to the stem

No iron is used in the hull, the planking being sewn in the usual surf-boat fashion already described in the case of the Ceylon outrigger coaster. A narrow keel projecting about 2 inches is usually seen, no bulk heads are used, stem and stern are both raked considerably and both are somewhat buff in their curves. Freeboard has to be very high as they have to pass through heavy breakers and in consequence the loads they carry are very light compared with their apartment capacity.

An oculus is sometimes (rarely) painted on the bows at Madras (Fig. 8).

In the seining masulas working in the neighborhood of Uppada, Vizagapatam district, this type of boat attains its greatest development, both in regard to size and economic importance. There it is esteemed the most valuable asset of fishermen as these men have vigorously developed the use of the shore seine and without roomy boats would be unable to carry and handle the great length of net requisite to effective operations on a large scale.

These Vizagapatam fishing masulas are usually decorated along the side with two rows of sloped panels of alternate black and white, those of the upper row slanting opposite to the inclination of the lower ones (Fig. 19).

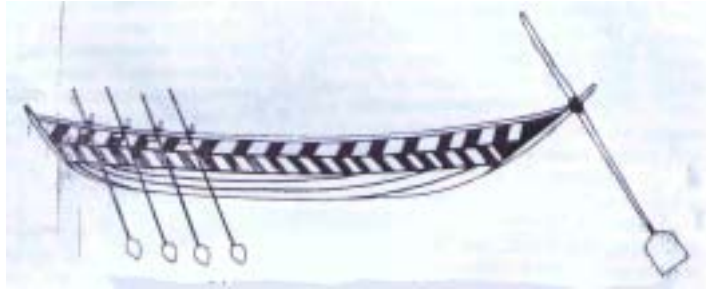


Fig19 - A large seining masula boat, Uppada, Vizagapatam

The delta of the Godavari furnishes a notable exception to the universality of the catamaran and the masula boat up on the East Coast. In the seaward creeks of this great river a host of peculiar fishing craft, called shoe-dhonis among Europeans, ply their trade. The name well describes their appearance—wide and flat forward with a sharp stem, they narrow greatly aft and have a square transom stern (Fig. 20). The fore part is decked in, and as the aft position, roughly two-thirds of the length, has tumble-home sides, and is also decked in

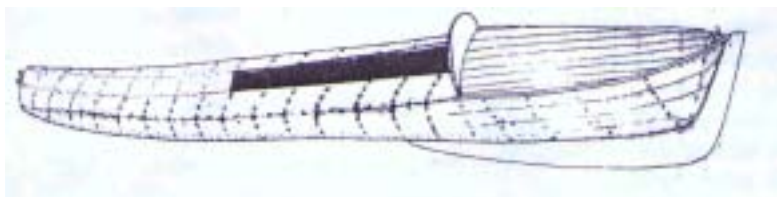


Fig 20 -Shoe-dhoni, Cocanada

for three feet from the stern, the well is narrow and restricted. It is protected by a high transverse coaming where it meets the fore-deck. The steersman squats on the little deck aft and steers by means of an oar about 12 feet in length working in a wooden rowlock nailed to the center of the stern. This oar is also used in skulling when there is no wind. The hull has a deep forefoot merging in to a fin-keel 6 to 8 inches deep beneath the mast; the aft portion is nearly flat

bottomed, and has almost identical lines as the same part in the skimming hydroplane. Narrow teak planks are generally used for the hull, nailed on ribs of any sort of wood. The outside is kept liberally coated with tar and not with fish oil as in Malabar. The forward decked part is considerably wider than the aft, usually by a foot; in one measured dimensions were as under.

	Ft	In
Overall length -----	26	0
Forepart, bow to aft side of coaming -----	8	6
Beam at fore side of mast (at coaming) -----	3	7
Beam aft of mast -----	2	8
Depth -----	2	0

A rather lofty square sail hung from a bamboo yard is used, hoisted to the head of a 19-foot mast set upright immediately abaft the transverse coaming. Its head measures 10½ feet, the luff 14½ feet and the foot 10 feet.

This shoe-dhoni of the Godaverri creeks is perhaps even more distinctly indigenous to India than the catamaran. The form of the shoe-dhoni is quite unique so far as I know among boats, and is especially interesting as I believe I am able to indicate its prototype for the first time in the curious palmyra-palm dug-out used on the upper reaches of the same river system. These craft frequently used as double canoe, consist of two butt sections of palms roughly hollowed out on one side lashed together parallel but at some distance apart by means of two bamboo pole passing from one to the other (Fig.21). The butt end of each dug-out being bulbous, one extremity is wide, whereas the other is narrow and truncated as being part of the cylindrical stem. One of these dug-out copied in planks and with a keel added below the fore end which corresponds to the bulbous butt, gives precisely the design of the shoe-dhoni. As further proving the inland origin of the latter, we have to note its tall mast and high and narrow square-sail, well adapted to the low banks of river and creek but a poor design for sea-going craft.

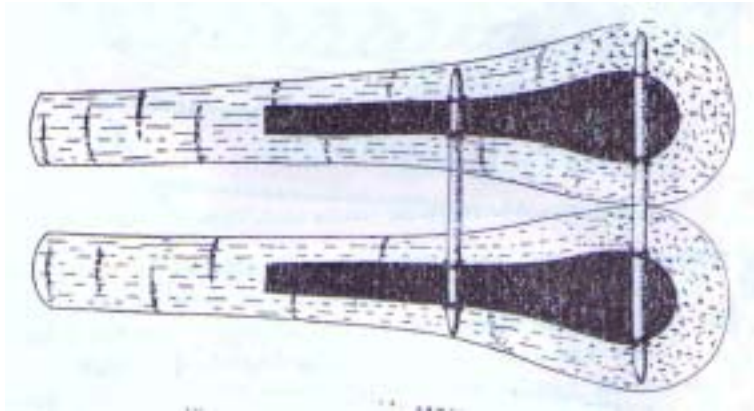


Fig 21 - A sangamdham or double canoe, Godavari river

These boats are absolutely local, not being found even in the adjacent delta of the Kistna. They are very fast with a fair wind, but are said to be poor sailers when beating in spite of the deep fin-keel and forefoot, a fault due apparently to the type of sail employed.

BACKWATER BOATS

Backwater boats on the East Coast are generally either dug-out canoes, or rough and usually clinker-built reproduction of that form. The latter are the craft generally used on Pulicat Lake and the Madras backwaters for fishing. The clinker-build is noteworthy as I am not aware of this style being employed anywhere else in India. Iron nails clinched upon iron washers are used for fastening the planks together. These boats remain naked of paint or of oil dressing all their life, so the majority always appear untidy and broken-down. For cargo carrying on the coast canals large undecked barges running to 20 tons' burden are numerous. They are broad and flat bottomed and of 3 to 3½ breadths of length. They are built in the same manner and on the same lines at the fishing boats but with a strongly marked "swim-bow" such as Dutch eelers affect. It is simply a punt bow ending roundly instead of being truncated. The stern is shaped similarly, so, to support the rudder properly, a strong heel has to be run out from the bottom of the boat to support the vertical stern post. These canal boats frequently carry a coach roofing over nearly their

whole length, supported on uprights set along the gunwale. The rig is a light cotton sprit-sail triced high up and carried on a fairly lofty spar stepped in a tabernacle above the deckhouse roof. Karimanal at the south end of Pulicat Lake is one of the chief places where these canal boats are built. For convenience, they are constructed upside down and a preliminary to launching is the turning of them right side up !

A considerable number of the Chilka Lake fishing boats are notably larger than those in use on Pulicat Lake; They are simply planked-up boats of canoe model, and are of no special importance in design.

Far otherwise is the novel rig of some of the smaller craft that ply on this greatest of Indian backwaters. Alone of any of the craft we have noticed above, two masts are here used, slender bamboos set up parallel on either gunwale well in the bows. A short stay runs from each to the bow, while another runs from each mast-head to the stern. On the masts is fastened a narrow oblong strip of matting as a sail. To give strength numerous transverse battens are fastened at short intervals. No mechanism exist to hoist the sail which has to be bound to the masts before being set. (P1. V, Fig. 5).

The idea is probably borrowed from Burma, where a double mast is customary on the big river rice-carrier which is one of the biggest and smartest forms of river-boat in the world. In the Burmese boats the two spars are however not fitted parallel but meet the apex in a manner seen in Egyptian drawing of the third and fourth dynasties.¹

Primitive catamarans made up of any old logs roughly tied together are fairly extensively used by cast-net fishermen on backwaters, particularly in the Tamil districts, the logs are usually old ones thrown out of use by sea -fishermen.

Dug-out canoes of the ordinary kind are not greatly in evidence on the Coromandel Coast backwaters as they are difficult and expensive to obtain.

¹Holmes, G.C.V., Ancient and Modern Ships, London, 1900.

In Vizagapatam district I have seen two or three of the clipper form dug-outs used in Burma; these were spoils of the sea, brought by the drift which sets across from Burma during the north-east monsoon; a similar one I saw recently at Muthupet on Palk Strait.

For a long time I believed the outrigger canoe to be unknown to the north of Point Calimere; quite recently I found them numerous on a backwater near Cuddalore, where at one place fifteen were seen together; they are also reported as numerous on the Vellar River near Porto Nova. Each is formed of a small dug-out, usually about 16 feet long by 22 inches broad, furnished with an outrigger float of ordinary form boomed out by means of two poles, at a distance of 5 feet from the canoe. They are used generally in conjunction with the casting net; mast and sail are never fitted. This extension in the range of the outrigger is practically interesting, as we now find it in use at intervals along the coast line lying between Baluchistan in the north-west to the point well north on the Coromandel Coast in the south-east. A small one is also often carried as a ship's dinghy by the coasting dhonis sailing of the northern ports of Ceylon (text-Fig. 5).

SEA – GOING SHIPS ON THE EAST COAST

Of ships in contradistinction to boats properly so-called many fine examples running from 50 to 300 tones' register were engaged in the Indian coasting trade a few years ago. The baggala and pattamar are run so cheaply that true ships were never able to compete with them on the West Coast. In the Bay of Bengal this competition was not severe, and as there has always been such carrying trade between Bengal and Burma on the one hand and the South Indian and Ceylon ports on the other, a fine fleet of brigs, barques and dhonis found these remunerative runs till the regularity and insurance advantages of steam traffic ran the slow and irregular sailers almost off the sea. Coringa near Cocanada, and Masulipatam, the ancient eastern sea-gate of the Deccan, were the most famous of the old Indian ship-building ports. Some of the small ports on the north of Ceylon, notably Valaveddithurai and others on the Ramnad coast, also turned out on a fair number of medium and small craft, chiefly however of the dhoni class. Even to-day all these ports

do a certain amount of shipbuilding, but the number and average size have become reduced, not on account of lack of skill on the part of the present-day designer and workpeople but solely owing to the difficulty which owners experience in earning remunerative freights with large tonnage sailing vessels, part of the handicap lying in the difficulty of effecting insurance upon cargo carried in native craft.

In the design of the larger of these craft, European influence has been paramount during the last three hundred years; the model on which the Coringa and Masulipatam builders founded their designs were chiefly the splendid vessels of John Company and the grand products of the eighteenth century French navel shipyards, refined during the past century by the influence of the clipper design that brought sailing ship construction as nearly to perfection as it seems possible to attain. The favourite rigs with Indian builders and shipmasters were those of the barque, the brig, and the topsail schooner. Even to-day East Coast harbours often contain a goodly collection of wooden brigs and schooners with here and there a barque with high poop and painted imitation gun-ports, that are wholly European of the early nineteenth century in appearance. Of Portuguese influence the larger three-masted Maldivian trader seems the only instance but a most interesting one, as it reproduces for us almost all the outstanding features of the fifteenth century caravels used by Columbus. The Dutch in spite of their skill in ship-building and first-class seamanship appear to have left no trace on Indian ship-designing. Probably both they and the Portuguese did exercise a great deal of influence on design in their day, this being lost or overlaid by British and French design as these powers displaced their predecessors.

Of modern European influence upon boat designing scarcely a trace exists, except in the isolated case of the Pamban dhoni, a transom or square-sterned lugger used largely in ferrying pilgrims to and from Rameswaram island in the pre-aviaduct days.

The small coaster class built in the north of Ceylon, generally called Jaffna dhonis, are weatherly vessels running to 150 tons' burden, and deserve particular notice from the many archaic features surviving in their build.

Technically known in Tamil as *padagu*, they hail mostly from the little port of Valaveddithurai. The majority are owned and manned by more than usually devout Hindus, the remainder by Muhammadans (Labbais).

Their rig is that of a fore and aft two-masted schooner with enormously developed bowsprit and head sails. Primarily the rig is European – almost the only foreign point about these boats, but in process of adoption the number of head sails has been increased beyond anything seen elsewhere, as many as five jibs being in regular use. Stem and stern are sharp and somewhat raked; the former ends in an inwardly coiled ornamental head in Hindu dhonis, called *surul* (சுரூல்), the bowsprit being placed on the starboard side. In Moslem ships, no *surul* is seen, the stem passing forwards to give support to the bowsprit, which here is placed in the median line.

The *surul* in Hindu *padagus* bears three horizontal white bars painted on the aft edge (Pl. VI, Fig. 1); these represent the three ash lines used by Saivite Hindus as their sect mark and the sign of their god. In these boats it has the same significance. Beneath it in a tiny recess in the bows is the little shrine of the god, before which one of the crew, who acts as *pujari*, with the aid of an assistant performs worship daily and in particular before leaving port. On a shelf in the recess a blowing conch and other items of the ceremony are usually kept. In the ritual followed, a lamp is kept alight on the shelf, incense is burned, the conch is blown, a bell rung, a coconut broken, libation made, and plantains and betel offered to the god.

Fore and aft is a short deck ending in each case in a high transverse breakwater, 2½ to 3 feet in height, sloping towards amidships. The waist between is undecked, but is covered in by a penthouse roofing of palm leaves overlaid and strengthened by closely set palmyra reepers tied down with coir. The aft deck is the larger on it a small cooking galley and several water barrels find accommodation. In the center is a small hatchway. There is no poop, the gunwale having a clear run fore and aft. As ship's boats, a small outrigger canoe and a fair-sized catamaran are carried, both useful types for a small coaster with restricted deck accommodation, as they can be taken to pieces and stowed away without difficulty.

As in the Laccadive boats, the hull, here also usually painted, pitched or tarred black, is ornamented with two parallel white lines. In the dhonis the lines are equibroad; at the rise of each bow, they are bent abruptly downwards and pass to the stempost in such a way as to leave a triangular patch of black beneath the coiled prow of *surul*. In the angle or elbow of the two white bands is nailed on a carefully carved ornament in the likeness of a human eye, pupil and eyelids well defined by being picked out in black and white – the eye of the god who has his shrine within the bows. With these eyes, the tindal stated that his ship would be able to avoid danger – without them she would be like a blind man blundering into danger with every step he takes. (PI VI, Fig.2).

The dimensions of a typical Ceylon padagu from Valaveddithurai are as follows:-

Length between perpendiculars	-----	100 feet.
Beam	-----	21 ft. 2 in.
Depth from keel to top of gunwale	-----	14 ft.
Tonnage	-----	144 tons.

Muhammadan padagus are similar in all respects save in having no curved prow and having no eyes on the bows.

The Sinhalese outrigger coaster or *yathra oruwa* (*yathra dhoni*, Tamil), hailing from the south-west coast of Ceylon, which, on account of its size, requires mention here, has already been described. In many points – the two pole masts carried, the sharp ends, the palm leaf or bamboo penthouse roof in place of a deck and other details – it shows a great family resemblance to the padagu; probably this Sinhalese type is the original of the latter, the great outrigger having been eliminated by the northerners as they passed the unskillful and timid stage of long voyage coasting wherein the Sinhalese still remain.

THE MALDIVE ISLANDS

No people of the Indian Ocean are the superior of the Maldivians as boat-builders, fishermen, and sailors, though for neatness of finish and beauty of line of their smaller craft, the neighboring Laccadive islanders excel them.

For shore work the Maldivians formerly relied largely upon outrigger canoes and boats, but these are seldom seen now-a-days, handsome little beamy skiffs having largely replaced them. Alike with all those of the Indian mainland, the Maldivian outriggers have the booms connected directly with the float; all are of the single type.

The most numerous craft in these islands are bonito-fishing boats (Fig.22). These are very handsome and wonderfully speedy boats showing, in the type used at Minicoy, a curious combination of fore and aft and square sails. These boats are of light draft in order to pass through the shoal passages in the encircling

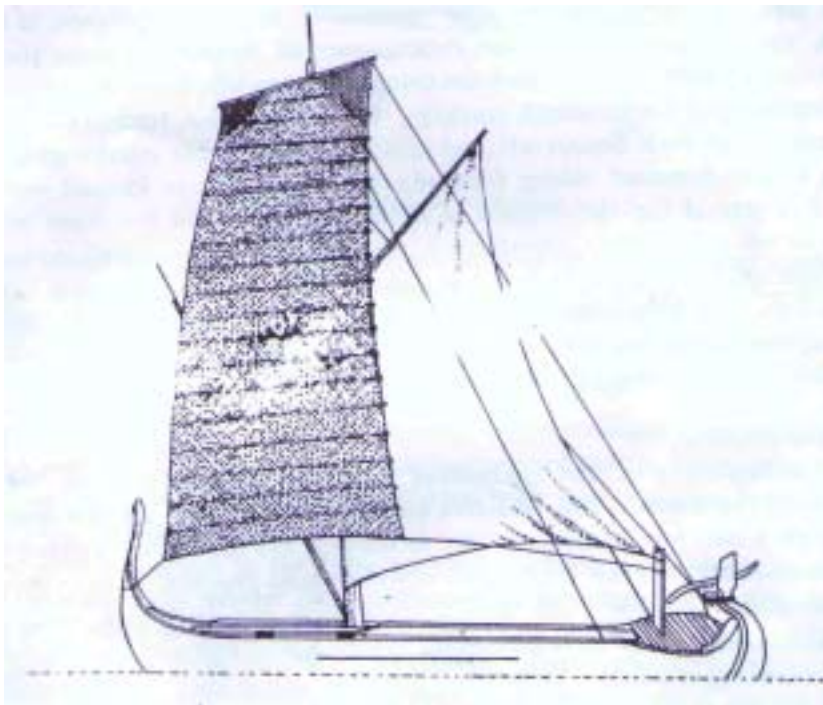


Fig 22 - A bonito fishing – boat, Minicoy Island

reef into the safety of the lagoon. The forward end rises easily land gracefully to a moderate extent, ending in a slender upturned prow; the stern is low and rather full to provide the better for a large platform not only decking in the extreme aft portion but projecting outboard to a considerable degree. A single

tall mast with little or no rake is stepped slightly forward of amidships in a simple tabernacle, and when lowered rests on the hollowed-out top of a broad plank set upright on the aft platform to act as a crutch. The rig is peculiarly hermaphrodite, there being a high mat square sail hoisted on the foreside of the mast while abaft on the same spar is set a fore and aft thin cotton main sail.

The object of the platform is not to give a commanding seat to the steersman but is primarily built to afford standing room for the crew to jig for bonito when they get among a shoal of these fishes. The hull is open save for this fishing platform and is divided by numerous bulkheads, as some of the compartments function as wells for the live-bait carried.

A somewhat similar boat, of larger dimensions, especially as regards beam and depth, is used in traffic between the Island and Ceylon; it is usually decked over with somewhat elaborate and comfortably arranged deck-houses in the better class, while in others these structures are largely replaced by well-built cadjan penthouse covers, efficiently protecting the cargo. These boats dispense with the fore and aft gaff sail used by the Minicoy bonito boats, but often add a small topsail in fine weather. They have speed and power and form a fine class of sea-boat. Formerly the smaller Maldivian boats of this description running to Ceylon employed an outrigger to give additional stability. The present build is more beamy and deeper and crew find they can now safely dispense with this clumsy contrivance.

For many years of Maldivians have maintained regular trade with Chittagong and other far-off ports, by means of large traders running to one hundred tones or more in size. These vessels are very remarkable as they perpetuate, in their main features, the characteristics of the Portuguese and Spanish caravels employed by the Columbus and Vasco da Gama and the conquistadores who followed in their footsteps at the beginning of the sixteenth century. These Maldivian traders are fully decked with considerable deck houses aft and amidships and big overhanging forecastle carrying a short foremast raking forwards, hoisting a square foresail well over the bows. The rest of the rig consists of a tall main mast and fair-sized mizzen; the former carries a big main square

sail set high up the topsail and occasional small topgallant sail, while the latter is rigged with a fore and aft gaff sail. In the last detail we have a departure from the lateen mizzen of the fifteenth century ship. The Maldivian design has also dispensed with the lofty poop and transom stern so characteristic of mediaeval ships.

LACCADIVE ISLANDS

The sailing craft of the Laccadives lack the diversity of form seen in the sister isles to the south. The islanders are of a different race and are home-keeping people with a narrower outlook in life, to whom a voyage to the adjacent mainland, to Calicut or Mangalore, to carry their simple island produce of tiny coconuts and amber-coloured coir fiber, with sometimes a little sun-dried fish, is the limit of their world travel. They have no elegant bonito boats, and no three-masted traders, notably no outrigger boats. They have no type alone, but that a most handsome one. It is little lateen-rigged modification of the type of Indian Pattamar, combining the simple bow of the southern type with the lofty highly ornamented poop of the northern or kotia design. The lines are particularly sweet, sweeping forwards in graceful curves to the overhanging bow, ending in a curious upright stem piece carried in the same way as the more elaborate ornament on the prow of a Venetian gondola.

The poop cabin is large and roomy with a curious stern gallery built out aft and on the quarters exactly as in many of our present-day naval vessels. The hull is painted or rather tarred black, relieved by two fore and aft white bands, the upper wide, the lower narrow. The sides of the loft poop and the stern gallery are decorated with elegant arabesques in white, usually in panels with a ornamental borders. No two pattamars are decorated alike; the designs vary greatly and bespeak a strong innate artistic sense in the Islanders. The hulls of these boats are put together entirely without nails, the planks being sewn together along the edges with coir twine, a device alike economical and of practical value in imparting elasticity invaluable to boats always liable to ground when entering the shoal entrances of the home lagoons.

The rig is a single medium-sized lateen sail carried on a stout mast well racked forwards; sometimes a small mizzen, also lateen rigged, is added.



Fig 23 - A reel- boat Laccadive Islands

The Island fishing boats and skiffs are built on the same general model save that the stern is generally rather low; the bow has often an exaggerated rise terminating in a high upturned pointed beak (Fig. 23).

THE ANDAMAN ISLANDS

In this group, thinly inhabited by wild Negrito tribes who are usually accounted the very lowest in civilization of all existing races of the human species, it is surprising to find these people habitually employing both the primitive dugout and a well designed single outrigger canoe.

The simple dug-out is the type adopted for their larger-sized canoes; the outriggers have normally smaller hulls fashioned on identical lines. The shape of the dugout both when used alone and as the hull of an outrigger canoe is peculiar; it is absolutely distinct from all Indian peninsular types, approximating closely to the Australian type instead of the sharp ends invariably favoured among the former, those of Andaman canoes are rounded, and the bow is prolonged horizontally forwards to form a overhanging shelf of platform to give footing for the harpooner on the look-out for turtle and great fish; at the stern a corresponding but much reduced projection is present. This form is distinctly primitive, characteristic of people still in the crude hunter-stage when reliance is placed solely or mainly upon barbed lances and harpoons and not upon nets for the capture of food from the sea.

The outrigger frame is invariably single; the float is connected with the hull by multiple booms varying in number according to the size of the dugout – never

less than three nor more than twelve as an extreme maximum. The booms are slender poles secured at their inner ends by being passed through holes in the sides of the dugout close to the edge – a most peculiar method seen nowhere else in India but found either exactly similar or in some variant form in the outriggers, both single and double of North Queensland, Australia.

The connection effected between the float and each boom is indirect, by means of three short stanchions; these are inserted in line longitudinally upon the upper surface of the float. The middle stanchion is vertical, its upper end lashed to one side of the extremity of the boom; the outer ones converge, their upper ends passing beneath the end of the boom, lashed thereto with rattan on each side of their vertical companion. The upper ends project irregularly beyond the upper surface of the boom. This method of connection again shows close relationship with that characteristic of certain Australian outriggers, differing however in the number of stanchions employed. In the Queensland form from Cape Bedford and neighborhood, two only are used, the median or vertical one being omitted. In this type a wholly unusual modification of the boom fitting is found, two twin slender rods being used therefore, the outer end of one being inserted over, and that of the other under, the crossing of the two stanchions. No vestige or suggestion of this modification is seen in the Andamans, but with the exception of this and the addition of a vertical (third) stanchion, the Andaman outriggers show such close resemblance in all details to the typical Queensland form, that it is obvious they have had a common origin. In both, (a) the canoe form is the same, both have the same lack of sheer, the same rounded ends and bow platform; (b) they agree in having multiple booms of no fixed number- the Andamanese cannot count beyond three- and (c) in the booms passing through the sides of the canoe; (d) the float connection though differing in one detail, is essentially of the same type. Only in the use of twin slender boom poles by the Australian type in place of a single stout boom is there any marked difference between the two. Were the points of similarity confined to one or even two important structures, one might consider them as coincidences or as a case of convergence brought about by like needs, like habits and similar environment; when the coincident structures comprise all those of importance, the evidence becomes cumulative and we cannot accept the view of independent origin – both canoes must have had a common ancestry.

It is difficult to avoid the conclusion that to the Negritos, low in civilization though they be, the invention of one form of the outrigger canoe is to be traced, and that the nearest approach to the original design is that existing still in the Andamans. From the Negritos the Australians appear to have borrowed this design, without ability to improve upon it. As this primitive form is of the single outrigger type, we may conclude that the single antedated the double outrigger: the evidence of Polynesia tends to the same conclusion².

NICOBAR ISLANDS

Although situated at no great distance, scarcely ninety miles from the Andamans, and although the single outrigger canoe is again the characteristic boat form, the Nicobar Islands design is radically different from that of the sister group. The outriggers found here are better built and more elegant in form and never possess more than two booms. Instead of the crudely fashioned hull without sheer prevalent in the Andamans, we find the Nicobarese bestowing considerable care and taste upon the lines and decoration of their canoes; the bow is carried high in a graceful curve to terminate in an extremely long-drawn-out prow ornament adorned with a stiff flag at the apex, while the stern is produced considerably in an acuminate projection inclined slightly upwards. "The hull is charred and decorated by grooved bands running at short intervals from gunwale to gunwale round the outside. These canoes are fitted according to size, with from one to four short bamboo masts, each supported by four widespreading stays of rattan, and on these are hoisted lateen sails with a short tack of about 12 inches, made of cotton or pandanus leaves. The masts are never stepped on the floor of the canoe, but always on one of the crossbars or thwarts."³

Haddon, A.C. "The Outrigger Canoes of Torres Straits and North Queensland" in *Essay and Studies* presented to W. Ridgeway, Combridge, 1913.

² I am indebted to the Chief Commissioner of the Andamans for kindly supplying the details of Andaman canoes given below; these may therefore be taken as accurate. A good figure of an Andaman outrigger with four booms is given by Mouat in his *Adventures and Researches among the Andaman Islanders*, 1863, while a model, agreeing in all essential particulars but furnished with eight booms, finds a place in the Ethnological collection of the Indian Museum, Calcutta.

³ Kloss, C.B., in *The Andamans and Nicobars*, London, 1903, page 79. In this work an excellent illustration of a Nicobar outrigger canoe is given.

In the case of the largest three-masted canoes, the fore mast is placed in the bows, and well forward of the fore outrigger boom; the main and mizzen masts are stepped between the two booms, the mizzen just forward of the aft boom. All the masts are vertical and short, the main being a little longer than the others. The yards are longer than the masts.

The chief peculiarity of these canoes is in the form of the outrigger. The booms are invariably two in number lashed above the gunwales at their inner ends, each being connected with the long float by means of three pairs of divergent stanchions crossing *beneath* the boom. The fore pair of stanchions slope outwards and backwards; the mid pair away from one another, while the aft pair pass outwards and forwards. The upper extremities of the stanchions project conspicuously above the boom, the length being often nearly equal to that between the boom and the float. The stanchions are red-shaped, the lower ends pointed and inserted in holes in the float without lashing. The upper ends are lashed with rattan to the boom.

The differences between the Nicobar and Andaman outrigger designs are so great and fundamental that it is impossible for one to be derived from the other. Discussion of this question and of the respective origins of both must however be postponed to a later page.

RIVER CRAFT

In the general types of river craft seen in India, much less ingenuity is shown in evolving designs for local needs, and correspondingly clearer and more primitive are their relationships to types known in the ancient world. The simplest and quaintest are the plantain-stem catamaran of Tanjore and Bengal, the chatty-raft of South India, the round coracle of the Cauveri and Tungabhadra and the double palm dugout of the Godavari.

The first of these is probably the most primitive form of river craft evolved by prehistoric man. In the form seen alike in Tanjore and in Bengal where plantain (banana) stems are valueless as soon as the fruiting age is passed, it consists of 5 or 6 of these stems roughly trimmed at the ends and fastened together

raftwise by a skewer of wood or thin stake passed through the series from side to side at each end. Banana leaf-stalks, whereof these "stems" are really made up, are full of tiny cubical air spaces and these give quite a considerable flotation value to the structure. It is the expedient of the moment — the simplest form of raft that will serve an emergency — a thing to be cast aside almost as soon as used.

The chatty-raft, while equally primitive, is still more ingenious. As seen at Vellore, it consists of two ordinary earthenware pots (chatties) turned upside down and connected tandem fashion by means of a stick lashed on each side of their necks. A space of some two feet is left between the pots and on this fragile frame a man can sit astride when the strange contrivance is "launched" into the water. At Vellore Fort this raft is used in order to reach the water-lilies which abound in the deeper parts of the moat; the leaves are collected to serve as platters.

The coracle such as we see to-day in use on the Cauveri and the Tungabhadra, on the Tigris and Euphrates, marked a great advance in our ancestors' efforts to harness the waters to their service. In this design the framework of the craft is of wickerwork made watertight by several devices. The Indian coracle probably preserves to us the original type; it consists of a very large wide-mouthed circular basket of much flattened form; it may indeed be termed flat-bottomed; the sides are comparatively low (Pl.V, Fig.6). A common size is fully 12 feet in greatest diameter which coincides with the mouth, the bottom being of smaller diameter. Over the outside is stretched and fitted a hide covering which efficiently excludes the water. In Tanjore and along the course of the Cauveri it used to be extensively employed in ferrying passengers across rivers but to-day it is going steadily out of use before the advance of the bridge-maker. This Indian coracle differs considerably in form from the Arab guffa, greatly in evidence for the same purpose on the Tigris and Euphrates, the latter having convexly curved sides with the diameter of the mouth less than that of the equator. A further distinction is that in the Mesopotamian design a hide covering is discarded in favour of pitch, but the former method is the older, for Herodotus tells us that hide-covered coracles were used by Assyrian wine-merchants to convey the produce of their vineyards down the Tigris to

the cities of Chaldea. He tells us too that each merchant took with him one or even two asses in the coracle so that after selling the cargo, he might dismantle the framework, sell it for what it would fetch and then load the hide on one of the asses, returning home by land. The coracle has indeed a notable lineage and in its distribution ranges as far west as Ireland, where today on the Donegal and Clare coasts, elongated boat-shaped coracles are extensively used in the sea-fisheries. This altered shape permits of oars being used. These Irish coracles are covered with tarred canvas.

Lastly we have the double palm-butt dug-out in use on the Godavari river (Fig.21). The main features of these have already been described in pointing to them as most probably the prototype of the strange shoe-dhoni of Cocanada and the Godavari delta. The name they go by is *sangadam* and it is noteworthy that this term is used also in Ceylon and in the Tamil country of the south for any kind of double canoe.

Of river craft other than the primitive relics of prehistoric boat-building, the Ganges from Benares to the sea provides the best Indian example of a busy inland waterway. Expect on the crowded rivers of China, a busier scene than that in the lower reaches is nowhere to be met with anywhere in the world -- two endless processions of craft of all sizes, but in the main of one general type, passing continuously up and down on the bosom of the silt-laden mother of rivers.

A distinctly old-world feeling pervades the scene; the majority of the boats have the high stern and low bow of the craft that crowded the Nile in those far-off days before Arab influence had appeared to change out of all semblance the stereotyped designs affected by the worshippers of Amen and Osiris. The chief exception is the ubiquitous one-man passenger dinghy of sampan habit that loiters about hawkeyed on the look-out for possible fares (Fig.24). In these little skiffs, the mosquito craft of the river, the boatman squats aft paddling on the low sharp stern. The bow rises sharply to end in a narrow-pointed stem about 2 to 2½ feet higher than the level of the stern. A neat cabin with semicircular roof occupies the space available amidships. With a fair wind and some considerable distance to go, a tall bamboo mast is stepped

abaft the cabin and a thin cotton sprit-sail hoisted high enough to enable the boatman to see ahead as he stands at the stern steering with a long paddle.

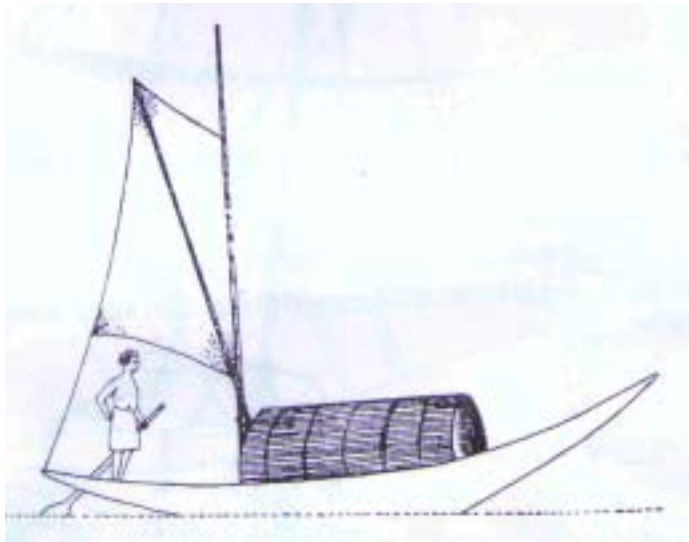


Fig 24 -A Ganges dinghi

All the larger boats, whether small fishing boats or large rice carriers, with the frequent need to row against the current are characteristically low forward. The stern is particularly high with a view to give the steersman a clear outlook. Usually bow and stern are sharp, the latter greatly raked. These boats may indeed be said to be identical in all their essential features with the lesser craft depicted on the walls of ancient Egyptian tombs or preserved to us in models made for the use of the dead.

The fishing boats, often passengers or cargo dinghies converted for the nonce, may or may not have a cabin amidships, but all carry a high spritsail set well forward towards the bow and not aft as in the littlesampan dinghies (Fig.25). This form manned by 3 or 4 men, is greatly in evidence during the hilsa season when a long procession of these boats is often to be seen drifting rapidly down stream with nets submerged, with another series sailing or rowing upstream with decks encumbered with the huge bamboo crescent trap-mouths of their sangla net.

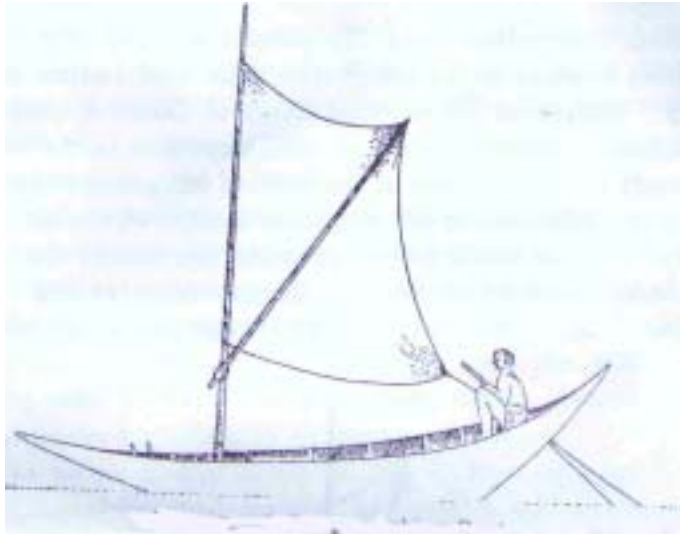


Fig 25- A Ganges Fishing Boat

Above this size of boat, the spritsail rig is seldom used; a big squaresail takes its place with a topsail above in many cases (Fig.26). The mast is always stepped far forward. Right in the bows a number of wooden thole-pins are set in the gunwale ready for use with the powerful sweeps usually lying alongside ready for a loss of wind or tide.



Fig 26 - Topsail river boat of the Ganges

The most remarkable feature of these cargo carriers is the great steering paddle. Supported in a grommet from the quarter gunwale, the shaft is specially long as the steersman works it from a high platform on the aft roof of the cabin. To give easy leverage a short handle bar — the prototype of the tiller — is fixed at right angles into the paddle shaft near the free end.

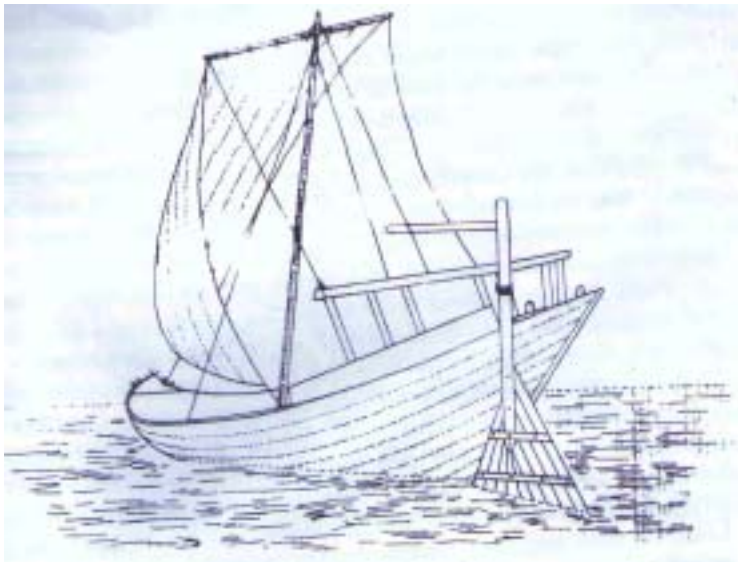


Fig 27 - A cargo - carrier of the Ganges

The blade itself is very wide and powerful, but rather short. This form of steering paddle is essentially the same as the type of fixed quarter oar characteristic of ancient Egyptian craft. It is notable that in Egypt this device was employed even in quite small boats whereas in Bengal it is never used except in the cargo carriers. In the largest river cargo carriers a very wide and powerful rudder takes the place of the steering paddle (Pl.I, Fig.2); in many cases it assumes the form of a balanced rudder in which a considerable portion of the blade is placed forward of the turning axis exactly as in the fixed quarter steering paddle from which it is plain to see it is directly derived. Between the steering paddle and the balance rudder fitted upon a sternpost, an intermediate form (Fig.27) is sometimes seen; in this the balanced rudder form in nearly all its details is used, but differs there from in being hung from the quarter and not upon the sternpost.

In Burma an entirely different type of river craft is in use, bigger, smarter and better built by far than the rough and archaic Bengal rice carriers. To quote the description given by Warington Smythe in his charming "Mast and Sail":-

"Owing to the prevalence of the southerly sea breeze which blow upstream for many months after the end of the cool season, these boats are rigged only for running up against the stream. When going against the wind they punt or pull along with the current, and never beat to windward. The squaresail, or square-headed lug, is the only sail practically known in Burma. And in these boats the mast is a triangle formed of two spars meeting at the apex in a manner already familiar to us in ancient Egyptian drawings of the third and fourth dynasties, and still also used in the Red River of Indo-China¹. The yard is a standing spar supported by a network hauled out along the yard from the deck. A crowd of these craft running before the fresh south wind up the broad Irawaddi form a fine sight in their way".

The most beautiful work in these boats is about the stern and the steersman's seat upon which the Burman loves to bestow his most elaborate and careful wood carving. Here, as Warington Smythe remarks," the classical scholar may recognize his old friend the ancient sitting in state raised aloft beneath his and he may study almost the identical method in which Greek heroes and Roman merchantmen used to sling their oar-blade rudders on the quarter, following the Egyptian example which takes one back to the very earliest days of man's boat building.

Some up-river forms of boats among the Burmans and Talaings are very pretty and elegant. The fiddle-head 'clipper' or 'schooner' bow shape is a great favourite, although, owing to the shallowness and rounded-up form of the ends of these canoe built craft, the lower edge of the stem is frequently carried right out of water.

For minor river and creek work, dug-out canoes are everywhere in evidence in Burma the design light and more elegant than that of Malabar. In Burma

¹ It was also the common mast form in Java in the 8th century as shown in the Boro Budur sculptures in that island - J.H.

proper the clipper bow and overhanging stern common to the large river craft are adopted, giving an exceedingly graceful appearance. In the Shan States on the great Inle Lake, the fishermen use a narrow shallow design very lightly hollowed along its length except at either end where it is left flat to form a tiny platform. Both ends are broad and truncated, terminating in two short claw-like horns. It is virtually a hollowed-out plank rather than a dug-out tree trunk; its draft is exceedingly small and its form such that it can be poled with ease over weed-grown shallows where no deep dug-out could pass.

SIFFS is a leading non-governmental organisation in fisheries. It functions as the apex body of over 100 primary fish marketing societies of artisanal fishermen in Tamil Nadu, Kerala and Pondicherry, which are in turn affiliated to District federations that are the members of SIFFS. The village level primary societies take care of the local fish marketing, credit and saving needs of over 6000 fishing units which benefit 25,000 fishermen. The total fish sales of this network was around Rs.270 million last year. The district federations provide various support services to the societies including monitoring, input supply, credit services and welfare measures. SIFFS as the overall apex, has a wide range of activities, both commercial and developmental. These include running a network of boat yards making marine plywood boats for artisanal fishing, supply of out board motors, a network of motor service centres, ice plants, a large micro-finance programme, domestic and export marketing of fish, R&D in fishing technology, promotion of societies in new areas, policy research and advocacy. Some of the SIFFS services are available in Karnataka and Andhra Pradesh also.