

## On the Characters of Fishing Floats

By

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The chief characters of fishing floats, which are indispensable components of most fishing nets are :

- (i) Extra buoyancy *viz.* the capacity to lift a piece of webbing, in addition to its original floating capacity;
- (ii) Loss of extra buoyancy on account of absorption of water and the properties of drying;
- (iii) Power of resistance to different water pressures at different water depths; and
- (iv) Power of resistance to abrasion, rotting and shocks.

Pieces of light wood, available locally are the traditional floating materials used by the indigenous fishermen for their nets. In recent years, however, manufacture of glass, aluminium alloy and synthetic floats within the country is gaining popularity particularly to meet the needs of modern types of fishing gear from mechanised boats. Some of the characters of these fishing floats, wooden and those manufactured in the country, were subjected to detailed study. The Indian manufactured floats were further compared with their foreign counterparts. The present paper gives a resume of these preliminary studies. The pressure resistance qualities of some of the floats are also discussed.

### Wooden Floats:

The chief woods used for the fishing floats on the west coast of India are, *Erythrina indica*, *Gmelina arborea*, *Alstonia scholaris*, *Cedrus deodara*, *Sapium insigne*, *Samadera indica*, *Bombax malabaricum*, *Derris uliginosa*, *Saccharum* sp., *Sonneratia* sp., *Balsomodendron mukul*, *Terminalia tomentosa*, *Acacia pennata*, *Calotropis gigantea* and *Melia* sp.; and those on the east coast are *Calotropis gigantea*, *Excoecaria agallocha*, *Melia azedarach*, *Vitex peduncularis*, *Sterculia urens*, *Erythrina indica*, *Aeschynomene aspera*, *Gyrocarpus jacquini*, *Sterculia urens*, *Boswellia serrata*, *Cedrus deodara*, *Sonneratia apetala*, *Alstonia scholaris* and *Bamboosa* sp. (Kuriyan and Satyanarayana 1961). Floats cylindrical in shape are generally used with gill nets and shore seines. In the former case they are usually thin and long while in the latter they are short and stout. Rectangular flat pieces are preferred for shore seines although cylindrical floats also are occasionally used in certain localities.

The physical measurements of the representative samples of floats from both the coasts were measured and extra buoyancy determined. The following table gives the extra buoyancy and the relative density of the floats studied.

TABLE I

Extra buoyancy and relative density of the common wooden floats\*

Name of the floating material	Regions from where samples were studied	Extra buoyancy per unit volume of material grams/cc.	Relative Density grams/cc.
I. WEST COAST			
1. <i>Alstonia scholaris</i>	Ratnagiri	0.580	0.414
2. <i>Balsomodendron mukul</i>	Veraval	0.659	0.340
3. <i>Bombax malabaricum</i>	Mysore & Kerala	0.652	0.347
4. <i>Cedrus deodara</i>	Veraval	0.538	0.461
5. <i>Derris uliginosa</i>	Kerala	0.732	0.268
6. <i>Erythrina indica</i>	Veraval, & Bombay Mysore	0.705	0.290
7. <i>Gmelina arborea</i>	Veraval, & Ratnagiri Mangalore.	0.462	0.537
8. <i>Saccharum</i> sp.	Kerala	0.769	0.238
9. <i>Samadera indica</i>	Mysore & Kerala	0.647	0.357
10. <i>Sapium insigne</i>	Mangalore	0.833	0.166
11. <i>Sonneratia</i> sp.	Bombay	0.566	0.290
II. EAST COAST			
1. <i>Calotropis gigantea</i>	Andhra & Madras	0.624	0.375
2. <i>Erythrina indica</i>	Orissa	0.788	0.221
3. <i>Exocoecaria agallocha</i>	Andhra & Madras	0.615	0.384
4. <i>Gyrocarpus jacquini</i>	Andhra	0.597	0.401
5. <i>Melia azedarach</i>	Madras	0.568	0.431
6. <i>Sterculia urens</i>	Madras	0.594	0.405
7. <i>Vitex peduncularis</i>	Orissa	0.842	0.157

\*Notes: Within the same material, certain variations in the above properties are likely to be present if they are from different portions of the trees and also if they are from trees grown in different areas under different soil conditions.

#### Manufactured Floats:

The different floats made in the country for fishing purposes are of glass spheres of 4" to 6" in diameter, aluminium alloy spheres of more or less similar sizes and synthetics of different materials and shapes. Among synthetics, thermocole and polythene are the main ones. Thermocole floats are made in spherical, barrel and sandwich shapes, whereas polythene ones are only in spherical shape. Similar to spherical floats of thermocole, floats of hard foam plastic material are also made. The basic characters of the above floats are incorporated in Tables II to V.

TABLE II  
Spherical glass floats and their extra buoyancy

Country of manufacture	Commercial specification (Diameter in inches)	Average of		Remarks
		Weight in grams	Extra Buoyancy in grams	
INDIA	4.0	311.87	238.28	
	5.0	465.31	579.30	
	6.0	576.82	1,263.82	
NORWAY	3.5	160.17	186.56	
	5.0	396.83	639.04	
	6.0	585.42	1,213.09	
JAPAN	4.0	206.00	423.00	} Studied by Dr. H. Miyamoto (1952).
	5.0	300.00	633.00	
	6.0	637.00	1,170.00	
FRANCE	6.0	600.00	800.00	Studied by A. Percier (1959).

TABLE III  
Aluminium spherical floats and their extra buoyancy

Country of manufacture	Commercial Specification (Diameter in inches)	Average of		Remarks
		Weight in grams	Extra Buoyancy in grams	
INDIA	3.0	82.63	146.85	
	4.0	141.68	404.70	
	5.0	257.74	788.18	
	6.25	391.22	1,662.12	
UNITED KINGDOM	7.5	1,083.83	2,135.52	
	8.0	1,339.54	2,292.18	
NORWAY	8.0	1,672.49	2,673.93	
FRANCE	8.0	1,200.00	2,900.00	

TABLE IV  
Spherical synthetic floats and their extra buoyancy

Material of the float	Country of manufacture	Commercial specification (Diameter in inches)	Average of		Remarks	
			Weight in grams	Extra buoyancy in grams		
Polythene	.	.	.	62.22	286.34	} Hollow inside.
				110.28	659.14	
				224.40	1,521.33	
Thermocole	.	.	.	56.70	921.37	} Not hollow.
Foam Plastic	.	.	.	47.50	519.50	
Synthetic rubber Plastic	.	.	.	392.84	611.54	} Hollow inside.
	.	.	.	161.87	735.10	
Nokalan Plastic	.	.	.	792.28	1,521.33	}
	.	.	.	635.97	3,292.79	

TABLE V  
*Other synthetic floats and their extra buoyancy*

Material of the float	Country of manufacture	Shape and specifications	Average of	
			Weight in grams	
			Extra buoyancy in grams	
Thermocole	India	Barrel 6" in length and 2" in central diameter	17.06	263.64
Synthetic sample	Japan	(i) Barrel 6" in length and 2" in central diameter	56.24	219.71
		(ii) Cylindrical 2" in length and 2" in diameter	32.19	170.10

The results in the case of spherical shaped floats indicate that weight and extra buoyancy are proportional to the diameter raised to the powers of 2.5 and 3.0 respectively (Satyanarayana 1960). With the help of the relationship, it has been found that Indian glass floats are heavier than their Japanese and Norwegian counterparts by 1.7 and 1.3 times. Consequently the extra buoyancy is correspondingly less, thereby indicating the need for the improvement in the quality of the floats. The Indian aluminium float is nearly 56% light and 54% more buoyant than the Indian glass float. Among the synthetic floats of same size, the thermocole float appears to be lighter with high buoyancy. Of all the floats made in India, aluminium floats appear to suit trawls.

#### Effect of pressure on the floats:

Certain preliminary tests were conducted on the effect of pressure on most of the Indian made synthetic floats namely, thermocole, polythene and others. Similarly few of the Japanese synthetic floats imported to Gujarat State for gill nets were also studied for their pressure withstanding capacity.

The results of the pressure tests on thermocole floats of Barrel shape 6" in length and 2" in diameter at the centre reveal that with the increase in pressure, the floats shrink in size, with a corresponding decrease in extra buoyancy. The size reduction noticed in length and central measure were nearly 21 and 25% when the samples were subjected to 135 lbs./in.<sup>2</sup>, equivalent to a sea depth of 50 fathoms. The loss of extra buoyancy is found to be proportional to the pressure acting on the floats at different levels of sea water. The relation can be expressed by the equation

$$B = 302.3 - 1.49 P.$$

Where B. & P. represent extra buoyancy in grams and pressure in lb./in.<sup>2</sup>.

The barrel shaped Japanese synthetic floats, when subjected to pressures upto 30 fathoms depth for a rather short duration (3 Hrs.), did not show any signs of losing their extra buoyancy and slight reduction in buoyancy was noticed at 40 fathoms depth pressure under similar conditions. But when the samples were subjected even at 30 fathoms pressure for longer periods (6 Hrs.), they were found reduced in size as well as in extra buoyancy. The reduction in extra buoyancy is found to be nearly 50% when the samples were kept under 30 fathoms pressure for 24 Hrs. These results indicate that these floats may be conveniently used up to 20 fathoms depth without any adverse effects.

Both the above types of floats are found not to absorb water, which in one way affects the loss of extra buoyancy, on the other hand they are influenced by the pressures, under which they are used.

The initial tests on the polythene floats showed that under even pressures available at 10 fathoms depth, they are influenced to a large extent. It has been found that though the material seems to be good, the floats are splitting at the seams, which in turn affect the buoyancy quality. It is felt that if the process of seaming is improved, the floats may stand increase of pressure to a certain extent.

#### REFERENCES.

- |                                       |      |  |
|---------------------------------------|------|--|
| Kuriyan, G.K. & Satyanarayana, A.V.V. | 1961 | <i>Journ. of the Timber Dryers &amp; Preservers Assoc. Ind.</i> 7, 4.                  |
| Miyamoto, H.                          | 1952 | "Theory and practice of set nets*".  |
| Pereier, A.                           | 1959 | "Specifications of Fishing Gear". <i>Modern Fishing Gear of the World</i> London 1959. |
| Satyanarayana, A.V.V.                 | 1960 | <i>Ind. Jour. Fish.</i> 7. 2.  |

\*In Japanese.

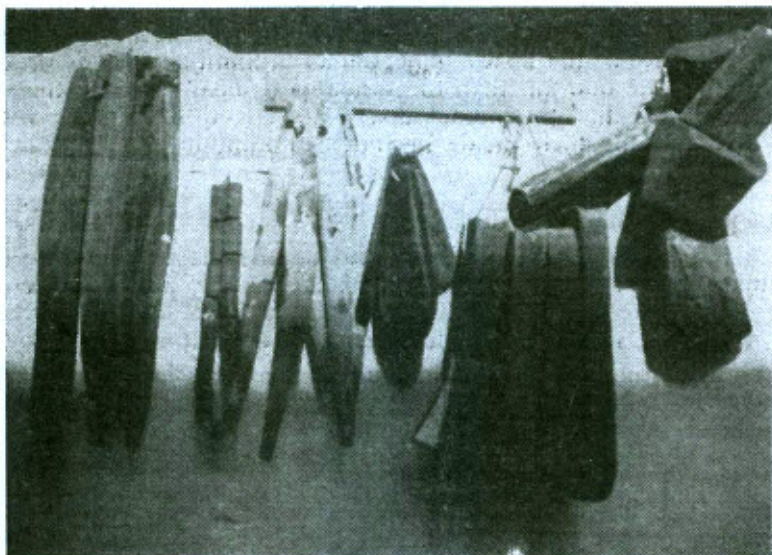


Plate 1. Indigenous wooden fishing floats of South Bombay.

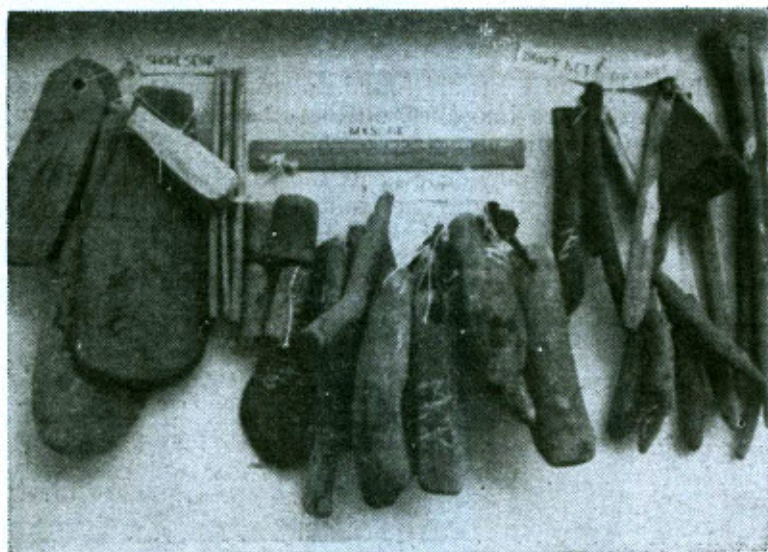


Plate 2. Indigenous wooden fishing floats of Mysore.

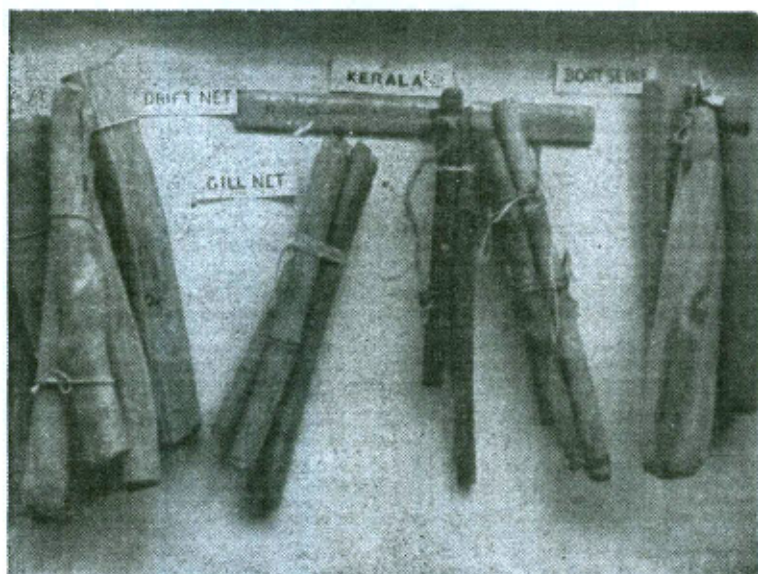


Plate 3 Indigenous wooden fishing floats of Kerala.



Plate 4 Indigenous wooden fishing floats of Madras.

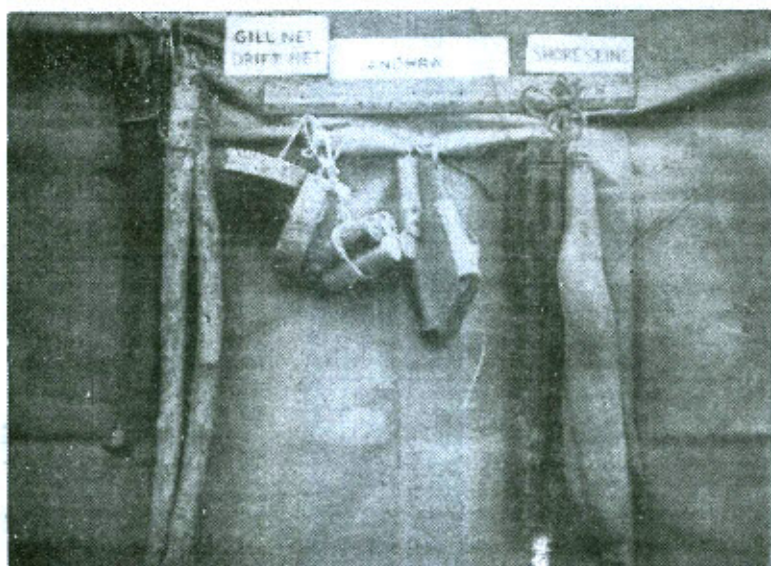


Plate 5 Indigenous wooden fishing floats of Andhra Pradesh.

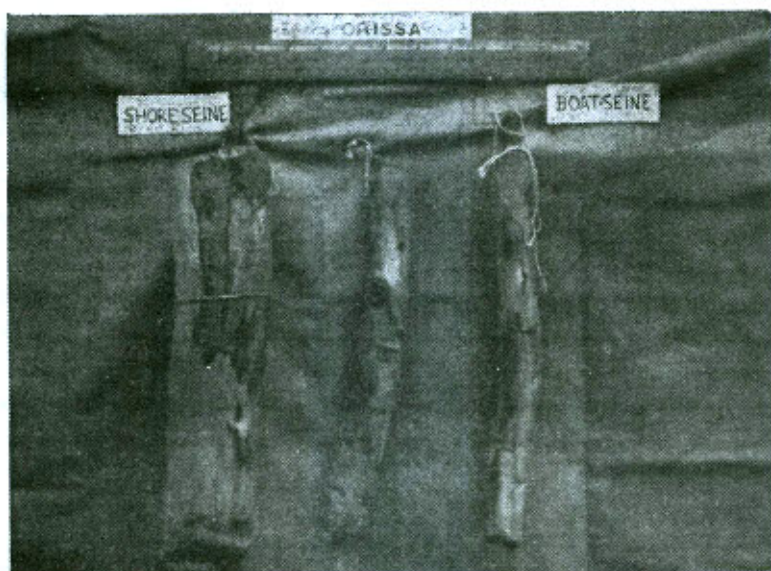


Plate 6 Indigenous wooden fishing floats of Orissa.