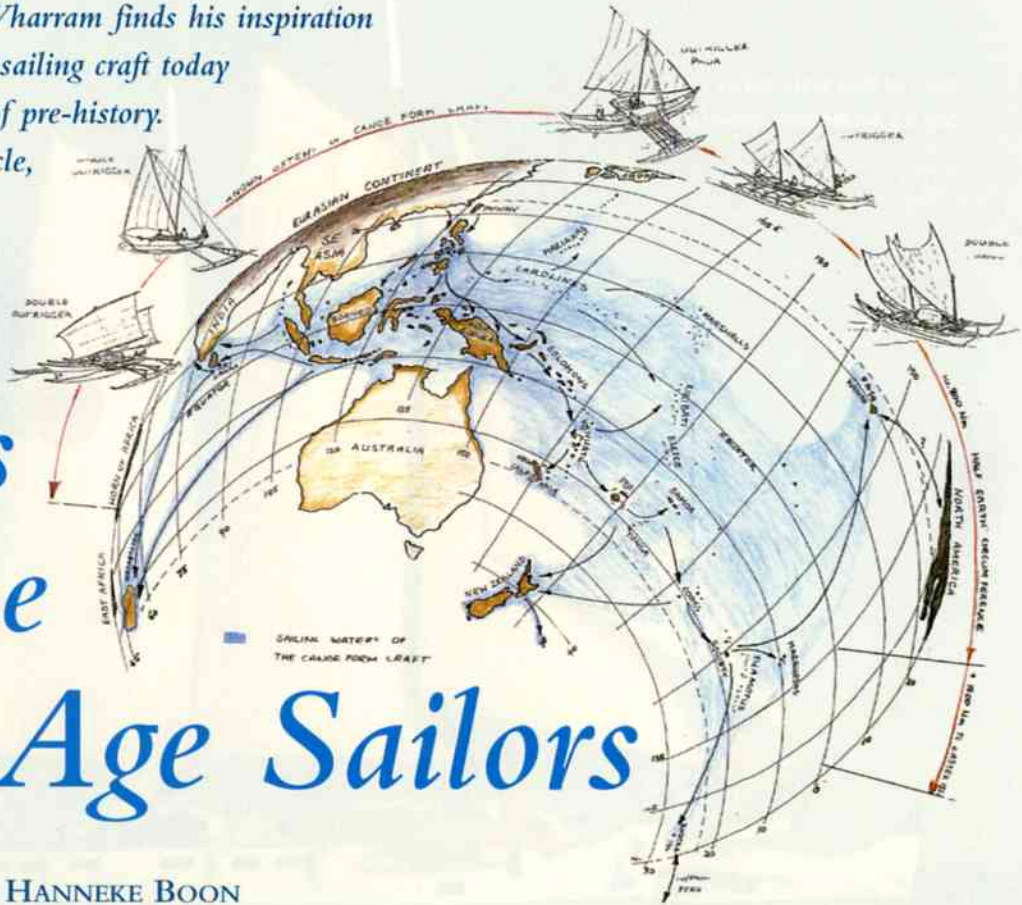


Multihull designer James Wharram finds his inspiration for affordable and practical sailing craft today in the ocean-going vessels of pre-history. In the first of a 2-part article, he considers:

# Lessons from the Stone Age Sailors

WITH ILLUSTRATIONS BY HANNEKE BOON



James with villagers in Vamuata, measuring a canoe.

In February 1998, an interesting public debate was held at the Royal Lyngington Yacht Club with the motion: "This house believes that the future of cruising yachts will be fast, light displacement boats that are fun to sail and are seaworthy."

The two sides of British yacht design were represented: the extreme 'modern' and the more traditional approach. The term 'Light Displacement Boats' meant the highly expensive modern monohulls with deep fin keels and tall, high-tension masts and the rider "that are seaworthy" showed the proposers considered some modern light displacement boats lack seaworthiness.

In general, the phrasing of the motion implied a disappointing lack of knowledge of the world's sailing craft for seaworthy light displacement cruising craft, coastal and ocean, have been around for thousands of years and have been – and are being – adapted for present day sailors.

The Viking ship was a light displacement craft and modern descendants of the type, like the Norwegian Femboring fishing boats or some of Iain Oughtred's excellent double-enders, are both "fun to sail" and very seaworthy.

Long before the Viking ships of 800-1100 AD – long, long before that, about 10,000 years ago at the end of the Ice Age – fast light displacement canoe-form craft started migrating out from areas around Taiwan, long before Chinese settlement and continued from Indonesia across oceans against the prevailing winds to eventually settle

*Spirit of Gaia in the Indian Ocean.  
She is a modernised ancient double canoe.*



Hawaii, New Zealand and across the Indian Ocean to Sri Lanka, South India and Madagascar – see Fig 1.

This ocean wide settlement of over half the world's circumference took about 8,000 years; 8,000 years during which the principles of the Canoe-form light displacement sailing ship evolved not by 'Regulations' but in the organic way of a living creature, like a seal or dolphin; their evolution speeded up by the minds and wishes of practical sailors.

### **The First Sailors**

This school of practical sailing design has existed longer than most people realize. The latest palaeo-anthropological studies of the evolution of humans show that the island of Flores in Indonesia was settled 800,000 years ago. Flores has always been an island and the settlers must have travelled by watercraft to get there. However, though disputed by some, the majority opinion of anthropologists is that Man, Homo

Sapiens, has only evolved out of Africa in the last 100,000 years! Therefore, watercraft of some sea survivable type were being used by what has so far been popularly presented as the semi animal-pre human Homo Erectus some 700,000 years *before* the Homo Sapiens species developed.

There is a less arguable later date of the settlement of Lombok from Bali 250,000 years ago but again 150,000 years before our ancestors walked out of Africa. The evidence again shows seagoing watercraft existed before Man existed. Homo Sapiens only settled Australia by watercraft 60,000 years ago.

Archaeological evidence shows the next wave of modern Man spreading and migrating out of the Eurasian continent from the end of the Ice Age 10,000 years ago, not by foot but by sea-going craft.

Small boat sailing is so old, it is a deep, instinctive part of our behaviour pattern like throwing a stone – inherent in cricket, football, tennis and other ball sports – wishing to light fires or find



*Sewn boat in Oman, a typical example of  
sewn boats all around the Indian Ocean.*

peace in the quiet sound of moving water. Perhaps our ancient sailing history explains the instinctive feeling of some people today that something has got lost in recent sailing craft and sailing attitudes.

### The Canoe-form Craft

For four years, my partner Hanneke Boon and I, with a number of interested sailors, have been sailing in the Pacific and Indian Oceans aboard our double canoe/catamaran, the 63' (19.2m) *Spirit of Gaia*, studying the last surviving light displacement canoe-form vessels, descendants of the canoe ships which explored those oceans in the great first chapter of Man's sailing history.

I have a replica collection of stone hand axes, available to Man 60,000 years ago which look like crude broken stones with sharp edges. However, with them you can cut bamboos or reeds to make a sturdy, seaworthy raft, or you can skin the bark of a large tree to make a short lived, delicate, bark skin canoe. But the Dugout Canoe-form Craft demands better woodworking tools.

By 30,000 years ago, Man had a kit of stone tools that could duplicate the work of the steel tools of this century. A stone adze, which I saw in use in New Zealand, was sending the chips flying at the speed of a modern steel adze.

The Dugout was a natural progression from the bark canoe and is often wrongly seen as the crudest form of boat built. A natural tree log is an ideal structural material that can

be subtly shaped and is free from leaking, unless you find a bad log. Some modern boatbuilders are gluing hundreds of strips of wood together to get the quality of wood construction inherent in developed carved dugout hulls.

When big trees are not available, you have to develop planked canoe hulls. Sewn or lashed together, planked hulls were used all over the world. The sewn boats which have survived in the Pacific and Indian Oceans until today show the strength and durability of this plank joining method and its suitability for hard long distance sailing, though like all planked boats they can leak.

Dugout hulls have the rigidity to crash land on a beach and be hauled out. Sewn boats have the elasticity to do the same. Modern light displacement yachts require very expensive wheeled boat hoisting vehicles to lift them and their slender fin keels out of the water for repair, painting or stowage! And if they should go aground...!

Single canoe form vessels up to 60' (19m) long, with a hull length/beam ratio of between 12:1 and 20:1, are ideal for river use. Jungle and heavily wooded country is easier to move through by river than hacking your way over land. For sea use, with their narrow beam they need to be stabilized to resist capsizing by wave and sail.

The slower, heavier, beamier rafts with a length/beam ratio of 3:1-5:1 have always existed along with the canoe. It does not take much thinking for practical sailors to combine 2,3,4 or 5 canoes into a stable load-carrying raft.

*A small double canoe made of two dugout canoe hulls lashed together. Sri Lanka.*





Gathering of Double Canoes in Raiatea, 1995.  
 Replica canoes arrived from Hawaii, New Zealand,  
 Cook Islands, Tahiti and ... UK.

A canoe raft of this type, the Lakatoi, existed in Papua New Guinea into the 1950s and I believe still exists. With several masts, they sailed to windward at least as well as our square-riggers. Rafts are seaworthy. Increasingly, 'regulators' are demanding that yachts carry rafts – the small inflatable kind – for safety. When these first canoe rafts began sailing we do not know. Papua New Guineans, builders of the Lakatoi, are descendants of the first human seafarers of 60,000 years ago who colonized the then combined Australia-New Guinea continent.

### The Double Canoe

What we do know is that when Europeans began sailing in the Pacific in the 17th century, over a wide area they met



Cook Island double canoe Te Au O Tonga.  
 70' replica built in ply and epoxy.



Fig. 2  
 Double Canoe

Double Canoe Rafts – as in Fig 2 – known to Polynesians as *Vaka* or *Pahi* and to Western sailors who call its modern version a 'Catamaran'.

Purists, like myself, have argued that the ancient and modern double canoes should not be called catamarans because catamaran comes from the Tamil word *katta-maran*, meaning tied logs. Perhaps, on reflection, the word catamaran, even though of the wrong language, is the right word to describe past and modern double-hulled Raft vessels. I have been sailing them offshore for nearly 45 years

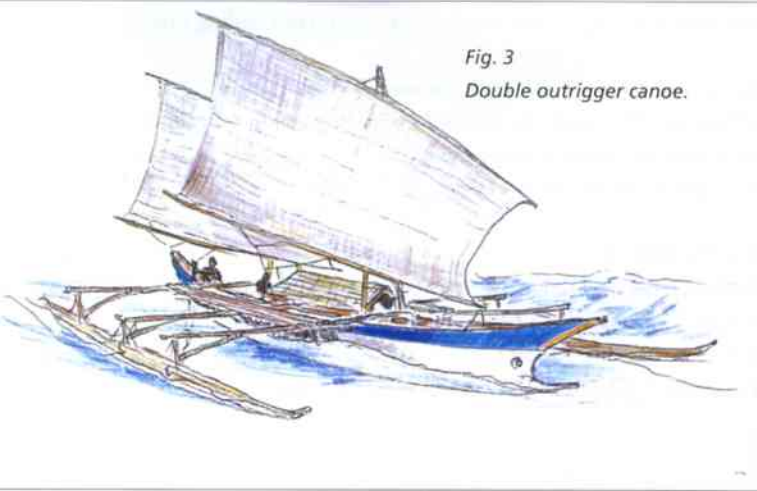
and this experience informs me that it is realistic to describe them as Rafts: their stability calculations are the same as for the raft and their 'feel' when sailing is comparable to a speeded up raft.

Double Canoe Sailing Rafts sail without heeling or rolling. Their large deck areas allow space to build fair sized deck cabins either in bamboo and mats as in the ancient canoes or elaborate GRP houses as on the modern catamarans.

The minimum wave drag and wetted surface of the two canoe hulls give the stable raft shape a good speed potential. These inherent qualities have made the modern catamaran, developed over the last 40 years out of the ancient Pacific craft, a successful part of the modern sailing scene.



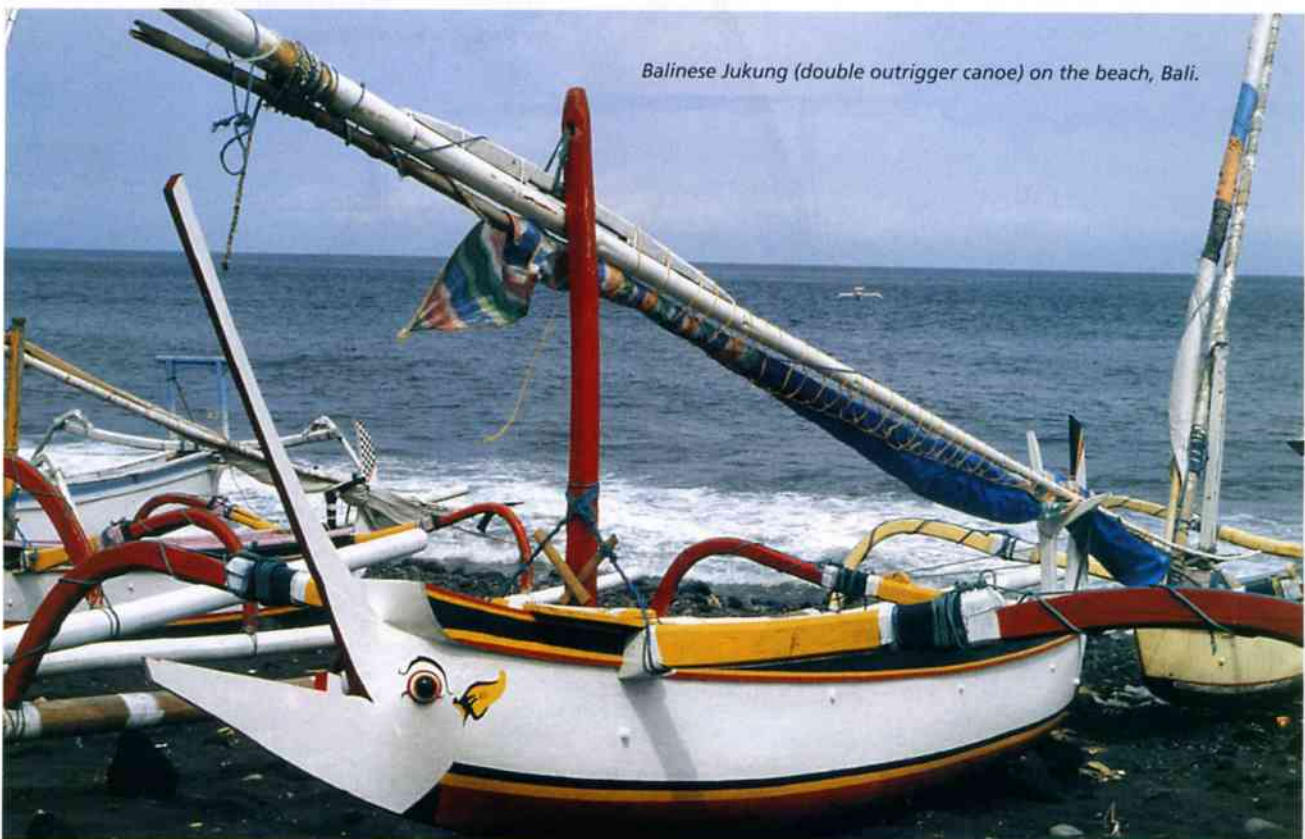
*This canoe is being sailed by the most basic of sails, ie four palm leaves lashed together to make a downwind rig.*



*Fig. 3  
Double outrigger canoe.*

### **The Double Outrigger Canoe**

Another modern craft developed out of the ancient canoe form is the Trimaran, a word I dislike. It is a mixture of the Greek *Tri*, meaning three, and the Tamil *maran*. It signifies the mixed up Western modern design approach to the Double Outrigger. Fig 3 shows a Double Outrigger of the type used in the settlement of Madagascar from Indonesia about 2,000 years ago. Today, the Double Outrigger Canoe type is sailed from the Philippines – where, when used for smuggling with 4 big outboards, they can outrun many high



*Balinese Jukung (double outrigger canoe) on the beach, Bali.*



*Jukung in Darwin Museum.*

speed Naval patrol craft – through Indonesia, to Madagascar.

The present day Balinese *Jukung* is one of the most beautiful of these double outrigger craft. To see them ride white crested waves, their floats balancing the main hull like gentle hands or swooping up to crunch land on the beach, is to observe a kinetic art form. Technically, the hulls are superbly shaped dugouts, semi-circular in cross section with greater buoyancy aft of the hull mid-section. An important part of the design is its outrigger floats, made of special thick bamboo, which are 33% longer than the main hull, projecting equally forward and aft of it and have 30% of the buoyancy of the underwater section of the main hull.

From our studies of Canoe-form designs in the Pacific and Indian Oceans, we believe that the basic sailing hull of the ancient Pacific sailing canoes is still ahead of the modern multihull in subtlety of underwater hull shape. Improvements in the performance of today's multihulls, as indeed much 'improvement' of yachts in recent years, have less to do with designers' hull shaping skills and more with improvements in modern sail fabric. Synthetic sailcloth allows you to sail closer to the wind, with more drive than the matting sail of the Pacific, the leather of the Roman sails, the wool of the Viking sails or the flax of the Channel lugger sails.

The development of modern catamarans and trimarans is an important pointer to the vast treasure house of design knowledge, experience and ideas that exist not on the screen of a computer but in the traditional small craft still sailing and found in ship museums or books of historic sailing craft.

*In our September/October issue, on sale 24 August, James Wharram will examine the less well-known single outrigger craft of the Pacific and Indian Oceans which could be suitable for development for present day sailors.*

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*Wharram designed double canoe, Tehini, rigged with Polynesian Crabclaw sails used for trading around Madagascar.*

