



DAVID PAYNE/ANMM 2017

Color, Style, and Sophistication

Documenting traditional canoes of Papua New Guinea

Text and drawings by David Payne

The traditional wooden canoes of the Milne Bay Province of Papua New Guinea (PNG) are woven into the fabric of the region's culture. The province includes just 14,345 square kilometers of land but 252,990 square kilometers of sea. It comprises more than 600 islands, about 160 of which are inhabited. Its canoes, and the trade they enabled, date back thousands of years. They are still being made, and they are extraordinary.

I made a month-long voyage in the Solomon Seas off Milne Bay in August 2017 to conduct research for the Australian National Maritime Museum (ANMM). During this trip I documented many of the existing examples of the region's traditional and contemporary canoes, recording their technical details to enable accurate plans to be drawn. I traveled in a converted 65' Australian-built wooden trawler, M/V CURRINGA, conducting research in association with Dr. Harry Beran, who is an internationally acknowledged expert in Massim art and culture, and John Greenshields, a private collector and researcher. Both have extensive previous experience in the region and in Massim art.

Accompanied by five friends, we visited spectacularly scenic islands and groups where canoes were once built or are still being built.

We made two passages, both starting and finishing at Alotau, Milne Bay. The first took in the southeastern zone down through the Engineer and Conflict groups, the Calvados chain, and into the Louisiade Archipelago to Sudest Island; we returned via Ole to Alotau. The second passage went to the northeast, first to Dobu, then working around counterclockwise through Kitava, Iwa, and Gawa as far as Muyuw (Woodlark Island), returning to Alotau via Nasikwabau (Alcester), Egum Atoll, and Normanby Island. Each day was challenging in this remote region. We visited 30 islands in 27 days, seeking permission from the head of each village and the canoes' owners before we came ashore. We were always welcomed. Then we worked with the community that gathered around to meet us.

The traditional nature of the craft we recorded was matched by our method of documenting them; it was all done by hand using a taut string as a baseline, and we measured the craft where they sat, in their huts or

Above—The traditional canoes of the Milne Bay Province of Papua, New Guinea, are diverse and sophisticated. Shown here is a Sailau (see page 75), a contemporary version of the widespread single-outrigger type.



LUKE WONG 2017

Author David Payne traveled to numerous islands in Milne Bay Province and worked with local villagers to measure and record details of their canoes. The collected data informed the drawings presented on the following pages.

out in the open. The outline of the hull and outrigger was captured with length, width, and depth measurements at frames and other key locations. Then specific points were measured to locate their positions relative to each other. The pattern of the framing and crossbeams often enabled the primary elements of the construction to be quickly established, after which specific details could be recorded. It was fun to engage with the community; quite often one or two people would understand what I was doing and, despite our language differences, help with the tape measure, and one even climbed a mast for the effort.

The field notes were a series of pages covered in quick sketches, notations, or tables of dimensions. CURRINGA's saloon table became a temporary drawing board for small-scale plans, which we used to check what had been recorded and sort out any mistakes or missing information before we moved on.

Back at my drawing board in Sydney, I drafted the canoes in pencil at 1:20 scale on A0 and A1 sheets following a similar layout of views on each plan where possible, so that comparisons between the craft and their details could be easily made. We also observed their floating trim to establish a datum waterline.

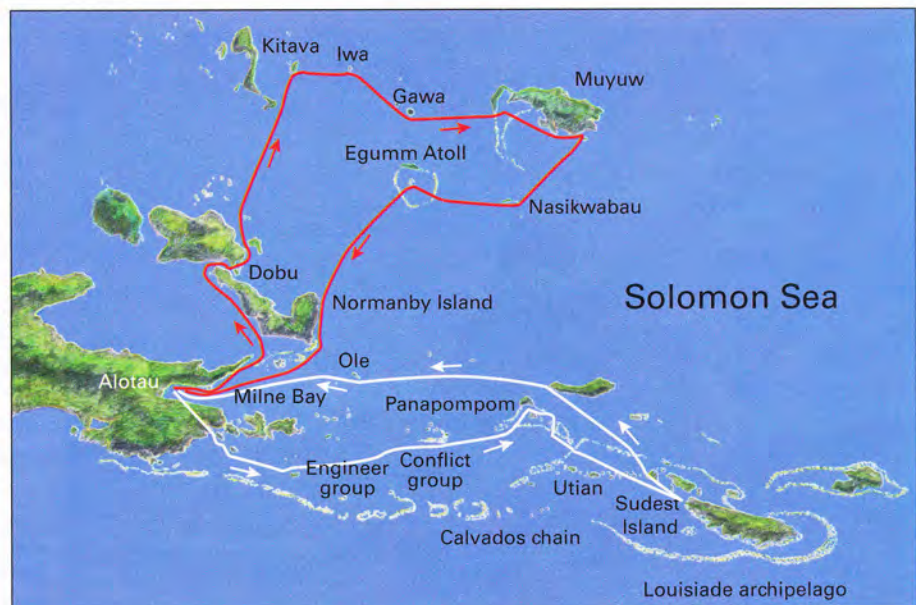
Many of the outrigger canoes we recorded were built on a log keel, with built-up sides made of two or three planks—the first one rabbeted to the keel and the rest lapped. The keels varied in cross-section and profile curvature according to boat type. This

log-keel-and-planked-topsides configuration, which is a relatively advanced method of construction and in which the rabbet line passes below the waterline, stands in contrast to the more widespread configuration elsewhere in PNG of a dugout log whose top edges sit well clear of the waterline.

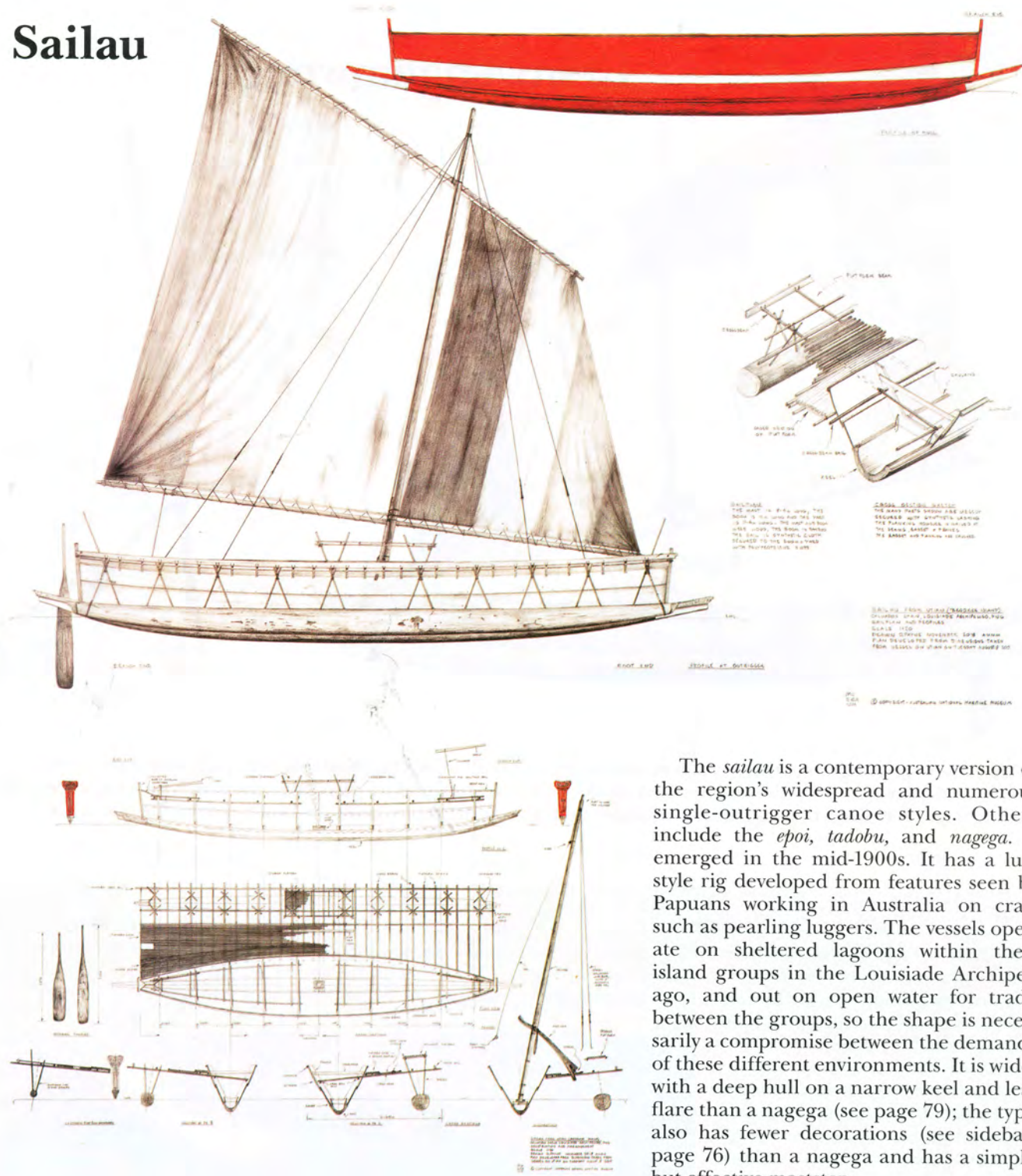
The rigs, too, show well-developed designs that fit the limitations of a single outrigger; they can gain ground to windward, and be maneuvered to change direction, but not in a traditional tacking or jibing manner (see sidebar, page 74). Steering is the essence of simplicity: by raising and lowering the rudder blade aft, the balance between center of effort and center of lateral resistance is manipulated. Pushing the big blade down drags the hull balance point aft, causing the craft to bear away; raising the blade up brings the craft up toward the wind direction.

In 2019, the plans presented here became an exhibition at the ANMM and then at the Massim Museum and Cultural Centre in Alotau, the principal town in Milne Bay Province. The community and senior representatives complimented their accuracy and detail, describing them as a “bank of knowledge.” The representatives noted that recording them in a contemporary naval architectural drafting standard acknowledged the depth and quality of engineering and design of these craft. The next step is to collect community stories relating to the cultural background of construction and use of these canoes. The boats and people of this region have much to tell.

The research was accomplished in two separate cruises, both originating from Alotau, near Milne Bay. The first (white track) covered the southeastern zone of the province, and the second (red track) covered the northeastern zone.



Sailau



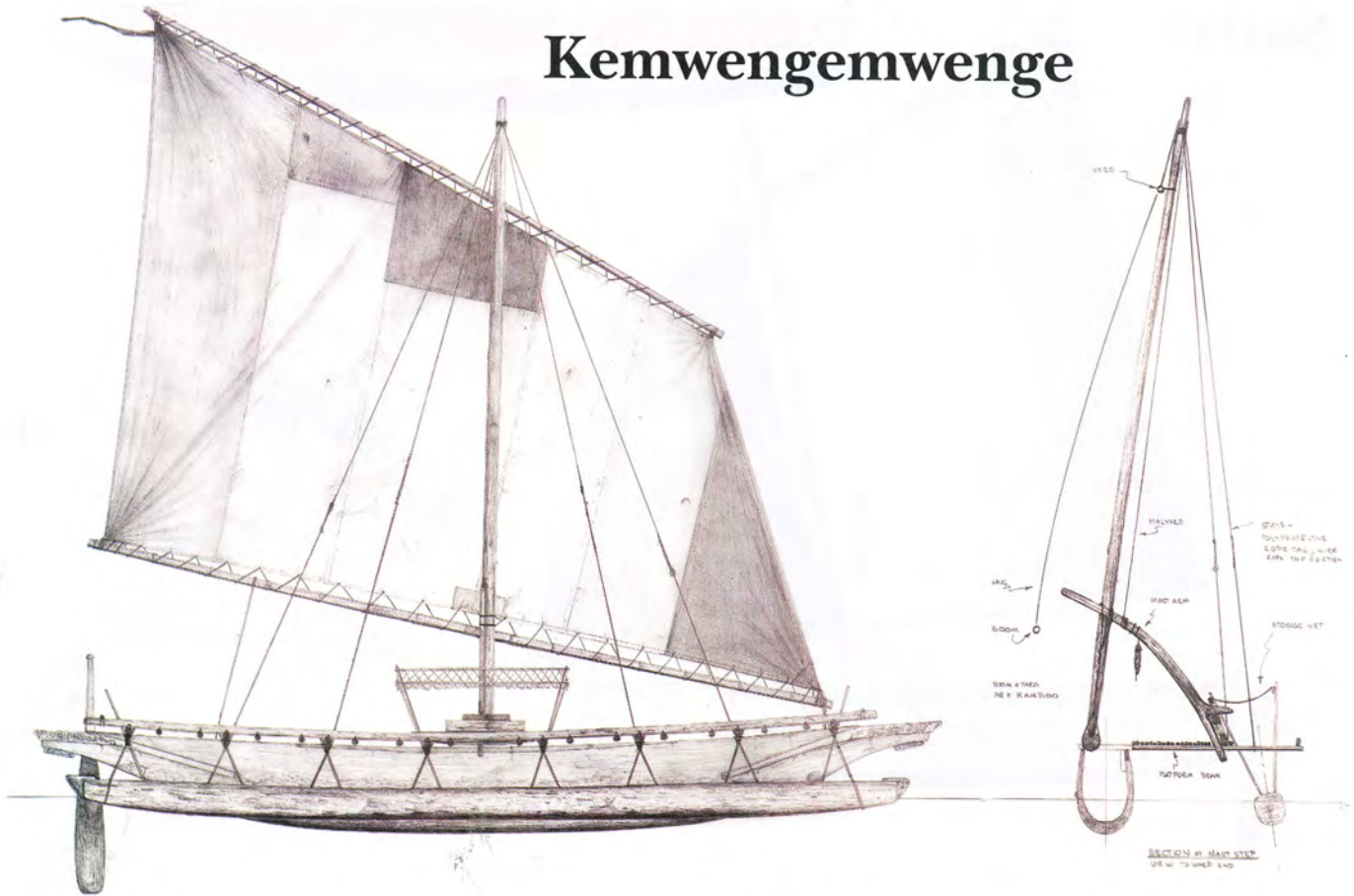
The *sailau* is a contemporary version of the region's widespread and numerous single-outrigger canoe styles. Others include the *epoi*, *tadobu*, and *nagega*. It emerged in the mid-1900s. It has a lug-style rig developed from features seen by Papuans working in Australia on craft such as pearling luggers. The vessels operate on sheltered lagoons within their island groups in the Louisiade Archipelago, and out on open water for trade between the groups, so the shape is necessarily a compromise between the demands of these different environments. It is wide, with a deep hull on a narrow keel and less flare than a *nagega* (see page 79); the type also has fewer decorations (see sidebar, page 76) than a *nagega* and has a simple but effective maststep.

canoes in a centuries-old market; others were for fishing and general-purpose work.

I had opportunities to sail two single outrigger canoes, a *sailau* and a *tadobu*. It was exciting and informative feeling how the craft behaved, sensing their stability and the power in their rigs. Teamwork between helmsman and crew kept them on course, and the *sailau* made excellent ground to windward. Both had

speed and balance, and the *tadobu* felt completely in control running with the waves or reaching across them in open water. I was lucky enough to be manning the mainsheet for a period, allowing me to feel the power of the sail firsthand; it also gave me insights into the relationship needed between skipper and crew, and the language difference was no barrier to communication.

Kemwengemwenge



The *kemwengemwenge* is another Massim single-outrigger canoe, and a variant of the sailau described on the preceding page. It is from the southeast Louisiades and is

built to suit the available materials, with a short, dugout log hull and no planking required. The mast is stepped on the top edge of the hull opposite the outrigger.

Canoe Decorations

The detail of the carving and decoration for all these Massim canoes is a subject of its own. There are strong cultural meanings within the work, reflecting individual community practices, and these are reflected in the carver's own style. Reference to aspects that are considered or depicted as male or female is widespread and even covers the description of how parts of the structure interact or behave. Natural subjects such as birds, animals, sea creatures, or the sea, sky, and land are featured, and some motifs are just decoration. The motifs have a curvilinear style, which is a hallmark of Massim art. On the *gebo*, a strong motif often repeated is the

jaws and tongue of a fish; another is a long heron's neck leading to the bird's head. A swirling pattern can represent clouds in the morning. Carvers learn from elders and use the main traditional motifs.



The colorful, curvilinear art that decorates the canoes has deep cultural meaning.

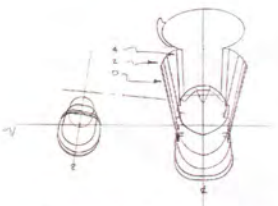
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Epoi

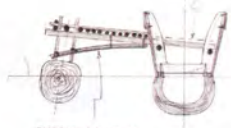


POOT END
(LAND FACING)

BEACH END
(SEA FACING)

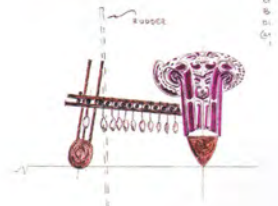


BODY PLAN & FOOT END



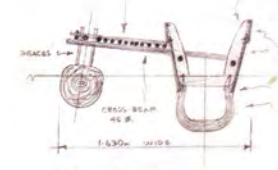
DIAGONAL BRACES ON EACH SIDE OF CROSSBEAM 75"

SECTION OF P.R. 3. P.R. 2, 4, 5, 6, 7, 8, 9, 10 MUST HAVE DIAGONAL BRACES AT CROSSBEAMS



OUTRIGGER

PADDLE



CROSS BEAM 46"

SECTION OF P.R. 4

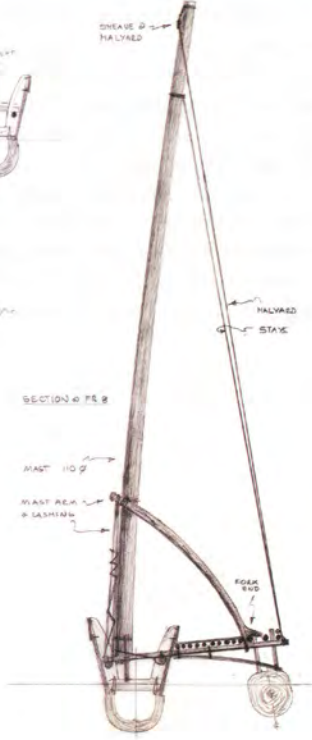


DIAGRAM OF HALVED

HALVED STAY

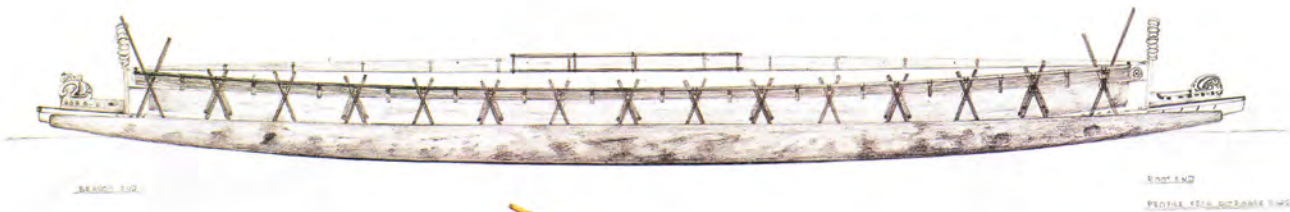
SECTION OF P.R. 8

MAST 110"

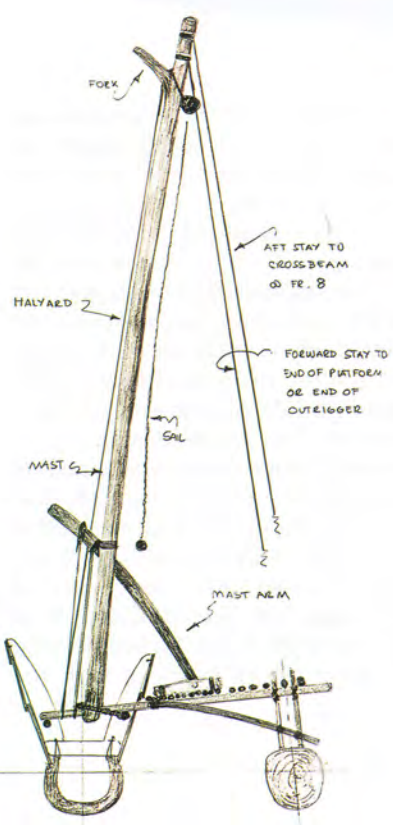
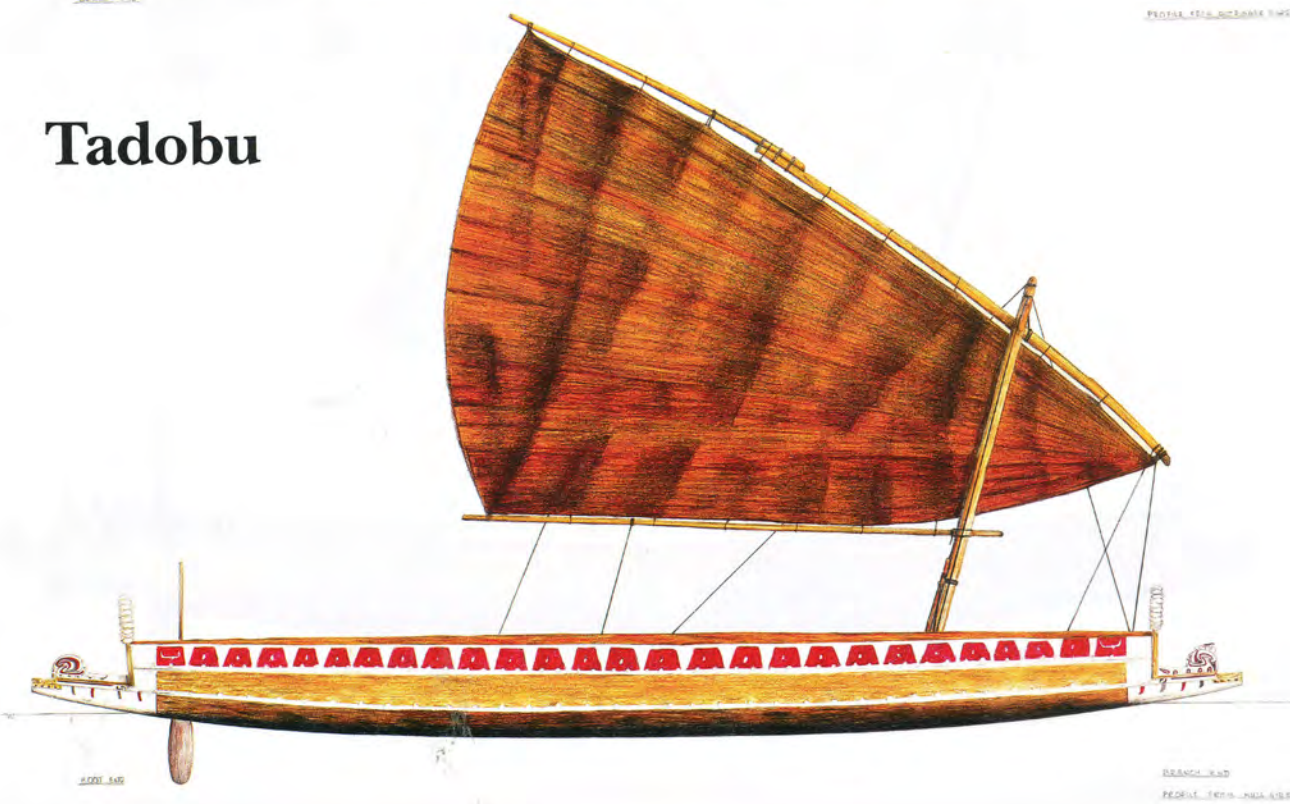
MAST RIGGING

FOOT END

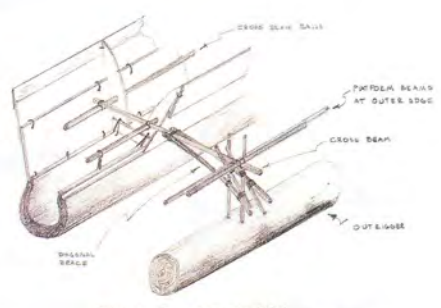
Epoi come from the D'Entrecasteaux Islands where the surrounding waters are comparatively sheltered. The boats are optimized for paddling, with seats on each crossbeam. The combined width of the hull and outrigger is quite narrow and the hull itself is also narrow. Although planked up on a wide and deep dugout keel, the sides are relatively vertical so it's both an easy shape to move through the water efficiently under paddle power, and comfortable to paddle. The reduced stability, as compared with wider canoes, is matched by a smaller sail area. On the example documented, the sprit rig could be stepped at either end. These craft, like all of the single-outrigger canoes, are always sailed with the outrigger on the windward side. Having the rig deep in the forward-facing end of the boat favors running with the breeze.



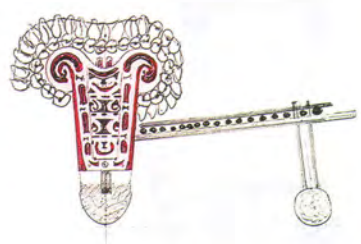
Tadobu



The *tadobu*, also known as the *masawa*, is similar to an *epoi*, and is well suited to the short open-water passages between their native Trobriand Islands. To handle these passages, the shape has more rocker, or curve to the keel profile, than the *epoi*, and the topsides flare out a bit wider. But these are still built on a wide dugout keel, like the *epoi*. The craft are also wider overall for stability, and can carry a large sail when needed. One example documented had the traditional mast and triangular sail set forward, another adopted a modern rig stepped amidships.

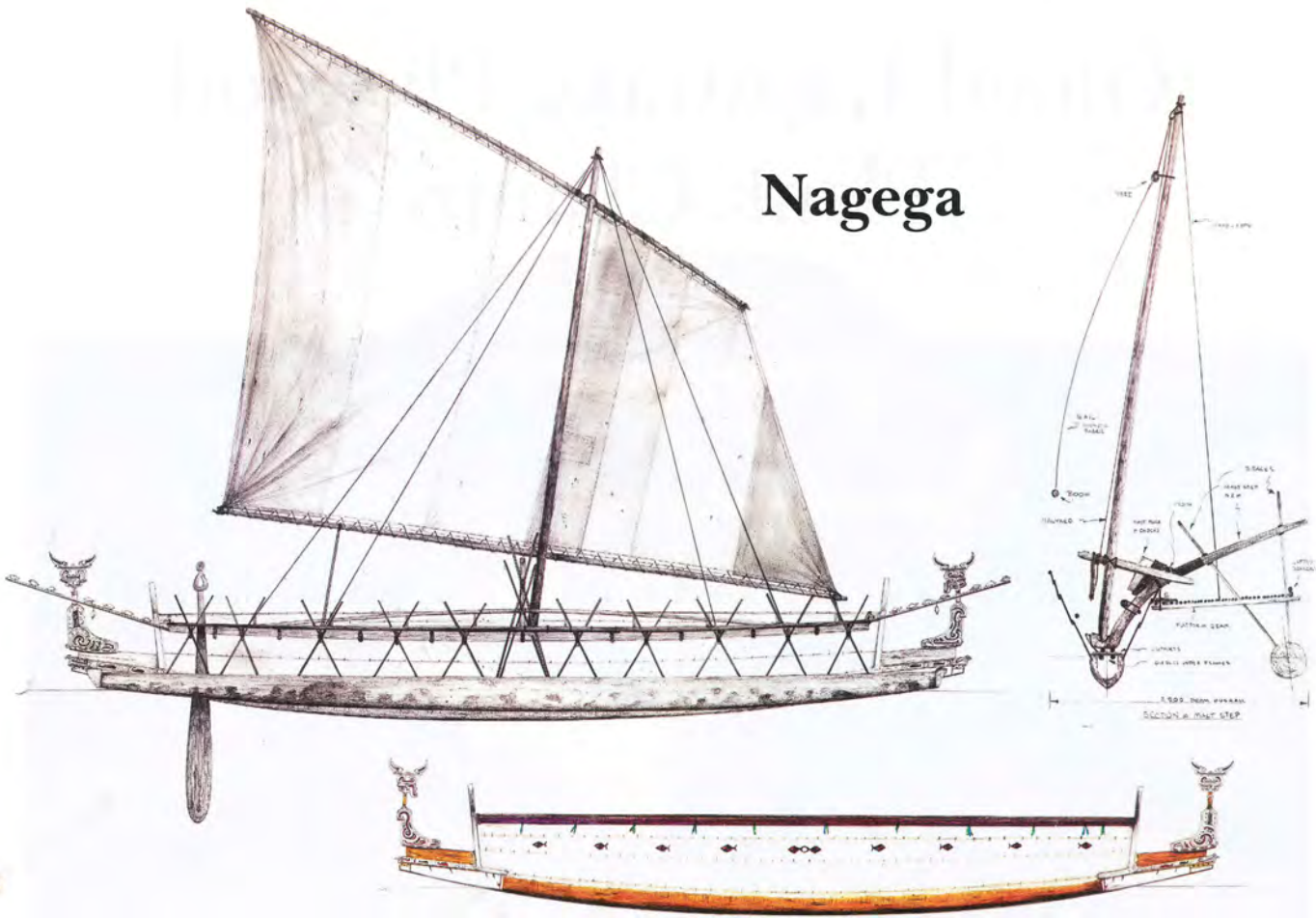


PERSPECTIVE CROSS-SECTION USED BY CROSS BEAM WITH DIAGONAL BEAMS. THERE IS EXTENSIVE USE OF SYNTHETIC LASHING TO SECURE PARTS TO EACH OTHER. THE RABBIT AND PAINING WARE ARE GAUWER.




SECTION @ WASHBOARD BEACH END

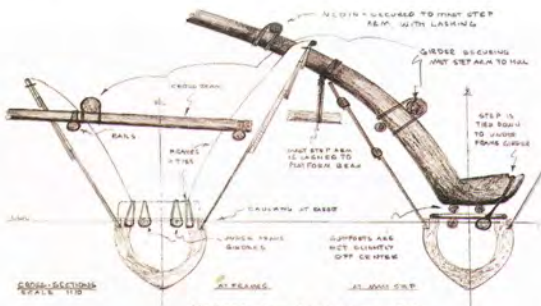
Nagega



The *nagega* or *anagega* are different from the *epoi* and *tadobu* and are the largest of the canoes in almost all respects. They are used in the Marshall Bennett Islands and on Woodlark Island, and a similar type of canoe was once common on Panaeati Island. While some of the *tadobu* are of similar length to the *nagega*, the *nagega* is the widest overall, and their hulls have more topside flare, and often have three planks for more freeboard. The keel profile has significant rocker. Collectively, these features are good for long passages in open water and allow a larger sail area than the other craft. The *nagega* has one more feature that helps its seagoing capabilities: The keel is quite narrow and the overall cross section is more V-shaped, which helps these craft gain good ground to windward. This is a necessary feature over the distances they sail between islands in changing conditions.

We saw the most significant piece of design in the

nagega. The maststep is a complex work that reflects an elegant simplicity. A long arm with a cupped base for the mast sits over longitudinal and transverse supports that direct the compression into the edges of the log keel and provide an additional ability to absorb this load with some spring or elasticity. Meanwhile, the long arm reaches up and out over the outrigger and connects to it through long struts. This ties it into the relative twisting and pitching movement between the outrigger and hull, and if that movement between them becomes too severe, it will damage the craft. This movement is measured in a unique way, through a built-in strain gauge called the *nedin*. This is a long, tapered, longitudinal spar whose midpoint is very tightly tied to the mast arm at a point close to the edge of the hull; the *nedin*'s ends are passed through loops close to the washboards and remain free to move. The *nedin*'s ends move and its curvature adjusts with the relative twisting of the hull and outrigger. This movement, and the change in shape of the spar, become a gauge of what is happening and sends a warning to the captain and crew that the craft is overloaded. It is, perhaps, a unique feature in the world of traditional craft. 



SOURCE: ROBERT GUILDFORD NARIGHA BUILT: c. 2012 WOODLARK IS.

NAJEGA FROM GUYANA ISLAND PNG. SAILMAN, PICTURE AND DETAILS SCALE 1/8\"/>

David Payne recently retired from the Australian National Maritime Museum after a 32-year association as a consultant, and then curator, focusing on historic vessel research, documentation, and restoration. He has also been a yacht and small-craft designer (plans for his 24' pocket cruiser *Paketi* are available through *The Wooden Boat Store*; www.woodenboatstore.com). David's sailing background includes racing in Lasers, 12' skiffs, and ocean-racing yachts, and long ocean passages on yacht deliveries.