

ON THE CHARACTERISTICS OF SOME OF THE INDIAN TIMBERS FOR BOAT BUILDING

—PART I



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Wood is one of the most durable of the natural raw materials and as such it is extensively used for the construction of modern mechanised fishing boats. The 7,000 mechanised fishing boats that are already in use in India have consumed about 60,000 tons of timber. The 8,000 fishing boats comprising of larger sizes that are to be introduced during the present Five Year Plan period would need about 1,60,000 tons of timber estimated to cost about 15 crores of Rupees depending on the species of timber used. In addition to the innumerable indigenous wooden fishing crafts that are continuously added on to the existing fleet for the periodical repairs and renewals of the mechanised fishing boats and for

many other harbour structures (Wharves, Jetties, Piles, and dry dock and slipway equipments), a further substantial quantity of timber may also be required. Wood as a construction material has to play a very vital role in this stride.

5,000 species of Indian Tropical trees are known to yield the timber though only 400 species are actually in use as building materials. It is also known that only about 200 of them are put to great commercial use of which a selected few have been found to be ideally suitable for the construction of modern mechanised fishing boats.

The basic characteristics of timbers for boat building can be

enumerated as under. Boat Building timbers should be strong, moderately heavy (35-45 pounds per cubic foot at 12% moisture level) elastic and durable under severe working conditions. They should be free as much as possible from natural defects and blemishes with a healthy hard heart wood and with straight grains. Timbers should be able to withstand the constant immersion in salt water and constant exposure to the weathering action of sun, rain and wind. They should have good retention of shape, weight, strength and stiffness as a beam; excellent bending properties as for hull planks and frames, shock-resisting characteristics and load-bearing properties as per the hull, engine bearers and the back-bone



Round logs of timber for boat-building (top)



Sawing of timber logs for boat-building (right)



Shaping of timber logs

assembly comprising of the stem, keel, and stern; compatibility with all metal fastenings with adequate nail holding power. Such timbers should also have good working qualities and be easily available for use.

Since Teak wood (*Tectona grandis*) satisfies most of the above requirements, it has been considered as a standard all purpose timber of very great repute both

within and outside India. Teak wood has been in use for boat construction for many years from time immemorial. Some of the mechanised fishing boats built earlier with Teak are still in perfect condition after 15 to 20 years of service. Both in Maharashtra and Gujarat only Teak wood is extensively used for fishing boat construction. This wood (Sag or Sagwan) is locally available and being some what inferior to Malabar and C. P. Teak, the price is naturally cheaper than in other places. Same is the case with Andhra Pradesh where the local variety of Teak known as 'Godavari teak' is easily available at a fairly cheap price and most of the boat yards use them for fishing boat construction. The few mechanised fishing boats constructed in West Bengal and

Orissa are also of Teak. Good Quality Malabar Teak is now being sold at Rs. 25/- to 30/- per cubic foot in log form.

Ainy or Anjili wood (*Artocarpus hirsuta*) became the second choice among boat builders, since 1950 onwards particularly along the coasts of Madras, Kerala and Mysore including Pondicherry and Laccadive Islands. The demand for good quality Ainy wood has been exceeding the supply as years passed. Its present supply has become scarce in the market and Ainy logs of greater length and girth are now not easily available from the normal sources. Average logs of Ainy have come to cost Rs. 12/- to 18/- per cubic foot. Thus Teak and Ainy are today beyond the reach of the boat-builders on account of their high price and scarcity in the market.

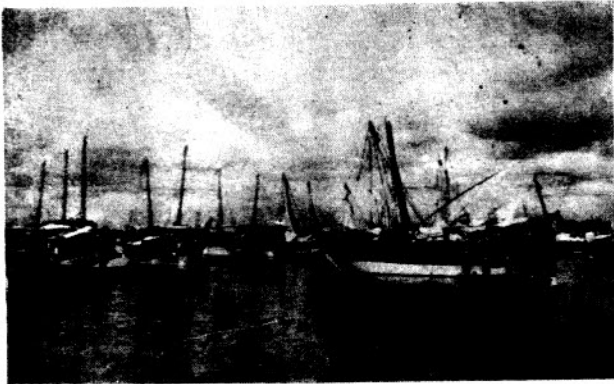


*Catamaran of
Madras Coast
(left)*

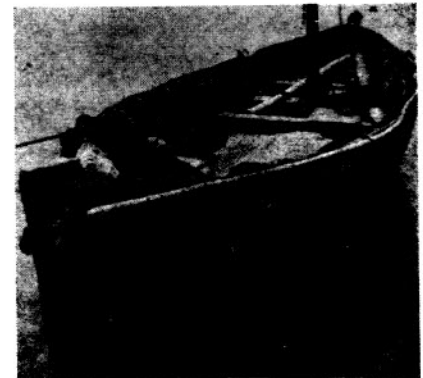
*Catamaran logs
of Kanyakumari
Coast of India
(below: left)*

*Masula boat of
the East Coast
of India
(below-right)*

and utility of Venteak wood (*Lagerstroemia lanceolata*) as a cheaper substitute for Teak and Ainy. Prototype fishing boats built of Venteak wood besides proving to be very cheap have been giving as long and good service as that of their counterparts built of the conventional materials. Good quality Venteak



*Sailing wooden
crafts in the
Beyport
(Calicut) (left)*



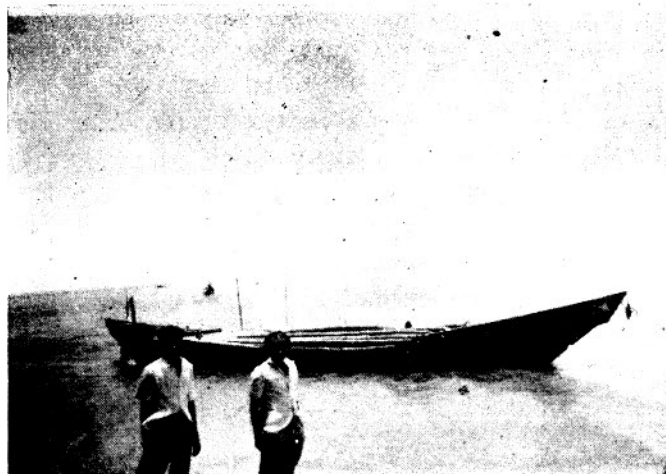
*Tuticorin fishing Canoe of
Gulf of Manaar*

No builder can make a cheaper boat if he or the perspective buyer still insist on Teak or Ainy for boat construction. The continuous increase in the cost of mechanised wooden fishing boats are very much resented by the fishing industry. The boat

builders are still not aware of the various alternatives and wider choices that are now available to them in selecting newer timbers species for their work.

The Central Institute of Fisheries Technology after a carefull study has already proved the usefulness

wood is available at Rs. 5 to 9 per cubic foot in log form. Table I will show the comparative cost figures for the different sizes of boats built of Venteak wood.



Wooden fishing craft of Chilka Lake (Orissa)



Sailing Canoe of Malabar Coast

Table I. Showing the Comparative Investment on Timber For the Different Sizes of Boat-Hulls

| Size of boat | Quantity of timber required | | | COST OF TIMBER | | |
|--------------|-----------------------------|------|---------------------------|-----------------------------|-----------------------------|-------------------------------|
| | TEAK | AINI | VENTEAK including postage | TEAK at Rs. 27/- per c. ft. | AINI at Rs. 15/- per c. ft. | VENTEAK at Rs. 7/- per c. ft. |
| 30' | 380 | 380 | 400 | 10,260 | 5700 | 2800 |
| 32' | 700 | 700 | 750 | 18,900 | 10500 | 5250 |
| 36' | 1050 | 1050 | 1120 | 28,350 | 15750 | 7840 |
| 42' | 1400 | 1400 | 1470 | 37,800 | 21000 | 10290 |
| 50' | 1800 | 1800 | 1880 | 48,600 | 27000 | 13160 |

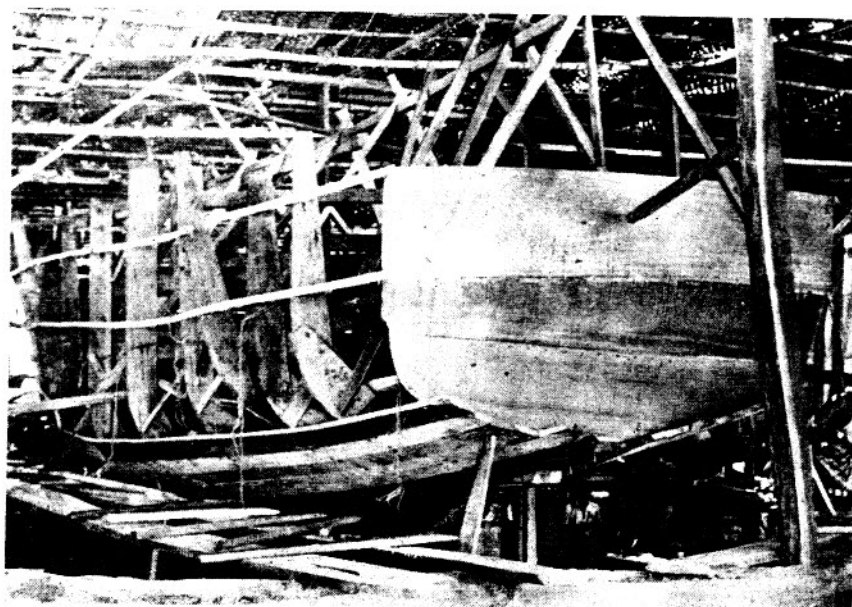
Based on Prices during 68'-69.

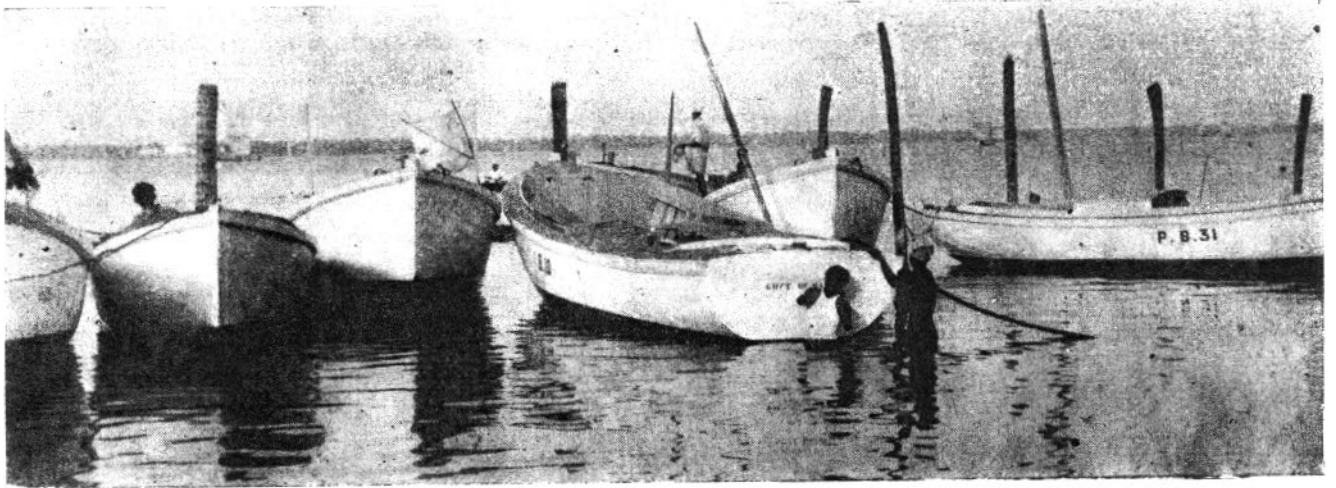
In the accompanying chart - Table II an attempt has been made to compare the main characteristics of some 18 different species of timbers with that of the standard timber Teak.

It is clearly seen that some of them appear to be as good as Teak in many respects. Many of them only lack the desired retention of shape which defect can however be easily overcome by a careful selection and by proper seasoning as per recommended schedule before they are actually put to use. It is also possible that some of the less durable species of timbers can be made more durable by resorting to suitable preservative treatment. It has been found that Mango wood (*Mangifera indica*) and Haldu (*Adina cordifolia*) when properly seasoned and impregnated with chemical preservatives like Creosote or Copper-chrome-arsenic compounds will not only be cheaper but will even last longer, than the untreated Teak, Aini and the like. However, studies at the C.I.F.T. have revealed that none of the Indian timbers can resist the severe attack of the marine wood borers under prolonged immersion in our tropical waters however much they are otherwise excellent in their mechanical or strength properties. This phenomena still necessitates the definite

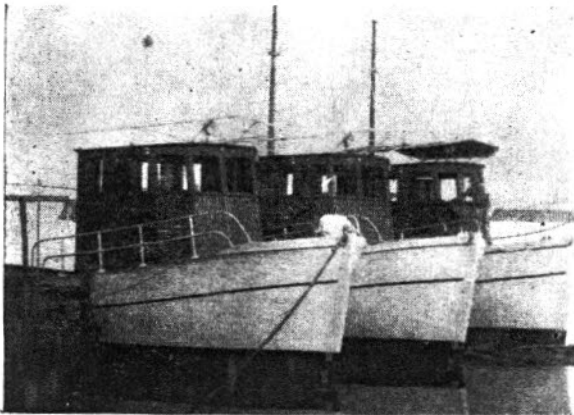
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A Mechanised wooden fishing-boat hull under construction

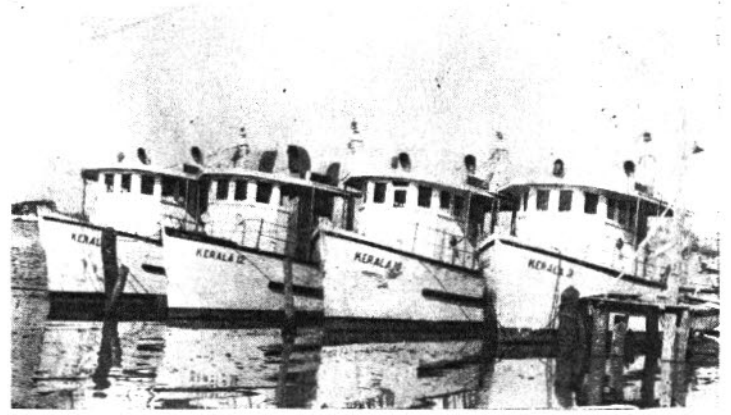




25' and 30' open mechanised fishing boats

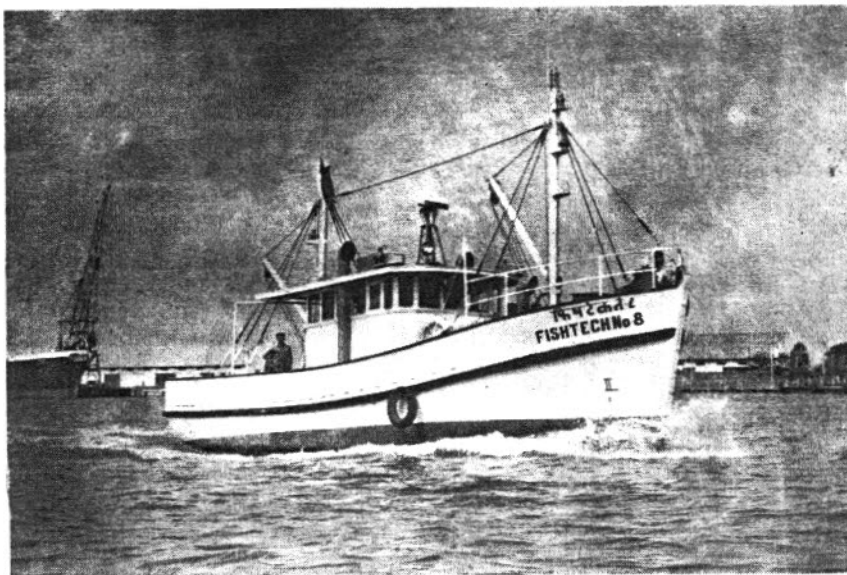


Fully decked 32' mechanised fishing boat with wheel-house for day-to-day fishing.



36' fully decked mechanised fishing boat with spacious wheel-house and capacious insulated fish-hold (3days cruise)

50' modern mechanised wooden trawler for 8-7 days fishing (below)



need for the sheathing of all wooden hulls of mechanised fishing boats either with metallic (Copper or Aluminium) or non-metallic (Fibre-glass or Toxic wood preservatives) materials.

The comparative data, it is felt, will serve as a useful guide and a ready reckoner while selecting newer woods for boat building purposes. Unless new species of timbers are tried and put to extensive use the industry may not be able to find the resource and procure the required quantity of conventional timbers for the 8,000 fishing boats. Further, the time is now ripe to go in for entirely newer constructional materials like Aluminium, Fibre glass-reinforced Plastic and Ferrocement apart from wood and teel that are now in use.

Table II- SHOWING DATA ON DIFFERENT TIMBER SPECIES

| Sl. No. | Scientific Name | Trade Name | V E R N A C U L A R N A M E S | | | | | | | | | English Common Name |
|---------|---------------------------|----------------|---------------------------------|--------------|--------------|----------------|-------------|--------------|----------------|---------|---------|---------------------|
| | | | Hindi | Gujarati | Marathi | Canarese | Malayalam | Tamil | Telugu | Oriya | Bengali | |
| 1 | 2 | 3 | 4 | | | | | | | | | |
| 1 | Tectona Grandis | TEAK | Sagwan | Sag | Sag | Theki-namara | Theku | Theku | Teku | Shegun | Shegun | Teak or Indian Oak |
| 2 | Pterocarpus Hirsuta | AINI | — | Path-phanas | Path-phanas | Hebbalasu | Aini | Anjili | — | — | — | Jungle Jack wood |
| 3 | Pterocarpus Dalbergioides | ANDAMAN-PADAUK | — | — | — | — | — | — | — | — | — | Andaman Padauk |
| 4 | Pterocarpus Marsupium | BIJASAL | Bijasal | Beo | Bibla | Honne | Venga | Vengai | Tegisa | Bijasal | Piasal | Gum-kino tree |
| 5 | Shorea Robusta | SAL | Sab or Sakhu | — | — | — | — | — | — | Sal | Sal | Sal tree |
| 6 | Dipterocarpus Indicus | GURJAN | Gurjan | — | — | Yennamara | Kalpayini | — | — | — | — | Gurjan |
| 7 | Dalbergia Latifolia | ROSEWOOD | Shisham | Shisham | Shisham | Biti | Itti | Itti | Ittegi | — | — | Indian Rose-wood |
| 8 | Dalbergia Sissoo | SISSOO | Shisham | Sissu | — | — | — | — | — | — | — | Indian Red-wood |
| 9 | Lagerstroemia Lanceolata | BENTEAK | — | Nana | Nana | Nandi | Venteak | Ben-teaku | — | — | — | — |
| 10 | Lagerstromia Hypoleyuka | JARUL | Jurul/ Pinna | — | — | — | — | — | — | — | — | — |
| 11 | Lagerstroemia Parviflora | LENDI | Bakli/ Lendya | — | — | Chan-nangi. | Nanagu | Peika-dukka | Chen-nangi. | — | Sidha | — |
| 12 | Terminalia Paniculata | KINDAL | — | — | — | Honal | Pillamaradu | Pillamaradu | Nalla-pulaga. | — | — | — |
| 13 | Terminalia Bialata | WHITE-CHUGLAM | — | — | — | — | — | — | — | — | — | Silver grey wood |
| 14 | Terminalia Tomentosa | DARUEL | Asna Sain | Sajad/ Ain | Sajad | Matti/ Banappu | Kari-marudu | Kari-marudu | Nalla-meddi | — | — | — |
| 15 | Albizzia Procera | WHITE-SIRIS | Siris | Karan-gro | Kinhai Kilai | Bellati-Vagai | Vella-vaka. | Vella-vagai. | Tella-chinduga | — | — | — |
| 16 | Albizzia Lebbek | KOKKO | Siris (Kala) | Siras | — | Bage | Vaka | Vagai | Diri-sinum | — | Sirish | — |
| 17 | Albizzia Odoratissima | BLACK-SIRIS | — | Kalio-siras. | — | Chella-Vagai | Karu-vaka | Karu-vagai. | Chin-duga | — | Korai | — |
| 18 | Adina Cordifolia | HALDU | Karam | Karam | Karam | Yetta | Bimbu | Kadambari. | Bandaru | — | Ranjkat | — |
| 19 | Mangifera Indica | MANGO | Am | Amba | Amba | Mavu | Mavu | Mamaram | Mamidi | — | — | Mango Wood |

| Wt of 1 cft. @12% moisture | Wt. | Strength as a beam | Stiffness as a beam | Suitability as a pesu | Shock resistibility | Retention of shape* | Shear | Hardness | Seasoning | Durability | Treatability | Resistance to marine fouling | Resistance to marine wood borers. Time for 50% internal damage. | Average price cft. i |
|--|-----|--------------------|---------------------|-----------------------|---------------------|---------------------|-------|----------|-------------------------|----------------------|----------------------|--|---|------------------------|
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Teak is taken as a standard timber for comparison (100 points) | | | | | | | | | | | | | | |
| 42 | 100 | 100 | 100 | 100 | 115 | 100 | 115 | 100 | Seasons well with care. | Very durable | Not possible | Surface freely fouled by barnacles, oysters, tube-worms etc. | 8 months ship-worms & Martesia | Rs. 25 |
| 37 | 90 | 90 | 90 | 95 | 90 | 95 | 90 | 95 | do | Durable under cover | Under pressure | do | 4 months- Martesia | Rs. 15 |
| 45 | 105 | 100 | 105 | 105 | 100 | 100 | 115 | 130 | do | Very durable | Partially treatable. | do | 6 months- Shipworms/ Martesia | Rs. 15 |
| 50 | 115 | 105 | 95 | 95 | 135 | 75 | 115 | 135 | Cracks in seasoning | Very durable. | Not possible | do | do | Rs. 10 |
| 55 | 125 | 115 | 120 | 115 | 135 | 60 | 140 | 155 | do | Extremely durable | do | do | 5 months- Martesia | Rs. 15 |
| 37 | 110 | 110 | 120 | 100 | 100 | 50 | 100 | 90 | Seasons well with care. | Durable under cover. | Treatable. | do | 5 months. Martesia | Rs. 15 |
| 51 | 120 | 95 | 90 | 85 | 135 | 80 | 135 | 165 | do | Extremely durable | Not possible | do | 7 months- Martesia | Rs. 20 average quality |
| 48 | 115 | 90 | 80 | 80 | 140 | 85 | 140 | 135 | do | do | do | do | do | Rs. 10 |
| 42 | 100 | 90 | 100 | 90 | 105 | 65 | 105 | 105 | do | Very durable | do | do | 5 months- Shipworms/ Martesia. | Rs. 67 |
| 38 | 90 | 80 | 80 | 75 | 85 | 70 | 100 | 80 | do | Durable. | do | do | do | Rs. 6 |
| 47 | 105 | 90 | 100 | 90 | 120 | 60 | 135 | 110 | do | do | do | do | do | Rs. 6 |
| 49 | 115 | 90 | 105 | 95 | 100 | 60 | 110 | 120 | Cracks in seasoning. | do | Partially treatable | do | 5 months martesia/ shipworms | Rs. 8 |
| 44 | 100 | 90 | 105 | 95 | 105 | 65 | 100 | 100 | Seasons well with care. | Durable under cover. | Not possible | do | do | Rs. 9 |
| 54 | 125 | 95 | 105 | 95 | 125 | 65 | 120 | 155 | Cracks in seasoning. | Durable | Treatable | do | do | Rs. 8 |
| 43 | 95 | 85 | 80 | 85 | 140 | 75 | 130 | 105 | Seasons well with care. | do | Partially treatable | do | 4 months- Shipworms & Martesia. | Rs. 8 |
| 40 | 95 | 85 | 100 | 90 | 85 | 80 | 125 | 100 | do | Very durable | do | do | do | Rs. 8 |
| 46 | 115 | 100 | 120 | 125 | 140 | 90 | 180 | 175 | do | do | Not possible | do | do | Rs. 8 |
| 43 | 100 | 80 | 80 | 80 | 90 | 80 | 110 | 110 | do | Durable under cover | Easily treatable | do | 4 Months- Martesia | Rs. 5 |
| 43 | 95 | 75 | 80 | 75 | 100 | 95 | 105 | 90 | Easy to Season | do | do | do | 4 Months- shipwrom & Martesia. | Rs. 5 |

* Well seasoned timber as per drying schedule will have good retention of shape.