



Massim canoes in the Milne Bay Province, Papua New Guinea

by David Payne

The traditional canoes of the Massim region of the Milne Bay Province of Papua New Guinea (PNG) are colourful, stylish, and sophisticated. These traditional wooden canoes are woven into the fabric of the culture with their origins dating back through countless generations, yet they are still being made and they are extraordinary.

A month-long voyage in the Solomon Seas off Milne Bay in August 2017 provided the opportunity to document many of the existing examples of the region's traditional and contemporary canoes, recording their technical details to enable accurate plans to be drawn when I returned home to Sydney.

I travelled in a converted 20-meter Australian-built wooden trawler, *M/V Curringa*, conducting research in association with and supported by the late Dr. Harry Beran, an internationally acknowledged expert in Massim art and culture, and John Greenshields, a private collector and researcher. Both had extensive previous experience in the region. My employer, the Australian National Maritime Museum, also supported the research. Accompanied by five friends, we visited spectacularly scenic islands and groups where canoes were once made or are still being made.



Map of the journey. Image: David Payne.

Alotau, the principal town and port in Milne Bay Province, was the base from which we undertook two passages. The first took in the islands through the Engineer and Conflict Groups, the Calvados Chain, and into the Louisiade Archipelago to Sudest Island; returning via Ole. The second passage went first to Dobu, then counterclockwise through Kitava, Iwa and Gawa as far as

Muyuw (Woodlark Island), returning 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 on each occasion. We were always welcomed



Kaoha, a Gebo war canoe at Milne Bay. Photograph: David Milne.



and then we worked with the community that gathered around to meet us.

The traditional nature of the craft we recorded was matched by the method of documentation; it was all done by hand using a string line as a datum, and the measuring was undertaken just where the craft sat on the shoreline, in their huts or 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 relative positions 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 of them would understand what I was doing and help with the tape measure, including climbing a mast in one instance. We accomplished all of this without much knowledge of each other's language.

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 a small-scale plan to be drawn, 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 observed their floating trim to establish a datum waterline, and a fairly consistent pattern of passing the waterline through the keel just under the washboards gave an even and appropriate flotation line to work to.

Many of the outrigger canoes we recorded were built on a log keel, with built-up sides made of two to 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, where the rabbet line passes below the waterline, stands out as a contrast to the more widespread configuration elsewhere in PNG of a dugout log

whose top edges sit well clear of the waterline. The log keel and planking configuration is a relatively advanced method of construction.

The rigs, too, show well-developed designs that fit the limitations of a single outrigger; they can gain ground to the windward, and be maneuvered to change direction, but not in a traditional tacking or gybing manner. Steering is the essence of simplicity: by raising and lowering the rudder blade aft, the balance between sail forces and the hull pressure of the craft is manipulated - pushing the big blade down drags the hull balance point aft and this will cause the craft to bear away; raising the blade up brings the craft up toward the wind direction.

In 2019, the plans became an exhibition at the Australian National Maritime Museum and then at the Massim Museum and Cultural Centre in Alotau. 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



Fishing canoe. Photograph: David Payne.



Building a sailau on Panapompom island, with the builder's daughter. Photograph: David Payne.

acknowledged the depth and quality of engineering and design of these craft. The next step is to collect the community stories, to record the cultural background of construction and use of these canoes. The boats and people of this region have much to tell.

Gebo War Canoe

Historically, villages raided and battled each other in war canoes, until the missionary influence brought this to an end. Canoe building suffered as a result. In recent times Massim war-canoes construction has returned to Maiwara village on the shoreline at the head of Milne Bay, a short distance from Alotau, and at Wagawaga village on the shore opposite Alotau. Gebo war canoes are built here, for racing and cultural events.

The canoes now being made are carved from a single tree, *illmo* being the commonly used one. The paddles are made from *kwila*. A combination of modern, mostly hand tools are now used for the construction. The top of the tree, called *nau*, is always the forward end of the canoe, and the root end, called *gedu*, is always the stern. The tapering shape of the tree is reflected in the boat's shape.

The example documented was paddled by up to 18 men, with a steersman/captain at the stern, and at the front are two lighter, agile crew who can help steer the craft with their paddling strokes.

Single outrigger canoes

The single outrigger styles called *sailau*, *kemwengemwenge*, *epoi*, *tadobu* and *nagega* share many characteristics. All have a main hull stabilized by the single outrigger float. The outrigger and hull are connected to each other by a combination of braces and crossbeams.

They are always sailed so that the outrigger remains on the windward side. In order to change direction, they are double-ended, and employ the proa 'shunting' method of reversing the rig while lying beam-to-the-wind. Many of them were trading canoes involved in the traditional kula exchange; others were for fishing and general-purpose work.

Each type is different in its length, width and depth proportions and has its hull shape optimised for the environment it is sailed in and the length of the passages they need to make between nearby islands. For example, the narrow hull and narrow overall beam of an *epoi* is ideal for its use around the d'Entrecasteaux Islands, whereas the much wider *nagega* hull and outrigger is

ideally proportioned for longer passages in open water from Muyuw and the Marshal Bennett islands to other islands in the *kula* exchange.

Sailau

The *sailau* is a contemporary version of the region's widespread and numerous outrigger canoe styles. The *sailau* 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 these different environments. It is wide, with a deep hull on a narrow keel and less flare than a *nagega*. It is also much less decorated than a *nagega* and has a simple but effective mast step.



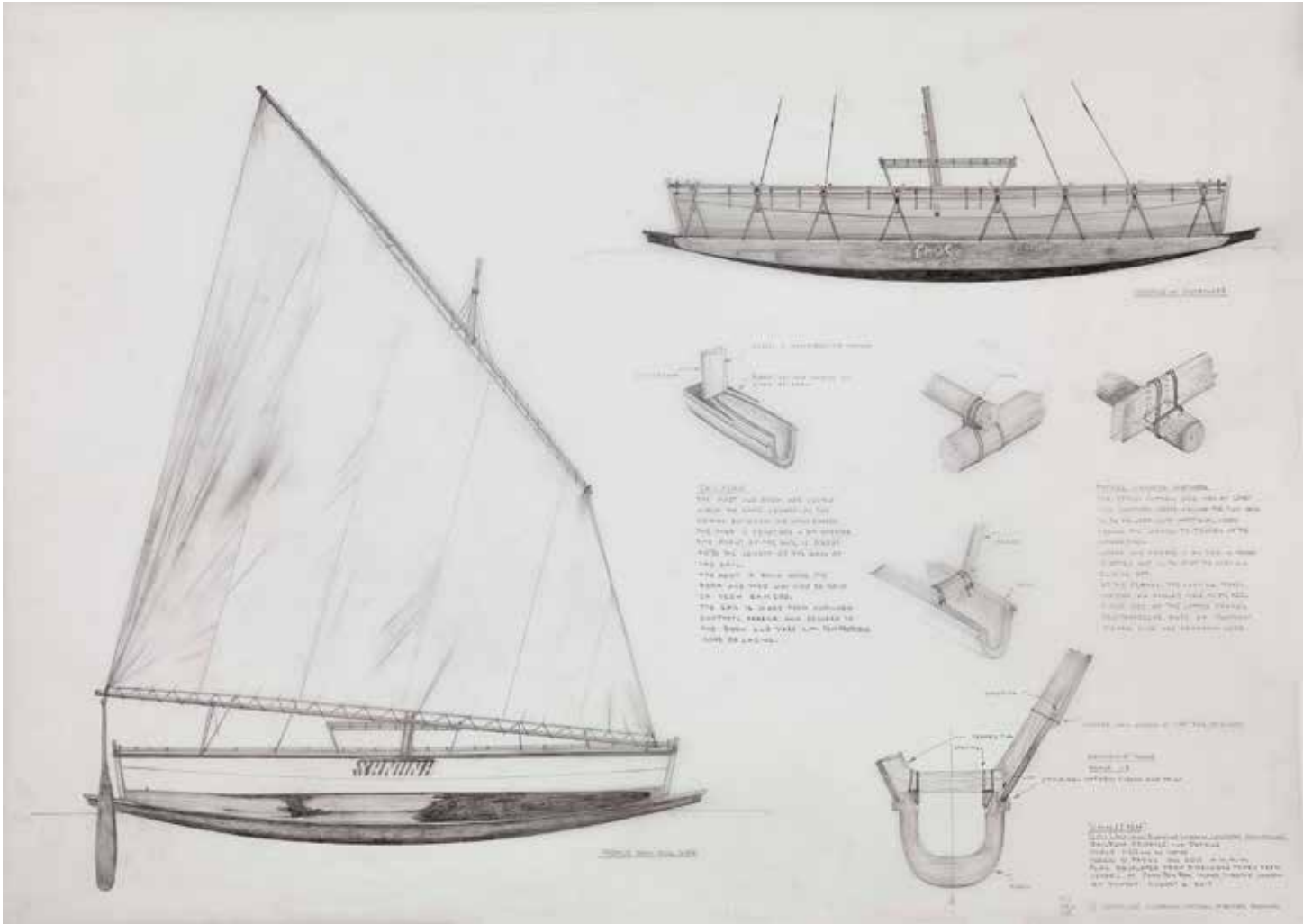
A sailau. Photograph: David Payne.



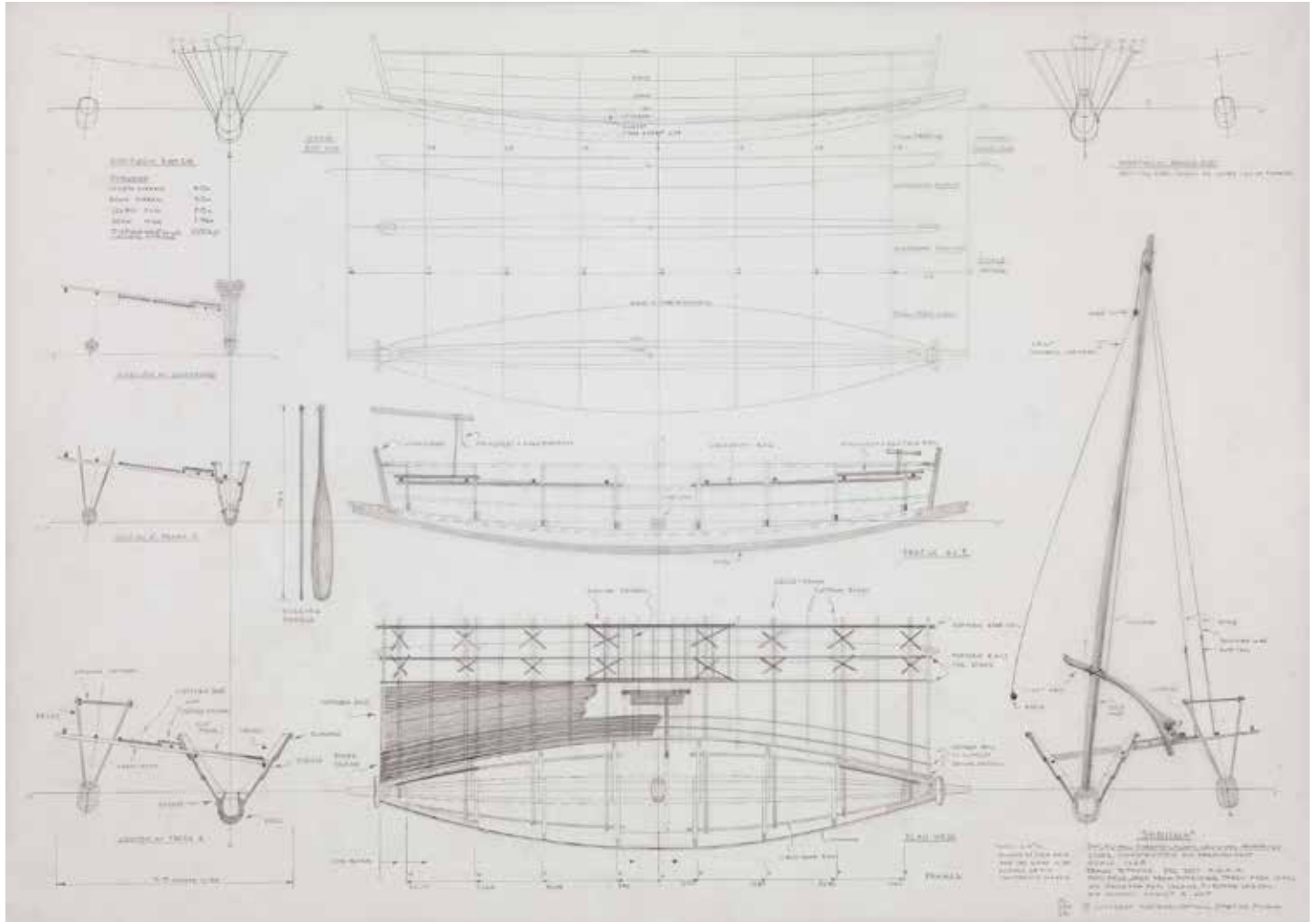
A sailau. Photograph: David Payne.



A sailau. Photograph: David Payne.



Shniinh, a sailau on Panapompom Island. Drawing: David Payne.



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Kemwengemwenge

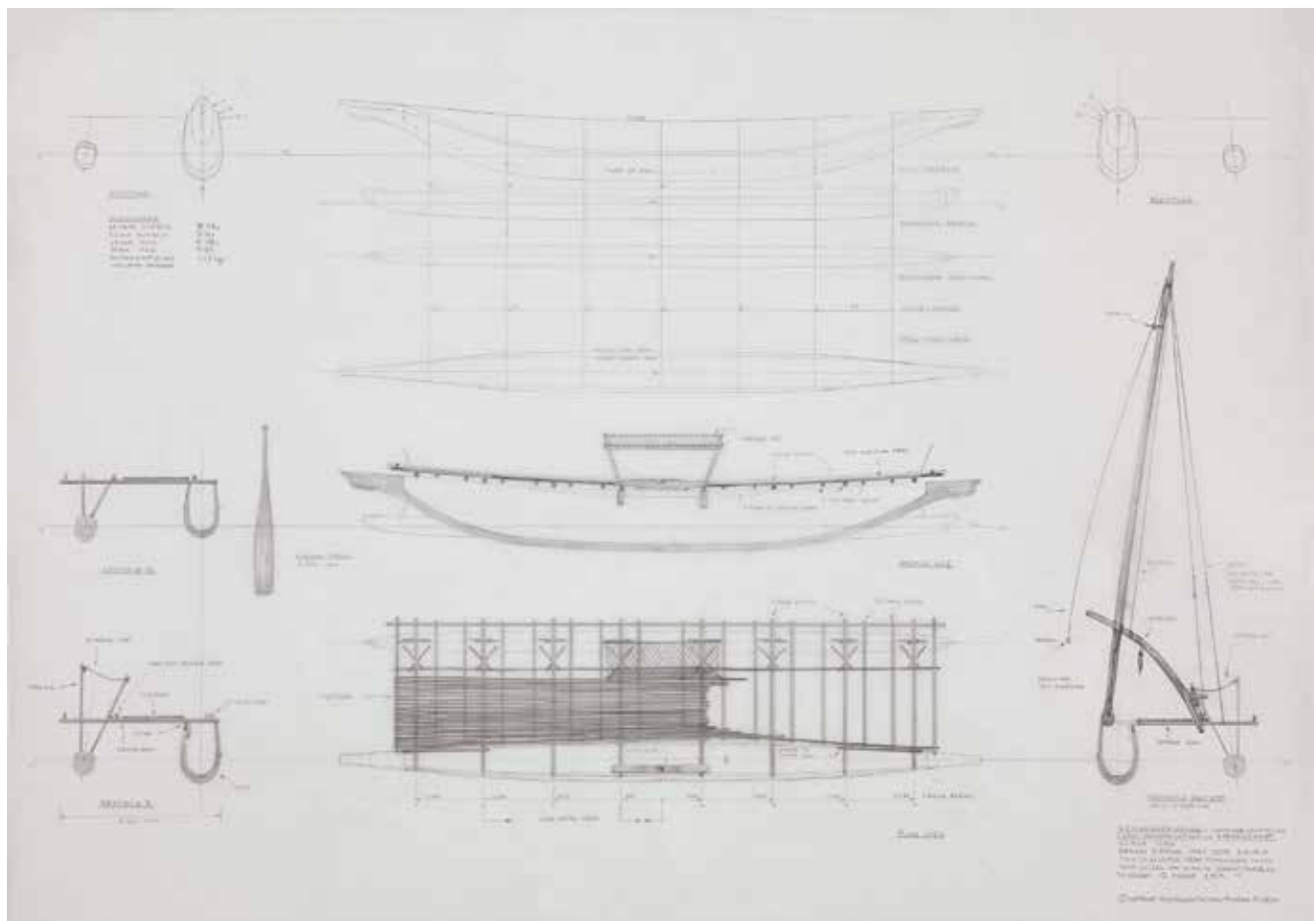
The *kemwengemwenge* is another Massim single-outrigger canoe, and a variant of the *sailau*. This variant from the southeast Louisiades has a short, dugout log hull with no planking required, built to suit their available materials, and the mast is stepped on the top edges of the hull.



Kemwengemwenge on Wanim island with Harry Beran. Photograph: David Payne.



Sailau and kemwengemwenge on Sabari island for a regatta. Photograph: David Payne.



Kemwengemwenge. *Drawing: David Payne.*

Epoi

Epoi come from the D'Entrecasteaux Islands where the surrounding waters are more sheltered. The canoes are optimized for paddling, with seats on each crossbeam. The overall width of the hull and outrigger is quite narrow and the hull itself is also narrow. Although planked up on a wider and deeper 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 is matched by a smaller sail area and on the example documented, the sprit rig was stepped at either end, favoring running with the breeze.



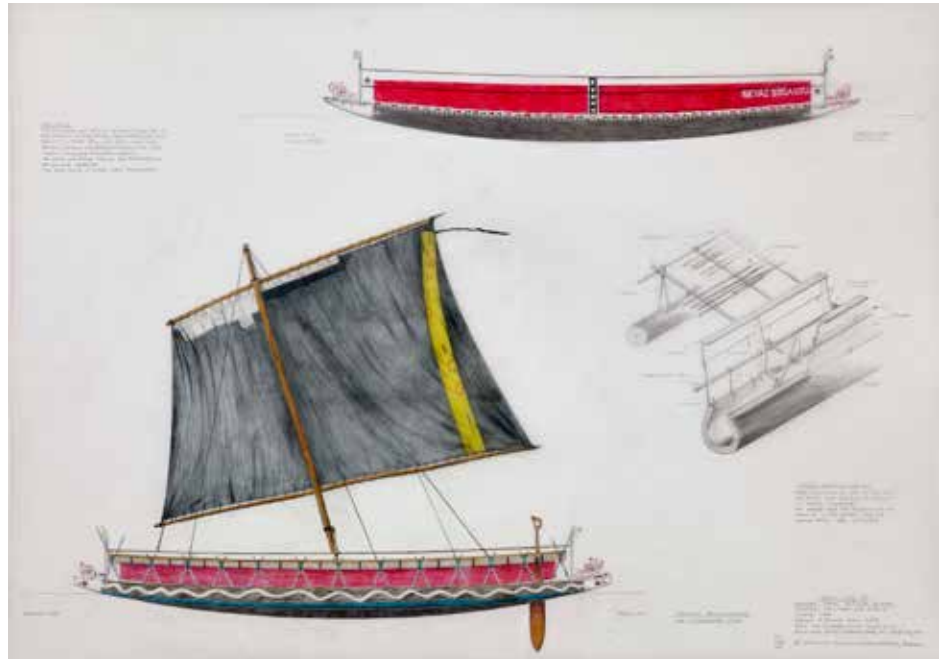
Ealamai Itana, an Epoi on Fergusson Island. Photograph: David Payne.



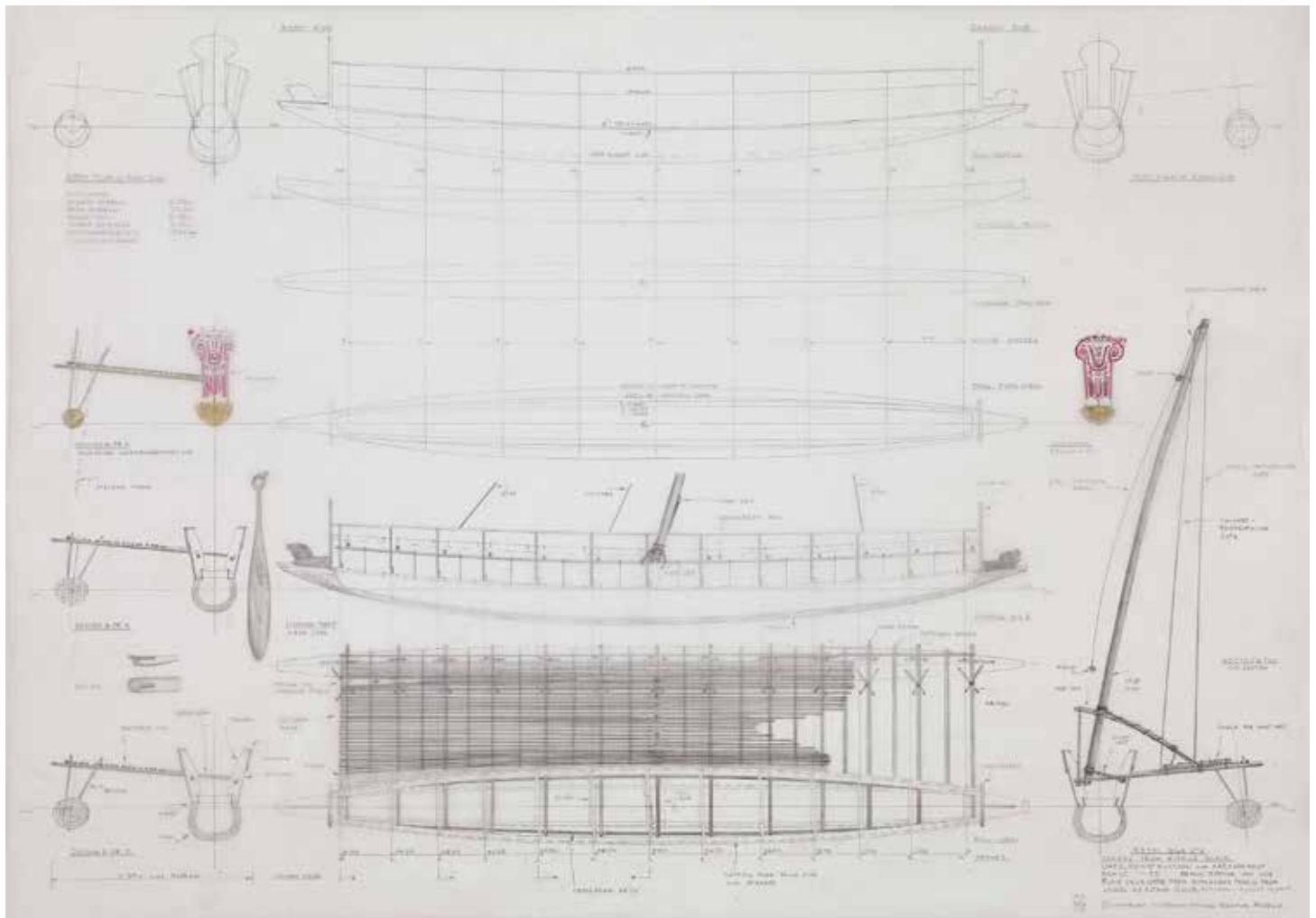
Ealamai Itana, an Epoi on Fergusson Island. Photograph: David Payne.

Tadobu

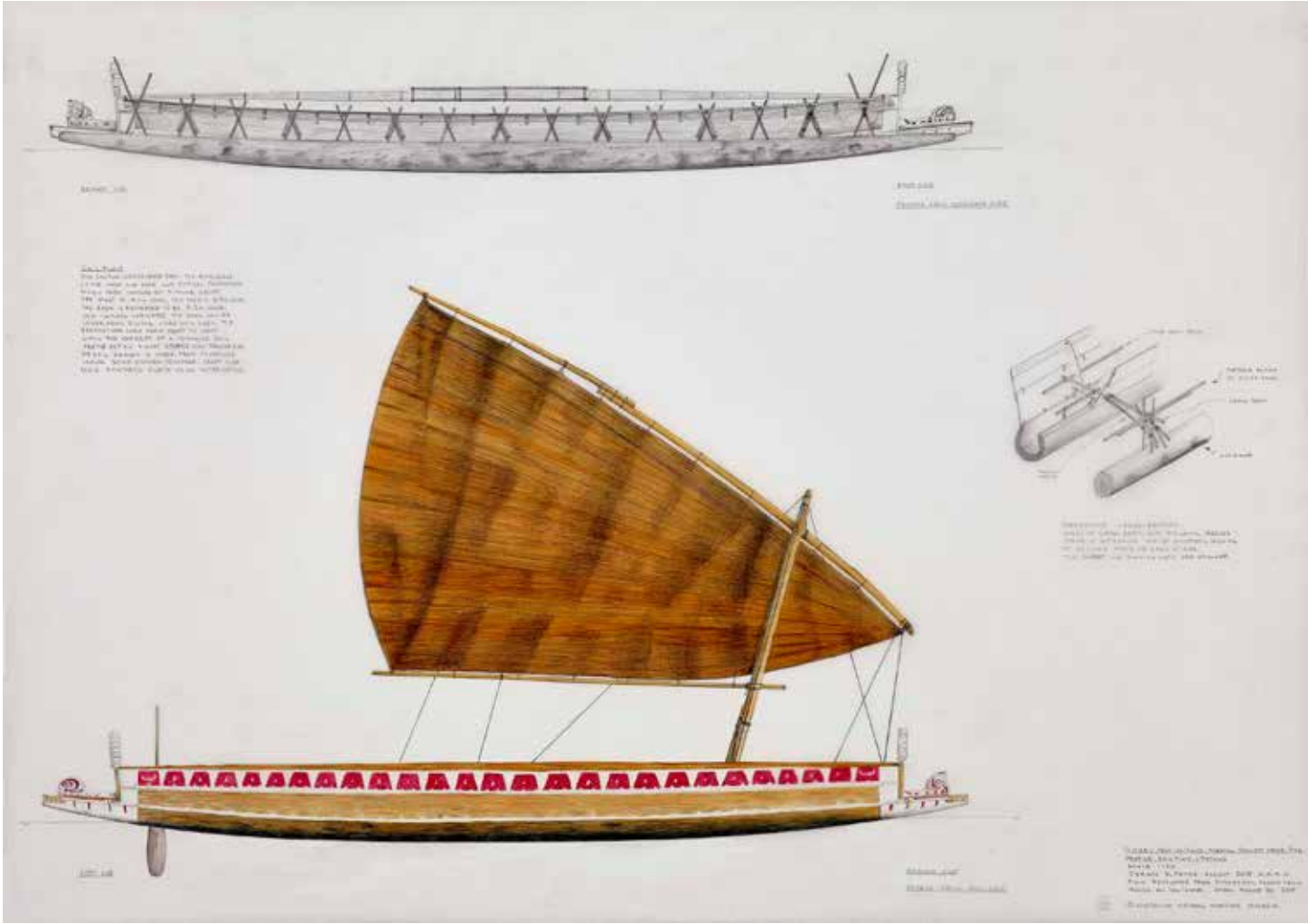
The *tadobu*, also known as the *masawa*, is similar to an *epoi*, and is well suited to the open water passages between the Trobriand Islands where they come from. To handle open water passages better, the shape has more rocker, or curve to the keel profile, than the *epoi*, and the topsides flare out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



Seyai Biga Utu, a tadobu from Iwa Island. Drawing: David Payne.



Seyai Biga Utu, a tadobu from Iwa Island. Drawing: David Payne.



A tadobu from Iwa Island. Drawing: David Payne.



Seyai Biga Utu, a tadobu on Kitava. Photograph: David Payne.



Sailing on Seyai Biga Utu, a tadobu on Kitava. Photograph: David Payne.

Nagega

The *nagega* or *anageg* 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 Woodlark Island, and a similar type of canoe was once common at 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 their long passages in open water, and allow a larger sail area than the other craft. The *nagega* has one more feature that helps its sea-going capabilities: The keel is quite narrow and the overall cross

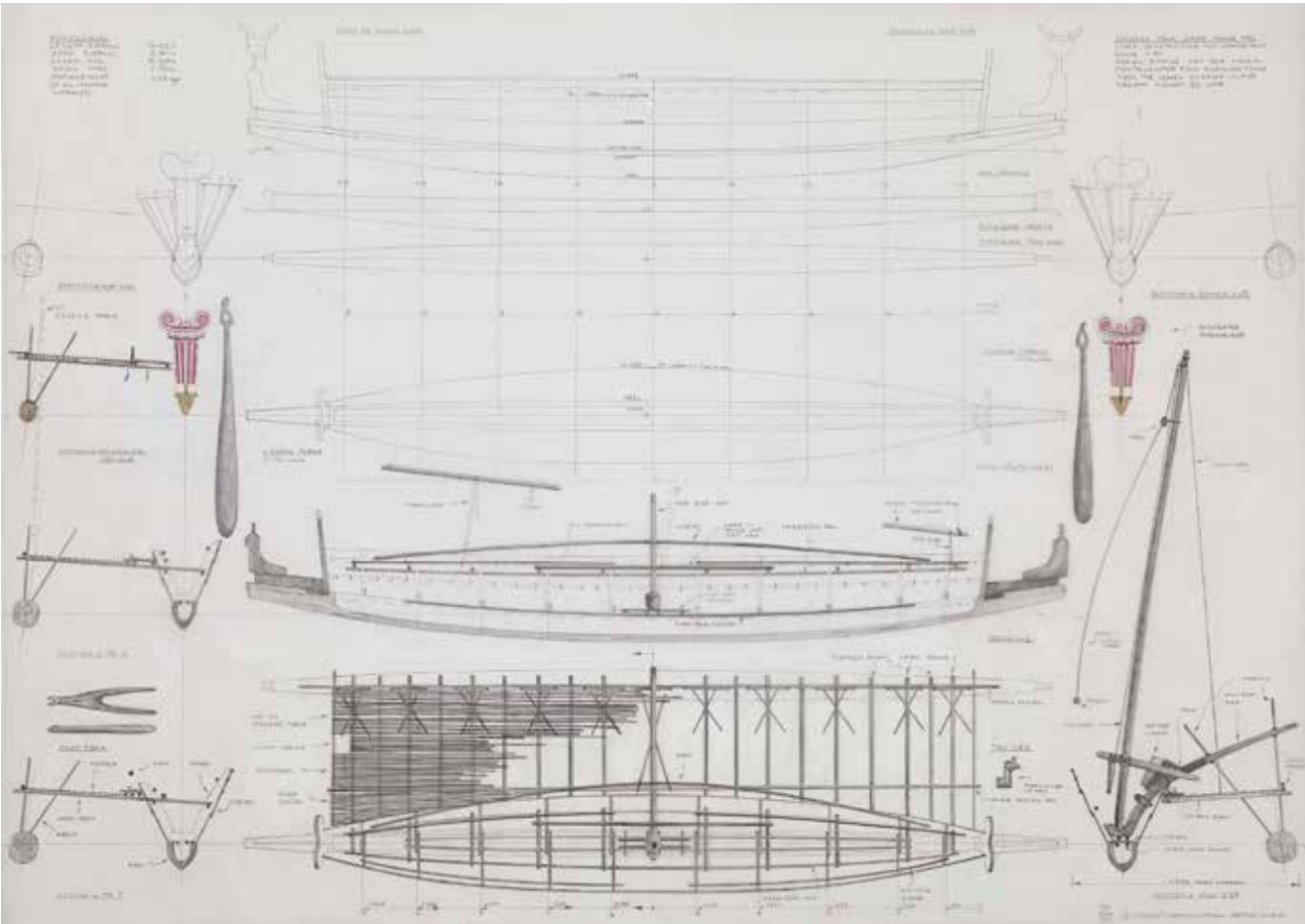
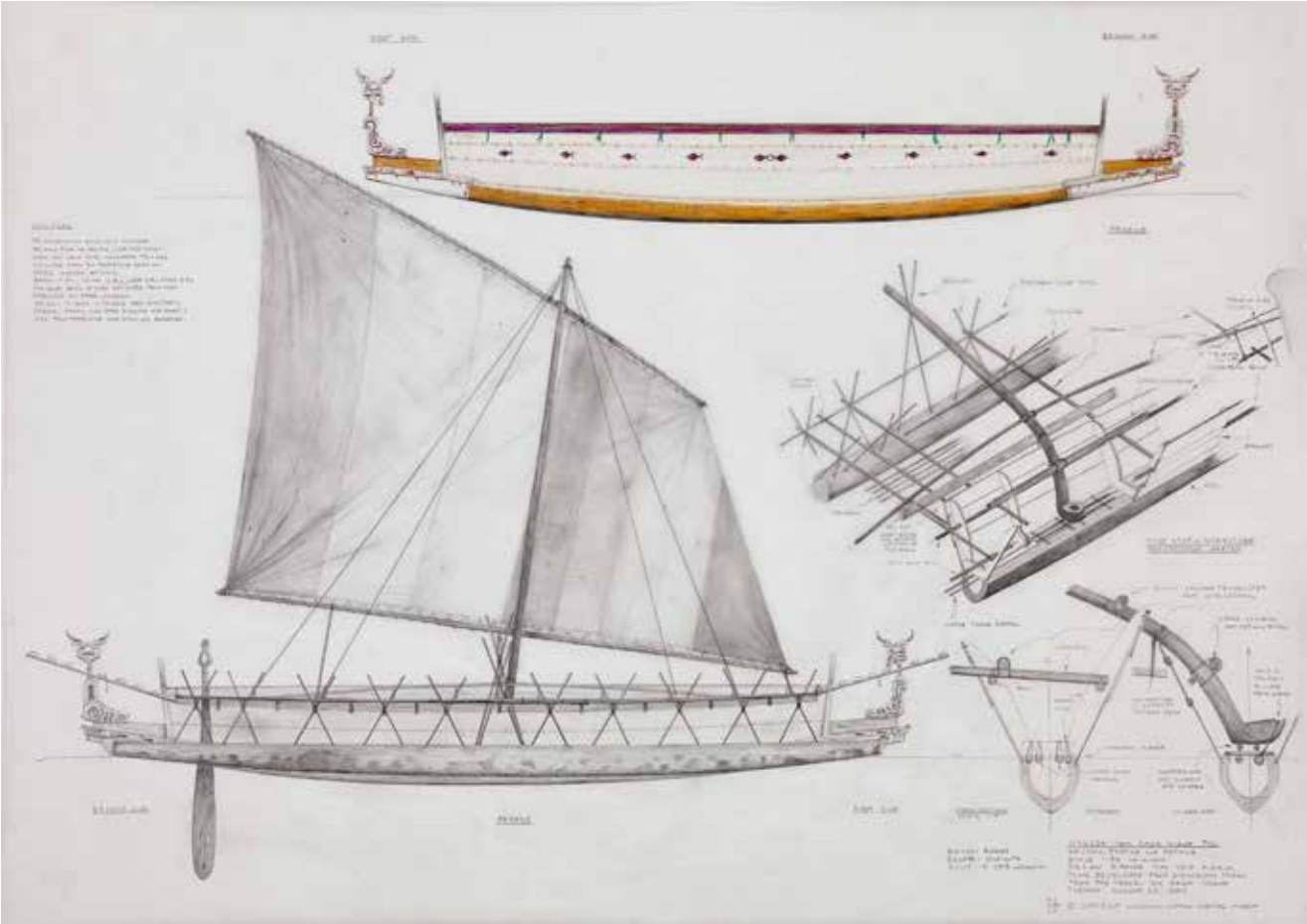
section more veed, which helps these craft gain good ground to windward. This is a necessary feature over the distances they sail between islands in changing conditions.

We saw the most significant piece of design in the *nagega*. The mast step 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.



A *nagega* at Gawa island. Photograph: David Payne.



A nagega. Drawing: David Payne.



A village canoe at Iwa Island. Photograph: David Payne



Village canoes at Nasikwabau Island. Photograph: David Payne



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 its stability and the power in the rig. Teamwork between helmsman and crew kept them on course, and the *sailau* made excellent ground to windward. They 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 and as well as feeling the power of the sail firsthand, it was also a perfect chance to understand the relationship needed between skipper and crew, and the language difference was no barrier to communication.

David Payne retired in 2020 from his role as Curator of Historic Vessels at Australian National Maritime Museum. Using his wide sailing experience, he has also been a yacht designer and documented many of the museum's vessels with extensive drawings.



David Payne measuring with some local assistance on Dawson Island. Photograph: John Greenshields.